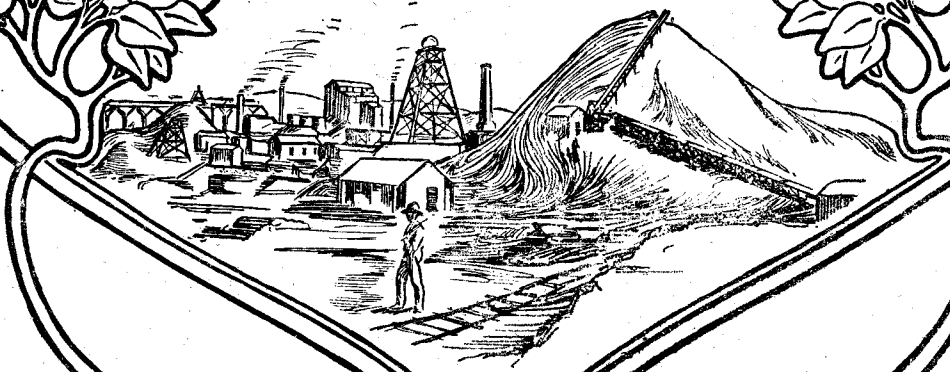




REPORT
OF THE
DEPARTMENT OF MINES
FOR THE YEAR
WESTERN · 1924 · AUSTRALIA



PRESENTED TO BOTH HOUSES OF PARLIAMENT BY HIS EXCELLENCY'S COMMAND



H.D. Higgins

1925.
—
WESTERN AUSTRALIA.

REPORT

OF THE

DEPARTMENT OF MINES

FOR THE YEAR

1924.

Presented to both Houses of Parliament by His Excellency's Command.

[SECOND SESSION OF THE TWELFTH PARLIAMENT.]

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1925.

ANNUAL REPORT OF THE DEPARTMENT OF MINES, WESTERN AUSTRALIA, 1924.

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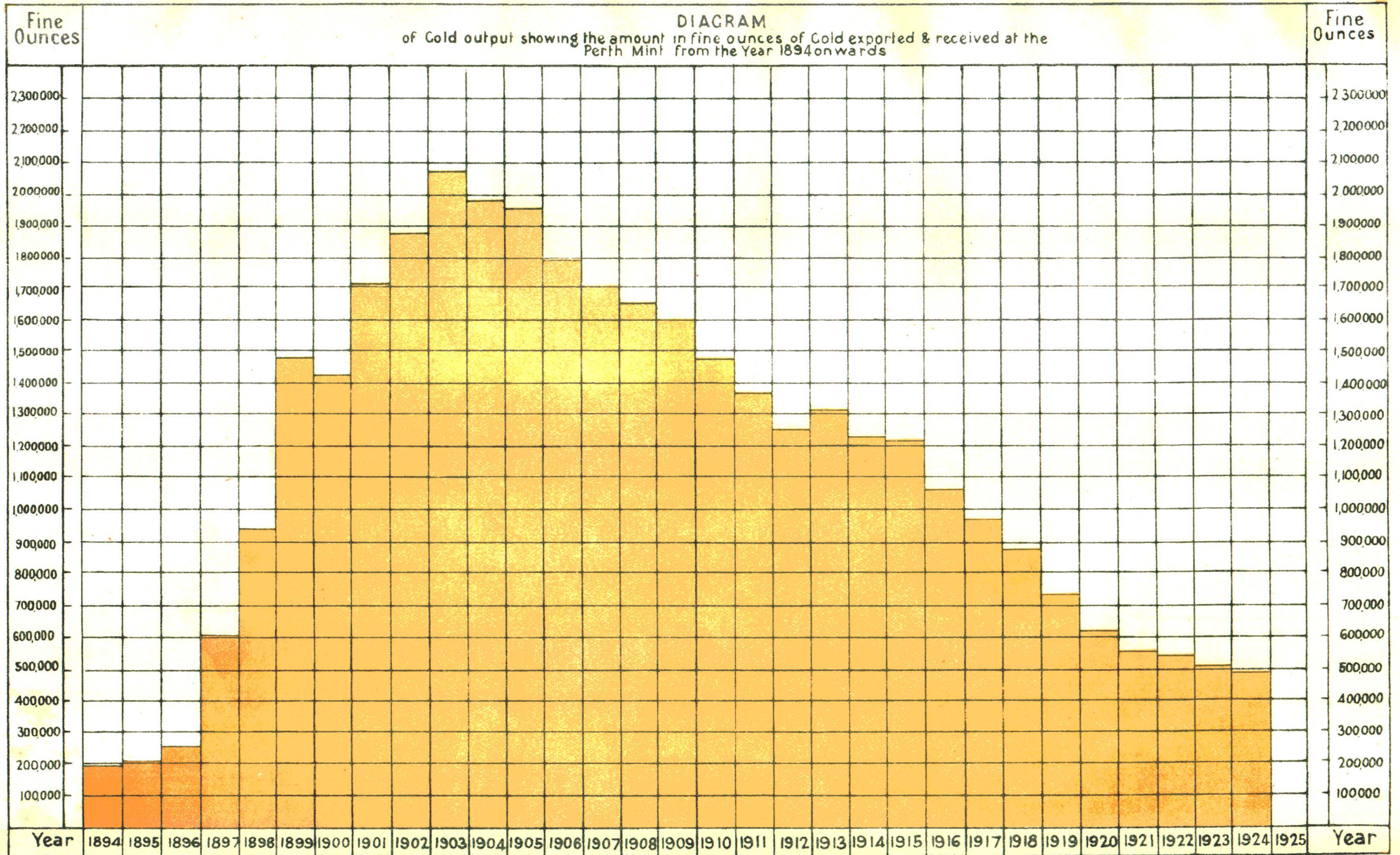
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STATE OF WESTERN AUSTRALIA.

**Report of the Department of Mines for the State of Western
Australia, for the Year 1924.**

To the Hon. the Minister for Mines.

Sir,—

I have the honour to submit the Annual Report of the Department for the year 1924, with summaries of reports from the Wardens and other officers, together with various comparative tables furnishing statistics relating to the mining industry of the State.

Reports from the officers controlling the various subdepartments are also submitted.

I have, etc.

M. J. CALANCHINI,

Under Secretary for Mines.

Department of Mines,

Perth, 31st March, 1925.

DIVISION 1.

Summary by the Under Secretary for Mines.

- PART I.—GENERAL REMARKS.
II.—MINERALS RAISED.
III.—LEASES AND OTHER HOLDINGS UNDER VARIOUS ACTS RELATING TO MINING.
IV.—MEN EMPLOYED.
V.—ACCIDENTS.
VI.—STATE AID TO MINING.
VII.—REMARKS ON THE GOLDFIELDS AND MINERAL DISTRICTS AND SUMMARIES OF WARDENS' AND OTHER OFFICERS' REPORTS.
VIII.—EXISTING LEGISLATION.
IX.—INSPECTION OF MACHINERY.
X.—SCHOOL OF MINES.

PART I.—GENERAL REMARKS.

The value of the mineral output of the State for the year 1924 was £2,581,162, being £76,788 less than that for the previous year.

Copper ore exported showed a decrease of 599 tons, and copper ingot, matte, etc., of 1,057 tons.

Coal showed an increase, but Silver and Tin decreases.

The value of the Gold yield was £2,060,298, being 79.82 per cent. of the total output.

The value of the Coal output was £363,255; Copper, £40,676; Silver, £13,409; and Tin, £12,008.

The dividends paid by mining companies amounted to £124,771, and in the preceding year £73,750; an increase of £51,021.

The total dividends paid to the end of 1924 amounted to £28,505,477. To the same date, the total mineral production was £161,912,951, and the total gold production £152,195,803.

GOLD.

The gold yield again shows a decline, being 19,476 fine ounces less than in 1923, which was 33,735 fine ounces less than in 1922.

The average value per ton of ore treated in the State as a whole has fallen from 53.28 shillings in 1923 to 49.24 shillings in 1924; and in the East Coolgardie Goldfield, which produced over 73 per cent. of the State's reported yield, it fell from 52.13 shillings to 48.47 shillings.

Comparing the tonnage of ore treated in 1923 and 1924, there was an increase of 1,991 tons in the latter year, during which 783,760 tons were treated.

There were decreases in all fields excepting Mt. Margaret, North-East Coolgardie and Yilgarn, where there were increases of 67,573, 1,901 and 4,964 tons respectively. The largest decreases were in Coolgardie, East Coolgardie, East Murchison and Murchison, viz.—14,357, 15,034, 11,376 and 17,112 tons respectively.

As previously, it has not been possible to get reliable figures as to working costs, but no general improvement has been effected.

There were increases in the outputs from Mount Margaret, Peak Hill, West Pilbara and Yilgarn, but all other fields reported decreases.

The acreage held under mining lease for all minerals is 57,011 acres, being a decrease of 3,259 acres when compared with 1923.

The area leased for gold mining is lesser by 1,830 acres, and for other minerals by 1,429 acres.

The area held under prospecting areas is 17,150 acres, including 6,062 acres for coal. This is a decrease of 12,142 acres on the area held in 1923.

The number of men engaged in all classes of mining was 6,289; a decrease of 208 on the number employed in 1923.

The number of men engaged in mining for minerals other than gold increased by 51, principally in lead mining.

In coal and copper mining there was a falling off, but in other minerals the figures were practically the same as in 1923.

In gold mining there was a decrease of 259.

The average value of gold produced per man employed on gold mines has fallen from £389.52 in 1923 to £376.77 in 1924.

The average tonnage raised per man was 153.02 tons, and in the previous year 146.21 tons.

In the East Murchison field there was a decreased output consequent on the closing down of the Daisy Queen and Waroonga Mines in the Lawlers district. In the case of the latter it is hoped that the stoppage is only temporary.

In the Black Range district mining has been very quiet.

In the Wiluna district, at Wiluna, a considerable amount of boring was carried out, with very encouraging prospects, and a shaft is to be sunk with a view to confirming the results disclosed by the drill. If satisfactory, the outlook for this centre is very promising.

Two finds reported from a locality about 60 miles N.E. from Mt. Sir Samuel give much promise.

At Cole's Find a good deal of activity was in evidence and the prospects are good.

The Murchison field had a small decrease.

The output from the Meekatharra district was smaller but indications point to an improvement.

In the Cue district there was also a decrease and mining was generally quiet. Some excitement was caused by the unearthing of very rich specimen stone on the "Monte Carlo Bank" lease adjacent to Cue. The lease has been sold to a company, but development work is not sufficiently advanced to enable any opinion to be expressed as to the permanency of the property.

At Reidy's the Mararoa Company has acquired a promising mine and is carrying out vigorous development. In the Day Dawn district work was practically confined to the old Fingall mine and there was a small decrease.

In the Mt. Magnet district there was an increase and several leases had satisfactory crushings, but no noteworthy development was reported.

The Mount Margaret field had an increase of nearly 17,000 ounces. In the Mt. Margaret district there was an improvement as a result of the treatment of accumulated sands on the Lancefield mine. In the various centres prospecting was active but nothing reported.

In the Mt. Morgans district there was a small decrease.

The principal producer was the Westralia Mt. Morgans mine, and in the outlying districts a few mines were working.

In the Mt. Malcolm district there was an increase consequent on the improved output from the Sons of Gwalia mine, which is now operating successfully and is expected to maintain a good production for many years. Elsewhere in the district little is being done.

The Coolgardie field recorded a decrease.

In the Kununalling district the output was practically the same as in the preceding year and several mines were steady producers.

In the Gibraltar district tributaries were working the Lloyd George mine, and this position is likely to continue unless further capital can be raised for development. Efforts to attain this end are being made.

At Widgiemooltha a little prospecting was being carried on.

At St. Ives operations have been retarded on account of the absence of an adequate water supply but several mines were producing. The Ives Reward mine is expected to maintain a steady output.

The North Coolgardie field had a decrease, practically wholly attributable to a reduced output from the Menzies Consolidated mine at Yunndaga in the Menzies district.

At Comet Vale work was resumed on the Gladstone and Sand Queen mines which were acquired by the Bullfinch Proprietary (1919) Ltd., but unwatering had not been completed by the end of the year.

At Mt. Ida there was no change. In the Ularring, Niagara and Yerilla districts there was no improvement.

The North-East Coolgardie goldfield had a small decrease but there was little change and no developments of any note.

The Broad Arrow field also had a small decrease. Prospecting generally was retarded on account of the prevailing drought.

At Ora Banda the outlook is promising.

In the East Coolgardie goldfield the number of men engaged in mining was 2,883, and in 1923, 2,902; a decrease of 109. This goldfield gave employment to 54 per cent. of the number of men engaged in gold mining, and the reported production during the year was 336,099 fine ounces, over 73 per cent. of the total reported yield. The tonnage treated was 588,263 tons, being 15,034 tons less than in 1923. The yield showed a decrease of 34,571

fine ounces, due to the closing down of the Ivanhoe mine, the assets of which were taken over by the Lake View and Star Ltd. This amalgamation is expected to eventually have considerable advantages.

The average grade of the ore per ton fell from 52.13 shillings in 1923 to 48.47 shillings in 1924.

In the Yilgarn field there was a small increase. At Southern Cross work on the Old Fraser's Central mine was given over to tributaries, results not having come up to expectations.

At Burbidge the Great Victoria Mine is fulfilling expectations and work is proceeding satisfactorily.

At Manxman the Radio Mine was producing and developing well, and this locality attracted a good deal of attention. In the various other centres a good deal of prospecting was going on.

In the Dundas goldfield there was a decrease. There was little change, but prospecting was adversely affected by the prevailing drought.

The Phillips River field had a smaller output and gold mining was practically at a standstill. This also applies to its copper mining, and copper is its principal product. However, an improvement is looked for when the flotation plant now being erected by a local company is operating. This is expected to eventuate in a few months.

In the Northern goldfields, Kimberley, West Kimberley, West Pilbara, Ashburton, and Gascoyne, there was not any improvement. In the Pilbara field there was a small decrease. The principal production was from Marble Bar, Lalla Rookh, Bamboo Creek, Dalton and Eastern Creek, and the fall in output is attributable to the closing down of the Lalla Rookh and McLeod's Reward mines.

TIN.

The quantity of tin exported was 87 tons, valued at £12,008, a decrease in tonnage of 44 tons, and in value of £3,087. The Greenbushes Tinfield produced 52.56 tons, valued at £7,469; an increase in tonnage of 24.54 tons, and in value of £4,445; the Pilbara field 28.55 tons, valued at £4,048; an increase in tonnage of 4.15 tons, and in value of £1,088.

None was produced in any other field.

TANTALITE.

None of this mineral was exported or reported. In the previous year 5 tons, valued at £688, were exported.

COPPER.

The value of the copper exported was £40,676, being £24,424 less than in 1923. The ore raised in the West Pilbara field was 79 tons, valued at £1,012; a decrease on the preceding year in tonnage of 142 tons, and in value of £2,488.

The Whim Well mine was practically the only producer.

In the Northampton field the production was 10,672 tons, valued at £34,955, an increase on the preceding year in tonnage of 1,045.71 tons, and decrease in value of £24,188.

In the Phillips River field the output was 3.69 tons, valued at £44; a decrease on the preceding year in tonnage of 22.32 tons, and in value of £497. There was very little mining done on this field.

The number of men engaged in copper mining was 110, and in 1923, 80.

COMPARATIVE STATISTICAL DIAGRAMS

RELATING TO

OUTPUT AND VALUE OF GOLD AND OTHER MINERALS, LANDS LEASED FOR GOLD MINING IN WESTERN AUSTRALIA

AND THE GOLD PRODUCTION OF AUSTRALASIA FOR THE YEAR 1924

FIG. 1. Output of Gold from various Goldfields as reported to Mines Dept.

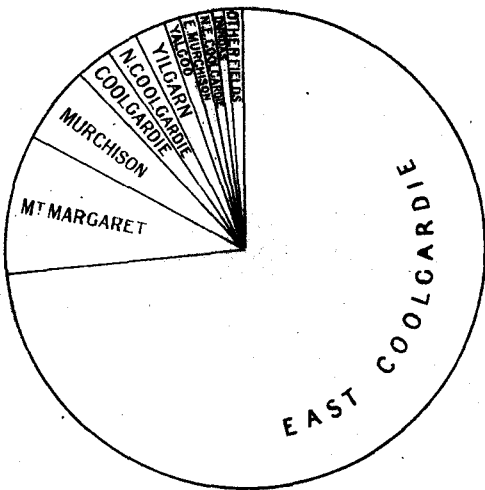


FIG. 2. Gold produced from various Goldfields as given by the Export and Mint Returns.

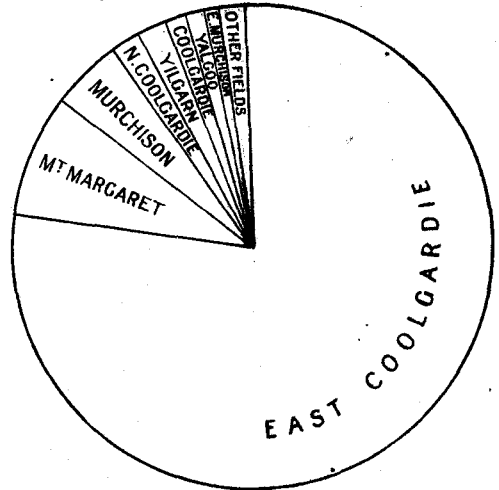


FIG. 3. Value of Gold and other Minerals.

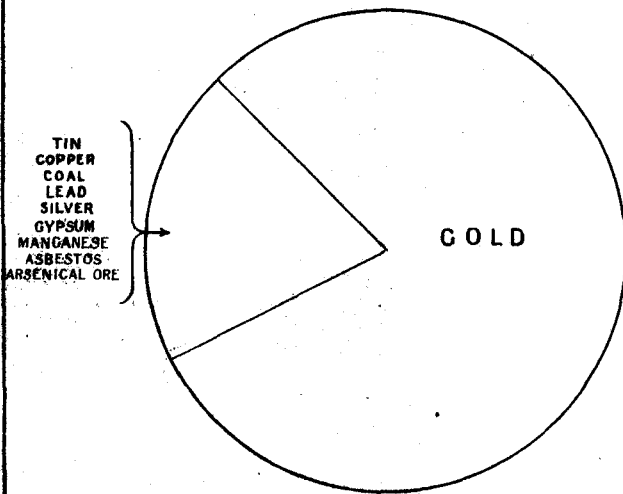


FIG. 4. Value of Minerals other than Gold.

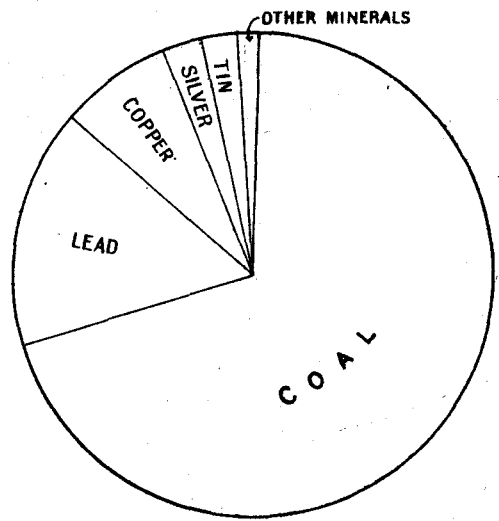


FIG. 5. Areas of Land leased for Goldmining on various Goldfields.

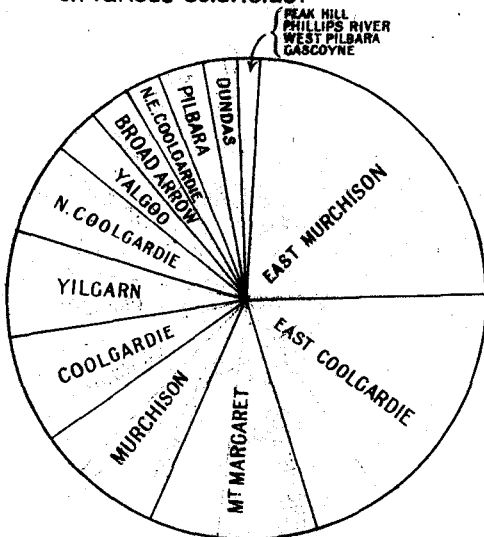
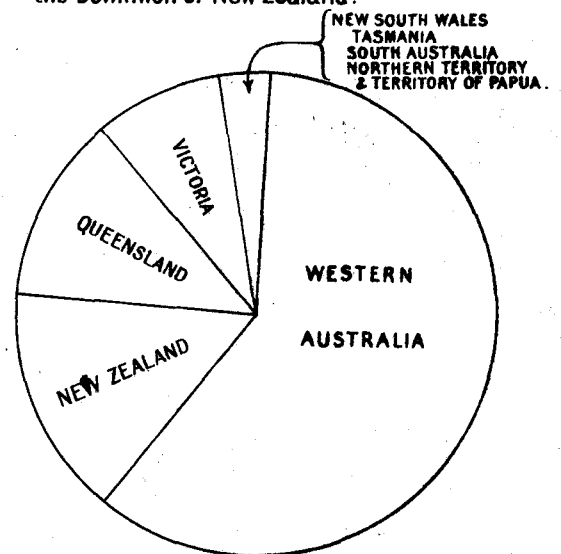
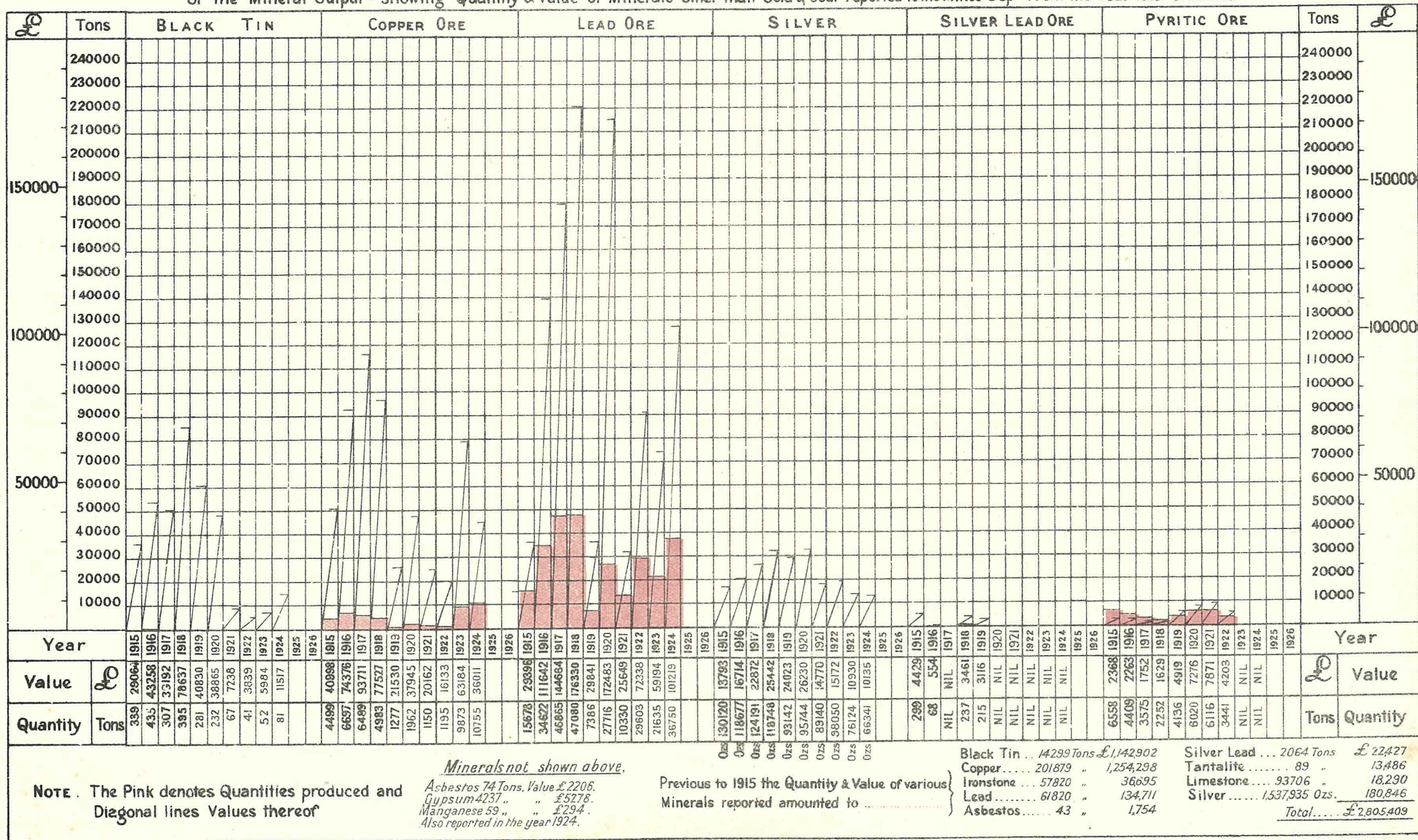


FIG. 6. Output of Gold in the States of Australia and the Dominion of New Zealand.



DIAGRAM

of the Mineral Output - showing Quantity & Value of Minerals other than Gold & Coal reported to the Mines Dept from the Year 1915 onwards



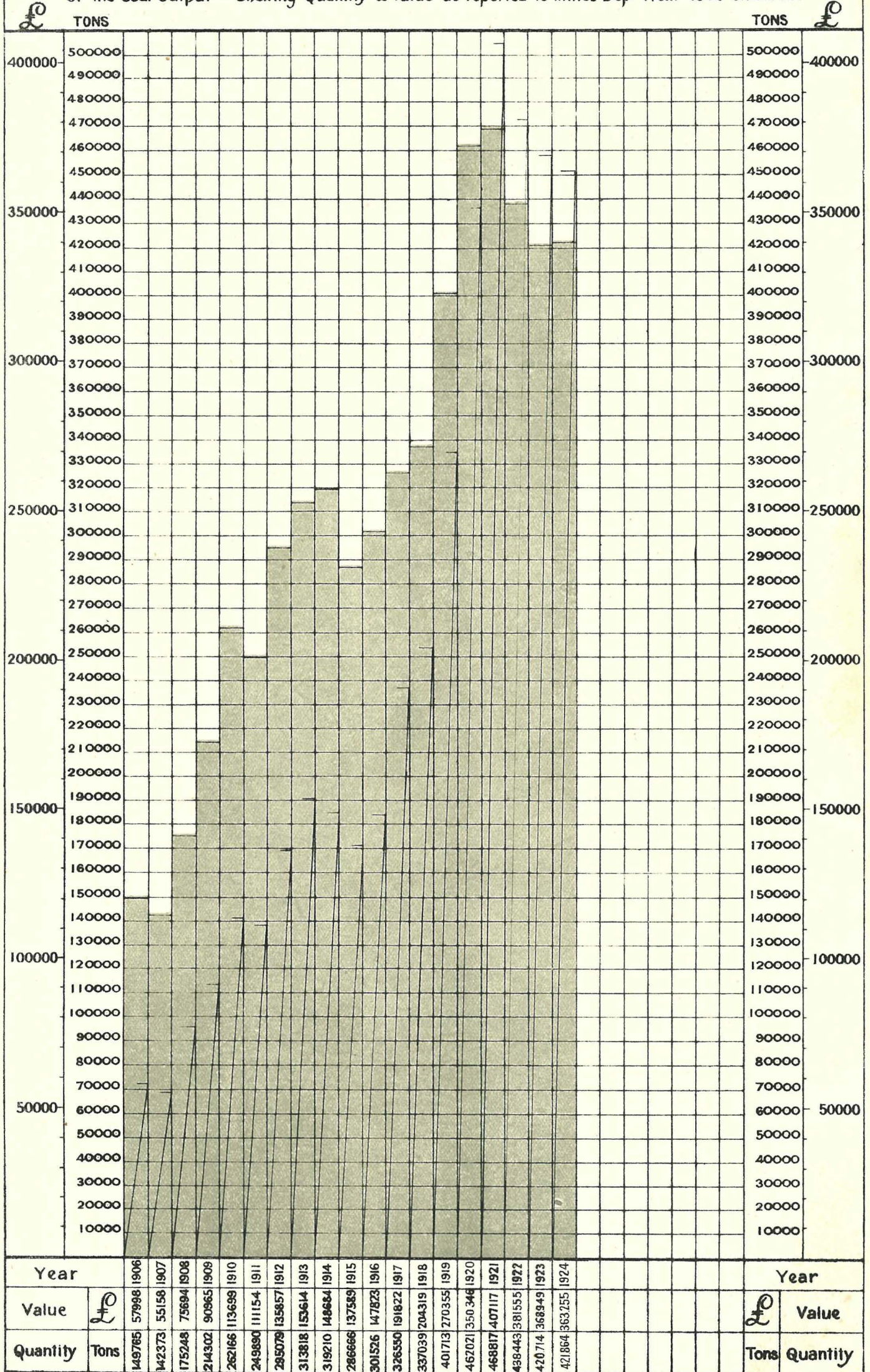
NOTE. The Pink denotes Quantities produced and Diagonal lines Values thereof

Minerals not shown above.
 Asbestos 74-Tons, Value £2206.
 Gypsum 4237 " " £5278.
 Manganese 59 " " £294.
 Also reported in the year 1924.

Previous to 1915 the Quantity & Value of various Minerals reported amounted to

D I A G R A M

Of the Coal Output - Shewing Quantity & Value as reported to Mines Dept from 1906 onwards.



COAL.

The output of coal was 421,864 tons, being 1,150 tons more than in 1923. There were five (5) collieries producing, all situated at Collie. Nothing was done in the matter of opening up collieries on the seams known to exist at Wilga.

At Irwin River further exploratory work is being carried out.

The number of men employed, 673, is less by 40 than in 1923, and the output per man was, in 1923, 590 tons, and in 1924, 627 tons.

OIL.

Boring operations are still in progress on the area known as "Freney's," in the North of the State, and encouraging indications have been encountered. Consequent on an adverse report by an oil geologist employed by the Commonwealth Government, boring was discontinued on the area known as "Okes-Durack." No boring is in progress on any other areas, but efforts are being made by some holders to raise capital for this purpose.

ASBESTOS.

In the Pilbara field 73.58 tons, valued at £2,206, were produced; a decrease on the preceding year in tonnage of 40.42 tons, and in value of £1,809.

Several of the deposits on this field are regarded as very valuable and their development is being encouraged by the Government. No production was reported from any other field.

OTHER MINERALS.

The quantity of silver obtained as a by-product and exported was 89,146 ounces, valued at £13,409, and in the preceding year 109,005 ounces, valued at £16,036; a decrease of 19,859 ounces and £2,627.

Arsenical ore, valued at £777, was exported, also 4,854 tons of lead and silver lead, valued at £83,095, an increase in tonnage of 1,682 tons and in value of £39,679, and 20 tons of manganese, valued at £160, also 4,237 tons of gypsum, valued at £5,278 were reported.

MINING GENERALLY.

The States of Queensland and Tasmania had increases of 10,155 and 942 fine ounces respectively, but New South Wales, Victoria, and South Australia recorded decreases. The Territory of Papua had an increase of 1,588 fine ounces, but the Northern Terri-

tory a decrease. New Zealand also reported a decrease.

The Western Australian production was 60.40 per cent. of the total for Australasia, and in the preceding year 58.05 per cent.

Very considerable relief as regards taxation has been afforded the mining industry by both the Federal and State Governments, and it is reasonable to hope that this will be reflected in an improvement in the near future. Strenuous efforts are being made to obtain some relief in regard to the high tariff on many mining requisites. A proposal for reduction in railway freights is also under consideration.

With a desire for a thorough investigation into the mining industry to ascertain how best to assist in placing it on a more satisfactory footing, the Government has secured the services of an eminent mining engineer with considerable South African experience and appointed him a Royal Commissioner for this purpose. He will commence his investigations early in the New Year.

In mining for base metals, the low prices ruling for many of them have prevented any advance. The assistance to prospectors by way of sustenance, loans of equipment and transport facilities, was continued, and the Board controlling recommended the granting of assistance to 145 parties, comprising 219 men, and 106 extensions to existing parties, at a total cost of £4,914 6s. 2d., and all were approved by the Hon. the Minister.

During the year a State prospecting party, consisting of a leader and two men, was sent out. This party examined a belt of country from Wyndham to Turkey Creek. They were not successful in finding any mineral deposits in payable quantities. The expenditure on State parties for the year was £808 18s. 10d. The severity of the drought which prevailed in nearly all the goldfields prevented prospecting in any locality removed from permanent water supplies, and natural horse feed was mostly entirely absent.

The area under prospecting areas for gold and minerals other than coal, viz., 11,088 acres, although less than in 1923 by 7,484 acres, indicates that a fair amount of prospecting is going on.

As hitherto, a considerable amount of financial assistance was rendered to mine owners under the provisions of the Mining Development Act, full particulars of which will be found in the report of the State Mining Engineer, Division II., of this report. Any application that had a likelihood of success was invariably granted.

PART II.—MINERALS RAISED.

TABLE 1.

Quantity and Value of all the Minerals produced during 1923 and 1924.

Description of Minerals.	1923.		1924.		Increase or Decrease for Year compared with 1923.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value
1. Arsenical ore (exported), statute tons	*	£ 686	*	£ 777	— ...	+ 91
2. Asbestos (reported), statute tons	115	4,032	74	2,206	— 41	— 1,826
3. Clay (exported), statute tons	34	94	...	...	— 34	— 94
4. Coal (raised), statute tons	420,714	368,949	421,864	363,255	+ 1,150	— 5,694
5. Copper { Ore (exported), statute tons	3,394	48,907	2,795	40,676	— 599	— 8,231
{ Ingot, Matte, etc. (exported), statute tons	1,057	16,193	...	...	— 1,057	— 16,193
6. Gold (exported and minted), fine ounces	504,511	2,143,028	485,035	2,060,298	— 19,476	— 82,730
7. Gypsum (reported), statute tons ... ..	...	...	4,237	5,278	+ 4,237	+ 5,278
8. Iron Ore (exported) statute tons	2	9	...	...	— 2	— 9
9. Lead and Silver Lead (exported), statute tons	3,172	43,416	4,854	83,095	+ 1,682	+ 39,679
10. Lead, Pig (exported), statute tons	20	609	...	...	— 20	— 609
11. Magnesite, statute tons	2	8	...	...	— 2	— 8
12. Manganese (exported), statute tons	22	200	20	160	— 2	— 40
13. Silver (exported), fine ounces	109,005	16,036	89,146	13,409	— 19,859	— 2,627
14. Tantalite, (exported) statute tons	5	688	...	...	— 5	+ 688
15. Tin (exported), statute tons	131	15,095	87	12,008	— 44	— 3,087
Total Values ... ..	...	2,657,950	...	2,581,162	...	— 76,788

* Contained in Gold ore.

TABLE 2.

*Value and Percentage of Mineral Exports in relation to the Value
of Total Exports from Western Australia.*

Year.	Total Exports.	Mineral Exports (exclusive of Coal).	Percentage.
1901	8,515,623	6,920,118	81.27
1902	9,051,358	7,530,319	83.20
1903	10,324,732	8,727,060	84.53
1904	10,271,489	8,625,676	83.98
1905	9,871,019	7,731,954	78.33
1906	9,832,679	7,570,305	76.99
1907	9,904,860	7,544,992	76.17
1908	9,518,020	7,151,317	75.13
1909	8,860,494	5,906,673	66.66
1910	8,299,781	4,795,654	57.78
1911	10,606,863	7,171,638	67.61
1912	8,941,008	5,462,499	61.09
1913	9,128,607	4,608,188	50.48
1914	8,406,182	3,970,182	47.23
1915	6,291,934	2,969,502	47.19
1916	10,878,153	6,842,621	62.92
1917	9,323,229	5,022,694	53.87
1918	6,931,834	2,102,923	30.34
1919	14,279,240	6,236,585	43.67
1920	15,149,323	3,096,849	20.44
1921	10,331,405	1,373,810	13.30
1922	11,848,025	2,875,402	24.27
1923	11,999,500	3,259,476	27.16
1924	13,808,910	1,424,319	13.24
Total since 1900	242,374,268	128,920,756	53.19

TABLE 3.

Showing for every Goldfield the amount of Gold reported to the Mines Department as required by the Regulations; also the percentage for the several Goldfields of the total reported and the average value of the Gold per ton of ore treated.

Goldfield.	Reported Yield.					
	1923.	1924.	Percentage for each Goldfield.		Average Value of Gold per ton of Ore treated.	
			1923.	1924.	1923.	1924.
	fine ozs.	fine ozs.			shillings	shillings.
1. Kimberley	31	13	.01	.01	...	...
2. West Kimberley ... ..	...	...	...	...	...	...
3. Pilbara	2,544	2,134	.51	.46	106.23	92.54
4. West Pilbara	64	76	.01	.02	84.80	163.00
5. Ashburton	9	3	.01	.01	...	...
6. Gascoyne ... ..	...	3	...	.01	...	...
7. Peak Hill	1,700	2,113	.34	.46	32.73	126.53
8. East Murchison	11,016	4,897	2.22	1.07	53.05	87.98
9. Murchison	27,037	24,425	5.46	5.33	38.31	50.07
10. Yalgoo	7,713	5,611	1.56	1.22	59.68	100.42
11. Mt. Margaret	26,876	43,705	5.42	9.54	84.91	39.27
12. North Coolgardie	12,213	9,509	2.46	2.07	53.72	54.75
13. Broad Arrow	2,741	2,661	.55	.58	99.49	154.25
14. North-East Coolgardie	4,714	4,691	.95	1.02	64.21	50.10
15. East Coolgardie	370,670	336,099	74.78	73.35	52.13	48.47
16. Coolgardie	13,077	10,243	2.64	2.23	44.75	90.81
17. Yilgarn	8,376	8,451	1.69	1.84	91.71	56.39
18. Dundas	6,358	3,429	1.28	.75	132.41	100.98
19. Phillips River	375	145	.08	.03	136.58	82.67
State generally	158	...	.03	...	...	...
Totals and averages	495,672	458,208	100.00	100.00	53.28	49.24

The total gold yield of the State is as shown in Table 1, being the amount of gold exported, and also that lodged at the Royal Mint, which total includes alluvial gold and gold not reported to the Department.

When comparisons are made as to the yield from any particular field with the preceding year, the figures reported to the Department are used.

TABLE 4.

Number of Gold-producing Mines in the several Goldfields and Districts during 1923 and 1924.

Goldfield.	District.	1923.		1924.		Increase or Decrease.
		District.	Goldfield.	District.	Goldfield.	
Kimberley ... ..	...	...	...	...	...	...
West Kimberley ... ..	...	...	...	...	...	...
Pilbara	Marble Bar	12	14	14	15	+ 1
	Nullagine	2	...	1	1	+ 1
West Pilbara ... ..	...	...	...	...	...	...
Ashburton ... ..	...	...	...	...	...	...
Gascoyne ... ..	...	...	...	...	...	...
Peak Hill ... ..	...	...	5	...	6	+ 1
East Murchison	Lawlers	4	...	6	...	...
	Wiluna	7	21	8	19	- 2
	Black Range	10	...	5	...	...
	Cue	10	...	4	...	...
Murchison	Meekatharra	14	44	11	31	- 13
	Day Dawn	6	...	7	...	...
	Mt. Magnet	14	...	9	...	...
Yalgoo ... ..	...	...	18	...	9	- 9
Mt. Margaret	Mt. Morgans	7	...	5	...	...
	Mt. Malcolm	11	24	7	14	- 10
	Mt. Margaret	6	...	2	...	...
	Menzies	7	...	7	...	...
North Coolgardie	Ularring	...	13	1	12	- 1
	Niagara	3	...	1	...	...
	Yerilla	3	...	3	...	...
Broad Arrow ... ..	...	...	13	...	10	- 3
North-East Coolgardie	Kanowna	10	11	7	8	- 3
	Kurnalpi	1	...	1	...	...
East Coolgardie	East Coolgardie	44	48	49	53	+ 5
	Bulong	4	...	4	...	...
Coolgardie	Coolgardie	22	30	22	31	+ 1
	Kunanalling	8	...	9	...	...
Yilgarn ... ..	...	...	24	...	23	- 1
Dundas ... ..	...	...	12	...	9	- 3
Phillips River ... ..	...	...	3	...	1	- 2
State generally ... ..	...	...	1	...	...	- 1
Totals ... ..	...	...	281	...	242	- 39

TABLE 5.

Gold Yield from Registered Gold Mining Companies and Gold Mining Leases for the Years 1921, 1922, 1923, and 1924.

Goldfield.	REGISTERED COMPANIES PRODUCING OVER 12,000 OZS.								REGISTERED COMPANIES PRODUCING UNDER 12,000 OZS.								LEASES, EXCLUSIVE OF SUNDRY CLAIMS AND TREATMENT.								
	1921.		1922.		1923.		1924.		1921.		1922.		1923.		1924.		1921.		1922.		1923.		1924.		
	No.	Fine ozs.	No.	Fine ozs.	No.	Fine ozs.	No.	Fine ozs.	No.	Fine ozs.	No.	Fine ozs.	No.	Fine ozs.	No.	Fine ozs.	No.	Fine ozs.	No.	Fine ozs.	No.	Fine ozs.	No.	Fine ozs.	
Kimberley	
West Kimberley	
Pilbara	11	1,902	14	2,229	14	1,602	15	1,532	
West Pilbara	1	15	1	25	...	...	...	...	...	...	...
Ashburton	
Gascoyne	
Peak Hill	8	735	7	1,740	5	558	6	938	
East Murchison	6	13,462	5	6,483	6	6,494	5	1,237	19	3,264	17	2,599	15	1,356	14	1,295	
Murchison	2	5,193	2	1,917	3	425	3	324	31	32,059	41	29,423	41	23,436	28	19,674	
Yalgoo	1	1,214	2	3,980	3	5,265	2	4,368	9	914	14	12,040	15	1,446	7	847	
Mt. Margaret	1	14,890	1	18,533	1	35,371	5	13,443	4	1,999	3	4,037	2	5,214	26	5,705	24	7,863	20	2,636	11	2,373	
N. Coolgardie	3	7,502	2	10,318	2	8,038	1	5,981	17	1,690	17	1,215	11	2,036	11	1,364	
Broad Arrow	2	6,048	1	92	1	55	...	...	11	1,373	9	2,451	12	1,574	10	1,691	
N.E. Coolgardie	2	44	2	1,655	2	2,740	2	2,401	14	3,584	10	1,917	9	1,416	6	2,059	
E. Coolgardie	8	337,097	8	343,664	8	334,664	9	306,476	14	19,839	12	13,148	10	14,000	10	12,967	38	15,465	39	11,334	30	13,614	34	11,083
Coolgardie	1	2,897	3	6,886	2	2,694	36	6,665	37	10,068	27	4,274	29	3,764	
Yilgarn	11	15,518	9	8,239	6	2,477	6	3,163	18	2,531	29	2,830	18	4,328	17	4,496	
Dundas	2	1,425	1	4,150	1	3,789	1	2,014	15	1,786	11	2,119	11	1,311	8	1,178	
Phillips River	1	30	1	12	1	9	...	...	5	770	4	587	2	317	1	96	
State generally	1	7,929	1	32	...	...	...	...	...	...	...	...	...	...
Total	8	337,097	9	358,554	9	353,197	10	341,847	49	83,768	43	62,819	42	54,247	35	40,378	259	78,468	273	88,415	230	60,404	197	52,393	

TABLE 6.

Increase or Decrease in Output of certain producing Gold Mines in 1924 as compared with 1923.

Goldfield.	District.	Name of Mine.	Gold Production.		Increase or Decrease for Year compared with 1923.		
			1923.	1924.			
Pilbara ...	Marble Bar ...	1. Haig	Fine ozs. 171·55	Fine ozs. 291·37	+ 119·82		
		2. Homeward Bound East	225·27	70·40	— 154·87		
		3. Kitchener	581·20	389·00	— 192·20		
Peak Hill ...	... ..	4. Evening Star	169·06	286·48	+ 117·42	
		5. No. 1 North leases	296·27	420·75	+ 124·48		
East Murchison	Lawlers ...	6. Queen : Daisy Queen G.M. Co., N.L.	828·29	35·84	— 792·45		
		7. Waroonga G.M. Co., Ltd.	1,540·17	949·27	— 590·90		
Murchison ...	Wiluna ...	8. Yellow Aster leases	182·72	506·89	+ 324·17		
		9. Moonlight leases	191·90	36·84	— 155·06		
	10. Western Machinery Co., Ltd.	1,761·59	101·93	— 1,659·66			
	11. Wiluna Gold Mines, Ltd.	1,199·51	65·33	— 1,134·18			
	12. Oroya East	357·24	85·09	— 272·15			
	13. Big Bell	2,431·95	11·82	— 2,420·13			
	14. Monte Carlo Bank ... ..	...	1,095·88	+ 1,095·88		
	15. Fenian leases	3,512·17	22·39	— 3,489·78			
	16. Ingliston Consols Extended leases	13,060·56	15,676·25	+ 2,615·69			
	17. Ingliston	264·67	353·35	+ 88·68			
Murchison ...	Black Range ...	18. Marmont	136·62	214·08	+ 77·46		
		19. Great Fingall Consolidated, Ltd.	151·93	99·31	— 52·62		
	Cue ...	20. Galtee Moore	246·19	16·01	— 230·18		
		21. Moyagee	164·43	6·24	— 158·19		
	Meekatharra ...	22. Neptune ... ..	...	193·68	+ 193·68	
		23. Carnation	29·45	136·75	+ 107·30		
	Yalgoo	24. Gnow's Nest Gold Mine, Ltd.	2,707·59	199·14	— 2,508·45	
			25. Lake View : Payne's Find Development Co., N.L.	348·42	355·93	+ 7·51	
		Mt. Margaret ...	Mt. Morgans ...	26. Sweet William	491·56	+ 491·56
				27. Big Stone	770·29	194·06	— 576·23
Mt. Margaret ...		Mt. Morgans ...	28. Bindah	104·85	1,401·84	+ 1,296·99	
			29. Torquay leases	615·93	58·10	— 557·83	
		Mt. Malcolm ...	Mt. Margaret ...	30. Westralia Mt. Morgans Mines, N.L.	3,629·86	3,603·75	— 26·11
				31. Sons of Gwalia, Ltd.	18,533·12	35,371·40	+ 16,838·28
		North Coolgardie	Menzies ...	32. Lancefield G.Ms., Ltd.	346·09	1,610·64	+ 1,264·55
				33. Nil Desperandum	196·34	211·75	+ 15·41
	Yerilla	34. Gladsome leases	1,301·36	792·52	— 508·84
				35. Menzies Consolidated G.Ms., Ltd.	7,947·81	5,980·65	— 1,967·16
	Broad Arrow	36. Redbrook G.M.	153·78	84·44	— 69·34
				37. Lady Evelyn	235·55	414·91	+ 179·36
North-East Coolgardie	Kanowna ...		38. Orinda	326·56	185·65	— 140·91	
			39. Oversight	141·86	306·99	+ 165·13	
East Coolgardie	East Coolgardie		40. Golden Valley	167·84	608·67	+ 440·83	
			41. Kanowna Consols leases	896·12	+ 896·12	
	42. Kanowna Red Hill G.M. Co., N.L.	2,185·83	2,160·66	— 25·17	
			43. North White Feather G.Ms., Ltd.	554·50	239·85	— 314·65	
	Coolgardie ...	Bulong Coolgardie ...	44. Associated G.Ms. of W.A., Ltd.	22,081·83	22,649·33	+ 567·50	
			45. Associated Northern Blocks (W.A.), Ltd.	4,102·16	3,126·01	— 976·15	
		Kunanalling	46. Central	3,356·02	970·98	— 2,385·04
				47. Golden Hope G.Ms., N.L.	1,338·95	3,174·03	+ 1,835·08
		Yilgarn	48. Golden Horseshoe Estates Co., Ltd.	52,406·83	57,310·51	+ 4,903·68
				49. Boulder Perseverance, Ltd.	54,165·51	45,130·26	— 9,035·25
...	50. Great Boulder Proprietary G.Ms., Ltd.	65,445·64	61,379·10	— 4,066·54
				51. Great Hope	3,066·78	1,983·33	— 1,023·45
...	52. Great Hope North	520·65	563·17	+ 42·52
				53. Hampton Celebration (W.A.), Ltd.	4,470·44	1,333·29	— 3,137·15
Coolgardie ...	Coolgardie ...		54. Hopeful	2,164·40	1,990·54	— 173·86	
			55. Ivanhoe Gold Corporation, Ltd.	59,550·38	25,606·97	— 33,943·41	
Phillips River		56. Lake View and Star, Ltd.	21,657·51	39,288·48	+ 17,625·97	
			57. Mount Martin	3,429·55	1,246·12	— 2,183·43	
	58. North Kalgurli (1912), Ltd.	1,209·85	1,310·18	+ 100·33	
			59. Oroya Links, Ltd.	20,218·65	18,018·87	— 2,199·78	
	60. South Kalgurli Consolidated, Ltd.	39,137·92	37,097·88	— 2,040·04	
			61. Transville	384·86	322·27	— 62·59	
	62. Brennan's Idough	309·93	341·62	+ 31·69	
			63. Coo-ee	373·09	+ 373·09	
	64. Lloyd George	6,708·05	2,596·12	— 4,111·93	
			65. Carbine leases	1,355·76	1,109·73	— 246·03	
... ..	... ..	66. Turn of the Tide	189·94	193·09	+ 3·15	
		67. Edna May Deep Levels G.M. Co., N.L.	342·21	10·00	— 332·21		
... ..	... ..	68. Golden Butterfly G.M. Co., N.L.	625·15	472·46	— 152·69	
		69. Great Victoria Gold Mines, N.L. ... ..	...	1,784·22	+ 1,784·22	
... ..	... ..	70. Radio	2,625·76	1,838·92	— 786·84	
		71. Spring Hill G.M. Co., N.L.	814·34	429·19	— 385·15		
... ..	... ..	72. White Horseshoe	448·53	510·00	+ 61·47	
		73. Great Boulder Proprietary G.M.S., Ltd.	3,789·05	2,013·82	— 1,775·23		
... ..	... ..	74. Viking No. 1 leases	608·26	364·37	— 243·89	
		75. Hillsborough	168·52	96·06	— 72·46		

TABLE 7.

Averages of Gold Ore raised and treated, and Gold produced therefrom, per man employed on the several Goldfields of the State, during 1923 and 1924.

Goldfield.	1923.				1924.			
	Tons of Gold Ore raised and treated.		Fine ounces of Gold produced therefrom.		Tons of Gold Ore raised and treated.		Fine ounces of Gold produced therefrom.	
	Per man employed under ground.	Per man employed above and under ground.	Per man employed under ground.	Per man employed above and under ground.	Per man employed under ground.	Per man employed above and under ground.	Per man employed under ground.	Per man employed above and under ground.
	tons.	tons.	fine ozs.	fine ozs.	tons.	tons.	fine ozs.	fine ozs.
1. Kimberley ... ..	...	...	...	...	...	...	...	...
2. West Kimberley ... ..	...	...	...	...	...	...	...	...
3. Pilbara	38·23	17·65	47·80	22·06	38·14	23·71	41·53	25·82
4. West Pilbara	39·00	19·50	38·93	19·47	21·00	10·50	40·64	20·32
5. Ashburton ... ..	...	...	...	...	...	...	...	...
6. Gascoyne ... ..	...	...	...	...	...	...	...	...
7. Peak Hill	191·51	75·81	73·80	29·21	123·73	43·61	184·37	72·43
8. East Murchison	183·93	83·21	114·86	51·96	76·21	33·50	60·99	26·81
9. Murchison	310·19	138·29	140·29	62·54	215·65	107·83	127·12	63·56
10. Yalgoo	130·49	69·81	91·66	49·04	86·24	43·92	101·94	51·92
11. Mt. Margaret	221·39	70·68	221·18	70·61	438·89	206·48	202·87	95·44
12. North Coolgardie	191·71	94·42	121·21	59·70	186·91	82·83	120·46	53·39
13. Broad Arrow	39·46	17·49	46·21	20·48	23·31	10·71	42·33	19·45
14. North-East Coolgardie	89·58	54·42	67·72	41·14	175·55	97·77	103·53	57·66
15. East Coolgardie	374·25	210·21	229·67	129·00	371·85	206·26	212·14	117·68
16. Coolgardie	89·11	46·52	46·94	24·50	41·79	22·43	44·67	24·03
17. Yilgarn	117·50	49·08	126·85	52·99	149·64	74·38	99·33	49·38
18. Dundas	74·16	41·71	115·60	65·02	44·75	25·80	53·19	30·67
19. Phillips River	23·28	12·93	37·46	20·81	29·89	13·59	29·00	13·18
Total Averages	283·76	146·21	177·97	91·70	289·10	153·02	167·58	88·70

The average value of gold produced per man above and under ground was £389·52 in 1923, and £376·77 in 1924. The average tonnage of ore raised shows an increase from 146·21 tons to 153·02 tons. The average tonnage raised per man is highest in the Mount Margaret Goldfield, viz., 206·48 tons, average value £405·40; the next being East Coolgardie Goldfield, with 206·26 tons, average value £499·87.

TABLE 8.

Output of Gold from the several States of Australia, the Northern Territory, the Territory of Papua, and the Dominion of New Zealand during 1924

State.	Output of Gold.	Value.	Percentage of total Output of Australasia.
1. Western Australia	Fine ozs. 485,035	£ 2,060,298	60·40
2. Queensland	98,841	419,851	12·31
3. Victoria	67,167	285,316	8·36
4. New South Wales	18,685	79,370	2·33
5. Tasmania... ..	4,626	19,648	·58
6. South Australia	880	3,739	·11
7. Northern Territory	225	956	·03
8. Territory of Papua	2,603	6,809	·32
9. New Zealand	124,976	530,864	15·56
Total	803,038	3,406,851	100·00

TABLE 9.

Dividends paid by Western Australian Gold Mining Companies during 1924 and Total to date.

(Compiled from information supplied by the Government Statistician's Office and the Chamber of Mines of W.A., Kalgoorlie.)

Goldfield.	Name of Company.	Capital.				Dividends.		
		Authorised	No. of Shares.	Par Value Shares.	Paid up to.	Paid in 1924.		Grand Total paid to end of 1924.
						No.	Total Amount.	
		£		£ s. d.	£ s. d.		£	£
Peak Hill ...	Various Companies ...	...	...	...	...	...	...	160,666
East Murchison...	Various Companies ...	...	...	...	...	...	...	437,968
Murchison ...	Various Companies ...	...	...	...	...	...	...	1,992,670
Mt. Margaret ...	Various Companies ...	...	...	...	...	...	...	1,504,701
North Coolgardie	Various Companies ...	...	...	...	...	...	...	575,032
North-East Coolgardie	Kanowna Red Hill G.M. Co., N.L.	100,000	91,782	1 0 0	0 5 0	1	2,294	2,294
Do.	Other Companies ...	...	...	...	...	...	...	82,971
East Coolgardie...	Golden Horseshoe Estates Co., Ltd.	1,500,000	300,000	5 0 0	5 0 0	1	30,000	3,607,500
Do.	Boulder Perseverance, Ltd. ...	125,000	2,130,266	0 1 0	0 1 0	2	17,685	1,478,801
Do.	Great Boulder Proprietary G.M.s., Ltd.	175,000	1,750,000	0 2 0	0 2 0	1	29,167	6,042,217
Do.	Oroya Links, Ltd. ...	312,500	1,250,000	0 5 0	0 5 0	1	14,375	100,625
Do.	South Kalgurli Consolidated, Ltd.	150,000	250,007	0 10 0	0 10 0	2	31,250	315,001
Do.	Other Companies ...	...	...	...	...	...	...	11,129,712
Coolgardie ...	Various Companies ...	...	...	...	...	...	...	339,495
Yilgarn ...	Various Companies ...	...	...	...	...	...	...	513,199
Dundas ...	Various Companies ...	...	...	...	...	...	...	222,625
	Total Dividends paid during 1924 ...	...	...	...	...	...	124,771	...
	Total Dividends paid to end of 1924 ...	...	...	...	...	...	...	28,505,477

TABLE 10.

Value of Gold Production and Percentage of Dividends paid.

Year.	Value of Gold Production.	Dividends paid by Gold Mining Companies.	Dividends % of Total Production.	Value of Gold Production by Gold Mining Companies only.	Dividends % upon Production by Gold Mining Companies.
Previous to 1915	£ 120,117,926	£ 24,702,069	20.56	£ ...	% ...
1915 ...	5,140,228	792,317	15.41	4,109,254	19.28
1916 ...	4,508,532	632,883	14.04	3,518,531	17.90
1917 ...	4,121,645	590,856	14.34	3,310,536	17.85
1918 ...	3,723,183	368,295	9.81	2,914,325	12.64
1919 ...	3,118,113	338,244	10.85	2,337,433	14.23
1920 ...	2,624,427	384,083	14.63	2,212,711	17.36
1921 ...	2,352,098	306,958	13.05	1,787,721	17.17
1922 ...	2,286,325	191,251	8.36	1,789,879	10.69
1923 ...	2,143,028	73,750	3.44	1,730,712	4.26
1924 ...	2,060,298	124,771	6.06	1,623,588	7.68
Total ...	152,195,803	28,505,477	18.70	*25,334,690	*15.01

* Ten last years only.

TABLE 11.

Quantity and Value of Minerals, other than Gold and Coal, reported to the Mines Department during 1924.

Goldfield, District, or Mineral Field.	1924.		Increase or Decrease for Year compared with 1923.	
	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£
BLACK TIN.				
Pilbara Goldfield (Marble Bar District)	28.55	4,048	+ 4.15	+ 1,088
Greenbushes Mineral Field	52.56	7,469	+ 24.54	+ 4,445
Total	81.11	11,517	+ 28.69	+ 5,533
COPPER ORE.				
West Pilbara Goldfield	79.00	1,012	- 142.00	- 2,488
Northampton Mineral Field	10,672.00	34,955	+ 1,045.71	- 24,188
Phillips River Goldfield	3.69	44	- 22.32	- 497
Total	10,754.69	36,011	+ 881.39	- 27,173
LEAD ORE.				
Northampton Mineral Field	36,750.00	101,219	+ 15,115.50	+ 42,025
ASBESTOS.				
Pilbara Goldfield (Marble Bar District) ... ..	...	...	- 3.00	- 150
Pilbara Goldfield (Nullagine District)	73.58	2,206	- 37.42	- 1,659
West Pilbara Goldfield ... ..	...	...	- .85	- 17
Total	73.58	2,206	- 41.27	- 1,826
GYPSUM.				
State generally	4,237.00	5,278	+ 4,237.00	+ 5,278
MANGANESE.				
Peak Hill Goldfield	58.63	294	+ 58.63	+ 294

The output of black tin shows increases in tonnage of 28.69 tons and in value of £5,533. In copper ore, there was an increase in tonnage of 881.39, although West Pilbara and Philips River Goldfields recorded decreases, but the value from all fields decreased by £27,173. Lead ore shows increases in tonnage of 15,115.50 tons, and in value of £42,025. Asbestos decreased by 41.27 tons and the value by £1,826, while gypsum shows increases in tonnage of 4,237 tons and

in value of £5,278, and manganese shows increases in tonnage of 58.63 tons and in value of £294.

The production of tin was again confined to Pilbara and Greenbushes fields, and copper ore came from West Pilbara Goldfield, Northampton mineral field, and Phillips River Goldfield. The production of lead ore was confined to Northampton mineral field, while asbestos came from the Pilbara goldfield, gypsum from the State generally, and manganese from Peak Hill goldfield.

TABLE 12.

Quantity of Coal raised during 1923 and 1924, and estimated Value thereof, with Number of Men employed, and Output per Man.

Coalfield.	Year.	Quantity raised.	Estimated Value.	Men employed.		Quantity raised.	
				Above ground.	Under-ground.	Per Man-employed under-ground.	Per Man-employed above and under-ground.
		tons.	£			tons.	tons.
Collie	1923	420,714	368,949	167	546	771	590
	1924	421,864	363,255	155	518	814	627

The number of men employed at collieries has decreased by 40, and the output has increased by 1,150 tons, but the value decreased £5,694.

PART III.—LEASES AND OTHER HOLDINGS UNDER THE VARIOUS ACTS RELATING TO MINING.

TABLE 13.

Total Number and Acreage of Leases held for Mining on 31st December, 1923 and 1924.

Description of Leases	1923.		1924.	
	No.	Acreage.	No.	Acreage.
Gold mining leases on Crown land	656	10,839	560	9,009
" " " private property ... ..	...	...	...	...
Mineral leases on Crown land	248	49,052	246	47,645
" " private property	10	379	11	357
	914	60,270	817	57,011

The total number of leases held for mining purposes decreased by 97 and the area by 3,259 acres, as compared with the year 1923. The number of leases for gold mining decreased by 96 and the area by 1,830 acres. The number of mineral leases decreased by 1 and the area by 1,429 acres.

TABLE 14.

Number and Acreage of Gold Mining Leases in force each year for the Five Years ending the 31st December, 1924.

Goldfield.		District.		1920.		1921.		1922.		1923.		1924.		Percentage of Total Acreage.		Increase or Decrease in Acreage for 1924 compared with 1923.		Goldfield.
Name.	Proclaimed.	Name.	Proclaimed.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	1923.	1924.	Increase	Decrease	
West Kimberley ...	19-3-20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	West Kimberley.
Kimberley ...	20-5-86	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Kimberley.
Yilgarn ...	1-10-88	...	...	91	1,584	65	1,080	60	1,032	45	788	40	665	7.27	7.38	...	123	Yilgarn.
Pilbara ...	1-10-88	Marble Bar ...	6-11-96	20	227	14	126	30	435	29	403	17	167	4.05	2.19	...	242	Pilbara.
Ashburton ...	11-12-90	Nullagine ...	6-11-96	3	24	3	24	1	12	3	36	3	30					
Murchison...	24-9-91	Cue ...	7-12-94	33	474	22	248	18	226	10	105	11	149	8.48	8.53	...	150	Murchison.
		Meekatharra ...	7-12-94	33	451	40	581	48	770	32	501	28	449					
		Day Dawn ...	10-1-96	11	116	8	82	15	228	11	122	9	79					
		Mount Magnet ...	7-12-94	14	144	14	138	21	210	18	191	11	92					
Dundas ...	31-8-93	...	...	34	451	23	284	22	253	14	159	13	147	1.47	1.63	...	12	Dundas.
Coolgardie ...	6-4-94	Coolgardie ...	7-12-94	338	7,233	57	1,029	50	865	54	965	33	521	10.19	7.56	...	424	Coolgardie.
		Kunanalling ...	1-9-97	15	203	12	143	11	130	12	140	12	160					
East Coolgardie ...	1-10-94	East Coolgardie	7-12-94	380	7,173	233	4,112	135	2,134	121	1,872	123	1,847	23.07	21.00	...	709	East Coolgardie.
Yalgoo ...	23-1-95	Bulong ...	15-4-96	15	323	...	...	13	302	30	629	2	45	4.80	3.16	...	235	Yalgoo.
		Menzies ...	15-4-96	26	417	16	293	18	298	19	304	20	330					
North Coolgardie	28-6-95	Ularring ...	15-4-96	16	221	13	161	13	161	5	88	3	56	4.64	6.13	149	...	North Coolgardie.
		Yerilla ...	15-4-96	6	108	9	138	6	81	5	75	10	149					
East Murchison ...	28-6-95	Niagara ...	1-4-97	4	60	2	36	3	48	2	36	2	17	11.60	23.56	866	...	East Murchison.
		Lawlers ...	1-7-04	18	297	14	213	13	212	11	174	16	248					
		Black Range ...	1-7-04	19	326	16	292	15	270	36	664	8	165					
		Wiluna ...	1-3-10	29	517	22	408	16	294	22	419	30	1,710					
North-East Coolgardie	15-4-96	Kanowna ...	15-4-96	29	434	19	315	20	276	17	251	16	256	2.47	2.84	...	12	N.E. Coolgardie.
Broad Arrow ...	20-11-96	Kurnalpi ...	15-4-96	6	47	6	40	4	23	2	17	...	...	3.15	2.85	...	84	Broad Arrow.
Peak Hill ...	1-4-97	...	...	13	137	14	116	7	69	13	142	6	32	1.31	.36	...	110	Peak Hill.
Mount Margaret	1-4-97	Mount Margaret	1-4-97	50	965	20	348	20	364	40	924	12	254	16.52	11.49	...	756	Mount Margaret.
		Mount Malcolm...	1-4-97	59	1,276	32	668	30	627	31	617	29	595					
		Mount Morgans...	2-4-02	22	379	16	259	15	241	14	250	11	186					
West Pilbara ...	1-11-95	...	...	3	36	1	6	2	12	1	6	1	6	.06	.07	...	...	West Pilbara.
Phillips River ...	14-9-00	...	...	10	138	8	118	9	108	6	88	6	88	.81	.98	...	...	Phillips River.
Other Localities ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Other Localities.
Gascoyne ...	15-4-97	...	...	...	...	...	...	2	12	2	12	4	24	.11	.27	12	...	Gascoyne.
Totals ...	...	...	...	1,347	24,540	735	11,831	688	10,847	656	10,839	560	9,009	100.00	100.00	1,027	2,757	

Decrease for the Year 1924: Leases 96, acres, 1,830. The largest percentage of the area leased for gold mining purposes is in this respective order: East Murchison, 23.56; East Coolgardie, 21.00; Mt. Margaret, 11.49; Murchison, 8.53; Coolgardie, 7.56; Yilgarn, 7.38; North Coolgardie, 6.13.

TABLE 15.

Number and acreage of Mineral Leases in force 31st December each year, for the Five Years ending 31st December, 1924.

Mining District.		Sub-District.		1920.		1921.		1922.		1923.		1924.		Increase or Decrease in Acreage for 1924, compared with 1923.		Mining District.	
Name.	Proclaimed.	Name.	Proclaimed.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Increase.	Decrease.		
Ashburton	11-12-90	...	...	3	44	1	10	3	30	1	48	3	87	39	...	Ashburton.
Murchison	24-9-91	Cue	7-12-94	4	135	2	63	3	90	...	...	...	...	...	...	Murchison.
		Meekatharra	7-12-94	Murchison.
		Day Dawn	10-1-96	2	54	1	48	Murchison.
Greenbushes	7-4-92	Mt. Magnet	7-12-94	...	...	...	...	...	...	...	...	...	...	...	...	Greenbushes.
		...	...	29	421	18	287	18	282	7	146	6	107	...	39	Greenbushes.
Pilbara	16-6-92	Marble Bar	16-6-92	11	247	15	415	13	367	10	271	14	447	172	...	Pilbara.	
		Nullagine	6-11-96	10	144	14	175	12	125	4	34	4	30	...	...	Pilbara.
Yalgoo	23-1-95	...	...	14	320	10	238	3	132	2	96	2	96	...	...	Yalgoo.
Yilgarn	22-3-95	...	...	1	48	1	48	1	48	...	...	1	10	10	...	Yilgarn.
Coolgardie	22-3-95	Coolgardie	22-3-95	2	28	3	76	5	112	2	28	2	28	...	...	Coolgardie.
		Kunanalling	1-9-97	Coolgardie.
East Coolgardie	22-3-95	East Coolgardie	22-3-95	2	3	1	1	1	1	...	...	1	1	1	...	East Coolgardie.
		Bulong	15-4-96	1	24	East Coolgardie.
East Murchison	28-6-95	Lawlers	17-4-04	...	...	...	...	...	...	...	...	...	...	...	...	East Murchison.
		Black Range	1-7-04	1	6	1	6	1	6	...	...	...	...	...	...	East Murchison.
North Coolgardie	16-8-95	Wiluna	1-3-10	...	...	...	...	...	...	...	...	...	...	...	...	North Coolgardie.
		Menzies	15-4-96	...	...	1	48	1	48	1	48	...	...	...	...	North Coolgardie.
		Ularring	15-4-96	North Coolgardie.
		Yerilla	15-4-96	North Coolgardie.
West Pilbara	1-11-95	...	...	26	751	21	798	18	710	22	826	21	778	48	48	West Pilbara.
Dundas	27-12-95	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Dundas.
Collie	21-2-96	...	...	115	34,979	117	35,621	127	38,671	135	41,108	125	38,059	3,049	...	Collie.
North-East Coolgardie	15-4-96	Kanowna	15-4-96	4	71	3	47	1	10	1	10	1	10	...	...	North-East Coolgardie.
		Kurnalpi	15-4-96	North-East Coolgardie.
Broad Arrow	20-11-96	...	...	28	637	14	286	12	250	12	238	13	278	64	...	Broad Arrow.
Northampton	1-1-97	(Private Property)	...	8	297	4	167	4	167	4	167	5	191	...	...	Northampton.
Peak Hill	1-4-97	...	...	12	375	8	261	5	216	1	48	...	...	...	...	Peak Hill.
Mt. Margaret	1-4-97	Mt. Margaret	1-4-97	Mt. Margaret.
		Mt. Malcolm	1-4-97	Mt. Margaret.
		Mt. Morgans	2-4-02	3	69	3	69	3	69	3	69	69	Mt. Margaret.
Gascoyne	15-4-97	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Gascoyne.
Yandanooka	1-12-97	...	...	1	10	...	...	...	...	...	...	1	48	48	...	Yandanooka.
Phillips River	1-7-99	...	...	16	437	16	446	15	485	17	520	17	398	...	122	Phillips River.
Other localities	...	(Private Property)	...	18	2,187	15	2,151	13	3,016	20	5,114	25	6,820	1,660	...	Other localities.	
West Kimberley	19-3-20	...	...	5	108	7	204	7	204	6	212	6	166	...	...	West Kimberley.
Totals	...	...	...	326	41,843	286	41,905	276	45,487	258	49,431	257	48,002	1,994	3,423	

In the Collie Mineral Field the largest area is held, viz. : 38,059 acres worked entirely for coal ; thus follow West Pilbara 778 acres for copper, antimony, silver and lead, asbestos ; Pilbara, 477 acres for tin, antimony, vanadium, tantalite, lead ; Northampton 469 acres for coal, lead ; Phillips River 398 acres for copper, manganese.

TABLE 16

Number and Acreage of Mineral Leases in force on 31st December, 1924, showing Minerals for which they are worked.

Goldfield or Mineral Field.	District.	MINERAL.																			
		Coal		Tin.		Copper.		Iron.		Antimony.		Ochre.		Silver and Lead.		Asbestos.		Vanadium.		Clay.	
		Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.
Pilbara	Marble Bar	...	...	5	107	...	...	...	...	...	...	...	...	...	...	2	96	1	48	...	...
West Pilbara	Nullagine	...	...	...	...	13	468	...	...	1	48	...	...	...	...	4	30	...	...	...	...
Ashburton ... ..	...	...	...	...	...	2	72	...	...	...	...	...	...	1	15	6	238	...	...	...	...
Gascoyne ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	1	48	...	...	...	...	...	...
Yilgarn ... ..	...	...	...	...	...	...	...	...	...	...	...	1	10	...	...	...	...	...	...	...	...
Yalgoo ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
East Coolgardie ... ..	...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...
Coolgardie ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
North-East Coolgardie	Kanowna	...	...	...	...	15	345	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Phillips River ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Collie ... ..	...	125	38,059	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Greenbushes ... ..	...	...	...	6	107	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Northampton ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Outside Proclaimed Fields	(Private Property)	1	100	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
West Kimberley	(Private Property)	21	6,720	...	...	2	18	...	1	48	...	...	...	...	...	...	...	...	...	3	48
Totals ... ..	...	147	44,879	11	214	32	903	11	496	1	48	2	11	3	87	12	364	1	48	3	48

Goldfield or Mineral Field.	District.	MINERAL.																Total:	
		Alunite.		Tantalite.		Lead.		Gypsum.		Graphite.		Molybdenite.		Mica.		Manganese.		Leases.	Acres.
		Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.
Pilbara	Marble Bar	...	...	2	20	4	176	...	...	...	...	...	...	...	...	...	...	14	447
West Pilbara	Nullagine	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	30
Ashburton ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	21	778
Gascoyne ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	87
Yilgarn ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	48
Yalgoo ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	10
East Coolgardie ... ..	...	...	...	...	...	...	...	...	...	...	...	2	96	...	...	...	...	2	96
Coolgardie ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1
North-East Coolgardie	Kanowna	1	10	...	...	...	...	...	...	...	...	...	...	2	28	...	...	2	28
Phillips River ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	53	17	398
Collie ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	125	38,059
Greenbushes ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	6	107
Northampton ... ..	...	...	...	...	...	13	278	...	...	...	...	...	...	...	...	...	...	13	278
Outside Proclaimed Fields	(Private Property)	...	...	...	...	4	91	...	...	1	40	1	42	...	...	...	...	5	191
West Kimberley	(Private Property)	...	...	...	...	...	...	...	...	1	46	1	24	...	...	...	...	25	6,820
Totals ... ..	...	1	10	2	20	21	545	2	86	2	66	2	96	2	28	2	53	257	48,002

TABLE 17

Number and Acreage of Miscellaneous Leases in force on 31st December, 1924.

Goldfield.	District.	LEASES.										Total.	
		Tailings.		Tramway.		Water.		Machinery.		Residence.			
		No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.
West Pilbara ...	...	...	...	2	25	...	...	...	...	...	...	2	25
East Murchison ...	Black Range ...	2	36	...	...	...	...	...	...	1	2	3	38
Murchison ...	Day Dawn ...	...	...	...	...	...	...	...	...	1	1	1	1
North Coolgardie ...	Menzies ...	2	15	...	...	1	5	...	...	...	...	3	20
East Coolgardie ...	East Coolgardie ...	12	245	...	...	1	34	2	16	...	...	15	295
Coolgardie ...	Coolgardie ...	2	12	...	...	1	13	...	...	...	...	3	25
Phillips River ...	...	...	...	3	7	...	...	1	10	...	...	4	17
	Total ...	18	308	5	32	3	52	3	26	2	3	31	421

TABLE 18.

Claims and Authorised Holdings, under "The Mining Act, 1904," and Regulations, existing on 31st December, 1923 and 1924.

Goldfield or Mineral Field.	District.	Prospecting Areas.				Water Rights.				Lode Claims.		Alluvial Claims.		Mineral Claims.		Dredging Claims.		Residence Areas.		Business Areas.		Machinery Areas.		Tailings Areas.		Garden Areas.		Washing Areas.		Quarrying Areas.		
		Number.	Acreage.	Number.	Acreage.	Number.	Acreage.	Number.	Acreage.	1923.	1924.	1923.	1924.	1923.	1924.	1923.	1924.	1923.	1924.	1923.	1924.	1923.	1924.	1923.	1924.	1923.	1924.	1923.	1924.	1923.	1924.	
West Kimberley		...	5	...	240	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Northampton		4	9	76	121	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Pilbara	Marble Bar	25	30	743	1,072	2	3	3	4	1	...	2	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Do.	Nullagine	7	5	54	52	4	4	4	4	4	4	...	5	5	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
West Pilbara		4	2	78	48	1	1	5	5	1	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ashburton		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Peak Hill		8	11	81	105	1	1	10	10	...	...	...	...	3	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
East Murchison	Lawlers	10	10	166	207	6	6	9	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Do.	Wiluna	7	95	109	2,046	6	7	9	13	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Do.	Black Range	77	10	1,237	110	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Murchison	Cue	15	22	188	284	5	4	18	18	...	...	3	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Do.	Meekatharra	21	24	333	366	1	1	10	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Do.	Day Dawn	10	5	123	58	3	3	4	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Do.	Mt. Magnet	79	27	1,029	350	1	1	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Yalgoo		66	31	1,083	568	1	1	4	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Mt. Margaret	Mt. Morgans	9	5	171	100	6	6	11	11	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Do.	Mt. Malcolm	11	16	160	261	18	19	173	174	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Do.	Mt. Margaret	118	11	2,689	210	15	12	31	16	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
North Coolgardie	Menzies	15	11	221	156	3	3	15	15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Do.	Ularring	2	2	27	36	6	6	6	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Do.	Niagara	2	3	18	58	1	1	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Do.	Yerilla	15	2	266	30	4	4	7	7	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Broad Arrow		27	16	491	273	7	8	23	22	6	6	7	7	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
N.E. Coolgardie	Kanowna	14	10	256	195	1	1	3	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Do.	Kurnalpi	2	1	30	12	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
East Coolgardie	Bulong	67	92	1,101	1,464	7	7	25	25	2	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Do.		43	9	970	199	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Coolgardie		111	48	2,281	834	10	10	40	45	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Do.	Kunanalling	11	10	189	178	6	6	40	40	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Yilgarn		53	34	989	711	2	2	3	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Dundas		12	7	154	107	6	4	13	7	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Phillips River		6	2	97	21	1	1	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ogille		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Greenbushes		...	1	...	10	2	5	2	15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Gascoyne		...	3	...	72	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Outside Proclaimed Fields		22	17	13,882	6,596	...	...	...	...	...	...	...	10	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Totals		871	586	29,292	17,150	126	127	471	474	15	14	13	23	21	25	8	8	87	98	83	77	42	34	42	37	106	101	...	...	...	...
Increase or Decrease for 1924 compared with 1923		-285		-12,142		+1		+3		-1		+10		+4		...		+11		-6		-8		-5		-5		...		...

For the year 1923 the number of prospecting areas held was 871, the total acreage being 29,292 which included 5 areas of 10,720 acres for coal.
For the year 1924 the number held is 586 of a total acreage of 17,150 including 4 areas of 6,062 acres for coal.

TABLE 19.

Miners' Rights issued during 1923 and 1924.

Place of Issue.	Miners' Rights.		Place of Issue.	Miners' Rights.	
	1923.	1924.		1923.	1924.
Albany ...	11	2	Narrogin ...	12	4
Boulder ...	30	35	Norseman ...	41	28
Bridgetown ...	1	...	Northampton ...	23	34
Broome ...	10	26	Northam ...	11	6
Bunbury ...	2	...	Nullagine ...	26	19
Busselton ...	...	21	Onslow ...	35	27
Carnarvon ...	24	39	Ora Banda ...	35	35
Collie ...	9	2	Payne's Find ...	13	12
Coolgardie ...	185	137	Peak Hill ...	27	24
Cue ...	121	111	Perth ...	311	255
Derby ...	11	14	Port Hedland ...	10	9
Geraldton ...	26	17	Ravensthorpe ...	24	27
Greenbushes ...	52	57	Roebourne ...	35	37
Hall's Creek ...	30	21	Sandstone ...	86	25
Kalgoorlie ...	694	648	Southern Cross ...	149	103
Laverton ...	219	89	St. Ives ...	10	22
Lawlers ...	40	97	Wagin ...	15	13
Leonora ...	82	100	Westonia ...	46	17
Linden ...	7	...	Wiluna ...	38	78
Marble Bar ...	86	83	Wyndham ...	2	14
Marvel Loch ...	25	14	Yalgoo ...	77	48
Meekatharra ...	155	145	Yarri ...	8	2
Menzies ...	111	80	York ...	6	2
Mount Magnet ...	143	102	Yunanmi ...	17	17
Mullewa ...	1	4	Total ...	3,132	2,702

TABLE 20.

Number and Acreage of Miners' Homestead Leases in force on 31st December, 1923 and 1924.

Goldfield.	District.	1923.		1924.		Increase.		Decrease.	
		Leases.	Acre-age.	Leases.	Acre-age.	Leases.	Acre-age.	Leases.	Acre-age.
West Pilbara ...	...	...	...	...	...	...	...	...	...
Greenbushes ...	...	7	733	6	522	...	...	1	211
Pilbara ...	Marble Bar	...	...	...	...	...	...	...	...
...	Nullagine ...	...	...	...	...	...	...	...	...
Dundas ...	...	28	1,365	25	1,319	...	...	3	46
Broad Arrow ...	...	3	44	3	44	...	...	...	...
Yilgarn ...	...	13	410	11	370	...	...	2	40
Mt. Margaret ...	Mt. Malcolm ...	4	1,039	5	1,239	...	...	...	...
...	Mt. Margaret ...	14	371	12	341	...	170	1	...
...	Cue ...	5	1,244	4	1,204	...	...	...	...
Murchison ...	Day Dawn ...	3	30	2	25	...	...	4	70
...	Meekatharra ...	13	1,700	11	1,675	...	...	...	...
...	Mt. Magnet ...	1	236	1	236	...	...	...	...
Yalgoo ...	...	4	1,184	5	1,204	1	20	...	...
Coolgardie ...	Coolgardie ...	27	1,101	24	1,031	...	...	2	60
...	Kunanalling ...	2	520	3	530	...	...	...	...
East Coolgardie ...	...	89	2,726	90	2,746	1	20	...	...
Phillips River ...	...	141	19,720	126	17,549	...	...	15	2,171
Peak Hill ...	...	4	247	4	247	...	...	...	...
North-East Coolgardie ...	Kanowna ...	14	742	14	742	...	...	...	...
...	Menzies ...	5	690	5	690	...	...	...	...
North Coolgardie ...	Yerilla ...	1	10	1	10	...	...	...	...
...	Niagara ...	1	20	1	20	...	...	...	...
...	Ularring ...	1	20	1	20	...	...	...	...
East Murchison... ..	Lawlers ...	6	1,115	6	1,115	...	...	...	...
...	Black Range ...	1	300	1	307	...	7	...	...
...	Wiluna ...	3	39	3	39	...	...	...	...
Total ...	...	390	35,606	364	33,225	2	217	28	2,598

As compared with the Year 1923, the number of leases held has decreased by 26 and the area by 2,381 acres.

PART IV.—MEN EMPLOYED.

TABLE 21.

Average number of Men engaged in Mining during 1923 and 1924.

Goldfield.	District.	Reef or Lode.		Alluvial.		Total.	
		1923.	1924.	1923.	1924.	1923.	1924.
1. Kimberley ...	...	...	...	5	5	5	5
2. West Kimberley ...	...	...	...	...	...	...	...
3. Pilbara ...	Marble Bar ...	82	56	16	12	98	68
	Nullagine ...	22	18	28	24	50	42
4. West Pilbara ...	...	2	2	1	2	3	4
5. Ashburton ...	...	...	...	2	2	2	2
6. Gascoyne ...	...	...	...	2	2	2	2
7. Peak Hill ...	...	48	28	9	7	57	35
8. East Murchison ...	Lawlers ...	62	51	1	...	63	51
	Wiluna ...	58	61	...	...	58	61
	Black Range ...	90	70	...	2	90	72
	Cue ...	74	57	1	1	75	58
9. Murchison ...	Meekatharra ...	203	198	23	23	226	221
	Day Dawn ...	42	31	3	2	45	33
	Mt. Magnet ...	87	76	2	3	89	79
10. Yalgoo ...	...	157	108	2	2	159	110
	Mt. Morgans ...	87	65	...	...	87	65
11. Mt. Margaret ...	Mt. Malcolm ...	238	342	...	...	238	342
	Mt. Margaret ...	54	50	...	...	54	50
	Menzies ...	144	126	...	...	144	126
12. North Coolgardie ...	Ularring ...	10	11	...	...	10	11
	Niagara ...	15	12	...	...	15	12
	Yerilla ...	32	27	...	...	32	27
13. Broad Arrow ...	...	88	111	4	7	92	118
14. North-East Coolgardie ...	Kanowna ...	85	71	4	2	89	73
	Kurnalpi ...	22	8	2	...	24	8
15. East Coolgardie ...	East Coolgardie ...	2,822	2,815	25	26	2,847	2,841
	Bulong ...	48	37	7	5	55	42
16. Coolgardie ...	Coolgardie ...	436	336	58	32	494	368
	Kunanalling ...	64	60	5	1	69	61
17. Yilgarn ...	...	158	171	1	...	159	171
18. Dundas ...	...	96	111	4	18	100	124
19. Phillips River ...	...	18	11	3	1	21	12
State generally	...	3	2	...	...	3	2
Total—Gold Mining		5,347	5,122	208	174	5,555	5,296
MINERALS OTHER THAN GOLD.							
Tin ...	Greenbushes ...	12	23	...	...	12	23
	Marble Bar ...	7	3	*16	14	23	17
	West Pilbara ...	15	35	...	...	15	35
Copper ...	Phillips River ...	6	23	...	...	6	23
	Northampton ...	59	52	...	...	59	52
Lead Ore ...	Northampton ...	96	141	...	...	96	141
Coal ...	Collie River ...	713	673	...	...	713	673
Asbestos ...	Nullagine ...	18	16	...	...	18	16
Gypsum ...	State Generally	...	13	...	...	...	13
Total—Other Minerals		926	979	16	14	942	993
GRAND TOTAL		6,273	6,101	224	188	6,497	6,289

*Classified elsewhere as employed at mines.

TABLE 22.
Average Number of Men employed at Mines during 1924.

Mineral.	Above ground.	Under ground.	Total.	Percentage of total men employed.	Increase or decrease compared with 1923.
Asbestos	9	7	16	·26	— 2
Coal	155	518	673	11·01	— 40
Copper	49	61	110	1·80	+ 30
Gold	2,411	2,711	5,122	83·76	— 225
Gypsum	13	...	13	·21	+ 13
Lead	43	98	141	2·31	+ 45
Tin	*40	...	40	·65	+ 5
Total	2,720	3,395	6,115	100·00	— 174

*As the tin obtained is principally "stream tin" the average number of alluvial workers has been, in this case, included in the heading "above ground."

The above table deals with men working their own mines, or employed on wages, and is compiled from returns furnished to the Department by mine-owners.

TABLE 23.
Average Number of Men employed at Gold Mines during 1924, classified according to the several Goldfields and the proportion of Men employed in each Goldfield.

Goldfield.	Above Ground.	Under Ground.	Total.	Increase or Decrease compared with 1923.	Percentage of total men employed.	
					1923.	1924.
1. Kimberley ... ..	...	...	...	...	...	...
2. West Kimberley ... ..	...	...	...	...	...	...
3. Pilbara	28	46	74	— 30	1·94	1·44
4. West Pilbara	1	1	2	...	·04	·04
5. Ashburton ... ..	...	...	...	...	...	...
6. Gascoyne ... ..	...	...	...	...	...	...
7. Peak Hill	17	11	28	— 20	·90	·55
8. East Murchison	102	80	182	— 28	3·93	3·55
9. Murchison	181	181	362	— 44	7·59	7·07
10. Yalgoo	53	55	108	— 49	2·94	2·11
11. Mt. Margaret	242	215	457	+ 78	7·09	8·92
12. North Coolgardie	98	78	176	— 25	3·76	3·43
13. Broad Arrow	60	51	111	+ 23	1·65	2·17
14. North-East Coolgardie	35	44	79	— 28	2·00	1·54
15. East Coolgardie	1,270	1,582	2,852	— 18	53·67	55·68
16. Coolgardie	183	213	396	+ 104	9·35	7·78
17. Yilgarn	86	85	171	— 13	2·95	3·24
18. Dundas	47	64	111	+ 15	1·79	2·17
19. Phillips River	6	5	11	— 7	·34	·22
State generally	2	...	2	— 1	·06	·04
Total	2,411	2,711	5,122	— 225	100·00	100·00

TABLE 24.
Alluvial Gold Workers.

Goldfield.	1923.	1924.	Increase or Decrease compared with 1923.
1. Kimberley	5	5	...
2. West Kimberley ... ..	...	...	...
3. Pilbara	44	36	— 8
4. West Pilbara	1	2	+ 1
5. Ashburton	2	2	...
6. Gascoyne	2	2	...
7. Peak Hill	9	7	— 2
8. East Murchison	1	2	+ 1
9. Murchison	29	29	...
10. Yalgoo	2	2	...
11. Mt. Margaret ... ..	...	...	...
12. North Coolgardie ... ..	...	...	...
13. Broad Arrow	4	7	+ 3
14. North-East Coolgardie	6	2	— 4
15. East Coolgardie	32	31	— 1
16. Coolgardie	63	33	— 30
17. Yilgarn	1	...	— 1
18. Dundas	4	13	+ 9
19. Phillips River	3	1	— 2
Total	208	174	— 34

TABLE 25.

Table showing Rate of Wages Payable in the Mining Industry at the 31st December, 1924.

Class of Employee.	Yilgarn, Coolgardie, Dundas, E. Coolgardie, N. E. Coolgardie, N. Coolgardie, Mt. Margaret, and East Murchison Goldfields.		Meekatharra and Youanmi Districts.		Cue and Day Dawn Districts.		Northampton.**		Norseman.		Murrin, Gwalia, Humberstone, Mt. Morgan, Laverton, St. Ives.		Lawlers and Wiluna.		Mulline, Riverina, Yundamindera and Linden.	
	Rate per Shift.	Rate per Shift.	Rate per Shift.	Rate per Shift.	Rate per Shift.	Rate per Shift.	Rate per Shift.	Rate per Shift.	Rate per Shift.	Rate per Shift.	Rate per Shift.	Rate per Shift.	Rate per Shift.	Rate per Shift.	Rate per Shift.	Rate per Shift.
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
Rock Drill Men in Shafts	16	10	18	10	18	1	...	...	...	...	...	...	...	...	...	...
Rock Drill Men in Rises	16	4	18	4	17	7	...	...	...	...	...	...	...	...	...	...
Rock Drill Men in Winzes	16	0	18	0	17	3	...	...	...	...	...	...	...	...	...	...
Rock Drill Men in Other places	15	8	17	8	16	11	...	...	...	...	...	...	...	...	...	...
Hand Miners in Shafts	16	0	18	0	17	3	15	10	...	...	...	...	...	...	...	...
Hand Miners in Rises	15	6	17	6	16	9	15	4	...	...	...	...	...	...	...	...
Hand Miners in Winzes	15	2	17	2	16	5	15	0	...	...	...	...	...	...	...	...
Hand Miners in other places	14	10	16	10	16	1	14	8	...	...	...	...	...	...	...	...
Shaft Timbermen	16	10	18	0	17	3	16	8	...	...	...	...	...	...	...	...
Timbermen	16	0	18	0	17	3	15	10	...	...	...	...	...	...	...	...
Mullookers, Truckers, Shovellers, etc.	14	0	16	0	15	3	13	10	...	...	...	...	...	...	...	...
Bracemen, Platmen, and Skipmen	15	0	16	6	15	9	14	10	...	...	...	...	...	...	...	...
Man in charge Explosives Magazine	15	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Platelayer (Underground)	15	0	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Scalers (Underground)	16	0	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Sampler	15	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Rock Breaker—Crackermen	14	6	16	6	15	9	14	4	...	...	...	...	...	...	...	...
Battery Feeders and Mill Hands	13	6	16	0	15	3	...	...	...	...	...	...	...	...	...	...
Battery—Repairers, etc.	15	0	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Mechanic's Labourer	14	0	16	0	15	3	13	10	...	...	...	...	...	...	...	...
Iron Furnacemen	15	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Castings Dresser	14	0	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Pitman and Pumpman	16	0	...	...	...	...	15	10	...	...	...	...	...	...	...	...
Fireman, Leading	15	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Fireman, Steam or Roaster	14	6	...	...	...	...	14	4	...	...	...	...	...	...	...	...
Wood Trimmer	14	0	...	...	...	...	13	10	...	...	...	...	...	...	...	...
Pumpman on the Surface	15	0	...	...	...	...	14	10	...	...	...	...	...	...	...	...
Greaser, Cleaner, and Oiler	14	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Motorman	15	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ball Mill Hand	14	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Mill Hands ... ..	...	...	...	...	...	...	13	4	...	...	...	...	...	...	...	...
Boiler Cleaners	16	0	...	...	...	...	15	10	...	...	...	...	...	...	...	...
Filterpress Filler	15	4	18	0	17	3	...	...	...	...	...	...	...	...	...	...
Cyanide and Filterpress Men	14	6	16	6	15	9	...	...	...	...	...	...	...	...	...	...
Amalgamator	15	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Wilfley Tablemen	13	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Grinding Panman	14	0	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Vacuum Plant Hands (Top)	15	6	18	0	17	3	...	...	...	...	...	...	...	...	...	...
Vacuum Plant Hands (Bottom)	14	2	16	6	15	9	...	...	...	...	...	...	...	...	...	...
Timber Dresser, Sawyer, etc.	15	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Jigman ... ..	...	...	...	...	...	...	14	1	...	...	...	...	...	...	...	...
Tool Sharpeners	15	6	18	0	17	3	15	4	...	...	...	...	...	...	...	...
Holman Hoist (aboveground)	15	4	...	...	...	...	15	2	...	...	...	...	...	...	...	...
Holman Hoist (underground)	15	10	...	...	...	...	15	8	...	...	...	...	...	...	...	...
Blacksmith's Striker	14	0	16	4	15	7	13	10	...	...	...	...	...	...	...	...
Platelayer on Surface	14	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Roper and Rigger	15	6	17	6	16	9	15	4	...	...	...	...	...	...	...	...
Sailor Gang Men	14	0	...	...	...	...	13	10	...	...	...	...	...	...	...	...
Conveyor Belt Men	13	6	...	...	...	...	13	4	...	...	...	...	...	...	...	...
*Horse-driver	13	6	16	0	15	3	13	4	...	...	...	...	...	...	...	...
Sanitary Man	16	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Watchman	15	0	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Smelter (Gold Room)	15	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...
General Labourer	13	6	16	0	15	3	13	4	...	...	...	...	...	...	...	...
†Winding Engine Drivers	18	0	17	3	...	...	...	...	...	...	...	...	...	...	...	...
†Winch Drivers	17	0	16	2	...	...	...	...	...	...	...	...	...	...	...	...
Other Engine Drivers	16	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...
†Locomotive Drivers	17	6	17	3	...	...	...	...	...	...	...	...	...	...	...	...
Sand Shovellers, Surface residues	17	0	...	...	...	...	13	4	...	...	...	...	...	...	...	...

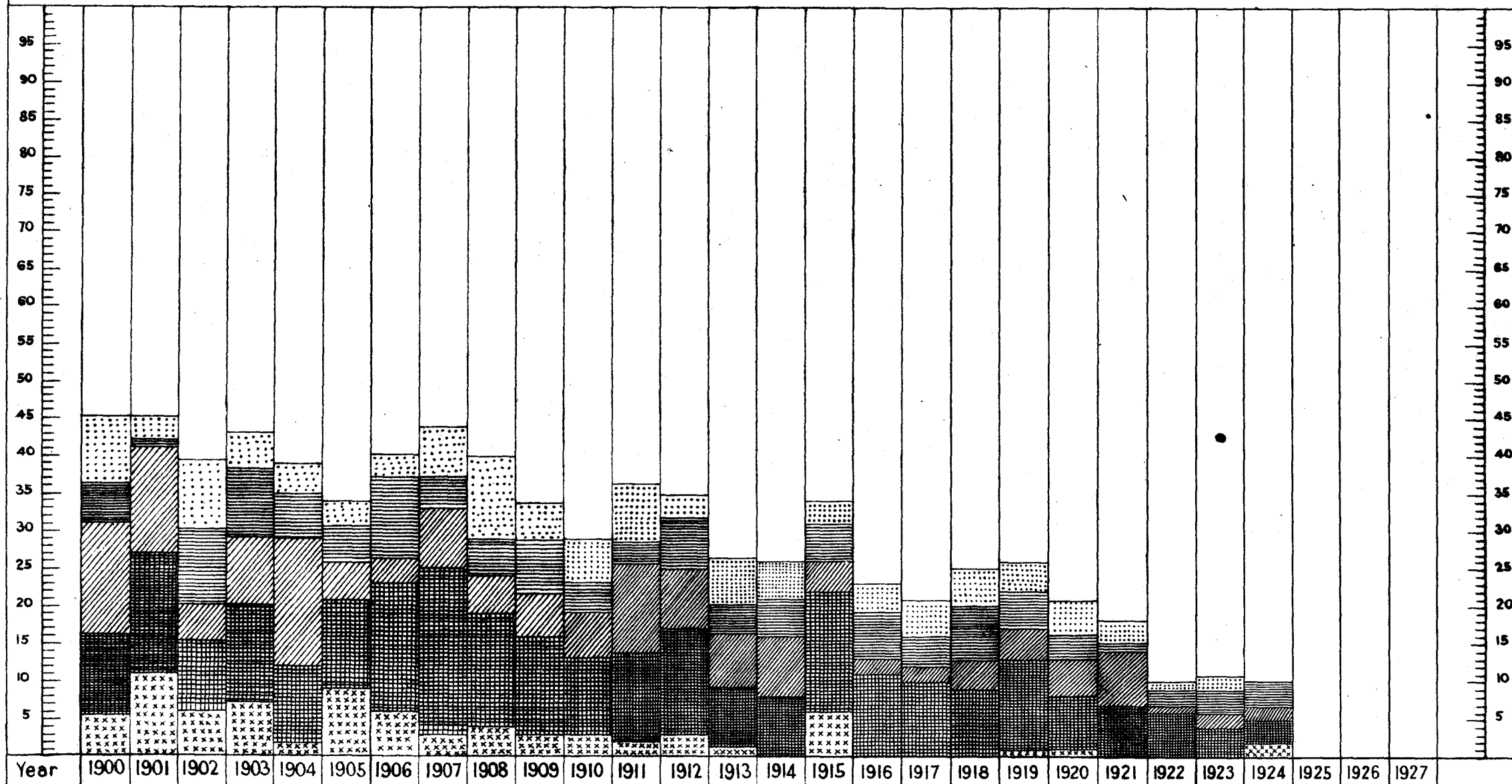
Forty-eight hours on surface and forty-four hours underground (including crib time) constitute a week's work.

*1s. per day extra for feeding and grooming horse. † 6d. per day extra if they raise or lower human beings.

† 1s. per day extra if carrying passengers.

** District Allowance, Northampton—All workers at Surprise Mine paid 1s. per day extra.

DIAGRAM SHEWING THE NUMBER OF DEATHS FROM ACCIDENTS ARRANGED IN FIVE CLASSES, IN THE MINES OF WESTERN AUSTRALIA DURING THE YEARS 1900 AND ONWARDS



EXPLOSIONS



FALLS OF GROUND



IN SHAFTS



MISCELLANEOUS UNDERGROUND



ON SURFACE INCLUDING MACHINERY

PART V.—ACCIDENTS.

TABLE No. 26.

MEN EMPLOYED IN MINES KILLED AND INJURED IN MINING ACCIDENTS DURING 1923 AND 1924.

A.—According to Locality of Accident.

Goldfield.	Killed.		Injured.		Total Killed and Injured.	
	1923.	1924.	1923.	1924.	1923.	1924.
1. Kimberley ... ..	...	...	...	...	...	...
2. West Kimberley ... ..	...	...	...	...	...	...
3. Pilbara ... ..	...	...	2	...	2	...
4. West Pilbara ... ..	...	...	...	...	...	...
5. Ashburton ... ..	...	...	...	...	...	...
6. Gascoyne ... ..	...	...	...	...	...	...
7. Peak Hill ... ..	...	...	...	...	...	...
8. East Murchison	1	...	4	1	5	1
9. Murchison ... ..	...	1	11	15	11	16
10. Yalgoo	2	...	1	...	3	...
11. Mt. Margaret ... ..	...	1	19	9	19	10
12. North Coolgardie ... ..	...	...	2	1	2	1
13. N.E. Coolgardie ... ..	...	...	...	...	...	...
14. Broad Arrow ... ..	...	...	...	...	...	...
15. East Coolgardie	7	5	198	131	205	136
16. Coolgardie ... ..	...	...	1	2	1	2
17. Yilgarn ... ..	...	...	1	1	1	1
18. Dundas ... ..	...	...	2	...	2	...
19. Phillips River ... ..	...	...	...	...	...	...
MINING DISTRICTS—						
Northampton	1	2	4	...	5	2
Yandooka ... ..	...	...	...	...	...	...
Greenbushes ... ..	...	...	...	...	...	...
Collie ... ..	...	1	62	70	62	71
Swan ... ..	...	...	...	1	...	1
Kendenup ... ..	...	...	...	...	...	...
Roelands ... ..	...	...	...	...	...	...
Total	11	10	307	231	318	241

From the above table, it will be seen that the total number of fatal accidents for the year 1924 was 10, as against 11 for 1923. The number injured shows a decrease of 76, compared with the preceding year.

Details of these accidents will be found in the report of the State Mining Engineer, published as Division II. to this report.

B.—According to Causes of Accidents.

	1923.		1924.		Comparison with 1923.	
	Fatal.	Serious.	Fatal.	Serious.	Fatal.	Serious.
1. Explosives ... ..	...	5	2	3	+ 2	— 2
2. Falls of Ground	4	34	3	21	— 1	— 13
3. In Shafts	2	6	2	5	...	— 1
4. Miscellaneous Underground	3	159	3	147	...	— 12
5. Surface	2	103	...	55	— 2	— 48
Total	11	307	10	231	— 1	— 76

Of the fatal accidents, seven occurred in gold mines, one in a coal mine, and two in a lead mine.

The death rate per 1,000 men employed in gold mines was 1.59 as against 1.54 in 1923.

TABLE No. 27.

Deaths from Accidents of Persons employed at Mines during 1923 and 1924.

	1923.						1924.					
	Number of Persons killed.			Death Rate per 1,000 men employed.			Number of Persons killed.			Death Rate per 1,000 men employed.		
	Above Ground.	Under Ground.	Total.	Above Ground.	Under Ground.	Total.	Above Ground.	Under Ground.	Total.	Above Ground.	Under Ground.	Total.
Coal Mines ... ..	...	...	...	...	...	...	...	1	1	...	1.93	1.49
Men employed	(187)	(546)	(713)	...	...	...	(155)	(518)	(673)	...	...	...
Gold Mines	1	8	9	.36	2.90	1.62	...	7	7	...	2.58	1.32
Men employed	(2,800)	(2,755)	(5,555)	...	...	...	(2,585)	(2,711)	(5,296)	...	...	...
Other Mines ... ..	...	1	1	...	7.46	4.37	...	2	2	...	12.05	6.25
Men employed	(95)	(134)	(229)	...	...	...	(154)	(166)	(320)	...	...	...
Total for all mines ...	1	9	10	.33	2.62	1.54	...	10	10	...	2.94	1.59
Total number of men employed	(8,062)	(8,435)	(6,497)	...	...	...	(2,894)	(3,395)	(6,289)	...	...	...

TABLE No. 28.

Deaths from Accidents of Persons employed at Quarries during 1923 and 1924.

Mining District.	Number of Persons employed.		Number of Persons killed.		Death Rate per 1,000 men employed.			
					Above Ground.		Total.	
	Above Ground.	Total.	Above Ground.	Total.	1923.	1924.	1923.	1924.
Swan	308	321	308	321	...	...	...	...
Roelands	18	16	18	16	...	...	...	...
Total	326	337	326	337	...	...	...	...

TABLE No. 29.

Deaths from Accidents of Persons Employed in Gold Mines during 1924, and the Death Rate per 1,000 Men Employed and per 1,000 tons of Gold Ore raised during 1923 and 1924. (Number of men taken as in Table No. 23, not including Alluvial Gold Workers.)

Goldfield.	Number of Deaths.			Death Rate per 1,000 men employed.				Number of Deaths per 1,000 tons of Gold Ore raised.	
	1924.			1924.		1923.		1924.	1923.
	Above Ground.	Under Ground.	Total.	Above Ground.	Under Ground.	Total.	Total.		
1. Kimberley
2. West Kimberley
3. Pilbara
4. West Pilbara
5. Ashburton
6. Gascoyne
7. Peak Hill
8. East Murchison	4.76	...	.057
9. Yalgoo	12.74	...	.182
10. Mt. Margaret	1	1	...	4.65	2.19	...	.011	...
11. North Coolgardie
12. North-East Coolgardie
13. East Coolgardie	5	5	...	3.16	1.75	2.09	.008	.010
14. Broad Arrow
15. Coolgardie
16. Murchison	1	1	...	5.52	2.76	...	.026	...
17. Yilgarn
18. Dundas
19. Phillips River
Total	7	7	...	2.58	1.37	1.68	.009	.008

The number of deaths per 1,000 men employed shows a decrease from 1.68 in 1923, to 1.37 in 1924, and that per 1,000 tons of gold ore raised shows a slight increase, being .009 as against .008 for the preceding year.

PART VI.—STATE AID TO MINING.

The number of State Batteries existing at the end of the year was 29.

From inception to the end of 1924, gold and tin to the value of £5,862,551 have been recovered from the State plants; 1,401,782 tons of auriferous ore have been treated and have produced £4,771,663 by amalgamation; £723,029 by cyanidation; £265,351 worth by slimes treatment; £9,353 worth from residues, and 80,460 tons of tin ore produced tin to the value of £92,682, and in addition a sum of £572 has been recovered from residues.

During the year the gold ore treated was 18,063 tons for 18,515.88 ozs. bullion.

The working expenditure for all plants for the year totalled £32,692 9s. 7d., and the revenue £22,347 0s. 4d., which shows a loss of £10,345 9s. 3d. on the year's operations.

The capital expenditure since the inception of the scheme has been £401,586 5s. 8d.; £309,605 4s. from General Loan Fund and £91,981 1s. 8d. from Consolidated Revenue.

The cost of administration for the year was £3,340 9s. 8d., as against £3,511 0s. 7d. for 1923. The working expenditure from inception to the end of the year exceeds the revenue by £134,499 13s. 7d.

GEOLOGICAL SURVEY.

As has been the case in the previous year, the operations of the Survey during 1924 have been somewhat restricted, though a considerable amount of useful and constructive work has been carried out.

In addition to the usual routine work of the office, the following field work has been performed:—

1. A geological reconnaissance by the Government Geologist of a portion of the South Coast, to the Eastward of Esperance, and to the Northward of Israelite Bay, Eucla Division.
2. A traverse by the Government Geologist of the country from Bullabulling to Red Hill, near Lake Lefroy, in relation to its bearing upon the geological survey of the East Coolgardie Goldfield.

3. A survey of the mining centre of Paynesville and the surrounding district, in the Murchison Goldfield.

4. A detailed examination of the North End of Kalgoorlie.

ASSISTANCE UNDER MINING DEVELOPMENT ACT, 1902.

The following statement shows the sums advanced during the year 1924 under "The Mining Development Act":—

	£	s.	d.
Advanced in aid of mining work and equipment of mines with machinery	23,456	12	1
Subsidies on stone crushed for the public	173	10	3
Boring	865	6	0
Providing means of transport and equipment to prospectors	5,723	5	0
	<u>£30,218</u>	<u>13</u>	<u>4</u>

In addition to the above, the vote was charged with £68,349 4s. 2d., rebates made to Goldfields Water Supply Branch consequent upon reduction of the price of water on the Eastern Goldfields. This arrangement dated from 1st July, 1923. Other assistance granted from the Vote during the year on various matters totalled £2,908 7s. 10d.

The subsidies paid on stone crushed for the public amounted to £173 10s. 3d., and are subsidies paid to owners of plants crushing for the public, the conditions being that they crush at fixed rates. The ore crushed during the year at these plants totalled 1,798.75 tons.

The receipts under the Mining Development Act, exclusive of interest payments, amounted to £2,819 4s. and included:—

	£	s.	d.
Refund of Advances ..	1,958	7	6
Sale of Securities ..	500	12	2
Miscellaneous Refunds ..	360	4	4
	<u>£2,819</u>	<u>4</u>	<u>0</u>

PART VII.—REMARKS ON THE GOLDFIELDS AND MINERAL DISTRICTS AND SUMMARIES OF THE WARDENS' AND OTHER OFFICERS' REPORTS.

ASHBURTON GOLDFIELD.

Three (3) fine ounces of gold were reported, and in the preceding year nine (9) fine ounces, got by fossickers. Practically no mining has been done for years.

BROAD ARROW GOLDFIELD.

The output of gold was 2,661 fine ounces, and in the preceding year 2,741 ounces; a decrease of 80 fine ounces. Prospecting and general development work was retarded on account of the drought conditions which obtained, nevertheless the output was little short of last year, which must be considered satisfac-

tory. At Ora Banda the future outlook is encouraging.

COLLIE COAL FIELD.

The output of coal for the year was 421,864 tons, and in the preceding year 420,714 tons, an increase of 1,150 tons.

Five (5) collieries were producing, viz.:—The Proprietary, Co-operative, Cardiff, Westralian, and Premier.

None of the mines was working at its full capacity, the output being kept to the required production. The district is a prosperous one, and its prosperity was well maintained throughout the year,

COOLGARDIE GOLDFIELD.

The output of gold was 10,243 fine ounces, and in the preceding year 13,077 fine ounces; a decrease of 2,834 fine ounces.

In the Kunanalling district, the output was practically the same as in 1923, and several mines were regular producers.

At Gibraltar, the Lloyd George Mine was being worked by tributers, and this is likely to continue for some time, at least until further capital is available for opening up.

At Widgiemooltha and in the immediate vicinity of Coolgardie, a little prospecting was being carried out.

At St. Ives several mines have been producing, but an adequate water supply has retarded work.

In the other centres there was little change.

DUNDAS GOLDFIELD.

The output of gold was 3,429 fine ounces, and in the preceding year 6,358 fine ounces; a decrease of 2,929 fine ounces. There was little change in this field, but operations were doubtless adversely affected by the prevailing drought.

EAST COOLGARDIE GOLDFIELD.

The output of gold was 336,099 fine ounces, and in the preceding year 370,670 fine ounces; a decrease of 34,571 fine ounces.

The principal happening of note was the absorption by the Lake View and Star Ltd., of the mine and assets of the Ivanhoe Gold Corporation, Ltd. This resulted in a temporary lessened output from the latter, but ultimately the amalgamation is expected to result in many advantages.

At most of the other large mines, the production has been well maintained.

At Mt. Hunt, a new find caused a good deal of attention to be centred on that locality, and hopes are entertained that something good may be revealed.

At the North End steady progress has been made.

At Mt. Monger, in the Bulong District, mining was fairly active and the outlook is very encouraging.

EAST MURCHISON GOLDFIELD.

The output of gold was 4,897 fine ounces, and in the preceding year 11,016 fine ounces; a decrease of 6,119 fine ounces.

In the Black Range district, mining at Sandstone has been exceedingly quiet, likewise at Youanmi where efforts to re-open the old mine came to naught.

At Curran's, the efforts of the party working the Red, White and Blue Mine were fruitless.

In the Lawlers district there was a falling off consequent on the closing down of the Daisy Queen and Waroonga Mines. In the latter case it is expected to be only temporary.

At Mt. Sir Samuel a small amount of prospecting was in evidence.

In the Wiluna district a considerable amount of boring was carried out and it is now proposed to sink a shaft to definitely establish the values disclosed by the drill. If the results are satisfactory there is a big future for this district.

During the year a new find was reported about 50 miles North-East from Sir Samuel, but results were somewhat disappointing. Later, two other finds, about 14 and 16 miles North, respectively, from this one were reported and the reports from these are more encouraging.

At Cole's Find there was a good deal of activity and the outlook is promising.

GASCOYNE GOLDFIELD.

There is no mining on this field at present. Three (3) fine ounces were reported, presumably got by fossickers, but none in the preceding year.

GREENBUSHES MINERAL FIELD.

The output of black Tin was 52.56 tons, valued at £7,469, and in the preceding year 28.02 tons, valued at £3,024; an increase in tonnage of 24.54 tons, and in value of £4,445.

Steady work was carried out on several claims, and if a payable price for tin is maintained prospects are brighter than they have been for some time.

KIMBERLEY GOLDFIELD.

Thirteen (13) ounces of fine gold were reported, and in the preceding year 31 fine ounces. Nothing of note was reported. Owing to an exceptionally dry season, the year was a bad one for prospecting.

MOUNT MARGARET GOLDFIELD.

The output of gold was 43,705 fine ounces, and in the preceding year 26,876 fine ounces; an increase of 16,829 fine ounces.

In the Mt. Margaret district there was an increase consequent on the treatment of accumulated sands at the Lancefield Mine. In the various centres there was a good deal of prospecting but nothing of note reported.

In the Mt. Morgans district there was a slight decrease.

The principal producer was, as hitherto, the Westralia Mt. Morgans Mine. In the outlying districts a few mines were working.

In the Mt. Malcolm district there was an increase consequent on the improved output from the Sons of Gwalia Mine. There was a good deal of prospecting throughout the district but no finds of promise were made.

MURCHISON GOLDFIELD.

The output of gold was 24,425 fine ounces, and in the preceding year 27,037 fine ounces; a decrease of 2,612 fine ounces. In the Meekatharra district there was a falling off, but indications point to an improved output in the near future. In the outlying centres a little prospecting was going on.

In the Cue district there was a falling off and matters were very quiet. In the immediate vicinity of Cue some excitement was created by the unearthing of very rich specimens on the Monte Carlo Bank lease. The mine was sold to a Company, but whether development work will reveal a continuance of good values remains to be seen. At Reedy's the Mararoa Company has exercised an option it had over a property and has been carrying out a vigorous policy of development with encouraging prospects.

In the Day Dawn district there was a small decrease and work was mostly confined to the old Fingall Mine.

At Lake Austin a party has commenced to re-open the old Mainland Consols Mine.

In the Mt. Magnet district there was an increase, and from several leases there were very satisfactory crushings but nothing sensational.

NORTHAMPTON MINERAL FIELD.

The output of lead ore was 36,750 tons, valued at £101,219; and in the preceding year 21,634.50 tons, valued at £59,194; an increase in tonnage of 15,115.50 tons, and in value of £42,025. Copper ore to the extent of 10,672 tons, valued at £34,955 was also produced, and in the preceding year 9,626.29 tons, valued at £59,143; an increase in tonnage of 1,045.71 tons, and decrease in value of £24,188.

During the year the price of lead appreciated very considerably, with the result that many mines re-opened. The principal producer of lead was the Surprise Mine at Galena, and of copper, the Narra Tarra Mine at Protheroe. If the price of lead remains good, which seems likely, the outlook for this field is excellent.

NORTH COOLGARDIE GOLDFIELD.

The output of gold was 9,509 fine ounces, and in the preceding year 12,213 fine ounces; a decrease of 2,704 fine ounces. The Menzies district was practically responsible for the decrease consequent on reduced output from the principal producer, the Menzies Consolidated Mine at Yunnadaga.

At Comet Vale work was resumed on the Gladstone and Sand Queen Mines, which were acquired under option by the Bullfinch Proprietary (1919) Ltd., and unwatering had not been completed at the end of the year.

At Mt. Ida there was little change.

In the Ularring district, as also in the Niagara and Yerilla districts, mining was exceedingly quiet.

NORTH-EAST COOLGARDIE GOLDFIELD.

The output of gold was 4,691 fine ounces, and in the preceding year 4,714 fine ounces; a decrease of 23 fine ounces. There was little change in this field and no developments of note were reported.

PEAK HILL GOLDFIELD.

The output of gold was 2,113 fine ounces, and in the preceding year 1,700 fine ounces; an increase of 413 fine ounces. Although a fair amount of prospecting is going on at the various centres, there was little change in this field, and no noteworthy finds were reported.

Every effort is being made to raise necessary capital for the proper development of the manganese deposits at Horseshoe, and at time of writing the prospects of accomplishing this were good.

PHILLIPS RIVER GOLDFIELD.

The output of gold was 145 fine ounces, and in the preceding year 375 fine ounces; a decrease of 230 fine ounces.

Copper ore to the amount of 3.69 tons, valued at £44, was produced, and in the preceding year 26.01 tons, valued at £541; a decrease in tonnage of 22.32 tons, and in value of £497.

Gold mining is practically at a standstill, and the position in regard to copper mining was not much better. Hopes are now centred on a company, called Copper Separation Limited, which has acquired some properties and is erecting a plant,

from which much is expected. If its anticipations are realised, the advantages to this field will be considerable. It is hoped to have the plant going early in the New Year.

PILBARA GOLDFIELD.

The output of gold was 2,134 fine ounces, and in the preceding year 2,544 fine ounces; a decrease of 410 fine ounces.

Black tin to the amount of 28.55 tons, valued at £4,048, was produced, and in the preceding year 24.40 tons, valued at £2,960; an increase in tonnage of 4.15 tons, and in value of £1,088.

Also 73.58 tons of asbestos, valued at £2,206, and in the preceding year 114 tons, valued at £4,015; a decrease in tonnage of 40.42 tons, and in value of £1,809.

In gold mining the principal production was from Marble Bar, Bamboo Creek, Dalton, Lalla Rookh and Eastern Creek. The decreased output was attributable to the closing down of the Lalla Rookh and McLeod's Reward Mines.

In tin mining the position showed little alteration.

Asbestos mining was limited to the Lionel centre in the Nullagine district, but the uncertain market has prevented much activity, although an improvement is anticipated.

Some attention is being directed to the silver lead deposits on the Oakover River, about 80 miles east of Marble Bar, and which appear to justify development.

WEST PILBARA GOLDFIELD.

The output of gold was 76 fine ounces, and in the preceding year 64 fine ounces; an increase of 12 fine ounces.

Copper ore amounting to 79 tons, valued at £1,012, was produced, and in the preceding year 221 tons valued at £3,500; a decrease in tonnage of 142 tons and in value of £2,488.

The continued low price ruling for copper militated against any increased activity in this field, the principal producer being the Whim Well Copper Mine.

WEST KIMBERLEY GOLDFIELD.

There was no gold output from this field and only a little prospecting going on.

Boring for oil is still in progress and the company carrying it out is very hopeful of success.

The iron deposits at Yampi Sound are still unworked, the necessary capital not having yet been made available, although there is a reasonable prospect that it will be shortly.

YALGOO GOLDFIELD.

The output of gold was 5,611 fine ounces, and in the preceding year 7,713 fine ounces; a decrease of 2,102 fine ounces. This is principally attributable to the closing down of the Gnow's Nest Mine, which was sold and is now being worked by the purchasing company, assisted by the Government.

At Field's Find several prospectors were working, and a small plant is being erected which should be a good help. At the various other centres the position was about maintained.

YILGARN GOLDFIELD.

The output of gold was 8,451 fine ounces, and in the preceding year 8,376 fine ounces; an increase of 75 fine ounces.

At Southern Cross work on the old Fraser's

Central Mine was abandoned, the results not coming up to expectations.

At Manxman the Radio Mine continued production and a good deal of attention was attracted to this locality.

At Burbidge the Great Victoria Mine is being worked steadily, and it is understood that the outlook is very good.

At the various other centres a good deal of prospecting was being carried on.

PART VIII.—EXISTING LEGISLATION.

At the close of the year the Acts in force relating to Mining were:—

1. The Mining Act, 1904.
2. Mining Act Amendment Act, 1919.
3. Mining Act Amendment Act, 1920.
4. Mining Act Amendment Act, 1921.
5. Mining Act Amendment Act, 1923.
6. Sluicing and Dredging for Gold Act, 1899.
7. Mines Regulation Act, 1906.
8. Mines Regulation Act Amendment Act, 1915.
9. Coal Mines Regulation Act, 1902.
10. Coal Mines Regulation Act, 1915.
11. Mining Development Act, 1902.
12. Mining Development Act Amendment, 1924.
13. Mines and Machinery Inspection Act, 1911.
14. Gold Buyers Act, 1921.

The following alterations, etc., regarding Regulations were gazetted under **The Mining Act, 1904**:—

- Additional Regulation 86c.
- Additional Clause (15), Regulation 40b.
- Amendment of Regulation 140.
- Amendment of the form No. 58 in the schedule.
- Amendment of Regulation 212.
- Amendment of the form No. 58 in the schedule.
- Additional form No. 58a in the schedule.
- Amendment of Regulation 214.
- Amendment of Regulation 214a.

Under the **Mines Regulation Act, 1906**:—

- Additional Clause 11, Division 2, of Regulation 15.

PART IX.—INSPECTION OF MACHINERY.

The Chief Inspector of Machinery reports that the number of useful boilers at the end of the year totalled 3,199 as against 3,135 total for the preceding year, showing an increase, after all adjustments, of 64 boilers.

Of the total 3,199 useful boilers, 1,507 were out of use at the end of the year; 1,598 thorough and 164 working inspections were made, and 1,606 certificates were issued.

Permanent condemnations totalled 25, and temporary condemnations 96. There were no conversions, and 16 boilers were transferred beyond the jurisdiction of the Act.

The total number of machinery plants in use was 5,563, against 5,215 for previous year, showing an increase of 348.

Inspections made total 4,169, and 3,718 certificates were granted.

195 applications for engine-drivers' and boiler attendants' certificates were received and dealt with, and 164 certificates, all classes, were granted as follows:—

Winding Competency (including certificates issued under Regulation 40 and Section 60)	2
First Class Competency (including certificates issued under Regulations 40 and 45, and Sections 60 and 63)	8
Second Class Competency (including certificates issued under Regulation 40 and Section 60)	11
Third Class Competency (including certificates issued under Regulation 45 and Section 63)	25
Locomotive Competency	4
Traction Competency	10
Internal Combustion Competency	10
Internal Combustion Service	2
Crane and Hoist Competency	8
Crane and Hoist Service .. .. .	..
Boiler Attendant's Competency	46
Boiler Attendant's Service .. .. .	..
Interim	5
Copies	11
Transfers	22
Total	164

Total mileage travelled was 41,652 miles, of which 16,980 were by rail, 24,666 by road, and 6 by water.

PART X.—SCHOOL OF MINES.

During this, the twenty-first year of the School's existence, the position was well maintained.

The attendance during the first term was practically the same as in the previous year, but during the year (in a large measure owing to the unsettled condition of the mining industry) it fell away a good deal.

The students and staff worked steadily and the standard of classwork was very satisfactory. The work carried out is referred to in detail in the report of the Director, published as Division V. of this report.

The system of free assays for prospectors was continued, and during the year a total of 366 assays and mineral determinations was made.

CONCLUSION.

In dealing with the operations of the various departments, I have only briefly commented on the principal items. Full and detailed information will be found in the reports of the various responsible officers, published as Divisions II. to VIII. of this report.

In conclusion, I desire to acknowledge the loyal support received from all officers of the department during the year.

I have, etc.,

M. J. CALANCHINI,

Under Secretary for Mines.

Department of Mines,

Perth, 31st March, 1925.

DIVISION II.

REPORT OF THE STATE MINING ENGINEER FOR THE YEAR 1924.

Office of the State Mining Engineer,
Perth, 31st January, 1925.

The Under Secretary for Mines, Perth.

Sir,

I have the honour to submit, for the information of the Hon. the Minister, my Annual Report for the year 1924:—

INSPECTION OF MINES UNDER "THE MINES REGULATION ACT, 1906," AND "THE COAL MINES REGULATION ACT, 1902."

The personnel of the Inspection Staff of my Branch remained the same as in the preceding year. On the 21st January, Mr. Inspector Phoenix left for South Africa for the purpose of enquiring into the prevalence and prevention of Miner's Phthisis in the mines of that State, and after his return his report was published in Bulletin form. Mr. J. McVee, Inspector of Mines, Collie, was granted long service and annual leave in October, and, during his absence, Mr. H. M. Sweeney carried out the duties of the position satisfactorily.

Workmen's Inspectors of Mines.—Owing to the resignation of Mr. J. Goggin at the end of 1923 an election was held in January, 1924, for a Workmen's Inspector of Mines for the Murchison and Northampton Districts, resulting in the appointment of Mr. R. P. McMennemin on the 14th March, 1924.

Elections were also held in October for the East Coolgardie and Leonora Districts, the period of two years for which the inspectors were appointed having expired, resulting in the appointment on the 18th December of Mr. R. A. Jones and the re-appointment of Mr. L. C. Darcey for the Kalgoorlie District, and the re-appointment of Mr. C. Byfield for the Leonora District.

REPORTS OF INSPECTORS OF MINES.

REPORT OF MR. W. F. GREENARD, INSPECTOR OF MINES, KALGOORLIE.

I have the honour to submit my Annual Report, for the information of the Honourable the Minister for Mines, on the working of the Mines Regulation Act and Amendments on the East Coolgardie, North-East Coolgardie, North Coolgardie, Coolgardie, Broad Arrow, and Dundas Goldfields.

A systematic routine inspection of all working mines on the above goldfields has been maintained throughout the year. The ventilation in all mines has received the sole attention of one inspector. The dust underground and on surface has also received constant attention from five different inspectors. Damping appliances have been made available in all working places. Shrink stopes are the cause of a good deal of dust from firing that cannot be minimised. Many methods and ideas have been tried without

effect. Shrink stopes when being drawn from are a source of continuous "sand blasting." Dust and smoke are forced to the airways, and there does not appear any remedy other than the regulating of firing to fixed periods in the shift working.

The storage of dynamite and detonators, and the receptacles for holding same in mine workings, have been constantly under supervision.

Cages, ropes, and safety hooks are carefully inspected, and records are made of all tests.

The change-rooms on the various mines have been constantly inspected and kept in good order.

The sanitation of both surface and underground workings has been kept up to a good standard.

During the year there has been a good deal of creeping in the workings on the western belt. This must be expected; as the ore becomes exhausted pillars left are bound to snap, causing a good deal of noise and the immediate neighbourhood to tremble. There is a good deal of side pressure, and unless the timber in levels is constantly repaired the levels are bound to close up.

I would recommend the following to the consideration of the Mines Department to further improve the underground workings of mines:—

"That in-take air and up-take air be completely divided, and that men be only allowed to travel to and fro to work in in-take air. That firing explosives be regulated to an agreed period on each shift."

The Great Boulder Proprietary, Ivanhoe, and Golden Horseshoe have continued to deplete their reserves of pay-ore. A good deal of development work has been done in these mines without disclosing any great quantity of pay-ore. There is a large tonnage of ore left in the stopes which contains values, but the grade is too low to pay with the increased cost of mining.

The South Kalgurli has done considerable development at 16-17 and 1,800 feet levels. A shoot of very high grade ore has been disclosed in the 16 and 1,700 feet levels. It is being looked for at the 1,800 feet level. The mine has been equipped with new winding engine and boiler plant, also with a large electrically-driven air compressor, which is showing good economy.

The Lake View Star and Chaffers Mines have taken over the Ivanhoe Mine. The new dry-crushing plant is being added to with the view of increasing its capacity from 7,000 tons to 15,000 tons per annum. The Oroya Links, Brown Hill, Eclipse and Kaituma Mines are being worked chiefly by tributaries.

At the North end during the year a good deal of prospecting has been done. The Great Boulder Proprietary are now engaged sinking winzes below the 1,800 feet level in the Hannans North Mine. This mine

is being continuously worked, and the ore is treated at the Great Boulder Proprietary's plant.

At Broad Arrow and Bardoc a good deal of prospecting is being done.

At Ora Banda the Associated Northern have commenced treating a large quantity of ore raised during the recent long dry period through which this locality passed in 1924. The whole of the dams have recently been filled, and there is a supply of water for immediate requirements.

At Kanowna a good deal of prospecting has been done. The Red Hill Company have been working good payable ore.

At Bulong and Mt. Monger a fair amount of prospecting has been carried on. McCahon's Great Hope Mine has been developed to the 300 feet, and the lode shows good gold.

Mining generally is depressed. There has been a considerable amount of prospecting and development done this year assisted by the Mines Department. So far very little high grade ore has been located, and with present costs—about 68 per cent. over pre-war costs—the outlook is anything but reassuring. There is a very great need of a complete review of the whole industry with a view to give it that assistance that will save it from extinction.

REPORT OF E. J. GOURLEY, INSPECTOR OF MINES,
KALGOORLIE.

I have the honour to submit to you my Annual Report for the year ending 31st December, 1924.

Complete inspections have been made of the following mines and districts: Kanowna 5, Kunanalling 4, Menzies 11, Horseshoe 3, Black Hills, Mt. Monger 6, Bulong, Mt. Magnetic 3, Coolgardie District 5, North End Mines 6, Great Boulder 5, Eclipse 2, South Kalgurli 7, South End Mines 2, Boulder Alluvial 2, Lake View 6, Ivanhoe 3, Perseverance 5, Dry Mills 8, Riverina and Ularring 1, Chaffers and Star 4, Associated 4, Oroya North Blocks 3, Kalgurli 4, Hampton Plains 3, Balgarrie 1, Ora Banda and Lady Evelyn 5, Brown Hill 4, Binduli 1, General Gordon 1, Waverley 6, Randells 1, St. Ives 2, Burbanks 2, North Kalgurli 2, Jubilee and Kurnalpi 1, Comet Vale 3, Broad Arrow 6, Paddington 2.

DEVELOPMENT.

During the year the *South Kalgurli Mine* has done 2,439ft. of driving, 419ft. of crosscutting, 382ft. of winzing, or a total of 3,240ft., at a total cost of £17,504 3s. 2d., compared with 2,537ft., costing £14,088 9s. 11d., in 1923; 1,956ft., costing £10,892 6s. 1d., for 1922; and 1,537ft., costing £10,546 16s. 4d., for 1921. This is a very substantial advance.

The majority of driving done has opened up large reserves of pay ore. Of course some of the ore has been of very low grade, but some very rich, notably the southern portions of the 1,400ft., 1,600ft., 1,700ft. levels, and the 1,800ft. level, has been opened up again after many years, the water taken out, shaft cleaned out, plats cut on both sides of the shaft, and a start made to drive the level south on what is known as the Lake View lode.

The company has also arranged to bail the water which flowed into their mine from the Kalgurli, Brookman's Boulder, and North Kalgurli mines,

using the North Kalgurli winder boiler and shaft to do the work. Consequently, these mines are dry from the 1,000ft. level in the North Kalgurli, and the 1,800ft. level in the Kalgurli and South Kalgurli, and the Perseverance mine has now only its own mine water to contend with.

The South Kalgurli has also been making extensive improvements in the surface machinery, such as installing a more powerful winding engine on the main shaft, and a new electrically driven air compressor; all rock drills, except those used in winzes, are water Leyners. These have had a very beneficial effect in the laying of dust. Steam, except for the winders, will soon be entirely dispensed with.

Oroya-Brown Hill Group.—Development work in the Kalgurli mine has been very limited, and no wages men are employed underground, or at the Oroya North Blocks. These workings have been opened up again at the 1,100ft. level by a tribute party, with payable results, from stripping an old stope.

Brown Hill.

The tributes, with the exception of two parties fossicking about the main ore pipe for rich telluride leaders, have been terminated and the company are treating oxidised ore, which has been crushed by pressure from the 200ft. level upwards, with varying results. It is, I understand, the intention to open out this ore eventually.

At the *Croesus Proprietary Mine* the work of cleaning up has been completed, and stoping is being done from 1,000ft. backs in all levels up to the 400ft. Values on the whole are low grade.

Kalgurli Mine.—This has been in the hands of tributers, who have been doing fairly well in the oxidised over the 100ft. level, and some development work has been done at 1,700ft., which did not open up any values to pay tributers.

Other parties have been content to confine their operations to taking out pillars or blocks of ore in the old workings, and some good returns have been obtained.

The company have started to do some development work now at the 400ft. and 800ft. levels out east, to try to pick up a continuation of the Associated lodes.

The treatment plant is kept running from these mines with about 60 per cent. of tributers and public crushings from outside, the remainder being the company's own ore. Five head of stamps have been put in order on the Brown Hill mine, and the flotation process is being experimented with, using the oil "Pyridine." So far investigations are not completed.

Development work done on this group of mines for the years 1923-24 amounts to 2,314ft., consisting of 318ft. of shaft sinking, 1,374ft. driving, 365ft. crosscutting, 256ft. winzing, some of which has been done by tributers.

Great Boulder Proprietary Mine.—During the year 1923, 1,050ft. of driving, 59½ft. of crosscutting, 206ft. of rising, 117½ft. of winzing was done, or a total of 1,438ft.; and in the year 1924, 825½ft. of driving, 230ft. of crosscutting, 278½ft. of rising, 297ft. of winzing was done, or a total of 1,631ft.

The development work done last year has opened up some very fair grade ore in places, notably going back to the shallow levels, that is, from 1,000ft. upwards from the main and Lane's shafts, and above the 1,200ft. in Hamilton's shaft. The stopes on the main reef are gradually being depleted; they are, however, still turning out a considerable quantity of ore, but the grade throughout the mine has been reduced to some extent.

Hammans North Mine (Great Boulder Company).—The development work for the year 1924 is 280½ft. of driving, rising 77ft., winzing 243ft., or a total of 600½ft. This work has been done on the 600ft. level and below the 600ft. chiefly, and has opened up a good quantity of pay ore.

O.K. Mine, Norseman (Great Boulder Company).—During the year 1923, 364ft. of driving on the reef at the 200ft. and 300ft. levels was done; and in 1924, 373ft. of driving, 18ft. of crosscutting, and 12ft. of winzing has been done, or a total of 403ft., making a total from these three mines of 1,802ft. for 1923, and 2,634½ft. for 1924.

The reef in the O.K. mine averages about 15in., but the values are good, and regular shipments of ore are being sent to the Great Boulder Proprietary G.M. plant for treatment. (This mine has now been closed down.—Ed.)

Boulder Perseverance Mine.—The development work in 1924 was: driving 1,476½ft., 611ft. of crosscutting, 252ft. of winzing, 62ft. of rising. Portion of this work has been done by assisted tributers. This shows a considerable improvement on the 1923 figures of: driving 49ft., crosscutting 12½ft., winzing 63ft., rising 60½ft.; total 185ft.

Some of the tributers have been doing very well, but during the last few months the grade has come down considerably, notably Lillis and party's tribute below the 1,450ft. level, No. 6 shaft, where a big tonnage of high-grade ore was discovered near the Lake View boundary, and this was underhand stoped for a length of 150ft. over a width of 10ft. to a depth of 50ft., when values, although the lode is still going down, would not pay the tributers to work.

At present the ore being treated from the mine is about 60 per cent. tributers, and 40 per cent. being mined by the company. This mine appears to me to still have a long and profitable life.

Associated Gold Mines of W.A., Ltd.—The development work for 1923 was 245½ft. of driving, crosscutting 40ft., rises and winzes 153¾ft., or a total of 439½ft.; while in 1924, driving 505½ft., crosscutting 386¾ft., rises and winzes 144ft. was done, or a total of 1,036ft. In addition to which 1,178ft. in 1923 and 1,968¾ft. in 1924 of diamond drilling was done.

This work has been chiefly at the 1,500ft. and 1,600ft. levels, but the diamond drilling has been done to some extent in shallow levels. The ore bodies opened up have been very short, and while values have been payable in some places the ore generally has been low-grade, and up to date the rich ore being worked in the South Kalgurli almost up to the boundary has not been discovered in this mine.

Golden Horseshoe Estates Co., Ltd.—The main shaft has been sunk a further depth of 102ft., or a total of 3,300ft.; plats have been cut and driving on the lode started. So far, I am informed, the

values are low, but as they have a distance of 1,500ft. to drive before reaching the southern boundary values may be struck at any time.

In addition, 1,058½ft. of driving, 255½ft. of crosscutting, 14½ft. of rising, 552ft. of winzing has been done, compared with driving 531ft., rising 4ft., winzes 362ft. for 1923, or totals 1,982½ft. for 1924 and 897ft. for 1923.

This development work has been done chiefly on the levels below the 2,800ft. level to the 3,300ft. level, and while values have not been high they have been satisfactory.

Lake View and Star, Chaffers, and Ivanhoe Mines.—The above are now under the one management, and extensive alterations and additions have been made and are still being carried out to the surface plant on the Lake View, Ivanhoe, and Chaffers leases.

The development work done is chiefly on the Lake View mine from the 1,400ft. level down to the 2,300ft. level.

During 1923, 1,881ft. of development, 497ft. of diamond drilling, and 900 cubic feet of plat cutting was done; and in 1924 to 30th November, 2,566ft. of development and 1,400 cubic feet of plat cutting has been done.

This development work appears to me to have been satisfactory, for winzes have been sunk for ventilation, leading stopes taken off and timbered, and since the mill on the Chaffers mines has been started stoping has been carried on.

The water in the *Star Mine*, which was allowed to rise in the bottom levels, is now being bailed, and a few contract parties are again employed in breaking ore above the 900ft. level.

The *Chaffers Mine* is entirely manned by tributers, chiefly from the 300ft. level upwards, and some of the parties have been doing well.

The *Ivanhoe Mine* has been closed down for some time during the year, but during the last four months a tramline to convey the ore from the mine across the Great Boulder lease to Chaffers mill (*which, by the way, is being duplicated to double the tonnage now being treated*) has been built, and a considerable quantity will come from this mine in the near future.

In the meantime a good number of men are employed putting in new air mains, filling stopes, repairing timbers, etc., preparing to start operations.

The milling plant is being dismantled, and cleaned up with fair results, and large quantities of the timber, iron, and some of the machinery are being used on the Chaffers plant. Also, the general offices of this group of mines are now in the Ivanhoe buildings.

The wet crushing mill on the Lake View has also been dismantled and is being cleaned up, and some payable ore has been discovered under the foundations, the extent of which is not known at present.

Boulder No. 1, now known as the Enterprise Mine, was taken up by a local syndicate, and is managed by Mr. T. Greenhill, the following parcels having been treated: June, 22 tons 18 cwt.; August, 107 tons; September, 92 tons; October, 172 tons; November, 168 tons; December, 172 tons; total, 732 tons, of an average value of 41s. per ton.

A party of eight men are at work, and Mr. Williams, the General Manager of the Perseverance Mine, has bought a share in the syndicate on behalf

of his company. He has also bought a share in the Bank of England lease, owned by Oliver Hancock, but only two men are employed at present prospecting the levels above water at 400ft. level.

Paringa Company.—This company during the year have put out a diagonal crosscut north-east from the 200ft. level to prospect for the lode from which tributars have obtained payable crushings down to 80ft.

However, although the lode was cut with low values, I am of opinion that sufficient driving was not done to prove it. The mine is again in the hands of tributars.

North Kalgurli G.M.—This mine is still the same as it has been for years—manned by tributars, and two parties have been doing well on the east boundary, but other parties scattered over the surface down to 100ft. are just making a living.

It is to be regretted that this company either cannot find the money now the water is being kept out at no expense to them down to the 1,000ft. level to do some work at the lower levels, or will not let anyone else have a chance to develop them.

The small mines around Kalgoolie have not discovered anything of any note, with the exception of the *Yorkshire Rose*, situated on the old Hannans Reward North mine, which struck a very rich pipe of ore on the North End of Raven's old open cut, and it is still developing satisfactorily, but tonnage is small.

The Yorkshire Rose South has also cut good values in a shaft about 400ft. south. The gold appears to me to be contact, and pieces, up to 3 and 4 ozs., have been obtained.

The Paymaster Mine, situated to the north of the Yorkshire Rose across the Trans. and Kanowna railways, has been worked under option by the *Brown's Reward Company*, and a good quantity of development work has been done at the 90ft. level. Results, from the company's point of view, were disappointing. The option has been abandoned.

I accompanied Mr. Howe, Superintendent of State Batteries, around all the mines from the Brown Hill North to beyond the Tea Gardens with a view to obtaining the quantities of ore available for a treatment plant, and having perused Mr. Howe's report I regret that I must agree with his recommendations.

Kanowna.

The Red Hill Company sunk a new shaft to the 100ft. level and holed to the stope, which improved the hauling way to some extent. However, the reef has now dipped away from the shaft at a very flat angle and double haulage is again being done. Regular crushings are going through Martin's Battery, which this company has leased, and a dividend of 6d. per share has been paid.

They have picked up the reef beyond the main fault, which runs through this hill, and samples tried on my last visit gave payable prospects, but a bulk crushing has not been taken out yet. The ground is hard, the gold-bearing leaders or veins small, and all ore has to be sorted—the rough mullock underground, and the fine on the surface.

Kanowna Consols.—Mr. Willmott has been plugging away with a few men doing as much development as possible and crushing parcels, which by careful management and hard work about keep him going. He has also been assisted under the Mines Development Act to do some development work on the White Feather Main Reef, but up to date no values of any note have been struck.

Broad Arrow.

A good many assisted prospectors have been sent out to this district, but they have not discovered anything, except that there is a possible chance of *Tapp and Lacey's Prospecting Area* at Paddington, which has a big soft lode formation at 100ft. in depth carrying low values over a width of 20ft., with further work becoming a payable mine.

Mr. Barrett, who purchased the *Oversight Mine* from Messrs. Borland and Rudd, has erected an oil-driven winch, and has been prospecting from 125ft. level upwards. He has been doing very well, taking out contract patches and treating them by dollying and the Berdan pan. He has lately bought the *Tara lease*, adjoining on the north.

Ora Banda.

On account of the shortage of water in this district mining has been very quiet. A few men have been developing the lower levels of the *Gimlet Mine* with satisfactory results, and in the *Lady Evelyn*, sinking the underlie shaft to 500ft., and opening out levels both ways on a little gold, also cyaniding the accumulated sands and slimes, is the principal work that has been done.

A few parties of assisted prospectors have not found anything of value. The *Orinda Mine* has been worked under option for some months, but results were not quite good enough, and the mine has reverted back to the owners, who are stopping out the ore developed by the option holders.

Waverley.

The options taken on the *Hazel Mine* by the Paringa Company, by the Lanarkshire Company on the *Hazelmere*, and by the Golden Butterfly Company on the *Hazelmere South*, have been abandoned, but the work done was most unsatisfactory. Sinking five shafts to a depth of 40ft., and driving on the lode between the shafts, is poor development work, and the ore mined, while not being rich—viz., 5 dwts. over the plates with about the same in the residues—warrants some deeper sinking; and an attempt is now being made to obtain further capital.

Four parties of men have been making wages in the alluvial at a depth of 12ft., but the Deep Leads at 100ft. has just given enough gold to keep the men undecided whether to leave it or keep going. However, they are still at work.

Comet Vale.

The Bullfinch Proprietary Company has taken an option on the *Sand Queen and Gladsome Mines*, and started to unwater the workings on 5th December. Good progress has been made, the water is now out to within 8ft. of the No. 4 level of the Gladsome,

and the manager expects to be able to break ore from these workings in the near future, and to keep on unwatering the Sand Queen shaft.

Yundaga.

Menzies Consolidated Mine.—This mine has been developing by winzes and driving a distance of 455ft. at the 2,100ft. level with satisfactory results. A change of management has taken place during the year, but as Mr. Wilson has completed an examination of the mine and obtained all information available, it is not necessary for me to comment further.

Menzies.

Lady Shenton Mine.—A local syndicate has erected a winder and poppet heads with the assistance of the Government, and the mine has been unwatered down to the 395ft. level; examined and reported on by Mr. Blatchford and myself. We found that the bottom workings have been very well prospected by crosscuts and bore holes, yet the syndicate wish to do further boring as soon as the work can be agreed on.

Crusoe Mine.—Messrs. Dawe and Goddard were assisted to sink the shaft a further distance of 30ft. and crosscut east to cut the reef. This was done and a level driven south on it, but no values were met with. These men missed a shoot of ore close to the shaft, which is being beaten out now by two men. This ore gives payable prospects.

R. Duckworth is mining payable ore down to a depth of 30ft. in the block north, and Hans Jersoe and mate have obtained a 36-dwt. crushing from a leader on the Church of England's ground in the town.

Warrior.—This mine is being worked by the six brothers Sawyer. They have a 5-head mill and crush for the public when parcels are available.

They broke some ore at the 140ft. level in their own mine, and are being subsidised to deepen their main shaft to 200ft. level, where they expect to mine good ore when holed through.

Other prospectors in this centre are not doing any good.

Mount Ida.

Mining is dull at this centre. The *Unexpected South Mine* is being worked by four men, who have their own mill. Yields have gone about an ounce, but parcels are small, the ground being very hard.

Brunner and mate are working on the *Boodie's Nest Mine* taking out a crushing, and four assisted parties of prospectors sent out to the district were not successful.

Kunanalling.

I visited this place several times to measure work on the *Sidney Mint Mine* (De Gracie and party). They sunk the shaft to 160ft. and crosscut east, but failed to find the reef. In my opinion the crosscut is not out far enough. The lease is now abandoned.

Kelly and Fox have been doing very well following an indicator about a mile north-west of the town by dollying and Berdan pan treatment, with an occasion small parcel of coarse residues and seconds for the mill.

Pearce Bros. are also doing well on this indicator two miles south-east of the town, which they have followed in several places down to 130ft. or water level.

Dwyer and party on the Turn of the Tide Mine are working out a series of rich small leaders from the surface to a depth of 40ft., and making more than wages.

Several assisted prospecting parties have been sent out to this district, but have not discovered anything of value. This is rather surprising, the place being noted for rich squibs.

Carbine.—This mine is stoping ore from below the 500ft. level up the intermediate above the 400ft. They have not yet discovered a continuation of the rich shoot worked in 1923.

The 10-stamp mill is worked one shift of eight hours, and above 20 men are employed. They appear to be a very happy little community out there.

Norseman.

I have only visited the district twice during the year, but regular crushings with payable values are still being produced, and I suggest that Mr. Blatchford make an examination of this field, for I am convinced that with the introduction of capital there is a good chance of reviving this mining field should his report confirm my opinion.

Higginsville and Widgiemooltha are just about deserted, not more than six miners being at work in the two places.

In conclusion, while there are a few places in the district that have improved and others show some promise, the mining industry on the whole is not as busy as I would like to see it.

REPORT OF MR. W. PHOENIX, INSPECTOR OF MINES, KALGOORLIE.

Ventilation.

During the first half of the past year, I was away from the district, making inquiries into dust determination and elimination in South Africa. Since my return, I have made a general inspection of all the large mines.

Some of these mines had shown a lack of attention to bratticing and air direction. Bratticing cloths in the return air current require very constant attention. They perish quickly.

The air volume and temperatures are fairly good, excepting in a few working places in the lower portion of the deeper mines. Preparation is being made to investigate the dust problem, and work is now in hand to determine the number of dust particles by the Konimeter method.

Explosives.

No complaints have been made during the past year; the explosives are of good quality; and no fatal accidents have resulted from nitrous fumes.

Sanitation.

I have given this subject close attention. The pan system is in good order and crib receptacles are being provided. No complaints have been received in

this direction. Good drinking water is also being provided for all employees.

Outside Districts.

Ives Reward Mine.—This mine during the year erected a treatment plant, which is working satisfactorily. The valves, length and width of ore shoot have been maintained to the 200 feet level. It requires a vigorous policy of development below 200 feet level to ascertain quickly the value of this lode at depth.

Ives Reward Junction.—A small crushing plant has been erected here, and this syndicate purposes treating the oxidised zone above 90 foot level.

McCahon, Idough, and Coovee Leases.—These prospecting properties have put several parcels of ore through the Government Battery during the past year.

Alluvial Deposits.—Several nuggets of gold have been discovered, but nothing of a payable nature has been found.

Hampton Plains.—The Celebration Mine has been closed during a greater part of the year. Operations will be resumed and further developing by winzing continued below No. 4 Level.

Golden Hope Mine.—This mine is still crushing ore from a shoot which has a dip to the North.

White Hope Mine.—Ore is being stoped above the 100 feet level and they are now approaching the surface. A regular tonnage has been maintained during the year.

Hampton Properties.—This company discontinued crushing during the year after depleting the payable shoot of ore above 200ft. level. A very poor effort has been made to further develop this property, and no work has been done to further develop below 200 feet level.

I have not had the opportunity of visiting many outback mines during the past year, but have kept in touch with them.

REPORT OF MR. W. M. DEEBLE, INSPECTOR OF MINES, CUE.

I have the honour to report on the Peak Hill and Murchison Goldfields, and Black Range District of the East Murchison Goldfield for the year ended 1924.

During the whole of the year under review, there was a record drought—the total rainfall being 4.19 inches for the 12 months; this is more serious than it appeared at first sight, as it was on top of a five months drought at the end of the previous year, during which time only .36 (thirty-six) points fell. From July, 1923, to the end of December, 1924, a total of 4.55 inches of rain fell, which has had a very serious effect upon mining in the outback parts, and where gold was found in the middle of 1923, men have been unable to test properly without they are supplied with more than the usual equipment. Prospectors have not been able to go far from wells or other known water supplies; and these were giving out towards the end of the year; therefore, prospectors have not obtained the results they may otherwise have done under more favourable weather conditions; however, there is already a silver lining showing, and during January, 1925 (350 points), three and a half inches were registered at Cue.

Peak Hill District.

Practically all the mining being done at present is carried out on the old Peak Hill Mine. The records show that the Peak Hill Goldfields Company, Limited, treated 462,057 tons for 223,273.59 fine ounces, but during the last twelve months the ground has been worked by miners for themselves, who have only been taking out leaders above water level, and generally the ore is high grade.

A show being worked at *Murphy's Well* promised good results, but the distance of 12 miles to cart the ore to the mill for treatment has prevented its proper development.

In the *Horsehoe* District a hill of manganese ore has been pegged out about 12 miles west of the main lodes at Horsehoe, but it will be necessary to have railway communication direct before it can be dealt with on a commercial basis.

Mistletoe District.

The Munarra, G.M.L. 1502, was the only mine to do any practical mining during the year, a total of 995.22 ounces were drolled, and 33.75 tons brought in to Meekatharra State mill returned 125.04 ounces. There is a large dump of lower grade ore on the mine, but the cartage for a distance of 32 miles precludes the possibility of its being carted to the mill for treatment.

Meekatharra District.

The main mine in this district is the Ingliston Consols Extended, in which an average of 116 men have been employed during the year, and 31,572 short tons treated for bullion, valued at £67,224. The deepest level is 1,100 feet, and is connected with the bottom level of the Fenian shaft, which caused a good current of air to flow through both mines. Fine strong ore bodies are showing in the mine, particularly at Nos. 8, 9 and 10 levels. On this mine there are now in commission 25 stampers, four wheeler pans, four wilfley concentrating tables, and nine curvilinear. About one mile to the north of Meekatharra township the Havelock—being worked by F. Lyons and adjoining P.A. 1086, being worked by T. O'Leary, are very promising shows. A very large lode goes through both these, and the last crushing taken from the Havelock of 52.50 tons, returned 127 ounces 4 dwts., which is equal to 2 ounces 8 dwts. 16 grs. per ton. P.A. 1086, 57¼ tons for 115 ounces 6 dwts., equal to 2 ounces 6 grs. per ton.

These two areas have been held and worked by various miners, and the mine records show the former have treated 1,675.25 tons for 1,340.20 ounces of gold.

Gwalia G.M., situated at the south end of the mines being worked, had a very promising development at the latter end of the year; records show that this piece of ground returned 9,609.20 ounces from 4,223.25 tons.

Empire G.M. north, and adjoining is a new mine, the deepest level being only 135 feet. The lode being worked is large, on an average. One foot of the wall is being saved for the mill, as this is very rich; the remainder carries gold, but is said to be too low-grade to pay.

At Abbots, situated about 25 miles north-west of Meekatharra, there has been no prospecting for some considerable time. The records of voided leases show that 35,210.60 tons treated from this place returned 37,124.40 ounces of fine gold.

Nannine.

The Nannine G.M. has been worked on a small scale during the year, but on account of the water the mine had to be worked on a larger scale to obtain satisfactory results. The ground has been held by different parties under different names; the records show that 28,333 tons have been treated for 41,997 ounces of gold, and this amount has apparently been taken out of the reef from a length of 2,000ft.; the deepest point is 174ft. This result speaks for itself, but to go deeper it would be necessary to instal pumping machinery to cope with the water.

The Star of the East Mine is now abandoned, and records show that 27,019 tons were crushed for 27,760.15 ounces, yet the country between has not been tested owing to the overburden being too deep for miners with limited supplies.

Gabanintha.

The ore in this district contains a small percentage of copper, and during the past year the Tumbulgum Sand Syndicate has been testing the sands at the Mountain View Mill Site, and erected the Gitcham process; should this prove a success, there is no doubt a number of the mines will restart.

Culculli.

The Turn of the Tide, G.M.L. 2018, is the only lease on which practical mining was done during the year; the records show that a tonnage of 960 tons have been treated for 4,047.87 ounces.

Reedy's.

The chief work done in this district has been in the Emu Group, where the manager has during the earlier part of the year been developing the mine with a view to proving value and tonnage, and after being satisfied, to secure a sufficient supply of water for milling purposes. A shaft was sunk to a depth of 97 feet, when a daily supply of about 3,000 gallons was struck, and on continuing the shaft to 106 feet deep, the miners were unable to cope with the inflow with windlass buckets.

Tuckanarra.

A number of miners have been prospecting in this district during the past year, the shoots of ore when found are generally small and rich, but records show the Nemesis G.M. has returned up to the end of 1923—6,220 ounces from 2,371 tons.

Cuddingwarra.

Early in December Mr. H. H. Carlyon picked up a slug of gold, four ounces in weight, about three miles north of Cuddingwarra, and since then several prospectors have been testing this locality. One small trial lot of nine tons returned over one ounce per ton.

There is no doubt that there is a considerable area of country around this district worth further testing. Records show that the Victory United G.M. treated 7,888 tons for a yield of 19,361.23 ounces.

Cue.

At present the Monte Carlo Bank G.M. is attracting most attention. This ground was formerly known as the "Kangaroo Dog," and whilst known by that name 289.5 tons were treated for 85.68 ounces from the plates, since then 256 tons have been treated for 1,095.88 ounces.

It is rumoured that the largest nugget ever found in Cue district came from this ground in the early days. It is worth noting that taking the average of the ore treated at Cue, the records show it to have been very high grade, such as the following:—

Agamemnon Leases, 9,054.83 tons for 6,574.46 ounces, an average of over 14 dwts. per ton.

Hidden Treasure G.M.L., 10,676.50 tons for 11,898.78 ounces, an average of over one ounce per ton.

Cue No. 1, 7,781.75 tons for 12,961.68 ounces, an average of 1.6 ounces to the ton.

Gem of Cue, G.M.L. Nos. 1637, 1663, 4,441.50 tons for 3,103.35 ounces.

Golden Stream Extended, 2,447.00 tons for 2,501.33 ounces, an average of 1.02 ounces per ton.

Leviathan, 1,148.50 tons for 936.53 ounces, average of 16 dwts. per ton.

Light of Asia and Queen of the May leases, 1148, 1151, working together, produced 23,043 tons for 18,341.27 ounces, these same leases worked by the Mararoa G.M. Co., produced 11,387.05 tons for 11,513.68 ounces.

Day Dawn.

The ground formerly held by the Great Fingall Consolidated is now being held and worked by Bastian Brothers, who expect to be breaking ore again in about two months' time. While this ground was held by the Great Fingall Company, 1,865,432.35 tons were treated for a return of 1,185,313.15 ounces.

The present holders are engaged completing their new shaft to the No. 4 level, which has been hung up for some time, owing to the difficulty in dealing with the water in the old mine workings, but with new machinery lately erected, there will be no further difficulty from that source.

Great Fingall No. 2 being worked by two men, produced 404 tons for a yield of 472.08 ounces fine.

Lake Austin.

On the Mainland, the Mainland Consols G.M. has been taken up by Walker Brothers. A gas engine, complete with a three-throw pump, and a winch were installed, and the work being carried out at present is the unwatering of the mine from the old main shaft; good progress is being made.

This mine was held last by Daniel Brothers and Gordon, who were forced to leave owing to the heavy inflow of water, which could not be dealt with without pumping machinery. I saw some very rich specimens taken out of the lowest level of the last work done, but in addition to the water being too heavy for a whip bucket to cope with, a man could not work very long in the water owing to its acid properties. The mining statistics, 1899, show that up to the end of that year 3,869.15 tons had been treated for a return of 18,351.62 ounces, which is an average of nearly 4¾ ounces per ton.

At Lake Austin there have been about 12 men engaged in mining, the Golconda was worked close to the surface by two miners, but the returns obtained were low. Up to 1903, when the mine was worked by a company, the records show that 10,089.00 tons were treated for a yield of 20,942.35 ounces.

Lenmonville.

At this place Mr. J. G. Duffy is working the old Wheal South G.M., and is now engaged taking out a crushing from a leader at 120 feet depth. I saw gold in the stone being broken, and should it prove payable, there will be the full 120 feet of backs to stope out. The records show that up to the end of 1909 a total of 2,652.55 tons had been treated from the lease for a yield of 6,729.00 ounces.

It is notable that high values were obtained from the mines in this district in the past, *e.g.*:—

The Burra Burra G.M., 1,133.50 tons for 3,468.95 ounces, average 3.06 ounces per ton.

The Long Reef G.M., 54,766.25 tons for 37,911.19 ounces average.

Welcome, 1,860 tons, 3,708.99 ounces, average two ounces per ton.

Empress G.M., 964, 1078M., milled 6,537.00 tons for 10,785.33 ounces.

Mt. Magnet.

P.A. 989, being worked by Hough and Pearsall, is at present producing the largest tonnage in this district. The reef is being stoped out 17 feet in width, and 569½ tons produced 159.41 fine ounces of gold.

From P.A. 970M., Richardson and mate crushed 26 tons for 95.55 ounces, and from this same ground taken up as P.A. 1037M., Mr. W. Jones treated 16 tons for 61.56 ounces. During November, 1923, Richardson and mate put a crushing through of 12½ tons for a return of 58 ounces, which makes a total of 54.5 tons for a yield of 215.11 ounces.

The Neptune G.M., Boogardie, improved recently, and a crushing of 96½ tons returned 193.68 fine ounces gold.

P.A. 1033, recently taken up by prospector Hornhardt, about two miles east of Magnet, returned 18.55 ounces from 4¾ tons of ore.

Paynesville.

The Elsie G.M., discovered last year and from which 200.54 ounces of doliied gold were reported, has since then returned 289.65 ounces of doliied gold. The main body of the ore has been put into a dump and free gold can be seen in it, but it is difficult to give an estimate of what it will yield when crushed. From P.A. 1032 M., Mr. J. Phillips brought in 17½ tons, which returned 63.47 ounces. This was taken from a leader close to the Paynesville Siding.

Youanmi.

Up to the end of 1923, the records show that the Youanmi G.M., Ltd., treated 56,125.75 tons for 38,674.15 ounces. During the past year practically no mining has been done on this mine.

Curran's Find.

About 13 miles from Youanmi, the Red, White and Blue treated 518 tons for a yield of 141.51 fine ounces; this has also been closed down.

Sandstone.

A number of miners have been working at this place, and a total of 385.5 tons have been reported for a yield of 330.72 ounces. The Oroya East Black Range G.M. Company, treated 112 tons for 85.09 ounces.

Maminga Marley.

The Havilah Leases crushed 161 tons for a yield over the plates of 104.78 ounces. Up to the end of 1923, these leases have turned out 44,679.50 tons for a yield of 28,114.28 ounces of fine gold.

Barrambie.

Heffernan and Swanstone, prospecting about five miles east of Barrambie, reported on January 12th that they have been working on what is known as a kidney reef, had doliied 50 ounces of gold, and had about six tons of ore at grass, estimated at from between two and three ounces per ton. On looking up the returns from this district, it will be noted there are some very high ones. The Barrambie took out 159.50 tons for 1,528.11 ounces.

Birrigrin.

The Birrigrin G.M.L. 109B treated 7999.50 tons for 546.09 ounces, and later worked as the Hawthorne; a total of 5,188.75 tons were treated for 5,065.55 ounces.

The Pelerin Leases 128B, 356B, 3,222.46 tons for 5,640.55 ounces.

Red Castle G.M.L., 407 tons for 462.27 ounces.

Stranger, 611.50 tons for 803 ounces.

At about 10 miles north, the Caledonian Leases 185B, 351B, treated a total of 356.90 tons for 1,372.21 ounces of gold, and the Montague Boulder 6,964.00 tons for 4,541.22 ounces.

When the large area over which gold has been found in payable quantities in the past is taken into consideration, it cannot reasonably be said that the ground has been tested, as up to now most of it has only been travelled over.

REPORT OF MR. A. W. WINZAR, INSPECTOR OF MINES, LEONORA.

I have the honour to submit my Annual Report for the year 1924 on the East Murchison, Mt. Margaret, and North Coolgardie Goldfields.

A new find was made by Ivan Jones and Vere Harris at *Mt. Grey* which caused some excitement, and a number of prospectors and mining men were attracted to the place. Unfortunately the find did not come up to expectations. One company was working their holdings at the end of the year. Another find was made about 12 miles north; some very good prospects were obtained, and a fair amount of work is being done. These finds were fully reported on during the year.

The testing of the *Wiluna* lodes by diamond drilling gave satisfactory results, the three holes drilled yielded valuable cores, and a shaft is now being sunk to test the lodes further. Other leaseholders are taking advantage of the diamond drill to test their holdings by boring.

The *Mt. Shenton Co.* ceased operations on their holdings, the reefs being too small and erratic for their requirements. A syndicate of working miners

did some 180ft. of development after the company left, but found nothing to encourage them to continue working.

Prospecting generally has been rather slack owing chiefly to the dry season, only 4.5 inches of rain being recorded locally. However, 1925 promises to be better as to the end of February five inches and over have been recorded over the whole of the goldfields, so feed and water will be in abundance.

The state of the mines generally is good, and I have had no occasion to complain of the working conditions.

Mt. Malcolm District.—Sons of Gwalia.—For the year 19,162 tons of ore were mined and treated, and together with the retreatment of the old accumulated sands and slimes produced £148,426 worth of bullion.

No development took place underground, but the reserves have not decreased considerably owing to the recovery of pillars and ore left in old stopes being made possible by filling. Improvements in ventilation are being made, and water drills are being installed. Horses are used for trucking in most portions of the mine. Several additions have been made to the surface plant, including a Browett-Lindley steam-driven 200 k.w. alternating set, 550 volts, 40 cycle. A 100 H.P. motor was installed as an auxiliary mill drive, and additions were made to the battery, bins, and cooling tower. Further additions are to be made. The foundations are being prepared for a 500 H.P. 4-cylinder Premier gas engine directly coupled to an Alley McLellan air compressor having a capacity of 2,000 feet per minute. Later on a similar engine will be installed which will be direct coupled to an electric generator. When these additions are completed the only steam used will be for the winding engine and small standby units. Two Babcock and Wilcox boilers are in course of erection.

The water-treatment plant, using lime barium compounds, was completed and put in operation, and an improvement made in the water for boiler purposes; temporary and permanent hardness and scale-forming compounds are eliminated. This method of treating water promises to have an important bearing on water used for boiler feed and gas engines, smelters, etc., and the process at the Sons of Gwalia Mine is being observed by the State and Commonwealth Railways Departments. Enquiries are being received from companies operating in other States. About 300 employees are engaged on the mine, of which 160 work underground, and, in addition, about 30 men are employed on the woodline.

Laverton District.—At the King of Creation Mr. Raven is making improvements around the surface, and intends shifting the battery at present on the "Famous Blue" at Elistoun, and erecting it on the lease. The Mighty Atom was worked part of the year, and 68 tons were crushed at the State Battery for 124.4 ozs. The ore pipe pinched out and the area is now abandoned. Nothing was obtained around Duketon by the few men still there.

At Lancefield the water is getting up to the natural level; the only work at present is the treatment of sand and slimes which return good values. A little development was done at Beria Main Reef, but no returns were obtained.

No change occurred at Burtville or Ida H. The Nil Desperandum recovered 211 ozs. from 66 tons,

and Scott, from the old "Savage Captain," got 16 ozs. from 30 tons.

At Mt. Shenton the company did a fair amount of development at a shallow depth. A few tons of good stone were obtained from about the surface. The reefs are small and very erratic, both in size and value, and are much dislocated by porphyry bars. A few tons of the picked ore are being brought into the State battery at Laverton for treatment.

At Mt. Morgans the Westralia Mt. Morgans treated 12,480 tons for 3,703 ozs., all the ore is being got from the surface to the No. 3 level, and is what has been left by the original company. No development work was done for the year.

At Yundamindera the Big Stone ceased operations. The stone got very small and patchy; 126 tons were treated for 194 ozs.

At Linden the Devon Mine closed for a period, but pumping was again in operation at the end of the year and the mine being emptied. The company intend giving the mine another trial; 230 tons were crushed for 103 ounces.

The Greenhills Syndicate put in their crosscut east from the new shaft at a depth of 125 feet, but found nothing of a payable nature. The mine was full of water at the close of the year.

At the Bindah, treatment of accumulated sands yielded good results, practically no other work was done on the mine.

A little prospecting was done around the district.

Around Murrin and Eulaminna no crushings were recorded, though a small amount of prospecting is going on at Murrin.

From Niagara centre only 36 tons were crushed for 104½ ozs., whilst 92½ ozs. were obtained by dollying and alluvial. Several prospectors have been working around Tampa and Butterfly.

From Edjudina and Yarri 495 tons were crushed for 847 ozs., all obtained from old workings.

Negotiations are in progress for the taking of several of the leases by investors, but nothing has been finalised to date.

Lawlers District.—Mining was at an exceedingly low ebb at the end of the year though an improvement may be looked for in the near future. The Daisy Queen started again and took out the water; this caused a lot of work and expense owing to the sand filling running into the levels. However, this difficulty was overcome and the winze below the 180 feet level deepened, and a fair amount of cross-cutting and driving done off this level. Values proved too low and the mine was closed. Seventy tons were crushed for 36 ozs.

The Vivien Gem is again being worked, the hauling plant has been put in order, and the mine unwatered and sampled with encouraging results. Development work, including shaft sinking, will be carried out and the mine given a good trial.

The Waroonga ceased operations for the time, treating 2,537 tons for 733 ozs. The owners intend to work the bottom levels later on, and also to cyanide the accumulated sands.

From cyanidation of old sands 936 ozs. were obtained. A little prospecting was done but nothing encouraging found.

At Mt. Sir Samuel the Vanguard and Westralia were worked, and the owners are very satisfied with the holdings. Development on the Westralia con-

sisted of 75 feet of sinking and 25 feet of driving, all in payable values. The Canberra was unwatered. A small crushing gave 12 ozs. from 11 tons, and the area was abandoned. Other prospectors found nothing of importance.

Cyaniding of accumulated sands was the only work done on the Yellow Aster at Kathleen Valley, 513 ozs. being obtained.

No work was done at Mt. Keith centre.

Wiluna District.—The yield for the year showed a big drop, owing to the cessation of tributing on the Consolidated leases, where shaft sinking by the option holders is now in operation. It is their intention to open up the lodes at 300 feet to test the lodes pierced by the diamond drill for size, and to get a fair sample of ore to decide the treatment process. Two leases directly north of the Consolidated are held by the Mararoa Company, who will be putting down drill holes. All the known areas containing lodes are held, and the field will get a good test.

The Brilliant and Diorite crushed 230 tons for 153 ozs.; the distance from the State Battery made this unpayable.

At Cole's Find some good crushings were obtained for 276.7 ozs. Nothing large has been opened up.

REPORT OF H. P. ROCKETT, INSPECTOR OF MINES,
SOUTHERN CROSS.

Herewith I present to you my Annual Report for the year ending 31st December, 1924.

Mines Regulation Act.—With the exception of the failure by the quarry managers in the Swan Mineral Field to lay the dust from their rock breakers, no breaches of the Mines Regulation Act are recorded.

The ventilation of all underground works is good, but owing to various causes it has not been practicable completely to lay the dust from the rock breakers at the quarries in the Swan district. The worst offender was the State Quarry at Boya, but recently fine sprays of water were directed at the discharge from the rock breaker and other dusty places, and at my last inspection I noted a very marked improvement in the conditions.

Prospecting.—There has been a good deal of active prospecting by, for the most part, men assisted by the Prospecting Board. Owing to light rains very little water was conserved, and prospecting could be done in most cases only in the neighbourhood of permanent water supplies. A few who had good turnouts managed to go further afield, and Bremer Range and Glenelg Hills received some attention. Bremer Range is a very promising field but, as pointed out in my report of the 22nd October last, the water difficulty is a serious matter in this locality.

Messrs. Hollow, Heaton, Davidson and McDonald have spent the last six or eight months examining the greenstone belt at Glenelg Hills. This belt runs parallel to the Rabbit-proof Fence, commencing about 47 miles south from Burracoppin and extending south to about opposite the 58 mile peg.

So far as is known, this belt is about 3½ to 4 miles wide in places and has been followed for about 11 miles. The main camp is situated about 3 miles east from the 50 mile camp on the Rabbit-

proof Fence and about 18 miles south from Mt. Hampton. For some months these prospectors had to cart water 16 miles. Mr. P. Kilmartin found gold near the present camp some years ago, but he did not spend much time at the place. About June last Messrs. Hollow and Heaton, on Kilmartin's recommendation, went out to give the place a good trial, and have been there ever since.

Hollow's Reward Lease is about half-a-mile north from the camp. Loaming gave only a bare indication of auriferous ground, and finally the formation, which proved to be 8 or 9 feet wide, was discovered by costeaning. At the time of my visit the workings consisted of many costeans and some shafts. The South Shaft was down 25 feet on a 2ft. reef of brown quartz contained in walls of micaceous schist. I saw some nice specks of gold on the dump from this shaft, and Mr. Hollow estimated the value per ton at 25 dwts.

The lode strikes N. 17 deg. W. with an easterly underlay of about 45 deg. At 300 feet north from South Shaft another shaft, Middle Shaft, has been sunk on the underlay. This shaft is down 30 feet. At 50 feet east from Middle Shaft a vertical shaft was sunk 45 feet, and from this drives were put in N. 35 feet and S. 26 feet. These drives expose about 2 feet wide of stone, said by Mr. Hollow to carry 15 dwts. of gold per ton.

The stone is showing in another shaft 50 feet N. from Middle shaft, but here the value of the stone is below the average of that in the other shafts.

McDonald and Davidson's Prospecting Area, No. 1401.—This show is situated about 10 chains east and 60 chains south from Hollow and Heaton's. Here again there was no outcrop, the lode having been first exposed by deep costeaning. The shaft was 60 feet deep when I saw it. Near the top of the shaft the stone is 8 to 10 inches wide, but gradually increases in width till at 60 feet deep it is 18 inches wide. Mr. Davidson estimates the value at 8 dwts. per ton. Scarcity of water was a great handicap, but the rains in December and more recently have left several months' supply in small dams and rock holes built by the prospectors.

This locality may be conveniently reached by way of either Burracoppin or Southern Cross, the distances being—from Burracoppin 53 miles, and from Southern Cross 64 miles.

I regret to say that the new find, the "Tree Frog," three miles south from Withers Find, has been abandoned.

Mining Generally.—In the Phillips River and Yalgoo Goldfields prospecting has been nearly at a standstill, but owing to the advance in the price of lead there was increased activity in the Northampton Mineral Field, and the improved price of tin has reacted in a similar way at Greenbushes.

At the close of 1923 there seemed to be a brighter prospect before the Yilgarn Goldfield, and I am very pleased to be able to report a general improvement, which is much more real than may appear at the first glance when it is seen that the net increased yield of gold is only 71 ounces.

The figures are:—

1923	7,755 tons for	8,372 fine ounces.
1924	12,719 ..	8,443 ..
Increase ..	4,964	71

DIVISION II.

REPORT OF THE STATE MINING ENGINEER FOR THE YEAR 1924.

Office of the State Mining Engineer,
Perth, 31st January, 1925.

The Under Secretary for Mines, Perth.

Sir,

I have the honour to submit, for the information of the Hon. the Minister, my Annual Report for the year 1924:—

INSPECTION OF MINES UNDER "THE MINES REGULATION ACT, 1906," AND "THE COAL MINES REGULATION ACT, 1902."

The personnel of the Inspection Staff of my Branch remained the same as in the preceding year. On the 21st January, Mr. Inspector Phoenix left for South Africa for the purpose of enquiring into the prevalence and prevention of Miner's Phthisis in the mines of that State, and after his return his report was published in Bulletin form. Mr. J. McVee, Inspector of Mines, Collie, was granted long service and annual leave in October, and, during his absence, Mr. H. M. Sweeney carried out the duties of the position satisfactorily.

Workmen's Inspectors of Mines.—Owing to the resignation of Mr. J. Goggin at the end of 1923 an election was held in January, 1924, for a Workmen's Inspector of Mines for the Murchison and Northampton Districts, resulting in the appointment of Mr. R. P. McMennemin on the 14th March, 1924.

Elections were also held in October for the East Coolgardie and Leonora Districts, the period of two years for which the inspectors were appointed having expired, resulting in the appointment on the 18th December of Mr. R. A. Jones and the re-appointment of Mr. L. C. Darcey for the Kalgoorlie District, and the re-appointment of Mr. C. Byfield for the Leonora District.

REPORTS OF INSPECTORS OF MINES.

REPORT OF MR. W. F. GREENARD, INSPECTOR OF MINES, KALGOORLIE.

I have the honour to submit my Annual Report, for the information of the Honourable the Minister for Mines, on the working of the Mines Regulation Act and Amendments on the East Coolgardie, North-East Coolgardie, North Coolgardie, Coolgardie, Broad Arrow, and Dundas Goldfields.

A systematic routine inspection of all working mines on the above goldfields has been maintained throughout the year. The ventilation in all mines has received the sole attention of one inspector. The dust underground and on surface has also received constant attention from five different inspectors. Dampening appliances have been made available in all working places. Shrink stopes are the cause of a good deal of dust from firing that cannot be minimised. Many methods and ideas have been tried without

effect. Shrink stopes when being drawn from are a source of continuous "sand blasting." Dust and smoke are forced to the airways, and there does not appear any remedy other than the regulating of firing to fixed periods in the shift working.

The storage of dynamite and detonators, and the receptacles for holding same in mine workings, have been constantly under supervision.

Cages, ropes, and safety hooks are carefully inspected, and records are made of all tests.

The change-rooms on the various mines have been constantly inspected and kept in good order.

The sanitation of both surface and underground workings has been kept up to a good standard.

During the year there has been a good deal of creeping in the workings on the western belt. This must be expected; as the ore becomes exhausted pillars left are bound to snap, causing a good deal of noise and the immediate neighbourhood to tremble. There is a good deal of side pressure, and unless the timber in levels is constantly repaired the levels are bound to close up.

I would recommend the following to the consideration of the Mines Department to further improve the underground workings of mines:—

"That in-take air and up-take air be completely divided, and that men be only allowed to travel to and fro to work in in-take air. That firing explosives be regulated to an agreed period on each shift."

The Great Boulder Proprietary, Ivanhoe, and Golden Horseshoe have continued to deplete their reserves of pay-ore. A good deal of development work has been done in these mines without disclosing any great quantity of pay-ore. There is a large tonnage of ore left in the stopes which contains values, but the grade is too low to pay with the increased cost of mining.

The South Kalgurli has done considerable development at 16-17 and 1,800 feet levels. A shoot of very high grade ore has been disclosed in the 16 and 1,700 feet levels. It is being looked for at the 1,800 feet level. The mine has been equipped with new winding engine and boiler plant, also with a large electrically-driven air compressor, which is showing good economy.

The Lake View Star and Chaffers Mines have taken over the Ivanhoe Mine. The new dry-crushing plant is being added to with the view of increasing its capacity from 7,000 tons to 15,000 tons per week. The Oroya Links, Brown Hill, Eclipse and Kalgoorlie Mines are being worked chiefly by tributaries.

At the North end during the year a good deal of prospecting has been done. The Great Boulder Proprietary are now engaged sinking winzes below the 1,800 feet level in the Hannans North Mine. This mine

is being continuously worked, and the ore is treated at the Great Boulder Proprietary's plant.

At Broad Arrow and Bardoc a good deal of prospecting is being done.

At Ora Banda the Associated Northern have commenced treating a large quantity of ore raised during the recent long dry period through which this locality passed in 1924. The whole of the dams have recently been filled, and there is a supply of water for immediate requirements.

At Kanowna a good deal of prospecting has been done. The Red Hill Company have been working good payable ore.

At Bulong and Mt. Monger a fair amount of prospecting has been carried on. McCahon's Great Hope Mine has been developed to the 300 feet, and the lode shows good gold.

Mining generally is depressed. There has been a considerable amount of prospecting and development done this year assisted by the Mines Department. So far very little high grade ore has been located, and with present costs—about 68 per cent. over pre-war costs—the outlook is anything but reassuring. There is a very great need of a complete review of the whole industry with a view to give it that assistance that will save it from extinction.

REPORT OF E. J. GOURLEY, INSPECTOR OF MINES,
KALGOORLIE.

I have the honour to submit to you my Annual Report for the year ending 31st December, 1924.

Complete inspections have been made of the following mines and districts: Kanowna 5, Kunanalling 4, Menzies 11, Horseshoe 3, Black Hills, Mt. Monger 6, Bulong, Mt. Magnetic 3, Coolgardie District 5, North End Mines 6, Great Boulder 5, Eclipse 2, South Kalgurli 7, South End Mines 2, Boulder Alluvial 2, Lake View 6, Ivanhoe 3, Perseverance 5, Dry Mills 8, Riverina and Ularring 1, Chaffers and Star 4, Associated 4, Oroya North Blocks 3, Kalgurli 4, Hampton Plains 3, Balgarrie 1, Ora Banda and Lady Evelyn 5, Brown Hill 4, Binduli 1, General Gordon 1, Waverley 6, Randells 1, St. Ives 2, Burbanks 2, North Kalgurli 2, Jubilee and Kurnalpi 1, Comet Vale 3, Broad Arrow 6, Paddington 2.

DEVELOPMENT.

During the year the *South Kalgurli Mine* has done 2,439ft. of driving, 419ft. of crosscutting, 382ft. of winzing, or a total of 3,240ft., at a total cost of £17,504 3s. 2d., compared with 2,537ft., costing £14,088 9s. 11d., in 1923; 1,956ft., costing £10,892 6s. 1d., for 1922; and 1,537ft., costing £10,546 16s. 4d., for 1921. This is a very substantial advance.

The majority of driving done has opened up large reserves of pay ore. Of course some of the ore has been of very low grade, but some very rich, notably the southern portions of the 1,400ft., 1,600ft., 1,700ft. levels, and the 1,800ft. level, has been opened up again after many years, the water taken out, shaft cleaned out, plats cut on both sides of the shaft, and a start made to drive the level south on what is known as the Lake View lode.

The company has also arranged to bail the water which flowed into their mine from the Kalgurli, Brookman's Boulder, and North Kalgurli mines,

using the North Kalgurli winder boiler and shaft to do the work. Consequently, these mines are dry from the 1,000ft. level in the North Kalgurli, and the 1,800ft. level in the Kalgurli and South Kalgurli, and the Perseverance mine has now only its own mine water to contend with.

The South Kalgurli has also been making extensive improvements in the surface machinery, such as installing a more powerful winding engine on the main shaft, and a new electrically driven air compressor; all rock drills, except those used in winzes, are water Leyners. These have had a very beneficial effect in the laying of dust. Steam, except for the winders, will soon be entirely dispensed with.

Oroya-Brown Hill Group.—Development work in the Kalgurli mine has been very limited, and no wages men are employed underground, or at the Oroya North Blocks. These workings have been opened up again at the 1,100ft. level by a tribute party, with payable results, from stripping an old stope.

Brown Hill.

The tributes, with the exception of two parties fossicking about the main ore pipe for rich telluride leaders, have been terminated and the company are treating oxidised ore, which has been crushed by pressure from the 200ft. level upwards, with varying results. It is, I understand, the intention to open out this ore eventually.

At the *Croesus Proprietary Mine* the work of cleaning up has been completed, and stoping is being done from 1,000ft. backs in all levels up to the 400ft. Values on the whole are low grade.

Kalgurli Mine.—This has been in the hands of tributers, who have been doing fairly well in the oxidised over the 100ft. level, and some development work has been done at 1,700ft., which did not open up any values to pay tributers.

Other parties have been content to confine their operations to taking out pillars or blocks of ore in the old workings, and some good returns have been obtained.

The company have started to do some development work now at the 400ft. and 800ft. levels out east, to try to pick up a continuation of the Associated lodes.

The treatment plant is kept running from these mines with about 60 per cent. of tributers and public crushings from outside, the remainder being the company's own ore. Five head of stamps have been put in order on the Brown Hill mine, and the flotation process is being experimented with, using the oil "Pyridine." So far investigations are not completed.

Development work done on this group of mines for the years 1923-24 amounts to 2,314ft., consisting of 318ft. of shaft sinking, 1,374ft. driving, 365ft. crosscutting, 256ft. winzing, some of which has been done by tributers.

Great Boulder Proprietary Mine.—During the year 1923, 1,050ft. of driving, 59½ft. of crosscutting, 206ft. of rising, 117½ft. of winzing was done, or a total of 1,438ft.; and in the year 1924, 825½ft. of driving, 230ft. of crosscutting, 278½ft. of rising, 297ft. of winzing was done, or a total of 1,631ft.

The development work done last year has opened up some very fair grade ore in places, notably going back to the shallow levels, that is, from 1,000ft. upwards from the main and Lane's shafts, and above the 1,200ft. in Hamilton's shaft. The stopes on the main reef are gradually being depleted; they are, however, still turning out a considerable quantity of ore, but the grade throughout the mine has been reduced to some extent.

Hannans North Mine (Great Boulder Company).—The development work for the year 1924 is 280½ft. of driving, rising 77ft., winzing 243ft., or a total of 600½ft. This work has been done on the 600ft. level and below the 600ft. chiefly, and has opened up a good quantity of pay ore.

O.K. Mine, Norseman (Great Boulder Company).—During the year 1923, 364ft. of driving on the reef at the 200ft. and 300ft. levels was done; and in 1924, 373ft. of driving, 18ft. of crosscutting, and 12ft. of winzing has been done, or a total of 403ft., making a total from these three mines of 1,802ft. for 1923, and 2,634½ft. for 1924.

The reef in the O.K. mine averages about 15in., but the values are good, and regular shipments of ore are being sent to the Great Boulder Proprietary G.M. plant for treatment. (This mine has now been closed down.—Ed.)

Boulder Perseverance Mine.—The development work in 1924 was: driving 1,476½ft., 611ft. of crosscutting, 252ft. of winzing, 62ft. of rising. Portion of this work has been done by assisted tributers. This shows a considerable improvement on the 1923 figures of: driving 49ft., crosscutting 12½ft., winzing 63ft., rising 60½ft.; total 185ft.

Some of the tributers have been doing very well, but during the last few months the grade has come down considerably, notably Lillis and party's tribute below the 1,450ft. level, No. 6 shaft, where a big tonnage of high-grade ore was discovered near the Lake View boundary, and this was underhand stoped for a length of 150ft. over a width of 10ft. to a depth of 50ft., when values, although the lode is still going down, would not pay the tributers to work.

At present the ore being treated from the mine is about 60 per cent. tributers, and 40 per cent. being mined by the company. This mine appears to me to still have a long and profitable life.

Associated Gold Mines of W.A., Ltd.—The development work for 1923 was 245½ft. of driving, crosscutting 40ft., rises and winzes 153¾ft., or a total of 439½ft.; while in 1924, driving 505½ft., crosscutting 386¾ft., rises and winzes 144ft. was done, or a total of 1,036ft. In addition to which 1,178ft. in 1923 and 1,968¾ft. in 1924 of diamond drilling was done.

This work has been chiefly at the 1,500ft. and 1,600ft. levels, but the diamond drilling has been done to some extent in shallow levels. The ore bodies opened up have been very short, and while values have been payable in some places the ore generally has been low-grade, and up to date the rich ore being worked in the South Kalgurli almost up to the boundary has not been discovered in this mine.

Golden Horseshoe Estates Co., Ltd.—The main shaft has been sunk a further depth of 102ft., or a total of 3,300ft.; plats have been cut and driving on the lode started. So far, I am informed, the

values are low, but as they have a distance of 1,500ft. to drive before reaching the southern boundary values may be struck at any time.

In addition, 1,058½ft. of driving, 255½ft. of crosscutting, 14½ft. of rising, 552ft. of winzing has been done, compared with driving 531ft., rising 4ft., winzes 362ft. for 1923, or totals 1,982½ft. for 1924 and 897ft. for 1923.

This development work has been done chiefly on the levels below the 2,800ft. level to the 3,300ft. level, and while values have not been high they have been satisfactory.

Lake View and Star, Chaffers, and Ivanhoe Mines.—The above are now under the one management, and extensive alterations and additions have been made and are still being carried out to the surface plant on the Lake View, Ivanhoe, and Chaffers leases.

The development work done is chiefly on the Lake View mine from the 1,400ft. level down to the 2,300ft. level.

During 1923, 1,881ft. of development, 497ft. of diamond drilling, and 900 cubic feet of plat cutting was done; and in 1924 to 30th November, 2,566ft. of development and 1,400 cubic feet of plat cutting has been done.

This development work appears to me to have been satisfactory, for winzes have been sunk for ventilation, leading stopes taken off and timbered, and since the mill on the Chaffers mines has been started stoping has been carried on.

The water in the *Star Mine*, which was allowed to rise in the bottom levels, is now being bailed, and a few contract parties are again employed in breaking ore above the 900ft. level.

The *Chaffers Mine* is entirely manned by tributers, chiefly from the 300ft. level upwards, and some of the parties have been doing well.

The *Ivanhoe Mine* has been closed down for some time during the year, but during the last four months a tramline to convey the ore from the mine across the Great Boulder lease to Chaffers mill (*which, by the way, is being duplicated to double the tonnage now being treated*) has been built, and a considerable quantity will come from this mine in the near future.

In the meantime a good number of men are employed putting in new air mains, filling stopes, repairing timbers, etc., preparing to start operations.

The milling plant is being dismantled, and cleaned up with fair results, and large quantities of the timber, iron, and some of the machinery are being used on the Chaffers plant. Also, the general offices of this group of mines are now in the Ivanhoe buildings.

The wet crushing mill on the Lake View has also been dismantled and is being cleaned up, and some payable ore has been discovered under the foundations, the extent of which is not known at present.

Boulder No. 1, now known as the Enterprise Mine, was taken up by a local syndicate, and is managed by Mr. T. Greenhill, the following parcels having been treated: June, 22 tons 18 cwt.; August, 107 tons; September, 92 tons; October, 172 tons; November, 168 tons; December, 172 tons; total, 732 tons, of an average value of 41s. per ton.

A party of eight men are at work, and Mr. Williams, the General Manager of the Perseverance Mine, has bought a share in the syndicate on behalf

of his company. He has also bought a share in the Bank of England lease, owned by Oliver Hancock, but only two men are employed at present prospecting the levels above water at 400ft. level.

Paringa Company.—This company during the year have put out a diagonal crosscut north-east from the 200ft. level to prospect for the lode from which tributers have obtained payable crushings down to 80ft.

However, although the lode was cut with low values, I am of opinion that sufficient driving was not done to prove it. The mine is again in the hands of tributers.

North Kalgurli G.M.—This mine is still the same as it has been for years—manned by tributers, and two parties have been doing well on the east boundary, but other parties scattered over the surface down to 100ft. are just making a living.

It is to be regretted that this company either cannot find the money now the water is being kept out at no expense to them down to the 1,000ft. level to do some work at the lower levels, or will not let anyone else have a chance to develop them.

The small mines around Kalgoorlie have not discovered anything of any note, with the exception of the *Yorkshire Rose*, situated on the old Hannans Reward North mine, which struck a very rich pipe of ore on the North End of Raven's old open cut, and it is still developing satisfactorily, but tonnage is small.

The Yorkshire Rose South has also cut good values in a shaft about 400ft. south. The gold appears to me to be contact, and pieces, up to 3 and 4 ozs., have been obtained.

The Paymaster Mine, situated to the north of the Yorkshire Rose across the Trans. and Kanowna railways, has been worked under option by the *Brown's Reward Company*, and a good quantity of development work has been done at the 90ft. level. Results, from the company's point of view, were disappointing. The option has been abandoned.

I accompanied Mr. Howe, Superintendent of State Batteries, around all the mines from the Brown Hill North to beyond the Tea Gardens with a view to obtaining the quantities of ore available for a treatment plant, and having perused Mr. Howe's report I regret that I must agree with his recommendations.

Kanowna.

The Red Hill Company sunk a new shaft to the 100ft. level and holed to the stope, which improved the hauling way to some extent. However, the reef has now dipped away from the shaft at a very flat angle and double haulage is again being done. Regular crushings are going through Martin's Battery, which this company has leased, and a dividend of 6d. per share has been paid.

They have picked up the reef beyond the main fault, which runs through this hill, and samples tried on my last visit gave payable prospects, but a bulk crushing has not been taken out yet. The ground is hard, the gold-bearing leaders or veins small, and all ore has to be sorted—the rough mullock underground, and the fine on the surface.

Kanowna Consols.—Mr. Willmott has been plugging away with a few men doing as much development as possible and crushing parcels, which by careful management and hard work about keep him going. He has also been assisted under the Mines Development Act to do some development work on the White Feather Main Reef, but up to date no values of any note have been struck.

Broad Arrow.

A good many assisted prospectors have been sent out to this district, but they have not discovered anything, except that there is a possible chance of *Tapp and Lacey's Prospecting Area* at Paddington, which has a big soft lode formation at 100ft. in depth carrying low values over a width of 20ft., with further work becoming a payable mine.

Mr. Barrett, who purchased the *Oversight Mine* from Messrs. Borland and Rudd, has erected an oil-driven winch, and has been prospecting from 125ft. level upwards. He has been doing very well, taking out contact patches and treating them by dollying and the Berdan pan. He has lately bought the *Tara lease*, adjoining on the north.

Ora Banda.

On account of the shortage of water in this district mining has been very quiet. A few men have been developing the lower levels of the *Gimlet Mine* with satisfactory results, and in the *Lady Evelyn*, sinking the underlie shaft to 500ft., and opening out levels both ways on a little gold, also cyaniding the accumulated sands and slimes, is the principal work that has been done.

A few parties of assisted prospectors have not found anything of value. The *Orinda Mine* has been worked under option for some months, but results were not quite good enough, and the mine has reverted back to the owners, who are stopping out the ore developed by the option holders.

Waverley.

The options taken on the *Hazel Mine* by the Paringa Company, by the Lanarkshire Company on the *Hazelmere*, and by the Golden Butterfly Company on the *Hazelmere South*, have been abandoned, but the work done was most unsatisfactory. Sinking five shafts to a depth of 40ft., and driving on the lode between the shafts, is poor development work, and the ore mined, while not being rich—viz., 5 dwts. over the plates with about the same in the residues—warrants some deeper sinking; and an attempt is now being made to obtain further capital.

Four parties of men have been making wages in the alluvial at a depth of 12ft., but the Deep Leads at 100ft. has just given enough gold to keep the men undecided whether to leave it or keep going. However, they are still at work

Comet Vale.

The Bullfinch Proprietary Company has taken an option on the *Sand Queen and Gladstone Mines*, and started to unwater the workings on 5th December. Good progress has been made, the water is now out to within 8ft. of the No. 4 level of the Gladstone,

and the manager expects to be able to break ore from these workings in the near future, and to keep on unwatering the Sand Queen shaft.

Yundaga.

Menzies Consolidated Mine.—This mine has been developing by winzes and driving a distance of 455ft. at the 2,100ft. level with satisfactory results. A change of management has taken place during the year, but as Mr. Wilson has completed an examination of the mine and obtained all information available, it is not necessary for me to comment further.

Menzies.

Lady Shenton Mine.—A local syndicate has erected a winder and poppet heads with the assistance of the Government, and the mine has been unwatered down to the 395ft. level; examined and reported on by Mr. Blatchford and myself. We found that the bottom workings have been very well prospected by crosscuts and bore holes, yet the syndicate wish to do further boring as soon as the work can be agreed on.

Crusoe Mine.—Messrs. Dawe and Goddard were assisted to sink the shaft a further distance of 30ft. and crosscut east to cut the reef. This was done and a level driven south on it, but no values were met with. These men missed a shoot of ore close to the shaft, which is being beaten out now by two men. This ore gives payable prospects.

R. Duckworth is mining payable ore down to a depth of 30ft. in the block north, and Hans Jersee and mate have obtained a 36-dwt. crushing from a leader on the Church of England's ground in the town.

Warrior.—This mine is being worked by the six brothers Sawyer. They have a 5-head mill and crush for the public when parcels are available.

They broke some ore at the 140ft. level in their own mine, and are being subsidised to deepen their main shaft to 200ft. level, where they expect to mine good ore when holed through.

Other prospectors in this centre are not doing any good.

Mount Ida.

Mining is dull at this centre. The *Unexpected South Mine* is being worked by four men, who have their own mill. Yields have gone about an ounce, but parcels are small, the ground being very hard.

Brunner and mate are working on the *Boodie's Nest Mine* taking out a crushing, and four assisted parties of prospectors sent out to the district were not successful.

Kunanalling.

I visited this place several times to measure work on the *Sidney Mint Mine* (De Gracie and party). They sunk the shaft to 160ft. and crosscut east, but failed to find the reef. In my opinion the crosscut is not out far enough. The lease is now abandoned.

Kelly and Fox have been doing very well following an indicator about a mile north-west of the town by dollying and Berdan pan treatment, with an occasional small parcel of coarse residues and seconds for the mill.

Pearce Bros. are also doing well on this indicator two miles south-east of the town, which they have followed in several places down to 130ft. or water level.

Dwyer and party on the Turn of the Tide Mine are working out a series of rich small leaders from the surface to a depth of 40ft., and making more than wages.

Several assisted prospecting parties have been sent out to this district, but have not discovered anything of value. This is rather surprising, the place being noted for rich squibs.

Carbine.—This mine is stoping ore from below the 500ft. level up the intermediate above the 400ft. They have not yet discovered a continuation of the rich shoot worked in 1923.

The 10-stamp mill is worked one shift of eight hours, and above 20 men are employed. They appear to be a very happy little community out there.

Norseman.

I have only visited the district twice during the year, but regular crushings with payable values are still being produced, and I suggest that Mr. Blatchford make an examination of this field, for I am convinced that with the introduction of capital there is a good chance of reviving this mining field should his report confirm my opinion.

Higginsville and Widgiemootha are just about deserted, not more than six miners being at work in the two places.

In conclusion, while there are a few places in the district that have improved and others show some promise, the mining industry on the whole is not as busy as I would like to see it.

REPORT OF MR. W. PHOENIX, INSPECTOR OF MINES, KALGOORLIE.

Ventilation.

During the first half of the past year, I was away from the district, making inquiries into dust determination and elimination in South Africa. Since my return, I have made a general inspection of all the large mines.

Some of these mines had shown a lack of attention to bratticing and air direction. Bratticing cloths in the return air current require very constant attention. They perish quickly.

The air volume and temperatures are fairly good, excepting in a few working places in the lower portion of the deeper mines. Preparation is being made to investigate the dust problem, and work is now in hand to determine the number of dust particles by the Konimeter method.

Explosives.

No complaints have been made during the past year; the explosives are of good quality; and no fatal accidents have resulted from nitrous fumes.

Sanitation.

I have given this subject close attention. The pan system is in good order and crib receptacles are being provided. No complaints have been received in

this direction. Good drinking water is also being provided for all employees.

Outside Districts.

Ives Reward Mine.—This mine during the year erected a treatment plant, which is working satisfactorily. The valves, length and width of ore shoot have been maintained to the 200 feet level. It requires a vigorous policy of development below 200 feet level to ascertain quickly the value of this lode at depth.

Ives Reward Junction.—A small crushing plant has been erected here, and this syndicate purposes treating the oxidised zone above 90 foot level.

McCahon, Idough, and Coovee Leases.—These prospecting properties have put several parcels of ore through the Government Battery during the past year.

Alluvial Deposits.—Several nuggets of gold have been discovered, but nothing of a payable nature has been found.

Hampton Plains.—The Celebration Mine has been closed during a greater part of the year. Operations will be resumed and further developing by winzings continued below No. 4 Level.

Golden Hope Mine.—This mine is still crushing ore from a shoot which has a dip to the North.

White Hope Mine.—Ore is being stoped above the 100 feet level and they are now approaching the surface. A regular tonnage has been maintained during the year.

Hampton Properties.—This company discontinued crushing during the year after depleting the payable shoot of ore above 200ft. level. A very poor effort has been made to further develop this property, and no work has been done to further develop below 200 feet level.

I have not had the opportunity of visiting many outback mines during the past year, but have kept in touch with them.

REPORT OF MR. W. M. DEEBLE, INSPECTOR OF MINES, CUE.

I have the honour to report on the Peak Hill and Murchison Goldfields, and Black Range District of the East Murchison Goldfield for the year ended 1924.

During the whole of the year under review, there was a record drought—the total rainfall being 4.19 inches for the 12 months; this is more serious than it appeared at first sight, as it was on top of a five months drought at the end of the previous year, during which time only .36 (thirty-six) points fell. From July, 1923, to the end of December, 1924, a total of 4.55 inches of rain fell, which has had a very serious effect upon mining in the outback parts, and where gold was found in the middle of 1923, men have been unable to test properly without they are supplied with more than the usual equipment. Prospectors have not been able to go far from wells or other known water supplies; and these were giving out towards the end of the year; therefore, prospectors have not obtained the results they may otherwise have done under more favourable weather conditions; however, there is already a silver lining showing, and during January, 1925 (350 points), three and a half inches were registered at Cue.

Peak Hill District.

Practically all the mining being done at present is carried out on the old Peak Hill Mine. The records show that the Peak Hill Goldfields Company, Limited, treated 462,057 tons for 223,273.59 fine ounces, but during the last twelve months the ground has been worked by miners for themselves, who have only been taking out leaders above water level, and generally the ore is high grade.

A show being worked at *Murphy's Well* promised good results, but the distance of 12 miles to cart the ore to the mill for treatment has prevented its proper development.

In the *Horseshoe* District a hill of manganese ore has been pegged out about 12 miles west of the main lodes at Horseshoe, but it will be necessary to have railway communication direct before it can be dealt with on a commercial basis.

Mistletoe District.

The Munarra, G.M.L. 1502, was the only mine to do any practical mining during the year, a total of 995.22 ounces were dollied, and 33.75 tons brought in to Meekatharra State mill returned 125.04 ounces. There is a large dump of lower grade ore on the mine, but the cartage for a distance of 32 miles precludes the possibility of its being carted to the mill for treatment.

Meekatharra District.

The main mine in this district is the Ingliston Consols Extended, in which an average of 116 men have been employed during the year, and 31,572 short tons treated for bullion, valued at £67,224. The deepest level is 1,100 feet, and is connected with the bottom level of the Fenian shaft, which caused a good current of air to flow through both mines. Fine strong ore bodies are showing in the mine, particularly at Nos. 8, 9 and 10 levels. On this mine there are now in commission 25 stampers, four wheeler pans, four wilfley concentrating tables, and nine curvilinears. About one mile to the north of Meekatharra township the Havelock—being worked by F. Lyons and adjoining P.A. 1086, being worked by T. O'Leary, are very promising shows. A very large lode goes through both these, and the last crushing taken from the Havelock of 52.50 tons, returned 127 ounces 4 dwts., which is equal to 2 ounces 8 dwts. 16 grs. per ton. P.A. 1086, 57¼ tons for 115 ounces 6 dwts., equal to 2 ounces 6 grs. per ton.

These two areas have been held and worked by various miners, and the mine records show the former have treated 1,675.25 tons for 1,340.20 ounces of gold.

Gwalia G.M., situated at the south end of the mines being worked, had a very promising development at the latter end of the year; records show that this piece of ground returned 9,609.20 ounces from 4,223.25 tons.

Empire G.M. north, and adjoining is a new mine, the deepest level being only 135 feet. The lode being worked is large, on an average. One foot of the wall is being saved for the mill, as this is very rich; the remainder carries gold, but is said to be too low-grade to pay.

At Abbotts, situated about 25 miles north-west of Meekatharra, there has been no prospecting for some considerable time. The records of voided leases show that 35,210.60 tons treated from this place returned 37,124.40 ounces of fine gold.

Nannine.

The Nannine G.M. has been worked on a small scale during the year, but on account of the water the mine had to be worked on a larger scale to obtain satisfactory results. The ground has been held by different parties under different names; the records show that 28,333 tons have been treated for 41,997 ounces of gold, and this amount has apparently been taken out of the reef from a length of 2,000ft.; the deepest point is 174ft. This result speaks for itself, but to go deeper it would be necessary to instal pumping machinery to cope with the water.

The Star of the East Mine is now abandoned, and records show that 27,019 tons were crushed for 27,760.15 ounces, yet the country between has not been tested owing to the overburden being too deep for miners with limited supplies.

Gabanintha.

The ore in this district contains a small percentage of copper, and during the past year the Tumbul-gum Sand Syndicate has been testing the sands at the Mountain View Mill Site, and erected the Gits-ham process; should this prove a success, there is no doubt a number of the mines will restart.

Culculli.

The Turn of the Tide, G.M.L. 2018, is the only lease on which practical mining was done during the year; the records show that a tonnage of 960 tons have been treated for 4,047.87 ounces.

Reedy's.

The chief work done in this district has been in the Emu Group, where the manager has during the earlier part of the year been developing the mine with a view to proving value and tonnage, and after being satisfied, to secure a sufficient supply of water for milling purposes. A shaft was sunk to a depth of 97 feet, when a daily supply of about 3,000 gallons was struck, and on continuing the shaft to 106 feet deep, the miners were unable to cope with the inflow with windlass buckets.

Tuckanarra.

A number of miners have been prospecting in this district during the past year, the shoots of ore when found are generally small and rich, but records show the Nemesis G.M. has returned up to the end of 1923—6,220 ounces from 2,371 tons.

Cuddingwarra.

Early in December Mr. H. H. Carlyon picked up a slug of gold, four ounces in weight, about three miles north of Cuddingwarra, and since then several prospectors have been testing this locality. One small trial lot of nine tons returned over one ounce per ton.

There is no doubt that there is a considerable area of country around this district worth further testing. Records show that the Victory United G.M. treated 7,888 tons for a yield of 19,361.23 ounces.

Cue.

At present the Monte Carlo Bank G.M. is attracting most attention. This ground was formerly known as the "Kangaroo Dog," and whilst known by that name 289.5 tons were treated for 85.68 ounces from the plates, since then 256 tons have been treated for 1,095.88 ounces.

It is rumoured that the largest nugget ever found in Cue district came from this ground in the early days. It is worth noting that taking the average of the ore treated at Cue, the records show it to have been very high grade, such as the following:—

Agamemnon Leases, 9,054.83 tons for 6,574.46 ounces, an average of over 14 dwts. per ton.

Hidden Treasure G.M.L., 10,676.50 tons for 11,898.78 ounces, an average of over one ounce per ton.

Cue No. 1, 7,781.75 tons for 12,961.68 ounces, an average of 1.6 ounces to the ton.

Gem of Cue, G.M.L. Nos. 1637, 1663, 4,441.50 tons for 3,103.35 ounces.

Golden Stream Extended, 2,447.00 tons for 2,501.33 ounces, an average of 1.02 ounces per ton.

Leviathan, 1,148.50 tons for 936.53 ounces, average of 16 dwts. per ton.

Light of Asia and Queen of the May leases, 1148, 1151, working together, produced 23,043 tons for 18,341.27 ounces, these same leases worked by the Mararoa G.M. Co., produced 11,387.05 tons for 11,513.68 ounces.

Day Dawn.

The ground formerly held by the Great Fingall Consolidated is now being held and worked by Bastian Brothers, who expect to be breaking ore again in about two months' time. While this ground was held by the Great Fingall Company, 1,865,432.35 tons were treated for a return of 1,185,313.15 ounces.

The present holders are engaged completing their new shaft to the No. 4 level, which has been hung up for some time, owing to the difficulty in dealing with the water in the old mine workings, but with new machinery lately erected, there will be no further difficulty from that source.

Great Fingall No. 2 being worked by two men, produced 404 tons for a yield of 472.08 ounces fine.

Lake Austin.

On the Mainland, the Mainland Consols G.M. has been taken up by Walker Brothers. A gas engine, complete with a three-throw pump, and a winch were installed, and the work being carried out at present is the unwatering of the mine from the old main shaft; good progress is being made.

This mine was held last by Daniel Brothers and Gordon, who were forced to leave owing to the heavy inflow of water, which could not be dealt with without pumping machinery. I saw some very rich specimens taken out of the lowest level of the last work done, but in addition to the water being too heavy for a whip bucket to cope with, a man could not work very long in the water owing to its acid properties. The mining statistics, 1899, show that up to the end of that year 3,869.15 tons had been treated for a return of 18,351.62 ounces, which is an average of nearly 4¾ ounces per ton.

At Lake Austin there have been about 12 men engaged in mining, the Golconda was worked close to the surface by two miners, but the returns obtained were low. Up to 1903, when the mine was worked by a company, the records show that 10,089.00 tons were treated for a yield of 20,942.35 ounces.

Lennonville.

At this place Mr. J. G. Duffy is working the old Wheal South G.M., and is now engaged taking out a crushing from a leader at 120 feet depth. I saw gold in the stone being broken, and should it prove payable, there will be the full 120 feet of backs to stope out. The records show that up to the end of 1909 a total of 2,652.55 tons had been treated from the lease for a yield of 6,729.00 ounces.

It is notable that high values were obtained from the mines in this district in the past, *e.g.*:—

The Burra Burra G.M., 1,133.50 tons for 3,468.95 ounces, average 3.06 ounces per ton.

The Long Reef G.M., 54,766.25 tons for 37,911.19 ounces average.

Welcome, 1,860 tons, 3,708.99 ounces, average two ounces per ton.

Empress G.M., 964, 1078M., milled 6,537.00 tons for 10,785.33 ounces.

Mt. Magnet.

P.A. 989, being worked by Hough and Pearsall, is at present producing the largest tonnage in this district. The reef is being stoped out 17 feet in width, and 569½ tons produced 159.41 fine ounces of gold.

From P.A. 970M., Richardson and mate crushed 26 tons for 95.55 ounces, and from this same ground taken up as P.A. 1037M., Mr. W. Jones treated 16 tons for 61.56 ounces. During November, 1923, Richardson and mate put a crushing through of 12½ tons for a return of 58 ounces, which makes a total of 54.5 tons for a yield of 215.11 ounces.

The Neptune G.M., Boogardie, improved recently, and a crushing of 96½ tons returned 193.68 fine ounces gold.

P.A. 1033, recently taken up by prospector Hornhardt, about two miles east of Magnet, returned 18.55 ounces from 4¾ tons of ore.

Paynesville.

The Elsie G.M., discovered last year and from which 200.54 ounces of dollied gold were reported, has since then returned 289.65 ounces of dollied gold. The main body of the ore has been put into a dump and free gold can be seen in it, but it is difficult to give an estimate of what it will yield when crushed. From P.A. 1032 M., Mr. J. Phillips brought in 17½ tons, which returned 63.47 ounces. This was taken from a leader close to the Paynesville Siding.

Youanmi.

Up to the end of 1923, the records show that the Youanmi G.M., Ltd., treated 56,125.75 tons for 38,674.15 ounces. During the past year practically no mining has been done on this mine.

Curran's Find.

About 13 miles from Youanmi, the Red, White and Blue treated 518 tons for a yield of 141.51 fine ounces; this has also been closed down.

Sandstone.

A number of miners have been working at this place, and a total of 385.5 tons have been reported for a yield of 330.72 ounces. The Oroya East Black Range G.M. Company, treated 112 tons for 85.09 ounces.

Maninga Marley.

The Havilah Leases crushed 161 tons for a yield over the plates of 104.78 ounces. Up to the end of 1923, these leases have turned out 44,679.50 tons for a yield of 28,114.28 ounces of fine gold.

Barrambie.

Heffernan and Swanstone, prospecting about five miles east of Barrambie, reported on January 12th that they have been working on what is known as a kidney reef, had dollied 50 ounces of gold, and had about six tons of ore at grass, estimated at from between two and three ounces per ton. On looking up the returns from this district, it will be noted there are some very high ones. The Barrambie took out 159.50 tons for 1,528.11 ounces.

Birrigrin.

The Birrigrin G.M.L. 109B treated 7999.50 tons for 546.09 ounces, and later worked as the Hawthorne; a total of 5,188.75 tons were treated for 5,065.55 ounces.

The Pelerin Leases 128B, 356B, 3,222.46 tons for 5,640.55 ounces.

Red Castle G.M.L., 407 tons for 462.27 ounces.

Stranger, 611.50 tons for 803 ounces.

At about 10 miles north, the Caledonian Leases 185B, 351B, treated a total of 356.90 tons for 1,372.21 ounces of gold, and the Montague Boulder 6,964.00 tons for 4,541.22 ounces.

When the large area over which gold has been found in payable quantities in the past is taken into consideration, it cannot reasonably be said that the ground has been tested, as up to now most of it has only been travelled over.

REPORT OF MR. A. W. WINZAR, INSPECTOR OF MINES, LEONORA.

I have the honour to submit my Annual Report for the year 1924 on the East Murchison, Mt. Margaret, and North Coolgardie Goldfields.

A new find was made by Ivan Jones and Vere Harris at *Mt. Grey* which caused some excitement, and a number of prospectors and mining men were attracted to the place. Unfortunately the find did not come up to expectations. One company was working their holdings at the end of the year. Another find was made about 12 miles north; some very good prospects were obtained, and a fair amount of work is being done. These finds were fully reported on during the year.

The testing of the *Wiluna* lodes by diamond drilling gave satisfactory results, the three holes drilled yielded valuable cores, and a shaft is now being sunk to test the lodes further. Other leaseholders are taking advantage of the diamond drill to test their holdings by boring.

The *Mt. Shenton Co.* ceased operations on their holdings, the reefs being too small and erratic for their requirements. A syndicate of working miners

did some 180ft. of development after the company left, but found nothing to encourage them to continue working.

Prospecting generally has been rather slack owing chiefly to the dry season, only 4.5 inches of rain being recorded locally. However, 1925 promises to be better as to the end of February five inches and over have been recorded over the whole of the goldfields, so feed and water will be in abundance.

The state of the mines generally is good, and I have had no occasion to complain of the working conditions.

Mt. Malcolm District.—Sons of Gwalia.—For the year 19,162 tons of ore were mined and treated, and together with the retreatment of the old accumulated sands and slimes produced £148,426 worth of bullion.

No development took place underground, but the reserves have not decreased considerably owing to the recovery of pillars and ore left in old stopes being made possible by filling. Improvements in ventilation are being made, and water drills are being installed. Horses are used for trucking in most portions of the mine. Several additions have been made to the surface plant, including a Browett-Lindley steam-driven 200 k.w. alternating set, 550 volts, 40 cycle. A 100 H.P. motor was installed as an auxiliary mill drive, and additions were made to the battery, bins, and cooling tower. Further additions are to be made. The foundations are being prepared for a 500 H.P. 4-cylinder Premier gas engine directly coupled to an Alley McLellan air compressor having a capacity of 2,000 feet per minute. Later on a similar engine will be installed which will be direct coupled to an electric generator. When these additions are completed the only steam used will be for the winding engine and small standby units. Two Babcock and Wilcox boilers are in course of erection.

The water-treatment plant, using lime barium compounds, was completed and put in operation, and an improvement made in the water for boiler purposes; temporary and permanent hardness and scale-forming compounds are eliminated. This method of treating water promises to have an important bearing on water used for boiler feed and gas engines, smelters, etc., and the process at the Sons of Gwalia Mine is being observed by the State and Commonwealth Railways Departments. Enquiries are being received from companies operating in other States. About 300 employees are engaged on the mine, of which 160 work underground, and, in addition, about 30 men are employed on the woodline.

Laverton District.—At the King of Creation Mr. Raven is making improvements around the surface, and intends shifting the battery at present on the "Famous Blue" at Eristoun, and erecting it on the lease. The Mighty Atom was worked part of the year, and 68 tons were crushed at the State Battery for 124.4 ozs. The ore pipe pinched out and the area is now abandoned. Nothing was obtained around Duketon by the few men still there.

At Lancefield the water is getting up to the natural level; the only work at present is the treatment of sand and slimes which return good values. A little development was done at Beria Main Reef, but no returns were obtained.

No change occurred at Burtville or Ida H. The Nil Desperandum recovered 211 ozs. from 66 tons,

and Scott, from the old "Savage Captain," got 16 ozs. from 30 tons.

At Mt. Shenton the company did a fair amount of development at a shallow depth. A few tons of good stone were obtained from about the surface. The reefs are small and very erratic, both in size and value, and are much dislocated by porphyry bars. A few tons of the picked ore are being brought into the State battery at Laverton for treatment.

At Mt. Morgans the Westralia Mt. Morgans treated 12,480 tons for 3,703 ozs., all the ore is being got from the surface to the No. 3 level, and is what has been left by the original company. No development work was done for the year.

At Yundamindera the Big Stone ceased operations. The stone got very small and patchy; 126 tons were treated for 194 ozs.

At Linden the Devon Mine closed for a period, but pumping was again in operation at the end of the year and the mine being emptied. The company intend giving the mine another trial; 230 tons were crushed for 103 ounces.

The Greenhills Syndicate put in their crosscut east from the new shaft at a depth of 125 feet, but found nothing of a payable nature. The mine was full of water at the close of the year.

At the Bindah, treatment of accumulated sands yielded good results, practically no other work was done on the mine.

A little prospecting was done around the district.

Around Murrin and Eulaminnna no crushings were recorded, though a small amount of prospecting is going on at Murrin.

From Niagara centre only 36 tons were crushed for 104½ ozs., whilst 92½ ozs. were obtained by dollying and alluvial. Several prospectors have been working around Tampa and Butterfly.

From Edjudina and Yarri 495 tons were crushed for 847 ozs., all obtained from old workings.

Negotiations are in progress for the taking of several of the leases by investors, but nothing has been finalised to date.

Lawlers District.—Mining was at an exceedingly low ebb at the end of the year though an improvement may be looked for in the near future. The Daisy Queen started again and took out the water; this caused a lot of work and expense owing to the sand filling running into the levels. However, this difficulty was overcome and the winze below the 180 feet level deepened, and a fair amount of cross-cutting and driving done off this level. Values proved too low and the mine was closed. Seventy tons were crushed for 36 ozs.

The Vivien Gem is again being worked, the hauling plant has been put in order, and the mine unwatered and sampled with encouraging results. Development work, including shaft sinking, will be carried out and the mine given a good trial.

The Waroonga ceased operations for the time, treating 2,537 tons for 733 ozs. The owners intend to work the bottom levels later on, and also to cyanide the accumulated sands.

From cyanidation of old sands 936 ozs. were obtained. A little prospecting was done but nothing encouraging found.

At Mt. Sir Samuel the Vanguard and Westralia were worked, and the owners are very satisfied with the holdings. Development on the Westralia con-

sisted of 75 feet of sinking and 25 feet of driving, all in payable values. The Canberra was unwatered. A small crushing gave 12 ozs. from 11 tons, and the area was abandoned. Other prospectors found nothing of importance.

Cyaniding of accumulated sands was the only work done on the Yellow Aster at Kathleen Valley, 513 ozs. being obtained.

No work was done at Mt. Keith centre.

Wiluna District.—The yield for the year showed a big drop, owing to the cessation of tributing on the Consolidated leases, where shaft sinking by the option holders is now in operation. It is their intention to open up the lodes at 300 feet to test the lodes pierced by the diamond drill for size, and to get a fair sample of ore to decide the treatment process. Two leases directly north of the Consolidated are held by the Mararoa Company, who will be putting down drill holes. All the known areas containing lodes are held, and the field will get a good test.

The Brilliant and Diorite crushed 230 tons for 153 ozs.; the distance from the State Battery made this unpayable.

At Cole's Find some good crushings were obtained for 276.7 ozs. Nothing large has been opened up.

REPORT OF H. P. ROCKETT, INSPECTOR OF MINES,
SOUTHERN CROSS.

Herewith I present to you my Annual Report for the year ending 31st December, 1924.

Mines Regulation Act.—With the exception of the failure by the quarry managers in the Swan Mineral Field to lay the dust from their rock breakers, no breaches of the Mines Regulation Act are recorded.

The ventilation of all underground works is good, but owing to various causes it has not been practicable completely to lay the dust from the rock breakers at the quarries in the Swan district. The worst offender was the State Quarry at Boya, but recently fine sprays of water were directed at the discharge from the rock breaker and other dusty places, and at my last inspection I noted a very marked improvement in the conditions.

Prospecting.—There has been a good deal of active prospecting by, for the most part, men assisted by the Prospecting Board. Owing to light rains very little water was conserved, and prospecting could be done in most cases only in the neighbourhood of permanent water supplies. A few who had good turnouts managed to go further afield, and Bremer Range and Glenelg Hills received some attention. Bremer Range is a very promising field but, as pointed out in my report of the 22nd October last, the water difficulty is a serious matter in this locality.

Messrs. Hollow, Heaton, Davidson and McDonald have spent the last six or eight months examining the greenstone belt at Glenelg Hills. This belt runs parallel to the Rabbit-proof Fence, commencing about 47 miles south from Burracoppin and extending south to about opposite the 58 mile peg.

So far as is known, this belt is about $3\frac{1}{2}$ to 4 miles wide in places and has been followed for about 11 miles. The main camp is situated about 3 miles east from the 50 mile camp on the Rabbit-

proof Fence and about 18 miles south from Mt. Hampton. For some months these prospectors had to cart water 16 miles. Mr. P. Kilmartin found gold near the present camp some years ago, but he did not spend much time at the place. About June last Messrs. Hollow and Heaton, on Kilmartin's recommendation, went out to give the place a good trial, and have been there ever since.

Hollow's Reward Lease is about half-a-mile north from the camp. Loaming gave only a bare indication of auriferous ground, and finally the formation, which proved to be 8 or 9 feet wide, was discovered by costeaning. At the time of my visit the workings consisted of many costeans and some shafts. The South Shaft was down 25 feet on a 2ft. reef of brown quartz contained in walls of micaceous schist. I saw some nice specks of gold on the dump from this shaft, and Mr. Hollow estimated the value per ton at 25 dwts.

The lode strikes N. 17 deg. W. with an easterly underlay of about 45 deg. At 300 feet north from South Shaft another shaft, Middle Shaft, has been sunk on the underlay. This shaft is down 30 feet. At 50 feet east from Middle Shaft a vertical shaft was sunk 45 feet, and from this drives were put in N. 35 feet and S. 26 feet. These drives expose about 2 feet wide of stone, said by Mr. Hollow to carry 15 dwts. of gold per ton.

The stone is showing in another shaft 50 feet N. from Middle shaft, but here the value of the stone is below the average of that in the other shafts.

McDonald and Davidson's Prospecting Area, No. 1401.—This show is situated about 10 chains east and 60 chains south from Hollow and Heaton's. Here again there was no outcrop, the lode having been first exposed by deep costeaning. The shaft was 60 feet deep when I saw it. Near the top of the shaft the stone is 8 to 10 inches wide, but gradually increases in width till at 60 feet deep it is 18 inches wide. Mr. Davidson estimates the value at 8 dwts. per ton. Scarcity of water was a great handicap, but the rains in December and more recently have left several months' supply in small dams and rock holes built by the prospectors.

This locality may be conveniently reached by way of either Burracoppin or Southern Cross, the distances being—from Burracoppin 53 miles, and from Southern Cross 64 miles.

I regret to say that the new find, the "Tree Frog," three miles south from Withers Find, has been abandoned.

Mining Generally.—In the Phillips River and Yalgoo Goldfields prospecting has been nearly at a standstill, but owing to the advance in the price of lead there was increased activity in the Northampton Mineral Field, and the improved price of tin has reacted in a similar way at Greenbushes.

At the close of 1923 there seemed to be a brighter prospect before the Yilgarn Goldfield, and I am very pleased to be able to report a general improvement, which is much more real than may appear at the first glance when it is seen that the net increased yield of gold is only 71 ounces.

The figures are:—

1923	7,755 tons for 8,372 fine ounces.
1924	12,719 " 8,443 "
Increase ..	4,964 71

The Districts and Mines.

Marda-Mt. Jackson, Ennamin, 50-Mile.—Several parties of prospectors were at work in these localities, and by leasing the Marda Battery it was hoped there would result some notable increase in the yield from the North Yilgarn. Unfortunately, the figures show a large deficit. The greatest shortage occurred at the Radio which, whilst yielding 1,839 ounces, was still 785 ounces below the output for 1923. This shortage was due to extended holidays, and perhaps in a measure to the absence of a definite progressive plan of campaign. There are now indications that the yield for 1925 will be a record one for some years past.

The Radio Deeps (formerly Lang's Glideaway) produced 165 tons, from which there were obtained 280 fine ounces, and the Radio North produced 43 tons of 2oz. stone. 508 tons obtained by tributaries from the Bullfinch mine yielded 372 ounces, being an increase of 336 ounces on last year's yield from this famous mine.

Very little work was done at Wither's Find.

Near Corinthia Messrs. Webster and Quinn obtained 44 ounces from 6 tons from their Colleen Bawn mine.

At Westonia Mr. G. N. B. Smith repaired the Myrtle Central battery, and made an effort to re-open the Edna May Central, working the "wash." 220 tons treated only yielded 34.12 ounces over the plates. This left too small a margin for profitable working, and operations have ceased again.

During the greater part of the year the owners of the Royal Flush mine were engaged sinking their shaft, and only raised 102 tons of 15dwt. stone.

At Southern Cross the Fraser's Central mine was unwatered and sampled, but the assays indicated unprofitable values and the mine was abandoned. 49 ounces were obtained from 13 tons at the Fraser's mine. The Great Leviathan, Cornishman, and other shows near Kennysville, yielded very little gold in the period covered in the report.

During the year the Transvaal mine was re-opened. In October a lease of the Sunbeam battery was taken, and for the three months ending with the year over 1,000 tons of ore were treated, yielding about 230 tons of arsenopyrite concentrate. Returns showing the quantity and value of the marketable arsenic and the gold contents are not available.

Early in the year the May Queen mine, about 16 miles south-east from Southern Cross, was purchased by a Perth syndicate, and a five-head battery erected. By the end of the year 203 tons of ore had been won, returning 351 ounces of gold. This show ceased operations in December, since when there has been no further production.

Messrs. Jenkins and Party and Tuckey's show—the Salvation—situate about a mile south from Howlett's battery, gave the very satisfactory return of 746 ounces obtained from 447 tons. This seems to be a very promising looking show; the shaft is now down about 150 feet. The extent of the pay shoot is not known, and at present it is being worked over a very short length.

The Banker Tribute yielded 478 ounces of gold, and there is not any indication that the yield will fall off in the near future.

The Great Victoria gold mine, which has already yielded nearly 17,900 ounces of gold, is again running full time. During the year the 10-head battery was renovated, a new boiler and engine, a tube mill and Cassell's filter erected, cyanide treatment plant completed, and the 4in. water main extended from Marvel Loch to the mine. 7,500 tons of ore yielded 1,784 ounces of gold. This mine consists of a huge low-grade formation, whose full extent is not yet known. The manager informed me that at the surface there is one flat lens whose extent is not less than 400ft. x 600ft. x 6ft. (it varies between 10 feet and 3 feet in thickness) proved by careful sampling and assaying to vary between 18s. and 75s. with an average of about 27s. The present method of working is simply that of backing in drays and carting the ore a little more than 100 yards and tipping it into a hopper, whence it is lifted by bucket elevator some 25 feet and discharged into the battery bin. I understand that the whole cost of realisation on the gold is covered by 14s. 3d. per ton of ore treated. Much development work was done by former owners in the search for, and in following the richer shoots of ore, and it is now considered certain that there is a block of ore below the lens now being worked measuring 400ft. x 400ft. x 200ft., or say over two million tons of 15s. oxidised ore, of which half, or one million tons, is calculated to contain values varying between 18s. and 70s. and averaging about 22s. per ton.

Shows having characteristics similar to the Great Victoria such as the Broncho Horseshoe, Never Never, Old Newry, Scots Greys, and others should be well worth examination.

The output from the Spring Hill mine has fallen from 814 ozs. in 1923 to 429 ozs. in 1924.

The White Horseshoe lease was worked under option of purchase for part of the year but the deal was not completed. 633 tons crushed at Spring Hill battery yielded 510 ozs.

Some prospecting was done in the neighbourhood of the Star of the West lease. Only 73 ozs. were won from the Scots Greys. At Forrestonia the Great Southern lease was worked by Mr. W. M. Hodges for the greater part of the year. The battery is in good order, and should prospectors wish to put through trial crushings there would be no obstacle in the way. This district is well worth the attention of careful and efficient prospectors. A little prospecting was done near Hatters Hill, but without any satisfactory result.

Phillips River Goldfield.

Returns from the Phillips River Goldfield are not available. The yield of both copper and gold was very small. For the last eight months or so Mr. P. Nevill has been erecting a plant to demonstrate the efficiency of his "Metallic contact process" for the extraction of copper from its ores. An extensive plant, costing, it is said, over £15,000, has been erected, and should be ready for a trial run at an early date.

Yalgoo Goldfield.

Complete returns from the Yalgoo Goldfield are not available. There was a general slackening of interest in mining ventures noticeable throughout

the field. At Payne's Find the Carnation yielded 136 ounces, the Lake View 355 ounces, and the Sweet William 491 ounces. Of the yield from the Orchid, Lady Mary, and others producing less than 100 ounces each I have no record. Very little mining was done at Field's Find, only four or five parties being at work. The 5-head battery formerly at Mt. Gibson after being pulled down and transported was in course of erection on the old Field's Find mine, where it was expected it would be conveniently situated for the crushing of ore from Brown's Reward and Field's Find Extended. Further west, between Field's Find and Warriedar, there was some activity early in the year, but returns were disappointing. No returns are available for Warriedar or Rothsay. At the former the Mug's Luck, Highland Chief, Payne's New Find and Oliver's mine were worked.

In the first half of the year the Gnow's Nest company sold their mine to the Brilliant company, which confined its operations principally to development work. The shaft is now being sunk; the output for the year was 4,001 ounces. At Noongal Mr. A. Nevill won 173 ounces from his Revival gold mine from the treatment of 170 tons.

Northampton Mineral Field.

As was to be expected, the steady advance in the price of lead concentrate has had a most beneficial effect on mining in this field. The increased activity is noticeable chiefly in the Galena district. During the year the principal producer, the Surprise mine, worked full time and produced 2,378 tons of lead concentrates, valued at £80,100, from the treatment of 26,500 tons of ore. The returns from the mine next in production, Thring's Block 7, are not available. The Wheal Ina raised 138 tons of crude ore, from which nearly 35 tons of concentrates were obtained, realising £482. There is a prospect of re-opening the Three Sisters and some other abandoned mines, and in addition a local syndicate is working one or two new shows. At Northampton the Wheal Ellen obtained 580 tons of lead concentrates, valued at £19,800, from the treatment of 9,314 tons. Other shows in this district are attracting attention but none have given returns to date. The Narra Tarra mine at Prothero raised 11,096 tons of crude copper and lead ore from which 426 tons of lead ore yielded 19½ tons of lead concentrate, which realised £782, and 10,670 tons of copper concentrate valued at £34,955—total value for the year £35,638.

Particulars of the output from the stone quarry at White Peak are not available.

Greenbushes Mineral Field.

Here, too, is a very noticeable increase in the number of claims being worked, due, as in the Northampton Mineral Field, to the increased value of the local product, in this case tin concentrate. There are now six dredges, two or three ground sluicers, and several prospectors at work, and should the autumn rains fall early giving a plentiful supply of water for the monitors, a considerable increase in the yield of tin oxide may be looked for in 1925. The output from the various claims is given as under:—

Moss and Co.	13½ tons.
Giese and Co.	¾ "
McKay and Co.	10¼ "
Cole and Co.	16¾ "
Lilywhite and Co.	5 "
Fox and Co.	¼ "
Lindsay and Co.	¾ "
Total	47¼ "

REPORT OF MR. J. McVEE, INSPECTOR OF MINES, COLLIE.

I beg to submit my Annual Report on the Collie Coal Field during the year 1924.

Five collieries were producing coal during the year, viz., Proprietary, Co-operative, Westralian, Cardiff and Premier.

Griffin Leases.—Nothing has been done on these leases during the year.

Amount of Coal produced and sold.—The total amount of coal produced and sold during the year amounted to 421,863.86 tons, valued at £363,256.61, and an average cost of 17/2.6 per ton; the average number of men employed being 519 underground and 155 on the surface—a total of 674. The amount of coal produced in 1923 was 420,893.98 tons valued at £369,144.84, and the number of men employed 715. This shows an increase of 969.88 tons and a decrease in value of £5,888.20, and 41 men less than in 1923.

The following table shows the amount of coal produced at each colliery during years 1923 and 1924:—

Colliery.	Output in Tons.		Employees—1923.		Employees—1924.	
	1923.	1924.	Surface.	Underground.	Surface.	Underground.
Proprietary	127,039.76	118,493.97	40	140	37	138
Co-operative	104,016.05	112,459.95	45	126	37	141
Westralian	82,639.34	97,454.04	30	120	34	124
Cardiff	60,695.36	45,936.95	27	106	19	61
Premier	46,503.47	47,518.95	25	56	28	55
Totals	420,893.98	421,863.86	167	548	155	519

The Government Railways took a total of 254,482 tons 5 cwt. 3 qrs., as follows:—

Month.					Large Coal			Nut Coal.			Small Coal.		
1924.					Tons	cwts.	qrs.	Tons.	cwts.	qrs.	Tons	cwt.	qrs.
January	...	...	...	...	18,494	10	3	...	...	...	17	19	1
February	...	...	...	...	21,912	5	0	659	4	2	26	7	0
March	...	...	...	...	28,829	1	0	758	1	3	36	5	2
April	...	...	...	...	22,087	15	2	555	17	2	19	2	3
May	...	...	...	...	22,796	9	2	519	4	1	43	4	1
June	...	...	...	...	17,664	1	1	660	0	1	18	16	3
July	...	...	...	...	18,390	7	3	614	11	2	25	1	2
August	...	...	...	...	21,729	2	3	756	5	3	9	7	3
September	...	...	...	...	19,048	17	3	670	17	3	27	2	0
October	...	...	...	...	17,614	14	1	598	8	3	25	8	1
November	...	...	...	...	21,926	6	0	705	12	3	17	3	0
December	...	...	...	...	16,578	6	0	627	15	1	18	10	1
Totals					247,071	17	2	7,126	0	0	284	8	1

Strikes.—There have been no strikes of any consequence during the year, the only stoppage being at the Premier Colliery, where the men ceased work for one day but returned on the following day.

All disputes which have arisen during the year have been settled by local arbitration without the men ceasing work, the number of disputes for the year being 35, and all have been finally settled with satisfaction to both men and owners.

General Progress.—The trade in the industry has not warranted any special development of the mines during the year, and the miners now working special places only work one shift a week over and above ordinary pit time; nevertheless the mines are gradually developing into more extensive and up-to-date collieries. Strikes in the district are gradually becoming a thing of the past, which I attribute mostly to local arbitration, which has improved the industrial position of this field greatly during the past two or three years.

The general conditions of the mines throughout the year have been very satisfactory.

REPORT OF MR. R. C. WILSON, ASSISTANT STATE MINING ENGINEER.

I beg to submit herewith my annual report for the year ended 31st December, 1924.

Throughout the whole of the year I acted as Assistant State Mining Engineer, my duties consisting for the most part in reporting upon the mines applying for larger loans under the Mining Development Act. I also continued to represent the Department on the Board of Control of the Surprise Lead Mine.

Six inspections of this mine were made, viz., in February, March, June, August, October and December. In June I furnished a report on the general position existing at that time, and at the end of the year Mr. C. M. Harris (who had been representing the syndicate on the Board of Control) and I furnished a report reviewing the half year's operations, which it will be noted resulted in substantial profits, and setting out the state of affairs generally at the end of the year. These reports are published herein as Appendices No. 8 and 9.

In March I visited and took samples from the swamps at Rockingham and other swamps thought to contain mineral oil for investigation by the Government Mineralogist and Analyst. The results indicated that the waxy material extracted by petroleum ether was of vegetable origin. It had formed in the

swamps and was not a residual resulting from a petroleum seepage. Dr. Simpson's report is published as Appendix No. 10.

During the same month I also visited the Menzies Consolidated G.M. at Yundaga, the Sand Queen and Gladsome Gold Mines at Comet Vale, and looked into the position of these mines. I also inspected and reported upon an application from Mr. E. Taylor for a loan of £3,000 to develop the Ularring Westralia Mine. A loan of a smaller amount was recommended and approved, but was not accepted.

In April I visited and looked into the general position of affairs at the Lalla Rookh G.M. My report is published as Appendix No. 11.

In May I inspected the La Fortuna G.M., an interesting type of deposit at Balgarrie. My report is published as Appendix No. 4. I also visited and reported upon an application for financial assistance to develop the Gnow's Nest G.M., in the Yalgoo District. A loan of £2,000 was recommended and approved by the Hon. the Minister, to be spent on approved development work on the basis of £2 to be spent by the company for each £1 advanced by the Department.

In June applications for assistance from Ives' Reward G.M. (Appendix No. 7), Lloyd George G.M., and Burbank's Oversight G.M. were investigated and reported upon.

In August the position at the Ajana Lead Mine was looked into and reported upon, and an application for assistance by Morrissey at Nabawa was investigated.

During this month I also inspected and furnished a report upon the Emu North Mine at Reidy's, in the Cue district (Appendix No. 2), and reported upon an application by the Mararoa company for assistance to carry out diamond drilling on their own holding at Wiluna (Appendix No. 3).

Field's Find and Hothsary were also visited, and the operations in progress were reported upon.

In September an application for assistance from Ives' Lake View Reward G.M., at St. Ives was looked into and reported upon.

A visit was made in November to the Waterloo G.M. at Holden's Find, and the question of a loan was gone into. I also investigated the position at the South Fingall G.M. at Day Dawn, and paid a visit to the Big Bell G.M.

Some of my reports are for departmental information only, but those considered advisable to publish will be found as appendices to the report of the State Mining Engineer, page 57 to page 67, of the Mines Department Annual Report.

REPORT OF MR. T. BLATCHFORD, ASSISTANT STATE
MINING ENGINEER.

I herewith beg to submit my report for the year ending December 31st, 1924.

For the first three months I was acting under a temporary engagement with the Freney Kimberley Oil Company in connection with the prospecting for mineral oil in the Fitzroy Basin in West Kimberley. Interim reports of this work have been furnished from time to time, and a full report, embracing also the information gained whilst with Dr. Wade, of the Ord River Basin, will be published in Bulletin form.

From the end of March to the 1st of July my time was occupied in accompanying Dr. Wade during his inspection of the Ord and Fitzroy Basins in East and West Kimberley. Dr. Wade's full report has been published. He condemns the Ord River Basin as a possible area for mineral oil, but considers there

is quite a reasonable chance of obtaining a mineral oil supply by boring in the Fitzroy Basin. I resumed my duties with the Department on July 1st.

During the last half of the year, in addition to the ordinary routine office duties, inspections were made of the following mines:—

Wheal Ellen and Narra Tarra Lead Mines at Northampton, Maida Vale Coal, Transvaal Gold and Arsenic Mine, Great Leviathan, G. N. B. Smith's alluvial at Westonia, North White Feather Gold Mine, Lady Shenton Mine, and the Deep Leads at Siberia. An inspection was also made of the Lake Cave in connection with an unexpected flooding at the Margaret River. A reconnaissance survey was made of the Braeside Mineral Belt, and the Chrome Iron Deposits at Coobina.

Reports on the foregoing subjects are attached as appendices Nos. 12 to 22.

ACCIDENTS.

The following table gives the number of fatal accidents reported to this office as having occurred on mines, whether to persons employed on the mines or not, for the last five years:—

	1920.	1921.	1922.	1923.	1924.
Total fatal accidents on mines reported	25	18	10	11	12
Less accidents to persons not engaged in mining, deaths in mines due to natural causes, and accidents to persons which were not due to their occupation as miners	4	1	1	1	2
Fatal accidents to men engaged in mining	21	17	9	10	10
Total men engaged in mining (average)	8,496	7,084	6,776	6,497	6,289
Accident death rate per 1,000 men engaged in mining ...	2.47	2.40	1.33	1.54	1.59
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Total fatal accidents on Quarries reported	1	1
Total men engaged in quarrying	195	203	207	326	337
Accident death rate per 1,000 men engaged in quarrying ...	...	4.93	3.75	...	...

The mining accidents for the year 1924 are classified in Tables 26, 27, 28 and 29, the previous year's figures being given for comparison, and are forwarded herewith for inclusion in your Annual Report, together with diagram of the fatal accidents year by year, and their causes. (See report of the Under Secretary for Mines.)

In Table 26 the accidents are classified according to causes. In 1924, 10 persons were killed and 231 persons were seriously injured, as compared with 11 persons killed and 307 seriously injured during the previous year. The diagram shows graphically the totals of fatal accidents year by year since 1891.

The death rate per 1,000 persons employed on surface and underground in gold, coal, and other mines is shown in Table 27, the general average rate for 1924 being 1.59, as against 1.54 for 1923. The rates per 1,000 are based upon the figures in table

No. 21 (Annual Report, Under Secretary for Mines, 1924), which shows a grand total for 1924 of 6,289 men employed at mines above and underground, inclusive of alluvial workers.

Table 28 gives the average number of men employed at quarries and the death rate per 1,000 persons employed thereon. The total number of men employed during 1924 was 337, as against 326 for 1923; the death rate for 1924 being nil, as against nil for 1923.

Table 29 summarises all the fatal accidents for 1924 above and below ground in gold mines only, with rates per 1,000 men and per 1,000 tons of ore raised, similar figures for 1923 being given for comparison. The number of men on which these rates are based is taken from Table 23 (Annual Report, Under Secretary for Mines, 1924), and does not include alluvial workers.

The following table comprises all the fatal and serious accidents reported to this office which occurred during 1924, the accidents being classified according to the gold or mineral field in which they happened, and also as to causes, the totals from each cause for 1923 are shown for comparison:—

	Explosives.		Falls of Ground.		In Shafts.		Miscellaneous Under-ground.		Surface.		Machinery.		Total.	
	Fatal.	Serious.	Fatal.	Serious.	Fatal.	Serious.	Fatal.	Serious.	Fatal.	Serious.	Fatal.	Serious.	Fatal.	Serious.
1.—East Coolgardie	2	2	1	...	1	5	*2	89	...	31	...	4	6	131
2.—Mt. Margaret	1	2	...	...	...	2	...	4	...	1	1	9
3.—Murchison	5	1	...	...	4	...	5	...	1	1	15
4.—East Murchison	1	...	...	...	...	...	1
5.—Coolgardie	2	...	...	2
6.—Yilgarn	1	...	...	...	1
7.—N. Coolgardie	1	...	...	...	...	...	1
8.—N.E. Coolgardie
9.—Broad Arrow...
10.—Dundas
11.—Pilbara
12.—Peak Hill
13.—Yalgoo
14.—Phillips River
15.—Collie	1	1	14	...	...	...	50	†1	5	...	...	2	70
16.—Greenbushes
17.—Northampton	2	...	...	...	...	...	2	...
18.—W. Pilbara
19.—Swan	1	...	...	...	1
20.—Ashburton
21.—Roelands
22.—Kendenup
23.—State generally
Total for 1924 ...	2	3	3	21	2	5	4	147	1	47	...	8	12	231
Total for 1923	5	4	34	2	6	3	159	2	88	...	1	11	307

* Includes one accident not a "True Mining" accident.

† Not a "True Mining" accident.

FATAL ACCIDENTS.

Brief particulars of each fatal accident reported to this Department during the year are as follows:—

Explosives.

At the Lake View and Star G.M., E. Coolgardie Goldfield, two men met their deaths through a premature explosion of some holes they had just lit, one man being buried under a large quantity of rock and killed instantaneously, while the other succumbed to his injuries five days later. At the coroner's inquest the jury brought in a verdict of accidental death. (1307/24.)

Falls of Ground.

A man was killed by a fall of coal at the Proprietary Colliery, Collie Coalfield. At the time of the accident deceased was engaged working down the face, when the top coal fell away and buried him underneath it. The coroner's jury returned a verdict of accidental death with no blame attributable to anyone. (94/24.)

At the Golden Horseshoe Gold Mine, East Coolgardie Goldfield, a man was fatally injured through a piece of rock falling on him from the back of the stope. Prior to the accident the ground which fell had been examined and appeared safe, but after the fall it was seen that an equilateral triangular piece formed part of the face. A verdict of accidental death, with no blame to anyone, was brought in by the coroner's jury. (838/24.)

A fatal accident occurred at the Sons of Gwalia Gold Mine, Mt. Margaret Goldfield. While several men were cleaning out a stope a large piece of ground, weighing about 10 tons, fell from the back on to one of the men, killing him instantaneously. The piece of ground which fell had been carefully examined just prior to the accident and appeared safe to work under. The coroner's jury gave a verdict of accidental death, no blame being attributable to anyone. (1291/24.)

In Shafts.

At the Ingliston Consols Extended G.M., Murchison Goldfield, two men were being lowered down the shaft on a bailing tank, having previously arranged with the engine-driver not to go below a given mark—the usual stopping place—and with the platman to stay at No. 11 level to give the signal to stop when the men called out. On the tank stopping one of the men started to crawl through an opening 2ft. 9in. x 4ft. on to the ladderway, but before he was through the tank moved upwards and jammed his head against the centres, death being instantaneous. On enquiry the engine-driver stated that before raising the tank he received a signal, but as the platman denied having signalled, it can only be supposed that the rope jerked when the platman took his hands off it and so conveyed a signal to raise to the engine-driver. An inquest was held and a verdict of accidental death with no blame to anyone returned by the coroner's jury. (989/24.)

A man was killed at the Golden Horseshoe G.M., East Coolgardie Goldfield, through falling from a cage in which he and another man were being raised from the 31st to the 30th level. There was no evidence to show what caused him to fall; his mate stated that deceased just seemed to disappear feet first from the cage and fell on to the pent-house below the 31st level, where he was picked up dead. The coroner's jury returned a verdict of accidental death, with no blame to anyone. (182/24.)

Miscellaneous Underground.

At the Golden Horseshoe Gold Mine, East Coolgardie Goldfield, a man was killed through a run of ore from a chute. At the time of the accident deceased was engaged clearing the chute ready for repairing and was standing on a truck at the mouth of the chute when the ore came away suddenly and caught him. He died in a few minutes after being extricated. The coroner's jury brought in a verdict of accidental death. (381/24.)

A man while descending a ladder in a winze of the Surprise Lead Mine, Northampton Mineral Field, missed his footing and fell on top of another man working at the bottom of the winze. When picked up both men were unconscious and succumbed to their injuries some hours later. A verdict of accidental death was returned by the coroner's jury at the inquest held on the bodies. (1389/24.)

OTHER ACCIDENTS.

The following accidents were reported but not classified as "True Mining" accidents:—

A regrettable burning accident occurred at the Premier Colliery, Collie Coalfield, to a lad of eight years, who wandered on to a burning slack dump and received such severe injuries that he died the following day. The dump, which had been burning for years, was securely fenced. (95/24.)

The body of a man was found in an open cut on the Lake View and Star G.M., East Coolgardie Goldfield. From the evidence adduced at the inquest it would appear that deceased was on his way to his camp when he fell into the open cut. The open cut was surrounded by a 2-wire fence, through which deceased must have crawled. The coroner's jury returned a verdict of death from injuries received through falling down an open cut, and added the following rider: "The jury consider the method of fencing open cuts in the district is a danger and a menace to people having to travel across different leases." As the Inspector of Mines and the State Mining Engineer concurred that the fence was a secure one, no action was taken against the company. (1919/24.)

SERIOUS ACCIDENTS.

The term "serious" is applied to all accidents resulting in such injuries as incapacitate the sufferer from carrying out his usual work in or about a mine for 14 days or more.

One hundred and thirty-one of the 231 accidents during 1924 occurred in the East Coolgardie Goldfield, but only 30 cases were breakages of the larger

bones, permanent injury to limbs, or injuries likely to have lasting disabling effects. The balance of injuries were of a less serious nature, such as bruises, cuts, strains, scalds, poisoned cuts, smaller dislocations, wrenches, jars, etc., but of a sufficiently serious nature to cause the injured person to be absent from his employment for 14 days or more.

Explosions and Explosives.

Only three accidents were classified under the above heading: in one case a charge exploded prematurely; in another a man was carrying a tin of detonators when they exploded; while one man received serious injury through an explosion occurring while he was passing a crosscut.

Falls of Ground.

Twenty-one accidents were due to falling ground. In four cases the injuries were sustained while men were engaged in the dangerous but necessary work of pulling down loose ground after firing. In the remaining 17 cases the injuries were due to ground falling, or their being struck by falling pieces of stone or coal in the workings of the mines.

In Shafts.

Five accidents were reported during 1924 as having occurred in shafts. One man while in the act of pulling a knocker line slipped and fell down a shaft; one man was struck by a stone falling down a shaft; two men received injuries while riding in cages, one by being struck by a piece of timber and the other fell from a cage in which he was descending the shaft; one man was injured while lifting a skip into a cage.

Miscellaneous Underground.

One hundred and forty-seven serious accidents were classified under above heading during 1924. In 43 cases the injuries were sustained while handling and loading trucks and skips, through fingers and bodies being jammed against chutes and other trucks, toes and feet being run over, bodies struck by upsetting of trucks, men slipping and straining themselves while trucking or lifting derailed trucks or material into trucks, and so on; the injuries being mostly wrenches, sprains, bruises, jars, fractures of fingers and toes, and cuts.

In 25 cases the injuries were due to falling and rolling loose rocks and stones, such as runs of ore and mullock while shovelling, or stones running down rills and ore chutes; and 10 men received severe cuts and bruises while handling sharp stones; seven men were injured handling rock drills, coal-cutting machines, and parts of same. Other falls in the workings from stages and ladders, in rills, passes, and so on caused injury to 28 persons, and 10 were hurt by falling tools and pieces of machinery. Flying splinters of stone and steel were responsible for five men being injured, and nine were hurt while handling timber. The remaining 10 cases were due to various accidental causes, jarring of hands and feet, blows from tools, strains, poisoned cuts, and so on.

Surface

(including machinery).

Fifty-five persons were seriously injured while working on the surface; three men were burnt in various ways; six sustained injuries from falls in the course of their work; 13 were hurt by trucks and skips, being jammed or struck by them, by them capsizing, or by men sustaining strains while working them. Flying splinters injured two men; falls of timber and pieces of machinery accounted for 12 cases of injury; 10 cases were caused by machinery in motion, two of these being caused by handling belts in motion; five men were hurt by being struck by tools they were using falling or slipping. Other causes of four accidents were jarred and jammed hands and feet, poisoned cuts, etc.

WINDING MACHINERY ACCIDENTS

(without serious injury to persons).

Twelve accidents were reported during 1924 as occurring to winding machinery, brief particulars are as follows:—

Overwinding.

An engine-driver overwound a cage to the thimble in the east compartment of the Fenian shaft of the Ingliston Consols Extended G.M. No damage was done. (983/24.)

An overwind of a skip occurred at the Sons of Gwalia G.M. through a set screw falling out and causing indicator to drop 2 inches. The sheave bearers were splintered. (1562/24.)

An overwind occurred at the Ivanhoe G.M., East Coolgardie Goldfield, through an engine-driver neglecting to follow the usual practice of putting the reversing handle in position for raising the bottom load after the top skip had been emptied. A couple of teeth of the worm wheel were fractured. (Machinery File No. 24/24.)

At the Golden Horseshoe G.M., East Coolgardie Goldfield, while instructing some mechanics an engine-driver's attention was distracted from the indicator through one of the mechanics talking to him, with the result that the cage was overwound. No damage resulted. (Machinery File 24/24.)

SKIP DERAILMENTS.

Seven derailments occurred at the Sons of Gwalia during the year. Particulars are as follows:—

In one case the cause of accident was unknown, but was probably due to a loose rail joint; a few centre legs were knocked out. Two cases were due to broken rails, the shaft timbers being damaged in one and some centres knocked out in the other; a skip left the rails from some unknown cause and knocked a few centrepieces out; one skip was derailed through a broken rim of a top wheel; a skip fouled a cap-piece—which probably fell out of the back—and in leaving the rails knocked some of the shaft timber out. A piece of stone on the rail caused another skip to be derailed. No damage resulted. (775/24, 920/24, 1292/24, 1625/24.)

MISCELLANEOUS.

At the Ingliston Consols a bailing tank left the shackle and fell to the bottom of the shaft owing to the butterfly striking the top of a tank edge on when slack rope was being let out. A rivet was sheared. (982/24.)

At the same mine a bailing tank fell away between the Nos. 6 and 7 levels to the bottom of shaft owing to internal corrosion of the rope, the rope being broken. (120/25.)

A third accident occurred at this mine. While an engine-driver was hoisting a cage the bridle lifted and allowed a truck to run out of the cage, jamming it in the west side of the shaft under the wall plate. A top brace of poppet legs was pulled down, the cage badly knocked about, and the winding rope bent in the centre. A new cage, winding rope and drum were installed. (1837/24.)

While hauling ore at the Lake View and Star G.M., East Coolgardie Goldfield, the pinion gearing into the east drum spur wheel broke. The engine-driver with great promptitude stopped the engine, applied the brakes and stopped the runaway skip. (Machinery File 24/24.)

PROSECUTIONS FOR BREACHES OF THE MINES REGULATION ACTS AND REGULATIONS.

Action was taken against the manager of the Oroya Links G.M. for failure to provide, and cause to be constantly used, appliances for prevention of dust contrary to provisions of "The Mines Regulation Act, 1906." The case was dismissed, the Resident Magistrate holding that Section 65 of the Mines Regulation Act had not been complied with and insufficient notice was given defendant. Judgment was obtained against the Inspector of Mines for £11 5s. plus costs. (1318/24.)

EXEMPTIONS FROM SECTION 31, SUBSECTION 4, OF "THE MINES REGULATION ACT, 1906."

Seventeen Exemption Permits were issued during the year, nine being for mines in the East Coolgardie Goldfield, two in the Yilgarn Goldfield, four in the North-East Coolgardie Goldfield, one in the Murchison Goldfield, and one in the Northampton Mineral Field.

Before these permits were issued the applicants were examined on the particular machinery to which the exemption applied, and satisfied the Inspector of Mines as to their capability of handling it, and that it was not reasonably practicable to insist on employment of a certificated driver.

SUNDAY LABOUR ON MINES.

No permits to work on Sundays were granted during the year.

AMENDMENTS AND ADDITIONS DURING 1924 TO THE REGULATIONS UNDER "THE MINES REGULATION ACT, 1906"; "THE MINES REGULATION AMENDMENT ACT, 1915"; "THE COAL MINES REGULATION ACT, 1902 AND 1915," AND "THE MINING DEVELOPMENT ACT, 1902."

The Mines Regulation Act, 1906.

Section 63: Additional clause under Division 2 of Regulation 15, specifying scale of fees, and officers empowered to receive them, at elections of workmen's inspectors of mines. Gazetted 6th February, 1924.

Section 8, Regulation 15, Part 2, Clause 3: Cancellation of *Gazette* notice, 29th September, 1922, and substitution of boundaries of centres, etc., for workmen's inspectors of mines. Gazetted 1st October, 1924.

The Mining Development Act, 1902.

Extension of operation of regulations published in *Government Gazette*, 25th August, 1911, relative to subsidies on production of merchantable mica and manufactured mica goods for a further term of 12 months from 1st January, 1924. Gazetted 29th May, 1924.

Revocation of regulations for treatment of auriferous copper ores at State Smelting Works, Phillips River Goldfield, published in *Government Gazette*, 4th April, 1919. Gazetted 17th December, 1924.

ADVANCES ON ORES.

The table hereunder shows the minerals on which advances were made to owners of ores suitable for shipment outside the State to enable them to carry on their operations:—

ADVANCES ON ORES.

STATEMENT OF TRANSACTIONS FOR YEAR 1924.

Miscellaneous Minerals.

Mineral.	File No.	Tonnage.	Amount Advanced		Expenses, Shipping, etc.		Balance of proceeds remitted to Owners.		Total Amount realised during year.		Remarks.
			£	s. d.	£	s. d.	£	s. d.	£	s. d.	
Lead (concentrate)	1034/23	3,216·5	57,600	0 0	...	9,460	9 1	70,701	17 9	Includes recoup of advances made during 1923.	
Asbestos ...	2050/22	21·00	1,050	0 0	60 9 5	996	7 9	Tonnage advance and portion of amount realised shown in previous year's return.	
Do. ...	146/23	8·75	437	0 0	14 4 1	4 9 0	455	13 1			
Do. ...	402/23	12	600	0 0	46 1 0	...	592	2 6	Tonnage and advances shown on previous year's return.		
Do. ...	99/23	3·425	68	0 0	29 12 5	7 12 6	105	4 11	Tonnage and advance shown previously.		
Do. ...	1916/22	20	1,000	0 0	49 3 2	...	865	15 7	Tonnage, advance, and portion of amount realised shown previously.		
Do. ...	2254/22	24	1,200	0 0	94 12 5	...	1,094	4 10	do. do.		
Do. ...	742/23	5·05	252	10 0	14 17 8	...	259	9 10	Not finalised. Tonnage and advance on previous return.		
Do. ...	856/23	3·15	250	0 0	4 5 8	...	203	19 5	Further proceeds to come. Tonnage and advance shown on previous return.		
Do. ...	1103/23	3·25	150	0 0	12 7 10	24 15 8	187	3 6	Tonnage and advance shown previously.		
Do. ...	1095/23	5	250	0 0	20 17 2	26 7 4	297	4 6	do. do.		
Do. ...	1216/23	·70	28	0 0	2 6 10	18 2 7	48	9 5	Tonnage shown previously.		
Do. ...	81/23	13·40	670	0 0	47 19 6	...	578	8 6	Tonnage, advance, and portion of amount realised shown previously.		
Do. ...	1308/23	2·20	109	0 0	4 2 0	7 4 4	120	6 4	Tonnage and advance shown previously.		
Do. ...	1537/23	5·125	245	0 0	9 12 11	22 11 7	277	4 6	do. do.		
Do. ...	1764/23	4·925	239	0 0	9 7 6	24 17 1	273	4 7	do. do.		
Do. ...	1887/23	6·15	302	0 0	6 10 9	57 0 2	365	10 11			
Do. ...	192/24	2·35	119	0 0	2 17 8	17 8 5	139	6 1			
Do. ...	451/24	4·1	221	0 0	4 2 5	32 13 3	257	15 8			

ADVANCES ON ORES—continued.

Mineral.	File. No.	Tonnage.	Amount Advanced.	Expenses, Shipping, etc.	Balance of proceeds remitted to Owners.	Total Amount realised during year.	Remarks.
			£ s. d.	£ s. d.	£ s. d.	£ s. d.	
Asbestos	933/24	3·2	136 0 0	2 1 1	36 4 3	174 5 4	
Do.	1052/24	2·65	125 15 0	1 10 5	37 8 11	164 14 4	
Do.	1211/24	4·4	201 10 0	2 16 0	59 3 3	263 9 3	
Do.	1473/24	2·15	96 10 0	1 6 1	28 2 2	125 18·3	
Do.	520/25	1·25	40 0 0	...	...	...
Do.	1637/24	2·55	107 0 0	...	...	...
Manganese	1564/23	62·8	502 10 0	25 4 3	...	...	Proceeds not to hand.
Copper Ore	420/24	12·95	95 0 0	36 16 5	21 4 11	153 1 4	Tonnage and £50 advance previously shown.
Do.	768/24	30·0	...	51 4 0	99 16 0	151 0 0	
Do.	420/24	4·8	...	16 14 3	11 12 8	28 6 11	
Do.	558/22	300·0	2,320 0 0	693 1 1	...	2,584 16 8	Tonnage, portion of advance, expenses shown previously not finalised.
Silver Lead, Bismuth	841/24	41·75	...	25 11 2	...	12 0 5	Not finalised.

LOANS AND SUBSIDIES UNDER "THE MINING DEVELOPMENT ACT, 1902," AND FROM THE MINING DEVELOPMENT VOTE.

The transactions under this heading always involve a large amount of investigation and field work, most of which has been carried out by the Assistant State Mining Engineers and the District Inspectors of Mines. A number of the more interesting investigations have been referred to in the foregoing reports of Messrs. Blatchford and Wilson, some of which are put up hereunder as appendices to this report. Tabulated statements of the expenditure on transactions for 1924 in aid of mining development are in Appendix No. 1 hereunder.

Diamond Drill Boring at Wiluna.

Important diamond drilling prospecting work was undertaken during 1924 by the Ivanhoe and Maroroa companies on the Gwalia Consolidated lines of lode at Wiluna. In the first case the Department gave no monetary assistance from the Mining Development Vote, and in the second gave £1 for £1 assistance by loan under Part IV. of the Mining Development Act. In both cases a departmental supervisor was present at the raising of all core, and saw to its being securely kept in locked and sealed boxes until sent under seal to Perth for examination in the Government laboratory. The results obtained are the property of the companies concerned, and have not yet been released for public information, so cannot yet be published. It is common knowledge, however, that they have induced the sinking of a shaft 300 feet deep on the Gwalia Consolidated Mine, and that an important large lode has been cut in cross-cutting at the 300ft. level.

Wilga Coalfield.

In continuation of the information given about the Wilga Field in Mr. Wilson's reports in 1921 and 1923 annual reports, a summary of the information in hand was prepared by myself in October and November, 1924, and is submitted herewith as Appendix No. 23.

Kalgoorlie School of Mines Experimental Plant.

The experimental work, mainly on flotation of gold ores, to which reference was made in last year's report, has continued to be carried on during 1924 at the Kalgoorlie school with very interesting and valuable results, for details of which reference may be made to the report of the Director of the School of Mines. It is becoming increasingly apparent that work of this sort is of the utmost importance to metallurgical progress in the State.

Dust in Mines.

Following up the publication in 1922 of the Hon. Jas. Cornell's report on Miner's Phthisis in South Africa as a departmental bulletin, a further publication was issued in November, 1924, in like form, of the report of Mr. Inspector of Mines Phoenix, on Methods of Dust Determination and Elimination in South African Mines, written as a result of his special mission to Johannesburg to gain knowledge of the methods in use there. This has been widely distributed throughout the goldfields, and should be of much service to all concerned in the vital problem of preservation of our miners' health.

I have, etc.,

A. MONTGOMERY,
State Mining Engineer.

MINING DEVELOPMENT EXPENDITURE.

Advances Outstanding, 31st December, 1924.

Name of Lease, Mine or Borrower.	No. of Lease.	District.	Amount authorised.	Principal Moneys advanced		Principal Moneys		Interest		Total Principal and Interest outstanding at 31st December, 1924.
				Previously to 1924.	During 1924.	Repaid, including Sale of Securities, etc.	Balance outstanding.	Paid.	Outstanding.	
A.—PIONEER MINING AND PROSPECTING—										
Alicia	254F	Mt. Morgan	£ 245 0 0	£ 195 0 0	£ ...	£ ...	£ 195 0 0	£ 4 2 6	£ 54 14 8	£ 249 14 8
Ard Patrick	197	Phillips River	1,331 16 4	1,331 16 4	...	...	1,331 16 4	...	105 11 11	1,437 8 3
Ard Patrick	197	Phillips River	270 0 0	268 8 8	...	...	268 8 8	...	32 4 9	300 13 5
Allen & Beaton	P.A. 1054Z	Menzies	250 0 0	250 0 0	...	...	250 0 0	5 5 7	7 1 3	257 1 3
Allen & Beaton	P.A. 1054Z	Menzies	100 0 0	99 17 6	...	...	99 17 6	...	0 19 3	100 16 9
Ajana Lead Mines, Ltd.	153	Northampton	1,500 0 0	...	1,380 5 10	...	1,380 5 10	1 17 8	35 4 6	1,415 10 4
Bulletin	795	Marble Bar	600 0 0	427 19 5	28 1 7	25 8 10	430 12 2	50 5 2	96 19 10	527 12 0
Baneygo, North	2113F	Laverton ... ..	...	200 15 0	...	...	200 15 0	14 5 3	31 7 6	232 2 6
Brittannia	953M	Mt. Magnet	150 0 0	114 12 6	...	43 10 0	71 2 6	...	9 4 6	80 7 0
Bickerton	378	Phillips River	150 0 0	148 12 6	...	...	148 12 6	...	14 18 2	163 10 8
Black Princess	5166E, 5247E	Kalgoorlie	150 0 0	148 4 8	...	...	148 4 8	...	12 3 4	160 8 0
Bull Oak	1179Y	Bulong	60 0 0	27 2 6	...	...	27 2 6	...	2 1 7	29 4 1
British Flag	5310E, 5316E, 5324E, 5334E, 5354E, 5355E, 5364E, 5365E, 5366E, 5352E	Kalgoorlie	750 0 0	500 0 0	250 0 0	...	750 0 0	3 13 1	65 13 5	815 13 5
Bayley's Reward	5127	Coolgardie	100 0 0	99 9 10	...	...	99 9 10	1 18 10	6 8 0	105 17 10
Brown & Moyle	P.A. 1842E	Kalgoorlie	75 0 0	...	75 0 0	...	75 0 0	...	0 18 6	75 18 6
Brilliant G.M. Co., N.L.	880, 897	Yalgoo	2,000 0 0	...	982 4 1	...	982 4 1	...	3 6 2	985 10 3
Champion, South	817N, 1039N	Nannine	400 0 0	400 0 0	...	358 0 0	42 0 0	29 11 8	19 19 8	61 19 8
Clarkson & Son	P.A. 186	Ravensthorpe	150 0 0	119 7 6	...	...	119 7 6	...	16 19 8	136 7 2
Clifford & Richards	P.A. 1182	Yilgarn	30 0 0	25 18 6	...	...	25 18 6	...	0 11 6	26 10 0
Cumpston, T. B.	P.A. 1564E	Kalgoorlie	39 0 0	39 0 0	...	...	39 0 0	...	1 9 3	40 9 3
Chrysoille, No. 1 and No. 2	274, 275	Pilbara	250 0 0	250 0 0	...	50 3 4	199 16 8	7 16 5	35 10 10	235 7 6
Coolgardie Redemption	5135	Coolgardie	500 0 0	500 0 0	...	...	500 0 0	...	70 2 6	570 2 6
Coolgardie Redemption	5135, 5136, 5137	Coolgardie	350 0 0	350 0 0	...	...	350 0 0	...	29 6 0	379 6 0
Central	5251E	Kalgoorlie	1,000 0 0	1,000 0 0	...	200 6 2	799 13 10	132 15 9	31 18 2	831 12 0
Clan McLeod	283	Pilbara	150 0 0	55 0 0	...	...	55 0 0	5 10 0	5 3 7	60 3 7
Christie, J. M.	Dry Dredge Area 1W	Waverley	100 0 0	100 0 0	...	...	100 0 0	0 8 7	13 0 4	113 0 4
Crocus Venture Syndicate	P.A. 1730E	Kalgoorlie	300 0 0	145 9 11	...	...	145 9 11	...	4 19 6	150 9 5
Copper Separation, Ltd.	Machy. Lease 11	Phillips River	4,000 0 0	...	4,000 0 0	...	4,000 0 0	...	108 15 4	4,108 15 4
Dawn of Hope	1504C	Leonora	100 0 0	100 0 0	...	...	100 0 0	0 3 11	...	100 0 0
Daley & McDonald	1051N	Nannine	100 0 0	57 5 0	...	...	57 5 0	0 3 11	...	57 5 0
Dupuy, Kemp & Hughes	P.As. 1628E, 1647E	Kalgoorlie	75 0 0	75 0 0	...	...	75 0 0	...	0 1 8	75 0 0
Dreadnought	4555, 4561, 5190, 1895W	Coolgardie	600 0 0	112 0 0	184 0 2	...	296 0 2	4 11 4	6 2 10	302 3 0
Digger's Luck	P.A. 1831	Cane Grass	175 0 0	174 0 8	...	76 6 8	97 14 0	1 8 10	...	97 14 0
Davidson, G. W.	P.A. 1831	Yilgarn	180 0 0	...	127 0 0	...	127 0 0	0 10 0	4 6 9	181 6 9
Daisy Queen Gold Mining Co., N.L.	1212, 1221	Lawlers	4,000 0 0	...	4,000 0 0	...	4,000 0 0	...	117 17 5	4,117 17 5
Duffy, J. G.	P.A. 1018M	Lennonville	100 0 0	...	49 0 0	...	49 0 0	...	0 12 2	49 12 2
Emily	1510	Cue	400 0 0	372 1 9	...	...	372 1 9	...	44 7 10	416 9 7
Elverdton	M.A. 95	Ravensthorpe	3,500 0 0	3,498 17 10	...	3,341 4 10	157 13 0	462 15 3	97 18 4	195 11 4
Edna May Battler	911, 3170, 3171	Yilgarn	3,000 0 0	2,539 12 9	...	8 6 8	2,531 6 1	86 18 9	310 5 5	2,841 11 6
Eclipse	1047X	Gindalbie	498 19 1	498 19 1	...	267 5 0	291 14 1	62 8 11	...	231 14 1
East Collie Coal Mining Briquetting Co.	294/299, 300/303	Collie	1,000 0 0	790 5 2	...	...	790 5 2	98 15 6	...	864 13 6
Emu	1977	Cue	850 0 0	840 4 8	...	...	809 17 2	121 3 4	26 10 9	836 7 11
Ellis, J. T.	Reserve 368H	Kalgoorlie	75 0 0	75 0 0	...	...	74 0 0	...	...	74 0 0
Egan & Sandler	P.A. 1959E	Kalgoorlie	100 0 0	...	100 0 0	...	100 0 0	...	1 7 5	101 7 5
Falkiner & Lavery	P.A. 1150	Yilgarn	150 0 0	122 10 3	...	0 6 0	122 4 3	3 14 11	...	122 4 3
Firelight & Undaunted	3217, 3222	Yilgarn	414 11 0	390 8 6	...	0 5 0	390 3 6	3 2 0	64 1 0	454 4 6
Field's Find Extended	902	Yalgoo	361 2 3	361 2 3	...	...	261 3 3	22 8 3	51 13 2	312 16 5
Flag Leases	136, 137, 138	Phillips River	3,500 0 0	3,080 18 9	...	8 3 9	3,072 15 0	...	177 9 6	3,250 4 6
Flag Tributaries (Grant & Edwards) ... ..	...	Phillips River	450 0 0	450 0 0	...	0 13 1	449 6 11	15 8 0	38 13 1	488 0 0
Flag Tributaries (Grant & Edwards) ... ..	...	Phillips River	150 0 0	148 16 10	...	16 12 3	132 4 7	1 2 9	4 7 6	136 12 1
Flynn & Ide	P.A. 1743E	Kalgoorlie	16 0 0	16 0 0	...	...	16 0 0	...	...	16 0 0
Flegeltaub & Manning	P.A. 2095	Coolgardie	50 0 0	49 17 6	...	...	49 17 6	...	0 18 2	50 15 8
Franklin	841	Pilbara	525 0 0	171 0 0	232 15 0	23 0 0	380 15 0	9 8 3	11 7 4	392 2 4
Falkiner & Harford	P.A. 1343	Yilgarn	125 0 0	...	24 0 0	...	24 0 0	...	0 0 3	24 0 3
Globe	912N	Nannine	500 0 0	444 12 9	...	171 1 6	273 11 3	77 17 10	15 8 1	288 19 4
Gallagher, H. J.	M.L. 145	Northampton	50 0 0	25 0 0	...	...	25 0 0	6 14 6	2 7 1	27 7 1
Gem	G.M.L. 184	Phillips River	500 0 0	500 0 0	...	52 9 5	447 10 7	84 14 8	54 5 1	501 15 8

Gem Consolidated	151, 156	Phillips River	1,000 0 0	1,000 0 0	...	...	1,000 0 0	0 18 8	265 17 9	1,265 17 9
Gem Consolidated	151, 156	Phillips River	150 0 0	149 19 1	...	...	149 19 1	...	21 7 9	171 6 10
Golden Lizard	1067E	Edjudina	366 7 4	366 7 4	...	...	366 7 4	45 18 6	35 17 8	402 5 0
Great Southern	2909	Yilgarn	630 0 0	630 0 0	...	...	630 0 0	9 18 5	181 15 10	311 15 10
Great Southern	2909	Yilgarn	500 0 0	374 10 0	125 10 0	...	500 0 0	...	53 19 0	558 19 0
Great Southern	2909	Yilgarn	800 0 0	644 15 4	116 8 0	...	511 0 0	...	812 14 4	812 14 4
Golden Mile Ore Channel Extended, Ltd.	5128E	Kalgoorlie	5,000 0 0	3,636 3 1	...	104 11 8	3,471 11 5	...	415 10 4	3,887 10 9
Griffin Syndicate	306/13	Collie	348 0 7	348 0 7	...	...	348 0 7	34 0 6	22 13 8	370 14 3
Griffin Syndicate	306/13	Collie	250 0 0	247 15 0	...	8 0 0	239 15 0	9 3 10	15 16 4	255 11 4
Gibbs, J.	P.A. 1683E	Kalgoorlie	30 0 0	15 0 0	...	...	15 0 0	...	0 3 1	15 3 1
Greenhills G.M. Co., N.L.	383F	Linden	350 0 0	262 12 2	23 8 6	...	286 0 8	15 3 10	18 1 0	304 2 5
Greenhills G.M. Co., N.L.	383F	Linden	225 0 0	...	171 10 0	...	171 10 0	...	4 3 5	175 13 5
Golden Promise	P.A. 2053	Coolgardie	300 0 0	300 0 0	...	...	300 0 0	...	40 4 7	340 4 7
Griffiths Gold Mine	4567	Coolgardie	1,000 0 0	1,000 0 0	...	...	1,000 0 0	10 2 4	88 16 3	1,088 16 3
Garden Gully	5147, 5148	Coolgardie	300 0 0	112 10 0	...	...	112 10 0	...	16 12 2	129 2 2
Golden Hope Gold Mines, N.L.	63, 86	Hampton Plains	2,000 0 0	2,000 0 0	...	...	2,000 0 0	180 11 6	65 10 8	2,065 10 8
Goddard & Dawe	P.A. 1100Z	Menzies	200 0 0	...	194 8 11	...	194 8 11	...	4 2 6	198 11 5
Havilah	345B	Black Range	600 0 0	553 2 1	...	455 12 4	97 9 9	176 11 4	2 14 7	100 4 4
Havilah	345B	Black Range	500 0 0	449 10 9	46 18 9	...	496 9 6	54 5 9	15 12 10	512 2 4
Hawk	725G	Desdemona	120 0 0	116 12 2	...	22 5 11	94 6 3	3 7 10	...	94 6 3
Harbour View Gold & Copper Co., Ltd.	M.L. 52 and 94	Kundip	2,886 11 0	2,886 11 0	...	74 16 7	2,811 14 5	8 18 11	620 18 3	3,432 12 8
Hamilton & Congdon	Tributers "Flag" Mine	Ravensthorpe	150 0 0	150 0 0	...	...	150 0 0	...	13 3 8	163 3 8
Holt & Rowe	P.A. 1454E	Kalgoorlie	50 0 0	50 0 0	...	...	50 0 0	...	0 10 11	50 10 11
Hamerston, O. A.	P.A. 184	Ravensthorpe	100 0 0	100 0 0	...	...	100 0 0	...	...	100 0 0
Hobby & Parry	...	Youanme	125 0 0	117 15 10	...	11 0 0	106 15 10	...	...	106 15 10
Humphries & Reid	Dry Dredge Area	Bulong	100 0 0	100 0 0	...	...	100 0 0	4 4 0	9 16 1	109 16 1
Ingliston Junction G.M. Co., N.L.	1475N, 1491N	Nannine	200 0 0	98 7 6	...	14 0 0	84 7 6	3 4 10	...	84 7 6
Ives Lake View Reward Junction	4732, 5154	St. Ives	500 0 0	64 0 0	22 10 0	51 0 0	35 10 0	2 5 0	1 3 3	36 13 3
Invincible	5358E	Kalgoorlie	75 0 0	...	25 0 0	...	25 0 0	...	0 2 5	25 2 5
Johnston & Stennett	Temp. Res. 218H	Ravensthorpe	150 0 0	150 0 0	...	0 17 3	149 2 9	17 14 2	4 12 8	153 15 5
Kuhlmann & Buckie (Ironclad Tribute)	Res. 196H	Ravensthorpe	300 0 0	263 8 0	...	...	263 8 0	18 8 0	2 17 3	266 5 3
Kuhlmann & Buckie (Ironclad Tribute)	Res. 196H	Ravensthorpe	403 17 3	403 17 3	...	6 1 0	397 16 3	...	...	397 16 3
Kingdom Come	M.L. 112	Northampton	204 14 0	204 14 0	110 0 0	...	94 14 0	5 8 0	15 11 0	110 5 0
Klondyke Boulder	804	Warrawoona	1,000 0 0	999 10 7	187 5 6	...	812 5 1	34 5 4	150 12 7	962 17 8
Kapanga	M.L. 515	Greenbushes	80 0 0	41 5 0	18 15 0	...	52 9 9	1 10 3	1 4 9	53 14 6
Lake View Extended	4538E	Kalgoorlie	1,050 0 0	892 15 5	...	803 0 0	89 15 5	...	54 11 1	144 6 6
Lorna	4554	Coolgardie	100 0 0	98 15 4	...	4 0 0	94 15 4	2 17 6	11 17 8	106 13 0
Lady Carmen	4556	Coolgardie	500 0 0	500 0 0	...	5 0 0	495 0 0	12 19 1	46 12 2	541 12 2
Lady of the Lake	5083E, 5173E, 5174E, 5177E, 5178, 5266E	Kalgoorlie	1,100 0 0	1,100 0 0	...	...	1,100 0 0	1 7 6	150 12 2	1,250 12 2
Lyons & Bacon	P.A. 1037C	Mt. Malcolm	33 10 0	29 5 0	...	...	29 5 0	...	0 9 10	29 14 10
Lloyd George G.M. Co., N.L.	4580, 4726, 4727	Coolgardie	1,750 0 0	1,750 0 0	469 17 3	...	1,280 2 9	305 5 8	41 2 2	1,321 4 11
Lloyd George G.M. Co., N.L.	4580, 4726, 4727	Coolgardie	2,000 0 0	...	1,044 14 0	...	1,044 16 0	...	8 3 1	1,052 19 1
Lupton, Chesson & Mathers	...	Day Dawn	600 0 0	600 0 0	...	...	600 0 0	...	...	600 0 0
Lake View Reward	4720, 4721, 4722, W.R. 553, 554	St. Ives	5,675 0 0	1,673 9 1	3,957 2 4	102 14 9	5,527 16 8	152 6 10	186 9 9	5,714 6 5
Lake View Reward	4720, 4721, 4722, W.R. 553, 554, 555	St. Ives	1,000 0 0	...	1,000 0 0	...	1,000 0 0	...	6 15 4	1,006 15 4
Lonsdale & Howard	P.A. 1822E	Kalgoorlie	100 0 0	81 0 0	19 0 0	0 19 10	99 0 2	0 9 11	6 3 10	105 4 0
Lake View	5410Z	Comet Vale	100 0 0	100 0 0	...	...	100 0 0	...	10 14 2	110 14 2
Lady Shenton G.M. Syndicate, Menzies, N.L.	5423Z, 5485Z	Menzies	1,000 0 0	...	413 18 6	...	413 18 6	...	8 16 4	422 14 10
Millenium	3256	Yilgarn	70 0 0	68 5 0	...	...	68 5 0	...	1 17 0	70 2 0
Mindeloo	1518	Mindoolah	300 0 0	198 17 0	...	10 0 0	188 17 0	...	8 1 1	196 18 1
Mt. Rankin Gold Mines, N.L.	3135, 3136	Yilgarn	1,000 0 0	911 19 9	...	115 13 11	796 5 10	...	47 8 4	843 14 2
Mt. Iron	198	Kundip	200 0 0	194 0 0	...	...	194 0 0	...	35 3 7	229 3 7
Melba	1053R	Yerilla	575 0 0	496 18 10	...	90 0 0	406 18 10	...	43 2 9	450 1 7
Mott & Matthews	P.A. 164	Roebourne	750 0 0	483 6 6	...	...	444 10 7	1 1 10	45 10 7	490 1 2
Mt. Magnet Prospecting Development Syndicate	1190M	Mt. Magnet	250 0 0	122 5 6	...	6 15 6	115 10 0	7 11 0	3 12 9	119 2 9
Mohr, John	P.A. 1522E	Kalgoorlie	150 0 0	143 5 7	...	...	143 5 7	0 7 6	29 2 11	172 8 6
Manners, W. G.	P.A. 572X	Kanowna	120 0 0	73 5 0	...	...	73 5 0	...	1 10 5	74 15 5
Meekatharra Prospecting Co., N.L.	P.A. 1021N	Meekatharra	150 0 0	77 5 3	...	...	77 5 3	2 6 4	...	77 5 3
Murrin Proprietary G.M. Co., N.L.	372F	Mt. Morgans	550 0 0	550 0 0	40 2 0	...	509 18 0	...	54 8 6	564 6 6
Murrin Proprietary G.M. Co., N.L.	372F	Mt. Morgans	413 3 6	413 3 6	85 1 6	...	328 2 0	...	36 11 6	364 13 6
Mt. Monger Proprietary G.M. Co., N.L.	4770E	Kalgoorlie	300 0 0	196 10 0	...	3 4 8	193 5 4	2 0 9	...	193 5 4
Mt. Zion	1013M, 1183M	Mt. Magnet	2,000 0 0	1,949 16 10	9 16 3	35 8 0	1,924 5 1	82 2 7	172 5 5	2,096 10 6
Mt. Zion	1189M, 1183M, 1189M	Mt. Magnet	500 0 0	500 0 0	...	...	500 0 0	9 15 9	45 18 8	545 18 8

MINING DEVELOPMENT EXPENDITURE—Advances Outstanding 31st December, 1924—continued.

Name of Lease, Mine, or Borrower.	No. of Lease.	District.	Amount authorised.	Principal Moneys advanced		Principal Moneys		Interest		Total Principal and Interest outstanding at 31st December, 1924.
				Previously to 1924.	During 1924.	Repaid, including Sale of Securities, etc.	Balance outstanding.	Paid.	Outstanding.	
			£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Menzies Consolidated Gold Mines, Ltd. ...	4931z, 4934z, 4935z, 4938z, 5074z, 5075z, 5315z, 5260z, 5261z, Garden Area 25z, 35z, Tailings Area 55z	Yundaga ...	5,000 0 0	1,474 5 3	1,185 16 3	...	2,660 1 6	84 19 7	82 1 4	2,742 2 10
Mills & Baker... ..	P.A. 622x ...	Kanowna ...	100 0 0	...	31 11 5	...	31 11 5	...	...	31 11 5
Mopoke Syndicate	P.A. 1182w ...	Broad Arrow ...	200 0 0	194 8 4	...	28 14 7	165 13 9	7 15 1	5 16 6	171 10 3
Mainland Consols	571D ...	Lake Austin ...	300 0 0	...	290 9 0	...	290 9 0	0 18 1	9 10 4	299 19 4
McGregor & Grylls	P.A. 1177 ...	Yilgarn ...	100 0 0	88 2 6	...	...	88 2 6	...	3 0 9	91 3 3
McMaus, D. J.	P.A. 1742e ...	Kalgoorlie ...	100 0 0	68 8 0	...	...	68 8 0	...	1 7 0	69 15 0
McLelland, Rowe, & Hehir	P.A. 2162 ...	Coolgardie ...	60 0 0	60 0 0	...	...	60 0 0	...	1 5 0	61 5 0
Norseman Prospecting Syndicate	1261 ...	Norseman ...	515 3 8	415 3 8	...	...	415 3 8	6 10 3	120 16 6	536 0 2
North Harbour View... ..	M.L. 370 ...	Phillips River ...	100 0 0	100 0 0	...	...	100 0 0	0 8 1	27 6 4	127 6 4
North End	4732e ...	Kalgoorlie ...	150 0 0	149 5 0	...	...	149 5 0	...	29 2 8	178 7 8
Norma	1460N ...	Nannine ...	220 0 0	220 0 0	...	42 8 7	177 11 5	15 7 3	22 4 10	199 16 3
North West Reward	5162 ...	St. Ives ...	250 0 0	140 11 0	...	...	140 11 0	3 15 0	9 3 2	149 14 2
New Glideaway	3248 ...	Yilgarn ...	200 0 0	126 10 0	...	83 1 9	43 8 3	16 2 1	2 16 8	46 4 11
New Victory	5159 ...	St. Ives ...	300 0 0	150 10 0	...	...	150 10 0	...	6 13 10	157 3 10
New Victory	5159 ...	St. Ives ...	115 0 0	93 15 5	...	...	93 15 5	...	3 9 9	97 5 2
North White Feather Gold Mines, Ltd.	12x, 13x, 1438x, 1443x	Kanowna ...	2,500 0 0	...	445 2 10	...	445 2 10	...	9 16 4	454 19 2
Oates & Party	P.A. 1022z ...	Menzies ...	90 0 0	90 0 0	...	4 19 6	85 0 6	...	...	85 0 6
Owen & Brown	M.L. 184 ...	West Pilbarra ...	100 0 0	58 3 0	...	14 13 7	41 9 5	7 19 5	1 11 0	43 0 5
Orr & Richards	3249 ...	Yilgarn ...	50 0 0	50 0 0	...	...	50 0 0	...	1 1 4	51 1 4
Oversight, South	1905w ...	Broad Arrow ...	200 0 0	143 18 1	15 0 0	3 18 10	154 19 3	8 0 5	...	154 19 3
Pearl	1095w ...	Mt. Magnet ...	76 0 0	76 0 0	...	...	76 0 0	...	24 18 2	100 18 2
Pyx	789B ...	Sandstone ...	600 0 0	571 4 8	...	87 10 7	483 14 1	12 14 5	24 15 0	508 9 1
Pilgrim's Rest G.M. Co., Ltd.	165, M.A. 14 ...	West Pilbarra ...	1,500 0 0	503 12 6	...	500 0 0	3 12 6	...	102 18 6	106 11 0
Pinder, A.	2102r ...	Duketon ...	100 0 0	100 0 0	...	...	97 18 0	...	15 14 4	113 12 4
Peterzen, C. G.	P.A. 1109c ...	Malcolm ...	20 0 0	20 0 0	...	...	15 0 0	1 6 7	0 9 10	15 9 10
Pinder & Cox	P.A. 1134r ...	Duketon ...	120 0 0	...	120 0 0	...	120 0 0	...	6 18 4	126 18 4
Pearce, J. A.	P.A. 1315 ...	Yilgarn ...	60 0 0	...	60 0 0	...	60 0 0	0 13 0	1 19 4	61 19 4
Quistini & Kinnane	941w ...	Broad Arrow ...	75 0 0	70 2 6	...	...	70 2 6	...	3 16 4	73 18 10
Rainbow Gold Mining Co., N.L.	5091 ...	Coolgardie ...	230 0 0	182 10 0	...	1 8 4	181 1 8	6 1 7	38 13 0	219 14 8
Riverina South G.M. Co., N.L.	324u, etc. ...	Mulline ...	2,000 0 0	2,000 0 0	...	...	2,000 0 0	1 0 0	211 6 9	2,211 6 9
Riverina South G.M. Co., N.L.	324u, etc. ...	Mulline ...	3,600 0 0	1,438 0 0	...	...	1,438 0 0	...	80 3 5	1,518 3 5
Raven, H. C.	P.A. 1712e ...	Kalgoorlie ...	85 0 0	74 19 2	...	...	74 19 2	...	1 3 2	76 2 4
Rich & Wigglesworth (Sub-Lesseees)	863B, 864B, 942B, 943B	Black Range ...	2,500 0 0	50 0 0	...	...	500 0 0	...	7 6 0	507 6 0
South Cornwall	M.L. 567 ...	Greenbushes ...	1,170 2 0	1,170 2 0	...	141 0 0	1,029 2 0	...	...	1,029 2 0
Stanley	1271x ...	Kanowna ...	150 0 0	112 0 0	...	...	112 0 0	2 6 0	39 14 8	151 14 8
Scots Greys	2801 ...	Yilgarn ...	200 0 0	200 0 0	...	...	200 0 0	...	77 7 3	277 7 3
Scots Greys	2801 ...	Yilgarn ...	200 0 0	200 0 0	...	...	200 0 0	...	74 17 2	274 17 2
Scots Greys	2801 ...	Yilgarn ...	120 0 0	15 10 0	86 5 0	0 10 0	101 5 0	...	2 19 5	104 4 5
Surprise	M.L. 342 ...	Ravensthorpe ...	600 0 0	327 4 1	...	11 9 0	315 15 1	1 5 1	28 5 0	344 0 1
Snelgrove & Mendis	P.A. 1880 ...	Widgiemooltha ...	100 0 0	100 0 0	...	...	100 0 0	...	0 10 4	100 10 4
Stevens & Party (Tributers) ... ..	...	Curran's Find ...	1,285 0 0	1,232 4 4	21 8 3	15 0 0	1,238 12 7	22 0 3	90 17 7	1,329 10 2
Stevens & Party (Tributers) ... ..	...	Curran's Find ...	1,047 13 0	1,047 13 0	...	...	1,047 13 0	17 3 10	119 3 9	1,166 16 9
Stevens & Party (Tributers) ... ..	...	Curran's Find ...	200 0 0	200 0 0	...	49 6 8	150 13 4	26 0 0	...	150 13 4
Scott & Sanders	P.A. 977t ...	Laverton ...	90 0 0	50 0 0	40 0 0	10 3 4	79 16 8	2 2 8	2 1 11	82 9 7
South Fingall	G.M.L. 569D ...	Day Dawn ...	1,750 0 0	798 15 0	324 5 7	55 6 7	1,067 14 0	47 14 4	34 19 8	1,102 13 8
Sydney Mint	895s ...	Kunanalling ...	200 0 0	68 3 11	102 2 3	...	170 11 2	4 12 3	5 11 10	176 3 0
Subard & Simpson	Reward M.L. 220 ...	West Pilbarra ...	100 0 0	50 0 0	...	1 15 0	48 5 0	0 17 8	6 5 10	54 10 10
Surprise Lead Mine	M.L. 148, 150, 154, 158, and 20Pr	Northampton ...	25,000 0 0	20,000 0 0	...	...	20,000 0 0	2,019 9 5	110 8 3	20,110 8 3
Thomas & McDonald (Tributers) ... ..	...	Kalgoorlie ...	40 0 0	35 0 0	...	...	35 0 0	...	3 10 9	38 10 9
Thorn, A.	P.A. 1913 ...	Widgiemooltha ...	50 0 0	50 0 0	...	...	50 0 0	1 13 10	1 11 6	51 11 6
Triffitt & Winter	P.A. 1452 ...	Tuckabianna ...	150 0 0	85 7 6	55 12 6	...	141 0 0	0 13 11	2 10 0	143 10 0
Triffitt & Winter	P.A. 1452 ...	Tuckabianna ...	75 0 0	...	75 0 0	...	75 0 0	...	...	75 0 0
Thompson, J.	P.A. 1362 ...	Yilgarn ...	75 0 0	...	31 10 0	5 0 0	26 10 0	...	0 15 8	27 5 8

Unexpected	5480Z, 5481Z	Mt. Ida	640 0 0	642 6 7	2 8 5	15 4 0	629 11 0	85 17 0	32 11 6	662 2 6
V's United G.M. Co., N.L.	271F	Mt. Morgans	500 0 0	406 14 1	...	...	406 14 1	1 11 2	25 7 9	432 1 10
V's United G.M. Co., N.L.	271F	Mt. Morgans	172 2 0	172 2 0	...	170 0 0	2 2 0	...	9 6 4	11 8 4
Victory	Reserve 334H	Marvel Loch	175 0 0	147 8 3	...	...	147 8 3	2 12 8	22 9 8	169 17 11
Victorian	5121	St. Ives	85 0 0	85 0 0	...	10 11 0	74 9 0	...	3 1 6	77 10 6
Venture	5160	St. Ives	100 0 0	59 4 2	...	...	59 4 2	0 3 1	3 13 10	62 18 0
Williamson & Pender	...	Kanowna	180 0 0	180 0 0	...	...	180 0 0	7 0 0	12 18 1	192 18 1
Western Graphite Co., Ltd.	M.L. 2PP	Plantagenet	300 0 0	100 0 0	...	...	100 0 0	...	18 15 4	118 15 4
Wheal May	Loc. 6	Northampton	302 4 6	302 4 6	...	50 0 0	252 4 6	5 15 9	14 9 8	266 14 2
Wilson & Son	P.A. 1103W	Broad Arrow	26 0 0	26 0 0	...	...	26 0 0	...	0 16 0	26 16 0
Wilga Proprietary Coal Prospecting Co., Ltd.	P.A. 406H	Wilga	1,000 0 0	582 9 6	151 18 10	...	734 8 4	...	63 7 1	797 15 5
Wheal Ina	M.L. 23PP	Northampton	180 0 0	128 6 4	...	128 6 4	...	9 5 10	...	...
Wheal Ina	M.L. 23PP	Northampton	200 0 0	...	42 17 0	...	42 17 0	...	0 2 0	42 19 0
Warrior	5484Z	Menzies	200 0 0	...	162 10 0	...	162 10 0	...	4 18 4	167 8 4
Watkins & Stout	P.A. 1935E	Kalgoorlie	75 0 0	...	60 0 0	...	60 0 0	...	0 9 10	60 9 10
Totals				90,462 8 3	21,875 6 3	9,135 12 6	103,202 2 0	4,970 7 2	6,786 9 3	109,938 11 3

B.—ASSISTANCE IN ERECTING BATTERIES AND TREATMENT PLANTS TO BE USED FOR CRUSHING FOR THE PUBLIC

Big Stone	357F, 369F	Yundamindera	500 0 0	484 2 1	...	...	484 2 1	37 18 0	60 11 10	544 13 11
Big Stone	357F, 369F	Yundamindera	1,438 0 0	1,438 0 0	...	418 6 3	1,019 13 9	...	384 6 3	1,404 0 0
Butcher Bird, No. 1	1933	Yilgarn	1,863 14 2	1,863 14 2	...	17 16 2	1,845 18 0	172 3 10	89 6 5	1,935 4 5
Butcher Bird Tributars (E. A. Cox)	...	...	76 8 4	76 8 4	...	26 4 9	50 3 7	...	...	50 3 7
Butcher Bird Tributars (Jones & Party)	...	...	12 0 3	12 0 3	...	...	12 0 3	...	...	12 0 3
Butcher Bird Tributars (Ogden & James)	...	...	26 4 9	26 4 9	...	...	26 4 9	...	...	26 4 9
Chunderloo	1048N	Nannine	2,032 12 8	1,730 10 2	...	656 4 2	1,074 6 0	...	218 16 2	1,293 2 2
Donovan's Find	768	Yilgarn	1,000 10 0	1,000 10 0	...	294 0 0	706 10 0	577 7 10	17 16 3	724 6 3
Donovan's Find	768	Yilgarn	150 0 0	150 0 0	...	...	150 0 0	46 10 9	4 14 6	154 14 6
Donovan's Find	768	Yilgarn	433 0 0	433 0 0	...	...	433 0 0	84 17 8	13 12 10	446 12 10
Donovan's Find	768	Yilgarn	100 0 0	78 0 9	...	...	78 0 9	12 16 11	2 9 2	80 9 11
Fraser's Central	3228, 3232	Yilgarn	2,971 16 4	2,971 16 4	...	...	2,971 16 4	17 0 0	496 8 10	3,468 5 2
Fraser's Central	3228, 3232	Yilgarn	636 17 8	636 17 8	...	...	636 17 8	...	83 6 11	720 4 7
Fraser's Central	3228, 3232	Yilgarn	891 6 0	891 6 0	...	...	891 6 0	...	47 13 7	938 19 7
Fraser's Central	3228, 3232	Yilgarn	650 0 0	...	650 0 0	8 3 10	441 16 2	...	8 16 5	650 12 7
Great Victoria	719, 944/5, 1227	Yilgarn	2,000 0 0	1,643 3 0	...	1 7 9	1,641 15 3	812 18 3	246 9 9	1,888 5 0
Great Southern	2909	Yilgarn	...	3,977 12 7	...	...	3,977 12 7	13 0 0	926 3 6	4,903 16 1
Hodder, E.	M.A. 64Y	Bulong	253 3 2	253 3 2	...	148 13 0	104 10 2	6 8 4	35 11 3	140 1 5
Hunt, H. W.	...	Kalgoorlie	500 0 0	...	150 0 0	...	150 0 0	...	0 11 2	150 11 2
Kirton's South	M.L. 127	Northampton	2,050 0 0	2,028 12 9	...	230 12 4	1,798 0 5	537 3 10	146 3 0	1,944 3 5
Kirton's South	M.L. 127	Northampton	200 0 0	200 0 0	...	...	200 0 0	15 8 5	14 19 9	214 19 9
Kirton's South	M.L. 127	Northampton	500 0 0	500 0 0	...	...	500 0 0	8 14 1	46 16 8	546 16 8
Lalla Rookh	112, 786, T.A. 10	Marble Bar	...	3,114 3 1	61 19 5	459 13 11	2,716 7 7	622 10 6	234 3 3	2,950 10 10
Malcolm Prospecting Co.	1175c	Mt. Malcolm	1,550 0 0	1,550 0 0	...	15 0 0	1,535 0 0	410 6 10	723 4 9	2,258 4 9
McCahon & Party	...	Mt. Ida	400 0 0	400 0 0	...	7 0 0	393 0 0	...	27 14 5	420 14 5
Myrtle Central	3269, 3271	Yilgarn	500 0 0	...	437 13 4	9 18 0	427 15 4	4 0 0	13 5 9	441 1 1
Neta	1011R	Edjudina	200 0 0	200 0 0	...	17 11 7	182 8 5	44 19 2	49 7 2	231 15 7
Nevill, A. M.	910	Yalgoo	67 10 0	...	67 10 0	4 19 2	62 10 10	...	2 10 9	65 1 7
Phoenix	622N	Quinn's	250 0 0	250 0 0	...	39 12 0	210 8 0	17 12 1	17 5 11	227 13 11
Randwick	978c	Mt. Malcolm	584 14 0	577 3 5	...	54 4 6	522 18 11	...	45 3 5	568 2 4
Red, White, and Blue	641B	Curran's Find	2,676 9 0	2,676 9 0	...	1,216 5 2	1,460 3 10	856 18 10	121 10 1	1,581 13 11
Rocklee	...	Yaloginda	350 0 0	350 0 0	...	38 0 0	312 0 0	12 2 0	21 14 1	333 14 1
Ravensthorpe Battery Co.	...	Ravensthorpe	1,300 0 0	1,038 8 2	...	125 0 0	913 8 2	...	326 1 2	1,239 9 4

MINING DEVELOPMENT EXPENDITURE—Advances Outstanding 31st December, 1924—continued.

Name of Lease, Mine, or Borrower.	No. of Lease.	District.	Amount Authorised.	Principal Moneys advanced.		Principal Moneys.		Interest.		Total Principal and Interest outstanding at 31st December, 1924.
				Previously to 1924.	During 1924.	Repaid, including Sale of Securities, etc.	Balance outstanding.	Paid.	Outstanding.	
Southern Cross leases	1067Y, 1076Y ...	Bulong	£ s. d. 1,000 0 0	£ s. d. 1,000 0 0	£ s. d. ...	£ s. d. 770 15 3	£ s. d. 229 4 9	£ s. d. 78 9 6	£ s. d. 155 11 10	£ s. d. 384 16 7
Spring Hill leases	724, 2633 ...	Parker's Range ...	655 16 5	655 16 5	...	404 6 9	251 9 8	572 0 4	7 12 0	259 1 8
Triplicate	1914	Tuckabianna ...	730 0 0	608 17 7	...	116 13 10	492 3 9	51 0 8	39 14 7	531 18 4
Totals ... ..	...	...	...	32,815 19 8	1,367 1 9	5,080 8 5	29,102 13 0	5,012 7 10	4,629 13 5	33,732 6 5
C.—MISCELLANEOUS.										
Bligh, R. N. W. ... ..	...	...	75 0 0	59 12 0	...	...	59 12 0	...	12 10 9	72 2 9
Duggan, Flynn, & Worrington	P.A. 890B ...	Youanme	150 0 0	...	150 0 0	51 8 3	98 11 9	...	...	98 11 9
Hough & Pearsall	1215M ...	Mt. Magnet ...	125 0 0	...	66 12 6	...	66 12 6	...	...	66 12 6
Totals ... ..	...	...	...	59 12 0	216 12 6	51 8 3	224 16 3	...	12 10 9	237 7 0
D.—BORING.										
Irwin River ... ..	...	...	...	3,817 5 10	...	...	3,817 5 10	...	...	3,817 5 10
Wilga ... ..	...	...	...	6,037 12 5	...	...	6,037 12 5	...	...	6,037 12 5
Totals ... ..	...	...	...	9,854 18 3	...	...	9,854 18 3	...	...	9,854 18 3
A.—PIONEER MINING AND PROSPECTING ... ..	...	...	...	90,462 8 3	21,875 6 3	9,135 12 6	103,202 2 0	4,970 7 2	6,736 9 3	109,938 11 3
B.—ASSISTANCE ERECTING BATTERIES, ETC. ... ..	...	...	...	32,815 19 8	1,367 1 9	5,080 8 5	29,102 13 0	5,012 7 10	4,629 13 5	33,732 6 5
C.—MISCELLANEOUS ... ..	...	...	...	59 12 0	216 12 6	51 8 3	224 16 3	...	12 10 9	237 7 0
D.—BORING ... ..	...	...	...	9,854 18 3	...	...	9,854 18 3	...	...	9,854 18 3
Totals ... ..	...	...	...	133,192 18 2	23,459 0 6	14,267 9 2	142,334 9 6	9,982 15 0	11,378 13 5	153,763 2 11

APPENDIX No. 2.

Report on the Emu North Gold Mine.

(By R. C. WILSON, Assistant State Mining Engineer. 13th September, 1924.)

The State Mining Engineer.

As instructed, I visited this mine on August 27th last. I spent two days at and in the vicinity of this property, and now beg to submit the following brief report for the information of the Hon. the Minister.

Location.—The mine is situated 10 miles due east of Tuckanarra, and is $8\frac{1}{4}$ miles south-east of Stake Well, the nearest siding on the Magnet-Meekatharra Railway.

Geology.—The country rock in which the lode is found is much sheared fine-grained greenstone. As is commonly the case in this State, the lode is found near the junction of the greenstone and granite country. In this instance the lode is about 24 chains east of the contact, and the intervening country is much sheared and altered. A conspicuous ridge of banded ironstone occurs about 10 chains to the west of the lode and is approximately parallel to it.

Ore Deposit.—The lode consists of a shear zone in the greenstone or amphibolite rock which has been impregnated by gold-bearing solutions. In the oxidised zone it is a soft yellowish schist, which changes to a harder and darker sulphide ore below water level, 190ft., carrying metallic sulphides, apparently mostly iron pyrites. This has just made its appearance in the bottom of the new main shaft.

Quantity and Value of Ore Exposed.—I took no samples for assay during my visit, but the whole mine has been carefully sampled by Mr. Mathers, and I am indebted to him for the following figures:—

The old main shaft was sunk for 114 feet (underlay) or 100 feet vertically. The value of the lode at surface was 165s. for 175 inches. Crosscuts through the lode at depths of 16ft., 51ft., 87ft., and 114ft. gave assay values of 100s. for 116 inches, 50s. for 43 inches, 58s. for 120 inches, and 60s. for 60 inches respectively, or an average value of 84s. per ton for a width of 92 inches.

The shoot of ore at the 100ft. level is 255ft. in length, and the lode exposed in driving averages 50s. per ton in value, and 39 inches in width.

At the bottom level (170ft.) 80 feet of driving has been done. The lode exposed in the drive averaged 41.6 shillings per ton for a width of 49 inches. Two

crosscuts across the full width of the lode gave assay results of 53s. per ton over a width of 34 inches, and 55s. per ton over a width of 90 inches. The lode in the face of the north drive appears to be pinching. This may be only local. The south face is in good value across the full width of the drive. The average values in other parts of the mine are shown on the plan attached, and need not be recapitulated.

Assuming the figures submitted to me to be correct, the ore in sight in the mine works out at about 15,000 tons averaging 50s. per ton value.

The Emu Lease.—No work was in progress here, and Mr. Mathers does not attach much importance to it, but informed me that a reasonable tonnage of oxidised ore will be obtained which has been left by the previous owners. Low values only were met with at the bottom level (130ft.) and at the north end the lode was cut off by a porphyry bar.

Treatment.—A quantity of ore was cyanided direct from the mine by previous owners with indifferent success. Mr. Mathers' tests show a satisfactory extraction of gold by cyanidation after fine grinding.

Water Supply.—The mine itself is making very little water, but I was assured by Mr. Matthiesen that an adequate supply can be obtained from Sorrensen's well, two miles away in an easterly direction. Mr. Matthieson said he had been working a show at the site of this well and had been flooded out. He was using a steam-driven winch and a 6ewt. kibble to bail with, and could not cope with the water, which he estimated was at least 1,000 gallons per hour.

General Remarks.—Generally speaking, I was very favourably impressed with the prospects of the Emu North Lease. Working out the widths and values supplied me by Mr. Mathers, I estimate that there is a tonnage of 15,000 tons of oxidised ore in sight, averaging 50s. per short ton (2,000lbs.) in value. The ore is soft and can be cheaply worked. Mr. Mathers' estimate of a total cost of 30s. per ton should be easily realised. The bottom level is still in payable value. I do not care to hazard an opinion as to the value of the lode at greater depth, but I will be very surprised if the lode itself does not persist to a much greater depth.

APPENDIX No. 3.

Report on Proposed Boring by Mararoa Company at Wiluna.

(By R. C. WILSON, Assistant State Mining Engineer. 13th September, 1924.)

The State Mining Engineer.

As instructed I inspected the site of the proposed boring in company with Mr. Mathers of the Mararoa Co.

Assistance is being asked for on the £1 for £1 basis to test the northern continuation of the old Gwalia Consolidated Co.'s eastern lode at a point 3,000ft. north of the principal workings and directly under an open cut, from which 1,206 tons of ore were crushed worth 9.9dwts. per ton in value.

It is proposed to put down a bore to a total depth of 560 feet at an inclined angle of 40deg. and to cut the lode at a vertical depth of 360 feet. The lode is known

to continue in a northern direction for a further 1,000 feet, where it has been worked in the old Essex lease, from which some 2,000 tons of ore are said to have been mined worth nearly 10z. per ton in value.

The position of the principal workings along the line of lode as well as the position of the Ivanhoe G.M.Co.'s bore holes are shown on the plan attached.

The proposed bore will give useful information with regard to the northern continuation of the lode, and assistance to carry out this work on the £1 for £1 basis can be recommended.

APPENDIX No. 4.

Report on "La Fortuna." Prospecting Area 5108.

(By R. C. WILSON, Assistant State Mining Engineer. 10th June, 1924.)

The State Mining Engineer.

In company with Inspector Gourley I inspected this property on 8th May last, and have to report as follows:—

Location.—This prospecting area, which takes in a portion of the old United Australia G.M.L. 6228, is situated five miles west of Balgarrie townsite, and about 13 miles west of north of Kunanalling.

Geology and General Description.—The country rock is a greenstone schist. It is crushed and altered near its contact with the "lodes," which in this locality consist of large porphyry or "Alaskite" dykes.

Two such lodes run in a north-westerly direction for at least a mile. Crushings have been taken out at intervals evidently from their richer portions.

In the P.A. under review the main lode has its maximum width of 108 feet near the main shaft, and the best values appear to occur along its eastern margin.

At the north end a small seam of chlorite is found to occur between the greenstone country and the eastern wall of the lode, varying in thickness from two to six inches, and sometimes carrying high values. This closely resembles in appearance the auriferous chlorite found at Mt. Monger. A specimen has been forwarded to the Government Geologist for examination, as has also a typical sample of the "lode," but his report upon them is not yet to hand.

With regard to the distribution of values, I think it will be found that most of the gold in these "quartz" porphyry lodes occurs in the small quartz veinlets which traverse them in all directions. It is noticeable, however, that all of my samples contain a little gold, indicating that the whole of the lode carries low values.

The State Mining Engineer, in a report on "Some parts of Kunanalling and Broad Arrow Districts," mentions that the occurrence of gold in a granitic dyke of this type is unusual in this State as far as published descriptions have gone, but is not altogether uncommon elsewhere. He points out that the term "alaskite" has been applied to very similar granitic extrusions, which pass by gradations more or less completely in quartz, found in North-Western America, where these are frequently auriferous, and that there is some reason to think that such auriferous dykes may often lie at the roots of many of our lodes and quartz reefs of the more ordinary types, and may be the source of their gold.

Since this report was written a number of more or less similar deposits have been described at Coolgardie, and Mr. T. Blatchford is of opinion that the Westonia lodes really belong to this class.

Workings.—These are all shallow and with the exception of some costeans and one crosscut are confined to the eastern margin of the lode. These are indicated on Mr. Vale's plan, which accompanies this report, and are briefly described hereunder:—

Main Shaft.—This could not be inspected as some of the shaft timber had come away and it was not considered safe until repaired. The plan shows its depth to be 110ft. and that a crosscut at 100 feet has just entered the lode. This is shown as being worth 26s. 6d. per ton in value. This could not be checked, but a few pieces of ore lying at the surface were found to give an assay value of 9dwts. 14grs. per ton.

Middle Costean.—This is situated 50ft. south of the main shaft, and has been cut right across the lode. Mr. Vale's plan shows it to have an average value of 34s. per ton over the full width of 108ft. Nine samples were taken, each representing a width of 12 feet, and gave an average value of 4dwts. 5grs. (or 17s. 11d.) per ton. One of these samples assayed 13dwts. 2grs.

and another 7dwts. 6grs. The remaining seven samples varied from 1dwt. 2grs. to 3dwts. 14grs. and averaged 2dwts. 12grs. (10s. 7d.) per ton.

Northern Costean.—This is situated 30ft. north of the main shaft, and has also been cut right across the lode. Mr. Vale's plan shows an average value of 22s. per ton over the full width. He informed me verbally, however, that the best value was obtained near the eastern wall. Accordingly I sampled the first 20 feet in two sections of 10 feet each. These, however, proved unpayable, one assaying 13grs. per ton and the other 1dwt. 7grs. per ton.

South Costean.—This costean is situated 170ft. south of the main shaft, and Mr. Vale informed me that it was generally poor, and that he had obtained one payable section only. I did not check his sampling of this costean.

50ft. Level West Crosscut from South Shaft.—This crosscut has been put out a distance of 59 feet into the lode. Mr. Vale's plan shows an average value of 26s. 6d. per ton. My sampling gave an average of 2dwts. 11grs. (10s. 5d.) only, the highest sample assaying 4dwts. 6grs. (18s. 1d.) per ton.

Northern Open Cut.—From about 40 feet north of the main shaft to 160ft. north an open cut has been worked to a shallow depth. The plan shows the values to be from 26s. to 40s. per ton. Three cuts across the lode exposed in this cut averaged 14dwts. (59s. 6d.) per ton in value.

East Lode Open Cut.—This is situated 20ft. north of the middle costean and has been taken down in the form of a shaft in the eastern wall of the lode to a depth of 40ft. The plan shows an average value of 28s. per ton. Two samples at the bottom averaged 3dwts. (12s. 9d.) per ton. A special sample near the surface assayed 4dwts. 9grs. (18s. 7d.) per ton.

At a depth of 25 feet a north drive has been driven 12 feet; the face assayed 6dwts. 11grs. per ton over a width of 54 inches.

90ft. Level North Drive off North Shaft.—This drive has been driven alongside the eastern wall of lode. A small seam of auriferous chlorite occurs at the contact. A general sample of the first 25ft. of the seam assayed 12dwts. 12grs. per ton for a width of three inches. A sample from the remaining 25ft. was worth 1oz. 6dwts. 13grs., the width being from 2 to 6 inches. In the present face a sample of chlorite assayed 4ozs. 11dwts. 11grs. for a width of 6 inches, and a special sample from the granitic dyke at the contact assayed 7dwts. 3grs. per ton.

In the west crosscut from this shaft 4ft. of lode assayed 6dwts. 13grs. per ton in value.

Summary and Conclusion.—The lode is a large quartz porphyry or "Alaskite" dyke carrying a little value throughout and payable values in places along the eastern wall. In the north shaft at the 90ft. level there is also a small contact chlorite seam a few inches in width worth about 1oz. per ton in value.

In regard to the general average value of the lode, my sampling goes to show that this is probably a little too low grade to admit of profitable working. The results are, however, sufficiently encouraging to warrant a little closer examination of the property, and I think that a loan might be recommended on the £1 for £1 basis either for crosscutting from the main shaft, driving on the east wall section of the reef at the 100 feet level, or for diamond drilling at intervals across the reef.

I cannot recommend the erection of a battery until further exploratory work has been carried out.

ASSAY RESULTS.

Sample No.	Location.	Width.	Value.	Remarks.
	Middle Costean—	ft. in.	ozs. dwts. grs.	
	Beginning from East Wall:			
8	E.W., 12ft. E.	12 0	0 2 7	Average value 4dwts. 5grs. for 108ft.
9	12ft. E.—24ft. E.	12 0	0 3 14	
10	24ft. E.—36ft. E.	12 0	0 3 6	
11	36ft. E.—48ft. E.	12 0	0 1 23	
12	48ft. E.—60ft. E.	12 0	0 13 2	
13	60ft. E.—72ft. E.	12 0	0 7 6	
14	72ft. E.—84ft. E.	12 0	0 3 8	
15	84ft. E.—96ft. E.	12 0	0 2 4	
16	96ft. E.—108ft. E.	12 0	0 1 2	
	East Crosscut from South Shaft:			
17	0ft.—10ft.	10 0	0 4 6	Average value 2dwts. 11grs. for a width of 59ft.
18	10ft.—20ft.	10 0	0 1 7	
19	20ft.—30ft.	10 0	0 3 9	
20	30ft.—40ft.	10 0	0 1 7	
21	40ft.—50ft.	10 0	0 0 17	
22	50ft.—59ft.	9 0	0 3 19	
	Northern Open Cut:			
24	70ft. S. of North shaft, E.W.	7 0	0 3 22	Eastern portion of lode only sampled.
25	Mid.	7 0	1 9 9	
26	96ft. S. of North shaft, E.W.	6 0	0 3 14	
27	113ft. S. of North shaft, E.W.	7 0	0 17 15	
	Northern Costean—			
	Beginning from East wall:			
28	E.W.—10ft. ... ..	...	0 0 13	20ft. of lode on East side only sampled.
29	10ft. E.—20ft. E. ... ..	...	0 1 7	
	Small Costean between Northern Costean and Middle Costean—			
23	... ..	12 0	0 3 22	
	East Wall Open Cut:			
30	15ft. from E. wall, near surface	8 0	0 4 9	Special up and down sample.
31	40ft. E.W. section	12 0	0 3 6	
32	40ft. down Middle section	12 0	0 2 17	
	25ft. Level North Drive off this Open Cut:			
33	12ft. along face	4 6	0 6 11	
	Main Shaft:			
34	Special sample of some broken stone at surface ... ..	...	0 9 14	
	North Shaft:			
35	90ft. Level, North drive—50ft. in face... ..	0 6	4 11 11	Chlorite
36	Special sample of dyke at face... ..	...	0 7 3	
37	General sample of chlorite from 25ft. to 50ft. in ... ..	...	1 6 13	Width 2in. to 6in.
39	General sample of chlorite from 0ft. to 25ft. in ... ..	...	0 12 12	Average width about 3in.
38	West Crosscut off shaft, 34ft. to 38ft. ... ..	...	0 6 13	

APPENDIX No. 5.

Report on Application for Reward Lease 13, Gascoyne District.

(By R. C. WILSON, Assistant State Mining Engineer. 30th January, 1924.)

The State Mining Engineer.

On November 25th last I inspected the area applied for by John McCarthy as a Reward Mineral Lease for mining lead and silver, and have to report as follows:—

Location and General Description:

The area is situated approximately 18 miles from Bangemall in a direction of north-east by east on a hill of marble standing about 50 feet above the surrounding flat country. This hill of marble, which is roughly 400 yards across, is more or less horizontally bedded and appears to be resting unconformably upon the underlying steeply inclined schists. The marble may therefore belong to the Nullagine Series of rocks, and the schists to the Mosquito Creek Series.

A number of small vertical seams of galena, varying in size from a fraction of an inch to three inches in width, can be seen crossing the hill in an east and west direction.

A pot hole 2 feet in depth has been sunk on the largest of these seams. Small lumps of pure galena can be dug out. These are associated with a little copper ore.

A sample of argentiferous galena from this hole gave the following assay result:—

Lead—60.71 per cent.

Gold—Trace.

Silver—16ozs. 16dwts. 16grs. per ton.

Minerals present:—Galena, anglesite, cerussite, quartz, limonite, and dolomite.

When at Bangemall assay certificates for higher lead and silver contents were shown me by Mr. McCarthy. These could no doubt be obtained by carefully picking the pure galena.

The seams are too small and the distance to the coast too great to admit of profitable working. Up to the present, therefore, no mineral deposit can be claimed to have been discovered in payable quantity.

APPENDIX No. 6.

Report on Mines in the Galena District.

(By R. C. WILSON, Assistant State Mining Engineer. 14th November, 1924.)

The State Mining Engineer.

My recent visit to the Galena District was made primarily to look into certain matters in connection with the working of the Surprise mine in which the Department is largely interested. While in the district I took the opportunity of making a brief inspection of the other mines operating, and beg to submit the following report:—

The Surprise mine had a very successful run during the month of October. 3,500 tons of ore were treated yielding 395 tons of concentrates. The estimated profit over all expenditure, assuming lead at £36 per ton, was £2,500.

Satisfactory progress is being made with the sinking of the main vertical shaft, which is now 27ft. below the 200ft. level. Two feet of fair grade ore is showing at the bottom. Further information in connection with this mine is given in a separate report.

The Ajana Lead Mines, Ltd., recently got their mine into working order, and installed a primitive treatment plant. They began to break ore at the 100ft. level which was said to be of good milling grade. As, however, the plant proved to be inadequate to treat the ore satisfactorily, the Company ceased operations and are at present negotiating with the Surprise mine to work the mine on a tribute basis, and to crush the ore at their mill. It is anticipated that an arrangement satisfactory to both parties will be effected.

At Block 7 Thring was driving south from the main shaft at the 122ft. level in high grade ore. He had also started another shaft about 200ft. south. About 12 tons of concentrates were at grass, and he expects to send away 7 tons per week.

Johnson & Gretchen have taken out most of the best ore showing above the 70ft. level, and have been assisted by this Department to sink the main shaft to open up another level.

Grant and Shieve have discovered a new and very promising lead lode about two miles north-west of Ajana Siding. I understand that when cultivating this land Shieve pulled a piece of galena out of the ground with his harrow.

At the time of my visit a shaft had been sunk 12 feet, at which depth water was appearing. Three feet of good grade lode were showing in the shaft, including a 6-inch seam of pure galena.

A second shaft was then started 30 feet north of the first shaft. Galena was showing freely in the cement. I have since been advised on good authority that the lode has been cut in the shaft 3ft. in width and contains 30 per cent. of lead.

Gallagher, on the north side of the river, has also made an interesting find. At intervals over a length of nearly half a mile he has picked up floaters of lead ore consisting of a mixture of anglesite (lead sulphate) and pyromorphite (lead phosphate). In one pothole two feet of ore is showing. The assay result is not yet to hand, but a picked specimen assayed 60 per cent. of lead. Further development of this property will be of interest.

General Remarks.—The present high price of lead (£38 per ton) should certainly give rise to renewed mining activity in this district. It is to be expected that quite a number of the old mines which closed down when lead was a low price will be re-opened. It is also most encouraging to note that new finds are also being made.

In my opinion this mining centre deserves more attention than has previously been given to it by mining investors.

APPENDIX No. 7.

Report on Ives Reward Gold Mine.

(By R. C. WILSON, Assistant State Mining Engineer. 22nd July, 1924.)

The State Mining Engineer.

As instructed I visited Ives Reward G.M. with a view of ascertaining the present position, and have to report as follows:—

The Underground Workings.—The following is a brief description of the principal underground workings:—

Main Lode.—The main vertical shaft (No. 6) has been sunk to a depth of 210 feet.

200 Feet Level.—The main east crosscut passed through six feet of lode assaying 5dwts. per ton by mine assays.

The main south drive was started from this crosscut and put out a distance of 20ft. in lode material averaging 12.7dwts. per ton over a width of 36 inches by mine assays.

118 Feet Level.—The west crosscut from the main shaft passed through 27ft. of lode which, by mine samples, averaged 12.8dwts. per ton, by Mr. Hill's sampling 12dwts., and Inspector Phoenix's sampling 9.4dwts. per ton. Details are as follows:—

		Mine Samples.	Hill's Sampling.			Phoenix's Sampling.
		ozs. dwts. grs.	ozs. dwts. grs.			ozs. dwts. grs.
F.W. to	3ft. ...	0 7 6	0 12 10	F.W. to	5ft. ...	0 6 6
3ft.	„ 6ft. ...	0 10 8	0 7 12	5ft.	„ 10ft. ...	0 17 5
6ft.	„ 9ft. ...	1 0 16	1 4 0	10ft.	„ 16ft. ...	0 15 16
9ft.	„ 12ft. ...	0 14 8	1 1 12	16ft.	„ 22ft. ...	0 5 0
12ft.	„ 15ft. ...	0 15 7	0 15 15	22ft.	„ 27ft. ...	0 2 15
15ft.	„ 18ft. ...	0 14 20	0 7 17			
18ft.	„ 21ft. ...	0 5 1	0 7 6			
21ft.	„ 24ft. ...	1 0 21	0 2 10			
24ft.	„ 27ft. ...	0 4 2	0 9 10			
Average Value ...		0 12 20	0 12 0			0 9 4

The main north drive has been driven 151 feet. The first 102ft. gave an average value of 9.8dwts. per ton over a width of 51 inches by Inspector Phoenix's sampling. For the remaining 49 feet low values only were met with. The mine sampling showing slightly

better values by their samples, the first 84 feet averaged 11.4dwts. per ton for a width of 48 inches.

Five east boreholes were put in averaging 4.3dwts. per ton, and five west boreholes averaging 17.8dwts. per ton, details being as follows:—

Distance.	Depth.	East Borehole.	West Borehole.
4ft.	3ft.	dwts. ...	dwts. 10.4
8ft.	3ft.	11.7	...
20ft.	3ft.	2.0	49.6
28ft.	3ft.	1.1	...
40ft.	3ft.	...	7.8
60ft.	3ft.	1.7	7.7
76ft.	3ft.	5.3	13.6
	Average Value	4.3	17.8

The main south drive has been driven 65 feet. It quickly went out of value. Mr. Phoenix's sampling shows a value of 7.8dwts. per ton over a width of 96 inches at 7 feet and 1.5dwts. over 48 inches at 15ft. The mine samples show an average value of 13.1dwts. over the full width of 14ft. exposed for the first 12 feet. The remainder of this drive is, I understand, out of value.

The "combs" of the country show signs of a drag to the east right from the crosscut, and there seems to me to be just a possibility of the lode having been thrown in this direction going south. The east crosscut at the end of the south drive is not in far enough to prove whether this is so or not.

No. 1 winze was started at a point 15ft. along the main south drive and sunk 70 feet. The first 40 feet of sinking was vertical and the remaining 30ft. very flat. The average value by Inspector Phoenix's sampling is 31dwts. per ton over a width of 35 inches.

No. 2 winze was started at a point 70 feet along the main north drive and was sunk 66 feet. The average value by mine assays was 6.4dwts. per ton over a width of 36 inches.

69 Feet Level.—At this depth 68 feet of driving has been done from the No. 6 shaft, averaging 13.8dwts. per ton for a width of 48 inches by mine assays.

50 Feet Level.—At this depth 60 feet of driving has been done from the No. 4 shaft. This drive is 10ft. wide and 236 tons of ore were crushed from here having a total value of 17½dwts. per ton.

Blue Lode.—This lode, which is of a jaspery nature, is situated 700 feet east of the main lode and runs approximately parallel to it. The main shaft (No. 2) has, I understand, been sunk to a depth of 215 feet. At present a crosscut is being put out at the 200ft. level, and at the time of my visit was just entering the lode.

A water supply was more or less confidently expected on cutting this lode, but so far the result has been very disappointing, the water making being only about 1,500 gallons per day.

Some sampling results on this lode are given on my previous report on page 148 of 2808/19, and additional samples by Inspector Phoenix are given on page 251 of the same file. It will be noted that fair values were met with in the crosscuts at the 73 and 106 feet levels, and rather erratic values in the short drives from these crosscuts.

Ore Reserves:

Main Lode.—Mr. Ives estimates that there are above the No. 1 level a southern shoot of ore of dimensions 77ft. long by 25ft. wide by 100ft. high equal to 14,800 tons of ore,* and a northern shoot of dimensions 49ft. long by 25ft. wide by 100ft. high equal to a tonnage of 9,400 tons* of ore, making a total of 24,200 tons of ore, which he estimates will average 12dwts. per ton in value.

This estimate must be looked upon as being in the nature of a guess since the actual width of payable lode has been proved at four points only above the 118ft. level, viz.:—

Location.	Width.	Value.			
		Ives.	Giblin.	Hill.	Phoenix.
	feet.	ozs. dwts. grs.	ozs. dwts. grs.	ozs. dwts. grs.	ozs. dwts. grs.
At No. 6 shaft, 69ft. level	36	0 17 21	0 10 3	0 12 10	...
At No. 6 shaft, 119ft. level	27	0 12 20	...	0 12 0	0 9 9
At No. 4 shaft, 50ft. level	21	1 1 0	...	...	...
At No. 4 shaft, 119ft. level	6	...	...	...	0 2 21

It will be seen from the above that at No. 6 shaft the lode above the 119ft. level is from 27ft. 0in. to 36ft. 0in. in width and, say, 11dwts. per ton in value. At the No. 4 shaft, however, there is no payable width at all at the 119ft. level, whereas the average value at the 50ft. level is 1oz. 1dwt. per ton for a width of 21ft. 0in.

With regard to the lode between these shafts there is no information as to its payable width, except that afforded by driving and the few boreholes already mentioned. Additional samples taken by myself at 68ft.

and 83ft., where No. 2 winze chamber has been excavated, gave low values only over widths of 10ft. and 9ft. respectively (Samples No. 3 to No. 8). Inspector Phoenix's sampling of the 119ft. level shows that the portion of the lode exposed in the drive averages 9 dwts. over a width of 54 inches for a length of 120ft.

The driving at No. 4 shaft and at No. 6 shaft at depths of 50ft. and 69ft. respectively, show a proved length of 130ft. of payable ore half way between the 118ft. level and the surface, so that Mr. Ives' total length of 126ft. is not unreasonable.

* Allowing 13 cubic feet of ore to the ton,

The average value of the ore in this section will depend largely on the width broken. Up to the present 929.5 tons of ore have been crushed averaging 15dwts. 6grs. per ton in value (9dwts. 23grs. over the plates, 1dwt. 3grs. in the concentrates, and 4dwts. 4grs. in the tailing). It is hardly to be expected, however, that this value will be realised when the full width of the lode is broken. On present showing it might be taken to average about 10dwts. Additional crosscuts between No. 4 and No. 6 shafts would have given valuable information in this regard, and in my opinion ought to have been put in. I might mention here that I impressed upon the manager the necessity of putting out east and west boreholes every 10ft. at the 200ft level and crosscuts at intervals to expose the full width of the lode. On the present showing, therefore, I would not consider it safe to assume an average width of the reef any greater than half that assumed by Mr. Ives, or a tonnage of, say, 12,000 tons above the 118ft. level.

It is too soon to say much about the ore between the 118ft. level and the 200ft. level, but it looks as if a small tonnage of better grade ore could be obtained, say, 2,000 tons worth 15dwts. per ton. Further development at the 200ft. level will be instructive in this regard, and quite a large tonnage of ore may, of course, be opened up.

Blue Lode.—The small amount of available ore in this lode is difficult to estimate and may be left out of the ore reserves for the present.

Power Plant.—This consists of two sister Crossley engines of 104 h.p., type Z, with separate Commonwealth Junior producing plants. One of these engines drives an air compressor (Bowes Scott and Weston) of capacity 400 cubic feet per minute at 80lbs. pressure. The other supplies power for the treatment plant.

Hoisting.—This is done by means of a double cylinder winch, 10in. x 6in., which is at present air-driven, but will be driven by steam supplied by a Craddock vertical boiler, 10ft. x 4ft. 4in., when the air is required underground.

Treatment Plant.—This is in course of erection and is to consist of the following:—

- Rockbreaker.
- Bucket elevator.
- Ore bin.
- 10-head battery, 1,250lb. stamps.
- 2 Wilfley concentrators.
- 3 Grinding pans (5ft. diameter).
- 2 Wilfley tables.

The treatment consists in crushing, amalgamating, fine grinding, and concentrating without cyanidation. Mr. Ives informed me that tests at the School of Mines showed that one residue of 1dwt. only was obtainable after grinding through 150 mesh and concentrating over a model Wilfley table.

This ore was taken from the main lode, and it certainly does look as if a good cheap treatment should be obtained without cyanidation. Mr. Ives admits that the plant will be unsuitable for the treatment of the ore from the Blue lode, which he says gives a good extraction by cyanidation.

Water.—This is the most serious question at the present time. The Company have excavated a dam of 525,000 gallons capacity about half a mile from the mine which supplies water for the power plant and also for domestic purposes. It has a good clay bottom and has held water for seven months. At present there are about 150,000 gallons of water in it. It is urgently necessary, however, to find a water supply for the plant, which is estimated will require about 15,000 gallons per day.

As already mentioned a little water, 1,500 gallons per day, is making at the 200ft. level on the Blue lode. This water was first met with in the crosscut and it was thought that a supply might be expected when the lode was struck. Unfortunately, however, no material increase was met with. This is rather remarkable, as this level is below the level at which water was met with in the Ives Reward Junction mine, and is also below the level of an extensive salt lake in the vicinity.

An indifferent water supply was obtained for the State battery after doing some boring near the lake.

These lakes are looked upon as belonging to an old river system, and if so the best chance of obtaining a supply of water would be by tapping the old river channel. This, however, is only speculative, and there is nothing at the surface to indicate where an old channel would most likely be found.

General Remarks:

The position at Ives may be summed up as follows:—

Payable ore has been met with over widths of from 3ft. to 36ft. at No. 6 shaft and from 0ft. to 21ft. at No. 4 shaft. In the absence of any crosscuts the average width of payable lode between these shafts cannot be determined. In arriving at his estimated ore reserve of 24,000 tons above the 118ft. level, Mr. Ives has assumed an average width of 25ft. for a length of 126ft. This tonnage may be realised, but until proved by crosscuts that such is the case, I do not consider it safe to assume such a large average width of payable ore. About half this tonnage might, I think, reasonably be counted upon worth, say, 10dwts. per ton. The 200ft. level is opening up encouragingly and a considerable tonnage may be obtained above this level.

The treatment plant, consisting of amalgamation and concentration without cyanidation, will be completed in about a month and the laboratory tests indicate that it will give a good extraction. Mining and treatment costs ought not to be heavy, and there should be a margin of profit over all expenditure.

The present water trouble is a very serious one and is the most pressing at the present time, as the plant cannot be started until a supply is obtained. I am of opinion that the general prospects of the mine, apart from the water position, are fairly good and that it should become a regular producer.

Ives Reward Gold Mine.

Results of samples taken by R. C. Wilson and E. Gourley, 3rd July, 1924:—

Sample No.	Location.	Width of Section.	Value.	Remarks.
		inches.	ozs. dwts. grs.	
2	200ft. Level Main South Drive—			
	10ft along drive	H.W. 30	0 9 7	
1	Do.	F.W. 30	0 4 6	
	118ft. Level Main North Drive—			
3	83ft. along drive	H.W. 40	0 0 10	
4	Do.	M.I.D. 40	0 0 13	
5	Do.	F.W. 40	0 7 20	
6	68ft. along drive	H.W. 36	0 3 4	
7	Do.	M.I.D. 36	0 2 12	
8	Do.	F.W. 36	0 2 12	

APPENDIX No. 8.

Report on Surprise Lead Mine.

(By R. C. WILSON, Assistant State Mining Engineer and Member of Surprise Board of Control.
28th July, 1924.)

The State Mining Engineer.

In June, 1924, I paid a visit to the mine and looked into the general position, and beg to submit the following report for the information of the Hon. Minister.

Underground Workings.—A brief description of a few of the principal workings is as follows:—

200ft. Level—Main Lode.—At this level 280ft. of driving was carried out on the main lode. For a length of 240 feet values averaged from 6 to 8 per cent., which improved to 11.5 per cent. over a width of 10ft. slightly above the level.

200ft. Level—West Branch Lode.—On this lode 120ft. of driving have been carried out. For a length of 70 feet the values in the drive averaged 8 per cent. Upon stopping, the lode gave an average value of 12 per cent. over a width of 48 inches.

200ft. Level Rise 30ft. North was put up to the 110ft. level in ore averaging 18 to 20 per cent. over the full width of the rise.

200ft. Level Winze 40ft. S.—Main Lode.—At a point 40ft. south (co-ordinate) a winze was started and was sunk 8ft. in lode averaging 10 per cent. over the full width of the winze. This winze will be continued when the new air compressor is installed.

Crosscutting at the 200ft. level has failed to pick up the west lode. It has been proved, however, in winze 90ft. north to a depth of 45 feet below the 110ft. level, suggesting that this lode may have joined up with the west branch lode a little above the 200ft. level.

No east crosscutting has yet been carried out at this level to cut the East lode and Penna's lode. This work will shortly be put in hand.

110ft. Level.—On this level no less than five lodes have been worked, viz., main lode, the west branch lode, the west lode, the east lode, and Penna's lode. It will be noted that the ore body shows a tendency to branch and form loops of ore with "horses" of mullock in between.

Main Lode.—The main lode above this level was stopped out by the original syndicate. High grade ore was met with for a length of 250 feet.

The West Branch Lode.—This has been driven on for 97 feet at which distance it joins up with the main lode again. Values average 10.5 per cent. over a width of seven feet.

The West Lode.—This lode has been driven on for a distance of 170 feet for 120 feet—the average value was 11 per cent. over a width of perhaps 10 feet.

Winze 160ft. North.—This winze was sunk alongside the west lode to a depth of 63 feet. An east crosscut at 25 feet proved the lode to be 8ft. wide, worth 14 per cent. lead in value.

Winze 90ft. North.—This winze was sunk on the west lode to a depth of 45 feet in lode averaging 12 to 13 per cent. over the 5ft. exposed in the winze.

East Lode.—This lode was met with 25ft. along an east crosscut at 90ft. north from the Main North Drive. North and south drives 37ft. and 44ft. respectively were driven on it. For a length of 64 feet values averaged 8.5 per cent. over a width of five feet.

Penna's Lode.—This lode was also met with in the east crosscut at 90ft. north from the main North Drive at a point 50 feet along the crosscut. A north drive on Penna's lode was driven 38ft. Payable value was met with for the first 25ft., the balance being poor.

A South Drive was driven 60ft. From 44ft. to 58ft. the lode was worth 9 per cent. for a width of 36 inches, but elsewhere was of low value.

A Rise at 20ft. North was put up 10ft. The lode was worth 7 per cent. only for a width of 30 inches.

A Rise at 80ft. North was put up 60ft., holing at this distance into a winze. For the first 45 feet the lode averaged 12 per cent. in value over a width of 48 inches. For the remaining distance values were low.

30ft. Level.—An east crosscut from the east lode was started opposite rise 80ft. north and put out 38ft. For the first 34 feet the crosscut was in lode material worth 6 to 7 per cent. The balance of the crosscut was in country.

A winze from the end of the crosscut was started and cut 8ft., holing into rise 80ft. north. A rise above the winze was put through to the surface.

Ore Reserves.—The manager's estimate at the end of April, 1923, was 27,835 tons above the No. 2 level, averaging 14.5 per cent. lead. From May 1st to 29th February, 1924, 16,244 tons of ore were extracted, yielding 2,394 tons of concentrates.

The ore reserves remaining above the 200ft. level were again estimated as at 29th February, 1924, by the manager as being 20,000 tons of ore, having an average value of 11.5 per cent. lead.

From March 1st to June 30th, 6,096 tons of ore were extracted, yielding 818.1 tons of concentrates.

The estimate of ore reserves as at 30th June above the No. 2 level was 17,000 tons of ore, having an average value of 10 per cent. The increased tonnage of ore obtained was due partly to the ore opened up in the parallel lodes and partly due to the fact that profitable ore was found to exist for a greater width than was figured upon.

I anticipate that the last estimate of 17,000 will also be found to be upon the conservative side. In addition, a certain tonnage of ore may be expected above the No. 2 level from the east lode and from Penna's lode and from the South Surprise lease.

Programme of Development.

The programme of development for the future includes the following:—

200ft. Level.—Sink winze 40ft. south to prove the value of the ore body below the 200ft. level.

200ft. Level.—Crosscut east to pick up the Eastern and Penna's lodes.

110ft. Level.—Put out a west crosscut to look for a lode further west than the west lode. Our experience has been that it is very profitable to crosscut anywhere in the ore channel. There is such a well defined eastern wall of hard country rock alongside Penna's lode that further crosscutting in this direction does not seem encouraging. The west lode is, however, not necessarily the most westerly make of ore.

Before long the Board will have to consider the question of sinking of the main shaft another lift. It proposes, however, to sink at least one winze below the No. 2 level to prove that it is justified in undertaking this work.

Output.

For the ten months prior to March 1st of this year the average output was 1,624 tons of ore for an average yield of 239.4 tons of concentrates. Since then the output has been as follows:—

	Ore treated.	Concentrates.	Estimated lead contents.
March ..	700	132.5	94.5
April ..	1,416	196.0	142.2
May ..	1,980	254.6	183.3
June ..	2,200	239.0	169.69
	6,296	822.1	589.69

During the latter part of March and portion of April the plant was hung up on account of the changeover from the old gas engine plant to the new one. During May the tonnage of 1,980 was limited by the amount of water available for the plant. At the beginning of June the river came down and the tonnage was increased to 2,200, which is the highest yet put through in any month.

Grade of Concentrates.—The grade of concentrates for the period averaged 71.7 per cent. metallic lead.

Extraction.—At intervals samples of the residues are taken to make sure that our extraction is being maintained. The residue samples representing the weeks ended 21st and 28th June assayed 0.28 per cent. lead and 0.31 per cent. lead respectively. Assuming a lead value of 10 per cent., the extraction was therefore 97 per cent., which is an unusually high extraction and all the more creditable when taken in conjunction with the fact that the grade of concentrates obtained is also high.

During the period March 1st to May 31st the total cost per ton of ore treated was 31.221s. per ton, the grade of ore treated 10.25 per cent. lead, and a profit over expenditure of £1,335 was made.

During the month of June the cost per ton of ore treated was 29.414s., the grade of ore treated was 7.71

per cent. lead, and the estimated profit over expenditure was £364.

Last year's costs averaged 34.732s. per ton of ore treated.

The improvement in cost is mainly due to the installation of the new gas engine and the consequent better running of the plant.

It is satisfactory to note that as low a grade as 7.71 per cent. has been profitably worked.

Sale of Concentrates.—This is quite an important factor in the success of the mine, and Mr. A. E. Fordham, the syndicate's representative on the Board of Control, is to be congratulated on having secured a very favourable contract with Brandeis, Goldsmidt & Co., of Melbourne. This contract provides for the purchase of the whole output of the Surprise Lead Mine for two years as from April 1st, 1924, payment to be for 95 per cent. of the total value of lead contents in the concentrates, less a returning charge of £3 16s. 6d. The concentrates to be delivered f.o.b. Fremantle and the price to be the middle price spot and forward for the week after the week of shipment. The following figures will indicate the advantage of this contract over the old method of treatment at Fremantle:—

Purchaser.	Concentrates.	Lead Contents.	Lead Contents.	Total Value of Lead Contents.		Total Amounts Paid.		Percentage paid for.
				tons.	per cent.	tons.	£ s. d.		£ s. d.	per cent.
Fremantle Trading Co. ...	1,628	65.8	1,071.552	26,663 11 2	13,415 4 1	50.3		
Lempriere ...	3,295	68.35	2,248.837	62,075 2 11	45,971 18 10	74.6		
Brandeis, Goldsmidt ...	663	72.9	483.332	13,713 4 10	10,491 12 1	77.4		

Water Supply.—This is the greatest trouble that the mine has to contend with. The mine water is sufficient to run the plant two shifts only. In order to run a third shift the mine has to rely upon river water. A dam of sand bags was thrown across the river during this month at a cost of £35 and enough water drained back to secure three shifts being run for at least the next four months.

The question of a more expensive but more permanent dam across the river is under consideration. Before going to this expense, however, the South Surprise shaft will be sunk to the 100ft. level and some driving done, as an increase of water in the mine would render further expenditure in this direction unnecessary.

Addition and Alterations to Plant.

The principal additions to the plant are:—

1. 140 h.p. Crossley Gas Engine.
2. Alley & McLellan Air Compressor, 300 cub. ft. of air at 80lbs. per min., 29 h.p.

The new gas engine is running very smoothly and constantly. The constant stops with the old engine were very costly. In addition, besides giving more power than the other two engines combined, it uses only 1½ cords of wood per 24 hours as against 2½ cords of wood used by the old engines. This in itself means a saving of 25s. per day.

The new compressor was on its foundations at the time of my visit. Its installation has since been completed and the manager reports that it is now running satisfactorily. This compressor is to provide air for the Holman hoist, a duplex pump and Jack Hammer at the 200ft. level winze, a Holman hoist at the South Surprise lease and all air lifts around the plant. It is also intended to use the air on the winder when the boiler is being cleaned and consequently is out of action.

The alterations to plant include the raising of the Wilfley table. This has enabled this portion of the plant to be kept much cleaner. It is now intended to reduce the speed of the tailings elevator and place the buckets nine inches apart instead of 14. This practice in the Wheal Ellen Mine has given very satisfactory results and an increased life of the belt may be expected.

Management and Staff.—I am pleased to be able to report that I am very well satisfied with the work carried out by the manager and his staff. They appear to me to have worked hard and to have worked in together.

General Position.—The position at present, taken in conjunction with the high price of lead, £32 per ton, must be regarded as very promising. Substantial profits may confidently be expected for the next four months, while a water supply is assured, provided the present price is maintained.

Note.—Since writing this report the following telegram has been received from the mine manager (Mr. Anderson):—

“Crosscutting west of No. 1 level at co-ordinate 90 feet north struck what appears to be new lode 2ft. of 20 per cent. showing from 5ft. to 7ft. not yet through value wiring later.”

Further results of crosscutting will be looked for with the greatest interest, as they may be of very considerable importance.

APPENDIX No. 9.

Report by the Technical Members of the Board of Control on the Surprise Lead Mine,
as at 31st December, 1924.

The following is a report on the above mine for the six months ended 31st December, 1924:—

During this period the mine has had a very successful run, and in consequence of the high price of lead has made substantial profits. During the month of November 2,885 tons of ore were treated yielding 357 tons of lead concentrates. In December 1,710 tons were milled for a return of 200 tons of concentrates for the first 16 days of the month. Owing to the Christmas holidays no further tonnage was treated for the month.

On January 8th 679 tons of concentrates were shipped on the French steamer "Cephee," valued at £16,437 to the Surprise mine after payment of returning charges, shipping, etc.

The principal development at present in progress is the sinking of the main shaft, which is being pushed down as expeditiously as possible in order to open up fresh supplies of ore at the No. 3 level before the ore above the No. 2 level is depleted.

The depth below No. 2 level on the 31st December was 77ft. and on the 31st January has been increased to 97ft. and timbered to 87ft.

It is hoped by the end of February that the shaft will be completed to the No. 3 level with a 10ft. well hole and plat cut. The west lode which bulged into the shaft just below the No. 2 level passed back into the wall at 50ft., but should be cut as soon as the plat chamber is driven a few feet.

Prior to shaft sinking a winze was started near the junction of the west branch and main lodes, and was sunk 58ft. in lode, the average value being 10.6 per cent. over the full width of the winze 4ft. At the bottom the lode is 12ft. in width of which 9ft. is in 7 per cent. ore and 3ft. is in low grade.

A crosscut was put in east at the No. 2 level, but neither the east nor Penna's lode was cut. A winze on the east lode 70ft. north was sunk 40ft. below No. 1 level in low grade formation. A crosscut is being put out to see whether values exist in the footwall of the east lode at this depth, and it will then be continued to Penna's lode.

On the main lode an intermediate drive 140ft. north between Nos. 1 and 2 levels and an additional 40ft. in length of good grade ore was developed and has helped to maintain the output.

In July the manager, after consultation with two members of the Board, after an inspection made by them, decided to crosscut west at the 100ft. level, and as a result the Model lode was discovered. This lode during the period opened up well but has gradually rolled back below the No. 1 level to the west lode, where at the junction the stoping width was 15ft. of ore. The tendency of the various ore bodies as depth is attained seems to merge in towards the main lode, and it will be interesting to see whether at the No. 3 level it will show any greater width on that account.

Some prospecting work was done from the surface on a lode formation on a lease pegged out to the east, some small veins were cut, but after sinking to 35ft. and crosscutting the work was stopped.

Ore Reserves.—At the end of June the manager estimated that there were 18,000 tons of 10 per cent. ore available. For the period under review 16,815 tons were treated for a yield of 2,022 tons of concentrates, or an average return of 9.25 per cent. lead. Additional ore was developed on the main lode in the intermediate level north, and in the open cut of lower grade, but still payable, and the ore from the new lode (Model).

During January since resuming work after the Christmas holidays, 2,435 tons of ore have been treated for a return of 308 tons concentrates, and although the reserves have not been measured up, it is probable that there are 6,000 to 8,000 tons still available above the No. 2 level. By the time these have been taken out the No. 3 level stopes should be available and will be helped out by the ore from the Three Sisters Tribute.

As soon as the main shaft sinking has been completed and compressed air becomes available, the Surprise South shaft will be sunk to the level of the Surprise No. 1 level, and crosscutting and driving done. Should the lode prove to be the same size and value as that stoped by the original holders, it should provide some good milling ore.

A find was made recently to the east of the Surprise South lease by two boys while playing in a creek bed. They happened to pick up some red-coloured rock which felt heavy. They informed their parents who pegged out the lease and employed two miners to prospect for the lode and sink a shaft which is now down 35 feet on the lode. So far they have not traced it any distance, so that the strike of it cannot be obtained. It is bounded by a tongue of granite on the eastern wall and if it follows that it may tend towards the Surprise South lease. The ground away from the creek bed towards the Surprise South lease is covered with a heavy red loam which gives no indications on the surface to where to look for the extension of the lode.

Ajana Mines Tribute.—This is on the Three Sisters lease and was secured by the Board of the Surprise mine from the Ajana Mines, Ltd. It is proposed to develop and stop the ore between the 100ft. level and the old workings at the 50ft. level and transport the ore by means of a motor lorry to the Surprise mill for treatment. This will prove to be advantageous to both owners, apart from the percentage of the profit accruing; in one case it will help to keep up the ore supplies for the Surprise mill while the No. 3 level is being developed. It will prove to the Ajana Mines, Ltd., the value of their property, putting the No. 1 level in good working order, and timbered and connected through with rises and air passes for stop filling and ventilation. As the mine had to be unwatered, the level timbered, and several alterations made before efficient working could be done, there has not been time to have the mine surveyed and the value of the ore estimated. However, samples of all ore broken and delivered to the Surprise mine are carefully assayed, so that the proper calculations can be made as to output and value.

Owing to the Murchison River being in flood, it is at present impossible to cart any of this ore across so that the timbering and the necessary rises on the lode are being done, the other miners being put off. The Government sent an engineer of the Public Works Department to report upon the advisability of erecting a bridge at a narrow point on the river. This is most necessary before any operations in a large way can be done to open up the several properties north of the river. Nothing has as yet been heard of the report and whether the Government are likely to do it.

Water Supply.—The Hon. Minister has approved of £150 to be expended in making a survey and preparing a report with the object of ascertaining how much it would cost to construct a shallow weir near the Surprise mine which would conserve sufficient water for mining purposes.

The manager constructed a temporary weir of old bags during the year and impounded sufficient water in the Murchison River to keep the mill supplied until the recent rains. But at Christmas he had to put in a condensing coil from the exhaust steam of the engines to provide for water for domestic use of the employees of the mine. It is to be hoped that some finality will be made in this direction before the river stops flowing, so that if the Government does not make the weir this mine will have to do so to provide for next summer. The Under Secretary for Works advises that if the Government does make the weir the Surprise will have to pay for the water, which they now get for nothing, except the cost of the temporary weir, now swept away, and of pumping.

Ore Treatment.—During this period 16,815 tons of ore were treated for a return of 2,022 tons of 72.47 concentrates worth £42,283 at Fremantle after deducting shipping and returning charges. This gave a good profit after paying all expenses of mining and treatment, transport, and interest.

A good deal of attention is at present being given to improvement in treatment. The mine has been sending samples of its tailings from the dressing mill to an outside firm of assayers, whose results in other directions have always been reliable, to ascertain the amount of lead escaping from the plant, and their results have been consistently low in metal, showing a completeness of extraction not usually to be expected from a mill not furnished with special slime treatment appliances. If with the small amount of lead in tailing shown by the assays it was clearly not worth while to put in a slimes plant, as any additional saving to be expected would not pay the cost of the further treatment necessary to obtain it. It has been shown that the losses of the lead in tailing are in accordance with common experience of ore-dressing mills and that they are large enough to justify additions to the plant to secure a higher extraction of lead. It is unfortunate that this was not recognised, but in the face of the assays there seemed no need for more plant.

Consideration is now being given and experiments made for selection of further appliances to save the lead losses.

As a result of further experiments taken over a run of eight hours by screening off the coarse sands, it has been found possible to further concentrate the fine lead in the slimes, and the following scheme is now being put into operation.

The material from the third hatch of the jigs will go on to No. 1 Wilfley table as before. Tailings from this table to go to a short elevator, thence to a new trommel, thence to a spitzkasten now under construction. The material from the fourth hatch to go to the same short elevator, thence to the same trommel and spitzkasten. The roughs from the trommel to go to the new residue elevator, and the fines to No. 2 Wilfley now being renovated, and possibly to a curvilinear table. It is considered that these alterations will result in a residue too low to admit of further treatment. If, however, these residues still are sufficiently high to admit of further treatment, the question of putting in a flotation unit will be considered.

The flotation experiments at the Kalgoorlie School of Mines have been disappointing as far as they have gone. But as a result of the investigations made by one of the members of the board while on a recent visit to the Eastern States it seems probable that the lead ore can be concentrated on the Surprise Mine, if necessary, by flotation just the same as at Broken Hill; but experimenting has to be done to obtain the best conditions.

Some samples have been taken from the dump, and while the outside portions do not seem to be worth re-treatment, that portion nearest to the discharge launder has been naturally concentrated. By running these into the main circuit and through the trommel to eliminate the coarse sands, the slimes will pay to retreat. When the additional plant is completed to treat the current ore, the question of the retreatment of the portion of the old dump will be gone into thoroughly to see how much of it will pay. From the preliminary sampling tests on the two dumps, for a radius of 75 feet from the discharge of the launder where the tailing has been automatically concentrating, it is estimated that there will be 5,000 tons of tailings which will pay to retreat, and it is expected should return 3 to 3.5 per cent. lead per ton. This figure is based on the experiments made and on what is expected the additional concentrating plant will do. The new tailings elevator which is nearly completed will enable a new dump to be made, leaving the richer part of the old dump available for this work. The old and shorter elevator will be used in the lifting of the pulp to the new trommel and spitzkasten.

The board appreciate that the secretary and the staff on the mine have worked very hard during the period under review, and the results have been most satisfactory.

These results have definitely proved the value of the assistance granted by the Mines Department in coming to the financial assistance of the shareholders in order to keep the mine going.

Indirectly it has been the means of opening up other promising mines in the Ajana portion of the Northampton Mineral Field.

(Signed) RICHARD C. WILSON,

(Signed) C. M. HARRIS,

Technical Members of the Board of Control,
Surprise Lead Mine.

APPENDIX No. 10.

Interim Report on the Occurrence of Traces of Oil in the Swamps of the Swan District.

An investigation has been carried on during the past six months into the question of the nature and quantity of oils and related substances found in the swamps of the Swan District. This was initiated because it had been found that swamp soils from White Lake, Rockingham, had yielded with petroleum spirit a small extract, an appreciable proportion of which was unsaponifiable, and therefore possibly related to mineral oil, whose occurrence in the district might thereby be indicated.

The special investigation had for one of its main objects the determination of whether similar extracts could be got only from the Rockingham area, or from all swamps in the metropolitan district. A number of samples of swamp soils were therefore collected from Fremantle southward to the southernmost end of the White Lake swamps, from Perth northwards to Lake Joondalup, and from a swamp in the Darling Ranges 32 miles east of Perth on the York Road. Some of these showed only vegetable debris associated with the mineral matter of the soil; others had more or less abundant animal debris in the shape of gasteropod shells.

With the exception of a single sample from a swamp half a mile north of 9-mile camp, Peel Estate, all the samples yielded an extract with petroleum spirit varying

in amount from 0.001 to 0.128 per cent. of the soil. Three samples from the York Road swamp overlying granite gave from 0.014 to 0.0646 per cent. of extract.

In every case a notable but varying proportion of the total extract was unsaponifiable. The other, saponifiable, part of the extract appeared to consist of resins, with possible small amounts of glycerides (vegetable or animal oils) and fatty acid.

The unsaponifiable matter was obtained in such small quantities that a detailed investigation of it was not feasible under ordinary circumstances. In quite a number of cases it consisted wholly of a white wax, in all cases wax was present, but at times it was accompanied by a yellow viscous fluid which, in the minute drops obtained, appeared to resemble a heavy hydrocarbon oil. Two of the richest soils from south of Fremantle were, however, mixed and a large bulk extracted, which enabled a little further work to be done on the unsaponifiable matter. Under these circumstances the supposed oil was found to be sticky and devoid of lubricating qualities, and tests indicated that it consisted largely of resins regenerated by the action of water after saponification, and hence failing to be removed with the large bulk of the soil resins. Doubtless a little hydrocarbon oil is

associated with the resin. Further investigation is needed on this point, and arrangements have been made with the State Mining Engineer to have large samples collected at three points.

A search through the literature reveals many facts of importance in connection with this investigation. Firstly, that a large number of plants produce waxes, resins and oleoresins (the last containing hydrocarbon oils), and that many of these resist decay long after the associated vegetable debris has been completely altered into humus. Secondly, that resins, waxes, oils or fats (both glycerides and hydrocarbon oils), and free and fatty acids of many different kinds have been recorded as having been obtained from existing vegetable moulds, swamps, peat beds and beds of lignite. To such an extent do these occur at times that "montan wax" from German lignite, "Montana wax" from Irish peat, "kauri gum" from New Zealand swamps, and other similar substances are regular articles of commerce.

Pending confirmation of existing results by the investigation of the three large samples of soil now to be collected, I am of opinion that—

(1) The extracts from the Rockingham swamps can be duplicated by material from other swamps on the coastal plain, and from at least one in the middle of the Darling Range granite.

(2) These extracts are similar to others found in many widely separated parts of the world, and are characteristic of decaying vegetation.

(3) No definite indications have been obtained of a mineral oil or its common associates, paraffin wax and asphaltum.

(Sgd.) EDWARD S. SIMPSON,
Government Mineralogist and Analyst.

3rd December, 1924.

APPENDIX No. 11.

Report on Lalla Rookh Gold Mine.

(By B. C. WILSON, Assistant State Mining Engineer. 27th May, 1924.)

The State Mining Engineer.

As instructed, I visited the mine on the 6th April last and have to report as follows:—

Location.—The Lalla Rookh G.M. is situated 30 miles west-north-west of Marble bar and 25 miles south-west of Gorge Creek, the nearest siding on the Port Hedland-Marble Bar Railway.

Geology.—This mining centre is described by the Government Geologist, Mr. A. Gibb Maitland, in Geological Bulletin No. 15, as follows:—

"The rocks of this field consist of greenstone schists and allied rocks, diabase, granite, laminated ferruginous jasper, together with a series of quartzites, grits, and conglomerates. The alluvial deposits form a wide strip along the banks of the Lalla Rookh Creek, but they nowhere attain any great thickness. The greenstone schists and allied rocks occupy by far the largest area of country in the immediate vicinity of the mines, and it is amongst these rocks that the important auriferous reefs yet opened up occur. The schists are vertical or inclined at high angles, and appear to have been arranged in a series of folds, the trend of which has been materially modified by the faulting which has taken place subsequent to their formation."

Without much more detailed work than has been possible to carry out up to the present time it is not possible to determine whether all the greenstone schists are of igneous origin or merely represent ancient sedimentary beds which have been subjected to regional metamorphism. The schists and allied rocks have been invaded by dykes of diabase, the positions of which have been shown on the map. A mass of intrusive granite occupies the western margin of the field, and forms part of that extensive area which occupies the greater portion of the country between Lalla Rookh and the coast at Port Hedland.

Nature of Ore Deposit.—The ore deposits consist of two main parallel reefs known as the north reef and the south reef, in addition to others of minor importance. These follow the parting planes of the schists, and also appear to be intimately associated with the diabase dykes.

Mr. A. Gibb Maitland states that "the question of the extension of the South reef underground in a large measure depends upon the relation which the intrusive diabase bears to the fracture system which resulted in the formation of the fissures occupied by the quartz reefs."

Quite recently No. 2 winze from the 60ft. level was sunk, and has given valuable information in this connection. The reef which dipped to the north until the diabase was met with instead of entering the rock turned over and dipped south, following the contact of the diabase and the schist. (See accompanying cross-section.) This suggests to me that the diabase was present prior to the formation of the quartz veins.

The geological sequence of events beginning with the oldest rocks would seem to have been as follows:—

1. The schist.
2. Intrusion of diabase into schist.
3. Formation of fissures which were filled with vein material.
4. Formation of faults.

Evidence of a good deal of faulting is noticeable. The south reef in particular is in a very disturbed and faulted zone.

The cross-section at the man shaft south reef accompanying this report shows a well-defined fault above the 60ft. level.

There is another pronounced fault just above the 150ft. level main east drive. The north reef is thrown to the south a distance of 12 feet just at the 90ft. level, and is thrown again in the same direction at a depth of 110 feet.

General Description of Mine Workings.

North Reef.—The north reef has been stoped out for a length of about 200 feet down to the 90ft. level. The old books, Mr. Bell informed me, show an average value of about 25 dwts. for the whole of the block taken out.

In a westerly direction the reef can be traced at the surface until about opposite the south shaft. Immediately west of the main shaft it appears to be broken and pinches, but makes again, and a little value is said to have been obtained in a shaft about 200 feet west.

Comparatively little stoping has been done below the 90ft. level. At a depth of 110 feet a crushing has been taken out from what is practically an intermediate drive 60 feet in length, 30 feet on either side of the main shaft. This is said to have yielded 1,000 ounces of gold. By cubic measurement the tonnage works out roughly at 700 tons. It will be noted, however, that my two samples of the ore left standing assayed only 6.1 dwts. for 36 inches and 6.5 dwts. for 30 inches respectively, from which it would appear that the prospector has stoped work here on account of a decided drop in the values. The recent crushings taken out by the present syndicate

were obtained from the east side of the west winze just above the 140ft. level. I am informed that the tonnage of ore mined was 305 tons averaging about 75s. per ton in value.

The following is a brief account of the principal workings:—

Main Shaft.—The main shaft has been sunk vertically to a depth of 148 feet, or 8 feet below the bottom level at 140ft. It is equipped with a poppet head and winch.

140ft. Level Main East Drive.—This drive has been driven on the reef for a distance of 73 feet.

For the first 60 feet the mine samples averaged 28 dwts. per ton over a width of 30 inches. For the remaining distance the average value was 6 dwts. per ton. Since this drive was sampled a leading stope has been taken off for a distance of 30 feet and the ore crushed. I took one sample of the face of the leading stope which assayed 42.2 dwts. per ton for a width of 42 inches, and one of the face of the drive which assayed 6 dwts. per ton for a width of 36 inches. Better values are to be expected in this drive as it is only about 25 feet from Underwood's winze in which high values were met with.

Main West Drive.—This drive has been driven 50 feet. For the first 40 feet the reef averaged 24 dwts. per ton for a width of 55 inches by the mine assays. At 40ft. the reef is faulted, and has made again in the present face. Owing to stoping operations I was not able to check this sampling, but I took a sample at 40ft. which assayed 4.4 dwts. over a width of 42 inches, and another from the face of the drive which gave a value of 117 dwts. per ton for a width of 18 inches. This sample is most encouraging, but should, I think, be checked before undue importance is attached to it.

90ft. Level, Underwood's Winze.—This winze has been sunk to a depth of 5 feet below the 140ft. level, and has been sampled to a depth of 40ft., the remainder being under water. For the first 35 feet the mine assays averaged 18.6 dwts. per ton over a width of 36 inches, and at 40ft. an assay value of 5 ounces per ton was obtained over a width of 36 inches. As will be noted, my samples agree fairly well with these.

West Winze.—This winze, I am informed, is off the reef proper, and consequently in low values. No attempt was made to sample it.

90ft. Level, Main East Drive.—This is all stoped above the level, and the drive timbered. A few samples were taken where they could most easily be obtained to ascertain what values were going underfoot. The following were the results obtained:—

18 west of Underwood's winze	..	5.7 dwts.	48in.
29 " " "	..	17.6 dwts.	48in.
54 " " "	..	54.2 dwts.	54in.
18 east " "	..	4.8 dwts.	36in.
34 " " "	..	17.9 dwts.	15in.
47 " " "	..	25.7 dwts.	18in.
71 " " "	..	0.3 dwts.	18in.

The samples average roughly an ounce per ton for a width of 34 inches.

Prospects of Ore from North Reef.—On present appearances there is a block of ore above the 90ft. level between Underwood's winze and the west winze nearly all of which can be profitably extracted, provided that anything like a satisfactory treatment can be effected. It is also encouraging to notice that good values have been met with at the bottom level, and that they are going underfoot.

I could not check these values, but they have been substantially borne out by the recent battery returns.

South Reef.—Like the north reef, the reef runs practically east and west. In the vicinity of No. 3 shaft, where the principal workings are, the reef at the surface underlays a little to the north. At a shallow depth an inclined fault carries the reef to the south. It takes up its course again and continues till it meets the diabase below the 60ft. level where, as already explained, it turns over and dips south, following the contact of the diabase and the schist. Mr. Bell informed me that crushings above the 60ft. level in this vicinity used to

average about 23 dwts. Opposite the main shaft the reef seems to make a double bend, forming the letter Z, at the surface. A rich crushing is said to have been obtained where the reef is running north and south by open-cutting.

An attempt to locate this portion of the reef at the 60ft. level has so far been unsuccessful.

When on the mine I pointed out to the manager where I thought he would find it.

On the east side of the main shaft two small reefs close together have been worked to a shallow depth. These form the bottom stroke of Z where the reef has apparently taken up its course again.

I understand that rich crushings have been obtained for about 20 feet below the 60ft. level, at which depth a smooth floor was met with. Between No. 1 and No. 2 winzes 300 tons are said to have been obtained, yielding 7,000 ozs. of gold.

The following is a brief description of the recent developments:—

60ft. Level.—Nothing of value was met with in the main drive on the east side of the main shaft, and Mr. Bell came to the conclusion that this was not driven on the proper reef, and in consequence put out a south crosscut at a point 50 feet west of the main shaft. At 25ft. a reef was met with lying flat. At 30ft. this reef is slightly faulted and steepens up. It is 4 to 5 feet in width, and assays 6 dwts. per ton by the mine assays. At 50ft. another reef carrying galena was met with. It is 36 inches wide and is said to be about the same grade. A south drive off the crosscut has been driven 15 feet, and the mine assay of the face was 8 dwts. for 60 inches. The average value was between 5 and 6 dwts. These two reefs are probably the same two previously mentioned as occurring at the surface.

60ft. Level, No. 2 Winze.—This winze was started from the 60ft. level at a point 130 feet west of the main shaft, and was sunk 70 feet. The first 15 feet of this winze was taken out by means of an underhand stope. From 15 to 30 feet the average value by mine assays was 70s. per ton. Below 35ft. the reef was left unbroken on the hanging wall. Two samples were taken by me on opposite sides of the winze, both at a depth of 24 feet. The sample from the west side assayed 5 oz. 8 dwts. 16 grs. per ton, and that from the east side 5 oz. 0 dwts. 9 grs. per ton.

150ft. Level, Main East Drive.—This drive has been driven a distance of 105 feet. For the first 95 feet the mine assays averaged 83s. 5d. per ton, the last 10 feet being off the reef.

I found a flat fault just above the back of this level. In consequence my samples taken across the back of the drive consisted to some extent of fault material. These averaged 10 dwts. per ton over a width of 56 inches. I have no reason to doubt that Mr. Bell actually obtained the results reported, and that these values are going underfoot. As the result of the fault, however, the reef has been thrown north or south. One of the first things to be done will be to locate the upward continuation of this reef, and prove its value between this level and the 60ft. level above.

Main West Drive.—This drive has been driven a distance of 104 feet. From 0ft-25ft. the mine assays showed a value of 81s. per ton for a width of 36 inches, after which the values were obtained only over a narrow width, beginning at 18 inches and pinching down to about 6 inches, and at about 70ft. giving out altogether. At about 85 feet along the drive the reef swings round, and for the last 18 feet the reef has been running north and south. Quartz is showing on both sides of the drive and in the face. Mr. Bell told me that he got very variable results in the sampling of this ledge of stone. My samples, taken 12 feet from the face on either side of the drive, assayed 1 dwt. 7 grs. and 21 grs. per ton respectively. The face of the drive assayed 10 dwts. 8 grs. per ton over the width of 60 inches. The only other sample taken by me along this drive was at 12ft., where the reef is now exposed for a width of 60 inches. This assayed 9 dwts. 7 grs. per ton. Mr. Bell here showed a value of about 80s. per ton over a width of 36 inches. The drive should be continued and a connection made with No. 2 winze.

Prospects of Ore from South Reef.—There are, I consider, good prospects of a large tonnage of payable ore from this reef between the 150ft. level and the 60ft. level.

This cannot be regarded as being assured, however, until the width and value of the reef above the fault at the 150ft. level has been ascertained.

Considerable importance should be attached to the values obtained in the rises or winzes connecting these levels.

The mine assays indicate high values going underfoot. As there was a foot of water on the level at the time of my visit I was not in a position to check them.

Surface Equipment.—Brief details of the surface equipment are as follows:—

Power and Battery:

- 1 battery 10-head 1,000lb. stamps.
- 1 rockbreaker, Frazer and Chalmers jaw cracker.
- 1 Crossley gas engine, Hit and Miss type, 44 h.p.
- 1 Hornsby gas engine, 50 h.p.. At present only generating 20 h.p. owing to worn cylinder.
- 1 Commonwealth producer, down-draught, 135 h.p.
- 1 Crossley charcoal producer, 60 h.p. (emergency).
- 1 air receiver (20ft.).
- 1 Ingersoll Rand belt-driven compressor.
- 3 drill capacity (280 cubic feet at 80 lbs.).
- 1 return water pump. Ledger type (in bad order).
- 1 10,000-gallon battery supply tank.

Cyanide Plant:

- 5 concrete cyanide vats (capacity, 18 tons each).
- 2 side-tipping trucks.
- 1 six-compartment zinc box.
- 1 centrifugal pump, 1½in., for pumping solutions.
- 1 4,000-gallon solution tank.

At North Shaft:

- 1 set wooden poppet legs (25ft.).
- 1 geared steam winch, 8in. cylinder, Holman (at present driven by air).

At South Shaft:

- 1 set poppet legs (steel), 30ft., double-sheave wheels.
- 1 steam winch, 8in., Robey type.
- 1 tubular boiler, 15 h.p., just blown out; considered beyond repair.
- 800ft. tramway from shaft to treatment plant.
- 800ft. water main, 3in. and 4in., connecting pumping system with treatment plant.
- 800ft. air main, 2in., from plant to south shaft.
- 1 pump, windmill type, 7in. cylinder, 3ft. stroke, 4in. delivery, capacity 4,700 gallons per hour at 25 strokes per minute. Boiler to be moved to south shaft.
- 1 Only Lister oil engine, 8 to 9 h.p., driving pump 15ft. x 6ft.
- 170ft. delivery pipe, 4in.
- 150ft. Oregon rods, 4in. x 3in.

Rock Drills:

- 1 Holman, 3in.
- 2 Ingersoll B. 24.
- 2 Taylor-Horsefields 2¾ rock drills (spares unobtainable on account of old type).

Buildings (wood and iron):

- 1 Assay office, 20 x 12.
- 1 store, 10 x 12.
- 1 gas engine room, 10 x 12.
- 1 blacksmith's shop, 10 x 12.
- 1 messroom, 12 x 12.

Although not in first-class order, the plant ran fairly well during the few days I was on the mine. Owing to the blow-out of the boiler at the south shaft the winch was being driven by air. Arrangements were being made to install another boiler which is on the mine. This is urgent, so that the air may be used for the rock drills.

There is no battery bin, and one is badly needed.

There are no filter bottoms in the vats. The manager has been endeavouring to filter by means of stones covered with bags. No good work can be done by such crude methods.

I was informed that financial considerations had prevented this work being done earlier.

The capacity of the plant is estimated at 600 tons per month.

Treatment.—The treatment at present is far from satisfactory, the head value of the ore is worth about 75s. per ton. I am informed that about 30s. per ton is obtained by amalgamation, and the same amount by cyaniding, leaving the balance, say 25s. per ton, in the residue.

The ore carries a percentage of concentrates which may or may not be readily amenable to cyanide treatment without roasting.

I have asked the Government Mineralogist to select a representative sample from those supplied by me, and carry out some experiments to see if a good extraction can be obtained by raw treatment. These results are not yet to hand, and I would have preferred to have received them before completion of this report.

However, as it is considered urgent that I should submit my report as far as I have gone with it, I am now doing so, and will submit a further brief report when I have the results of the treatment experiments before me.

Development Work.—The following is a list of the development work which can be recommended:—

South Reef:

Extend the 150ft. level south drive 135 feet;	
estimated cost per foot £6	£810
Rise from the 150ft. level to connect with No. 2 winze, distance 30 feet; estimated cost per foot £4	120
Connect the 60ft. level and the 150ft. level by means of a rise or winze at a point 110 feet south, distance 150 feet; estimated cost per foot £3	450

North Reef:

Extend 140ft. level, main east drive, 135 feet;	
estimated cost per foot £6	780
Total	£2,160

Conclusion.

Both reefs have produced good ore, and in each case good values appear to be going underfoot. Both have, however, been subjected to considerable faulting, thereby increasing mining and development costs. A block of payable ore between the 140ft level and the 90ft. level on the north reef seems to be reasonably assured.

There are also prospects of a good block of ore above the 150ft. level on the south reef, but this cannot be regarded as being assured till the behaviour of the reef between this level and the 60ft. level has been proved by the proposed connections.

Well handled, the mine should on present appearance have a good chance of success. The prospects of such success will of course be much improved if the tailings from the battery present no treatment difficulties and a better extraction be obtained without additional cost.

Underground there are two main levels which connect to the shaft by short crosscuts at vertical depths of 125 and 195 feet.

No. 1, 125 foot Level.—This level extends 500 feet south and 480 feet north from the main crosscut. A further extension south to 600 feet will be necessary to connect with the southern mullock pass, and also to explore the lode underneath the old surface workings, from which there seems to be little doubt considerable quantities of lead ore were originally taken. The north end of the drive is well under the northern pass. In driving this level there seems to have been a desire to leave the foot wall and incline the drive towards the hanging wall. This is particularly noticeable in the sections immediately north and south of the shaft, where there is a greater width in the lode formation. I was not at all satisfied that the dip of the lode as shown on the mine plan is a true representation of what really occurs. There is quite a reasonable chance that the lead values lost in the drive at the 195ft. level between points 121ft. north and 200ft. south of the main crosscut will be found by further prospecting for the true footwall of the lode.

The best values are usually found on the footwall, though at times quite good runs of ore also occur on the hanging wall side.

Certainly the diary shows stoping values at the 125ft. level over quite a length in this section, and since my return in an opening made at a spot 140ft. south of main shaft quite good lead values have been found under the drive and dipping away towards the eastern wall. In the main stope 80ft. to the north of the shaft above the 195ft. level good stoping values still continue, although there are practically none reported in the level below for a distance south of 120ft. There is, however, no certainty that any appreciable amount of ore will be found in this section, and the history of the field as far as continuity of payable ore is concerned, all points to a very erratic nature of both the lead and copper minerals. It is evident, however, that the block should be thoroughly tested either by crosscuts or winzes from the 125ft. level. Neither the south nor north end of the 125ft. level is in payable ore, though apparently the level is on the course of the lode.

The stopes in the back of the level are practically continuous for a length of 750ft.

No. 2 Level.—This level is connected to the main shaft by a crosscut 65ft. in length. At a point 56ft. from the shaft drives were extended north and south for distances of 620ft. and 526ft. respectively. Fourteen feet in from the shaft an eight inch galena vein was cut which probably indicates the position of the hanging wall side of the lode. The crosscut extends past the drive a distance of some 8ft. There is no definite footwall exposed.

It has already been stated that there are no values in the 195ft. level for a distance of 220ft. south and 121ft. north of the main shaft.

Most of the payable ore has been stoped from the 121ft. to 600ft. north. There are still values in the end of the drive, but only over a narrow section.

In the south drive stopes extend from 220ft. to 479ft. south. There are practically only traces of lead ore in the face. Unless values are found in the block of lode formation immediately north and south of the shaft there will shortly be little or no payable ore for the mill. Generally speaking the widths of the stopes are almost as erratic as the mineral contents, and vary from two to occasionally 10 feet, but four feet would be a liberal average.

Unfortunately the ore from above the No. 1 level was mined with that of the bottom level, so an accurate average width is not determinable from a comparison of the ore and extent of the stoping done. The present mine returns show a production of 17,218 tons producing 2,267 tons leady concentrates of a realised value of £26,402. From these figures the average grade of the ore was 9 per cent. metallic lead. No copper or zinc has been recovered from this mine. Zinc occurs in fair quantities in certain sections, but up to the present did not warrant the extra expense of concentration for its recovery.

Plant.—The plant, which is almost a duplicate of that on the Narra Tarra, consists of a 105 H.P. Gas Corporation Producer gas engine complete, for the pro-

duction of the necessary power. The hauling plant is steam driven, the steam being generated in two Lancashire boilers. The ore passes first through a No. 3 Gates rock-breaker, from whence it travels to a set of May Bros.' Rolls 24in. x 10in. From the rolls it is conveyed to two trommels with a 7-mesh screen, the discards returning back to the rolls, the fines passing on to a thirty-inch compound May jig with five hutches. The screens on the jigs are six mesh. From the first two hutches the concentrates are bagged direct. The discharge from the second two passes over the Wilfley tables. The discards from the fifth hutch and the Wilfleys are raised to the tailings dump by a bucket elevator. The seconds from the Wilfleys and droppings from the concentrate trucks are returned to the Wilfleys by means of a second smaller bucket elevator. The speed of the Wilfleys is about 220 per minute. The plant is capable of handling at least 100 tons of ore a day.

The average grade of the concentrate is about 70 per cent. lead, or in the case of copper ore 23 per cent. copper.

1. **Summary.**—(i.) The lode at the bottom level shows payable values over a length of 400ft., with a blank of 340ft., which when thoroughly prospected may reasonably be expected to increase this length of ore body.

(ii.) At present most of the developed ore has been beaten out from the 195ft. level to the surface.

(iii.) There is every reason to expect the present values to reach the depth of another level. This being the case, as most of the heavy expenditure of the plant has been incurred it should be good policy to extend the present drives further south to explore ground which near the surface was productive, and to sink the shaft and open up a new level. With reference to sinking the shaft, as this will be a wet sink it would be advisable in my opinion to instal a belt-driven air compressor to work, say, three light drills. There might even be enough steam in the second Lancashire boiler to drive a small steam-driven air compressor if a belt-driven plant was not easily procurable.

2. **Narra Tarra Copper Mine.**—The leases comprising this mine consist of Vic. Locs. 830, 118, 119, of 200 acres each, and Vic. Loc. 833, 300 acres, all freehold. The total freehold area is therefore 900 acres.

Reference has been made to this mine in Bulletin 59 by H. W. B. Talbot, written in the year 1914. There has been considerable work done since that date, and the lead portion of the main lode has been practically depleted of all its payable ore from the 550ft. level to the surface. The copper section, which commences about 400ft. south of the main shaft, is on the other hand almost intact, and should provide milling ore for a period of from 12 to 15 months on the present daily output. The main features of the lode are similar to those in the Wheal Ellen mine, except for the occurrence of the copper in the southern end of the mine. The junction between the lead and copper minerals is not at all definite. Veins of copper ore project considerable distances into the lead portion, and stringers of copper ore are traceable in the same way into what is essentially lead ore.

Most of the copper values occur in the form of yellow pyrites containing a variable proportion of chalcopyrite and probably a little black oxide. In the top levels the green and blue carbonates predominate. The copper concentrates from the Wilfleys average about 23 per cent. metallic copper, and contain 5ozs. of silver. An attempt was made by the present company to unwater the old shaft in the north-eastern corner of the lease, and open out new ground under some old lead workings which had fallen in from the surface.

From the 150ft. level in this shaft two drives were extended north and south 75ft. Unfortunately the old workings were deeper than report made them out to be, and the water breaking through from underneath flooded the workings and drowned one of the miners. The workings were abandoned. In an old open cut north of this shaft appreciable amounts of pyromorphite can be picked up. In the old dumps there is quite a lot of galena which was too small for hand picking, and has been left by the early prospectors. There seems little doubt that the lode exposed in these workings is a continuation of the main line of lode.

About 1,900ft. south-west of the main workings is another well-defined line of lode which has also had its surface ore gouged out by the early prospector over quite a considerable distance. Except that this is undoubtedly a long line of lode and has attracted considerable attention in the early days as a lead and copper ore producer, little further can be written until more mining development has been done.

The positions of the old shafts have been placed by Mr. Talbot (*vide* plan Bulletin 59, copy attached).

At present, having sunk a new shaft on the south end of the old workings to a depth of 103ft., a crosscut is being driven to intersect the lode at this level. At a distance of 300 feet north of this shaft an old shaft has also been cleaned out and rendered safe for working to a depth of 92ft. The old surface workings extend at least 200ft. continuously north of this shaft,

with scattered workings on the line for fully half a mile further to the north. In some of the old workings a good hanging wall is visible. Lead and copper minerals may be picked out of any of the old dumps. There is no available record as to what ore has been taken out of these workings.

Between this line of lode and the main workings is still another copper lead bearing zone, but without further prospecting there is little to see by walking over the surface, except a few old shallow workings and scattered fragments of galena, etc.

There is no doubt whatever in my mind that this eastern line of lode is worthy of further prospecting and development, as on the surface it has every appearance of turning out to be a second Wheal Ellen or Narra Tarra lead copper mine.

APPENDIX No. 13.

Report on Mr. Boyce's Area near Maida Vale.

(By T. BLATCHFORD, Assistant State Mining Engineer. 31st July, 1924.)

The Under Secretary for Mines.

I have inspected Mr. Boyce's area near Maida Vale, where he has been boring for coal, and report as follows:—

The site of the above is about one to one and a half miles from the western slope of the Darling Range scarp fault. Mr. Boyce claims *inter alia* that the following are indications of the existence of coal:

1. A peculiar smell in water found in a bore hole in the vicinity.

2. The similarity of the vegetation which grows on his block to that found in the Collie Coalfield.

3. That a seam of coal 6in. thick was found in a well at Maida Vale some 25 years ago.

He has sunk a shaft about 60ft. deep and bored a further depth of 100ft. with a hand-boring plant.

With the exception of a quantity of blackish mud the rest of the sludge on the dump consisted of sand or mixed clay and sand.

I endeavoured to point out to Mr. Boyce the following facts:—

1. That the strata between the coast and the Darling Range consisted of a series of rocks which had been faulted to a considerable depth, and that the Permo Carboniferous beds were probably from 2,000 to

3,000ft. below the surface, the intervening beds being of Cretaceous and Jurassic age, with a top covering in most places of the Tertiary or Post Tertiary sands, etc.

2. This being the case the foliage growing at the surface would give no indication as to the location of the Permo Carboniferous strata.

It was also pointed out to him that the bores in the Metropolitan Area had reached depths of upwards of 2,000 feet, and had not passed through coal seams of any importance. Further, that the black mud (not shale) which he had cut was not indicative of the proximity of coal seams, although black shales were at times found associated with coal deposits.

In my opinion boring for commercial coal at Maida Vale is a hopeless proposition, for the following reasons:—

1. That coal is not at all likely to be found at a depth of up to 2,000ft. (This has been proved by existing bores.)

2. That if found it would be at a prohibitive depth for economic mining, more particularly so as it would be necessary to pass through a known artesian water system.

APPENDIX No. 14.

Report on the Great Leviathan Mine.

(By T. BLATCHFORD, Assistant State Mining Engineer. 18th August, 1924.)

The State Mining Engineer.

A full description of the old workings, with plans, may be found in Bulletin 49, page 170. Most of these workings are now inaccessible. The present prospectors, Messrs. Bairnson & Sutherland, are confining their prospecting to three points—

1. When the previous owners had driven the 130ft. level a distance of some 350 feet south-east, the reef apparently cut off and operations were suspended. The present party continued the drive and found that the reef, though small, continued. Their intention is to continue the drive and explore further.

2. At a point 250 feet east from the main shaft in the same level a crosscut 35 feet in length to the north-east cut a reef which had been stoped from the 90ft. to the surface. From these stopes 600 tons are reported to have been crushed yielding 700ozs. of gold. The reef at the 130ft. level has been opened out for a distance of 50ft., and will probably give a stope three feet wide for the full length of the drive. The prospectors

expect to get about the same grade of stone. They are still driving, but are anxious to test the stone raised with a crushing.

3. What is known as the east reef is being worked from a shaft 110ft. deep lying 300ft. east, 11deg. south from the main shaft. The strike of this vein is different to most (W. 10deg. N.), but seems to be a promising make of stone. At the 80ft. level a drive on the lode extends for a distance of 35ft., the width of the stone varying from 3 to 5 feet. If the values only keep up to expectations quite a good quantity of milling ore should be produced from here.

Taking a general view of the prospects there seems to be a reasonable chance of the party making good for some time. Certainly their work is good, and the men seem to be hard working and to know their business. They were anxious to finalise about the leasing of the battery, and were quite prepared to take it on reasonable terms.

APPENDIX No. 15.

Report on the Great Victoria Mine.

(By T. BLATCHFORD, Assistant State Mining Engineer. 21st August and 19th December, 1924.)

The State Mining Engineer.

In company with Inspector Rockett I visited the Great Victoria mine. At present the mine is closed down on account of the water supply failing, the season proving to be an exceptionally dry one. There is little change in the mine since my last visit except that quite a considerable amount of the surface lateritic ironstone in between the main and Hamilton shaft has been put through the mill.

From what I could gather from the mine attorney, Mr. Jack, the greatest difficulties they have had to contend with are the high consumption of cyanide and poor extraction of gold.

The consumption of lime reached about 35 to 40lbs. of lime to the ton of ore treated. The reason for this is to a large extent due to the acidity of the mine water. However, Mr. Jack states that experimentally with fresh water a very much better extraction and a greatly reduced consumption of lime has been obtained. At present the Company is waiting for the Goldfields Water Supply Department to lay the main to supply them with 10,000 gallons of Scheme water per day. I am still hopeful that with a supply of good water for this mine it will become a regular producer and maintain a small mining centre. Further, if successful it may be the means of attracting attention to several other similar deposits in the vicinity such as the Broncho mine and Delaney's Hill.

The State Mining Engineer.

A report from Dr. Simpson on a sample of ore from the Great Victoria mine has just come to hand, and is particularly interesting as it points out an uncommon cause for the destruction of cyanide and alkalis in cyanide treatment. For some time past the management of the mine was experiencing trouble in their cyanide treatment, more particularly in the excessive loss of cyanide or alkali. The real reason was not clear but was attributed mostly to the acid nature of the mine water.

Experiment shows, however, that the water is not the only cause, but that two chemical actions take place, and the breaking up of the water soluble basic sulphates and consequent liberation of sulphuric acid by the combination of the alumina, of the mineral Gibbsite which occurs in the ore, with either the potassium of the cyanide or calcium of the lime to form aluminates. Whether the mine will benefit from the knowledge will depend on to what extent they can eliminate those portions containing the harmful ingredients, now the cause of the trouble has been located. Dr. Simpson's full report is as follows:—

Reg. No. 2076/24.

This ore was submitted for examination with a view to determining the cause of the high consumption of cyanide and lime experienced in its treatment. The ore

was found to be a highly ferruginous gossan assaying 6dwts. 6grs. of gold per ton.

A partial quantitative analysis gave the following results:—

Metals of group 11 a—nil.
" " 11 b—nil.
" " 111 b—nil.

Free acid ... nil (water extract was neutral)

Water soluble sulphates, SO₂ 0.05% (1.1 lb. per ton)Acid soluble sulphates, SO₂ 0.28% (6.3 lb. per ton)

Sulphides ... S, 0.04%.

A qualitative test showed the presence of much alumina soluble in dilute (5 per cent.) caustic soda solution. Such a reaction would be obtained when alunite or gibbsite (Al₂O₃·3H₂O) is present. Alunite could hardly exist in the presence of so much iron, the acid soluble SO₂ being present probably as jarosite or a basic iron sulphate such as copiapite. Further, the quantity of caustic soluble alumina was much greater than that required to form alunite with the acid soluble SO₂. I conclude, therefore, that the ore, like many laterites, contains gibbsite.

Tests were made of the consumption of cyanide and lime, the figures obtained being:—

Lime alone, Consumption 11.7 lbs. of CaO per ton.

Cyanide alone, Consumption 10.89 lbs. KCN per ton.

Lime followed by cyanide—

Lime present.	Cyanide consumption.
lbs. per ton.†	lbs. per ton.
10.0	2.87
4.6	4.64

These high consumption figures cannot wholly be attributed to the water and acid-soluble sulphates.

In view of the known interaction between gibbsite and alkalis, a test was made of the consumption of cyanide by a typical Darling Range laterite carrying much gibbsite. This consumption was found to be 14.6 lbs. KCN per ton, due probably to the formation of potassium aluminate. A proportionate consumption of lime would no doubt occur owing to the formation of calcium aluminate.

The conclusion arrived at is that the high consumption of lime and cyanide is due partly to water soluble and basic sulphates of iron, partly to aluminium hydroxide in the form of gibbsite.

† 100 per cent. CaO.

APPENDIX No. 16.

Report on the Transvaal Mine, Southern Cross.

(By T. BLATCHFORD, Assistant State Mining Engineer. 22nd August, 1924.)

The State Mining Engineer.

The object of my visit to this mine was to inspect the No. 4 level, as there was a doubt in the manager's mind as to whether they had picked up the true course of the lode. On my arrival I found that the water had been allowed to rise and flood the bottom of the mine, the present programme of development being to continue the south drive at the No. 3 level, sink a winze over the crosscut at the No. 4 level, and ascertain whether the lode has faulted or the values cut out below the No. 3 level.

At a point in the No. 3 level about 100 feet south of the shaft the country has no doubt been shattered, and although it is not quite clear which one of two things has happened, either there has been an overlapping of the south and north lenses, or the lode has been faulted. Unfortunately there is a considerable amount of ore still on the walls, and the previous flooding of the mine has left the walls very dirty, so that it is not at all easy to see all that might have been evident when mining was in operation. It is quite probable that the trouble at the No. 4 level is due to the crosscut being in this crushed zone, and the values have been missed. The lode is so well defined in the No. 3 level that it seems improbable it will cut out in such a short distance as 100 feet. The policy of driving south is quite a good one, for the lode has been traced and worked on the surface for some hundreds of feet beyond the present southern face of the No. 3 level. Sinking a winze to follow the values to the No. 4 level is also excellent work.

I have recommended the manager to go still further, and start a second winze when the level is extended to,

say, a distance of 150 feet south of the winze now being sunk.

There is one other point I wish to draw your attention to: if you at any time study the assay plans you will notice that the values in the south and north winzes from No. 2 to No. 3 levels show very poor values in the bottom section. This is due in each case to the work being carried into the hanging wall country. There is every probability that the same conditions pertain in the south winze from the No. 4 level. Why this should be is not quite clear, and the only conclusion one can arrive at is that it was deliberate to depreciate the value of the mine, or it was gross incompetence on the part of the man in charge. Without an explanation it might have a very wrong impression on anyone studying the plans not having seen the mine.

There is quite a good ore reserve already developed in the mine, and the south face in the No. 3 level looked very high grade across the whole face.

As the No. 3 level is now reaching ground which has not been stoped above, every foot of driving should increase the tonnage materially. The oxidised zone terminates at a vertical depth of about 60 feet from the surface.

I was unable to obtain any definite figures about the percentage of arsenic. The procedure which has been adopted in relation to values is to study the gold contents only, as the management is convinced from experience that if the gold values are above 20s. per ton the arsenic contents are 5 per cent. or more, and sufficient for the purpose of export with arsenic at the present market price.

APPENDIX No. 17.

Report on G. N. B. Smith's Alluvial Workings, Edna May Central Mine, Westonla.

(By T. BLATCHFORD, Assistant State Mining Engineer. 22nd August, 1924.)

The State Mining Engineer.

When the Edna May Central mine stopped working the area of alluvial which is shown on the accompanying plan, the conclusion naturally arrived at was that the gold-bearing wash had derived its gold contents from the sheddings of the Edna May reef. Unfortunately, as the lead travelled northwards the gold contents became less and less until the wash was unpayable.

A south-east crosscut at the 70ft. to 75ft. level was put out to try and pick up any lead which might have arisen from the detritus of the Consolidated Main Reef, but although wash was present the gold values were very discouraging.

Working in the vicinity of No. 6 shaft, tributaries in 1922 mined 166 tons of wash for a return of £276 12s. 3d.; in 1923, 101 tons of wash for a return of £368 4s. 8d.; and in 1924, 193 tons of wash for a return of £336 13s. 1d.; making a total of 606 tons for an average of 32s. 4d. per ton.

The present faces are moving towards the Consolidated mine, but how long the values will last is for-

titious, as no prospecting has been done below the surface between No. 6 shaft and the Consolidated boundary. With a battery almost on the spot and plenty of water at a depth of 80 to 90 feet the wash can be very cheaply handled, and with good management and these conditions there should be a lot of wash which will pay to treat though the margin of profit be low. There is also quite a chance of picking up another reef in the unprospected block. You might remember that the "New Reef" in the Central mine was found when mining the alluvial. Smith will probably have a hard row to hoe until he can get enough payable alluvial exposed to warrant his sinking an underlay shaft and trucking the ore direct to his mill, or instal a better hauling plant than a horse and whip. He can, however, very easily feel his way without incurring much further capital expenditure. It will be interesting to revisit this venture in, say, 8-10 weeks' time, when there should be sufficient development in the wash to see if there is another lead coming from the Consolidated ground.

APPENDIX No. 18.

Report on the Siberia Deep Leads.

(By T. BLATCHFORD, Assistant State Mining Engineer, 22nd August, 1924.)

The State Mining Engineer.

There are three parties working on the alluvial patch known as the PEARLING ground, about $1\frac{1}{4}$ miles north of Waverley townsite.

Two of these, Emery and O'Loughlin and Neil V. Cullen, are in shallow ground; the third, Keith Blackman and Martin, are in deep ground. Most of the shafts were inaccessible, but I was able to have a good look round the shallow workings and the lower workings of Keith and party's deep ground. In the shallow workings the wash above a false bottom is being worked at a depth of from 12 to 15 feet below the surface. The average thickness of the wash is from one to two feet.

It is unnecessary here to go into the details of the composition of wash and minor details, which have been fully expounded on in Dr. Larcombe's lengthy report, but there is one important point which still remains doubtful, and that is the true bottom (the country rock) has not been exposed in these shallow workings; so the real depth of the alluvial is not known. Certainly, there is a band of alluvial containing more gold than the detrital matter above or below, but the floor is just as much alluvial as the material from the floor to the surface.

In Keith's shaft, which is about 100 feet deep and no great distance to the south of the other two claims, the sides of a gutter have been exposed. These sides are steep, and where the eastern wall has been broken into there is very pronounced slickensiding. This is not evident on the western bank, which, though steep, shows no sign of slickensiding or faulting.

Another feature which the present workings definitely show is that the true bottom of the gutter is dipping south-westward.

Having found the two banks definitely and the course of the gutter in one direction, the prospectors are now prepared to drive in both directions along the gutter, and if they do this it will clear up the situation considerably. My own opinion is that the deep lead will find a way out to the south-west, and trend away north-east in the other direction.

I was very disappointed at being unable to see the fault you refer to when describing the lead in your report on the Waverley District. There was certainly no definite evidence of any faulting in the ground I examined, and if there is any appreciable depth in the

now so-called shallow workings there will be no necessity at least for extensive faulting to account for the apparent sudden increase in the depth of the ground in the deep lead.

The three parties are all getting enough gold to encourage them to continue working, but of course there is no check on the actual amount. The old problem of where the gold comes from is still present, and I cannot bring myself to believe that the rough, ragged gold which is being found has been transported any distance. The argument of rounded quartz grains and pebbles being in the vicinity is to my mind contradictory evidence, for surely the action which would round off quartz would wear away the rough edges of the gold too, which is not the case in the lead gold. Furthermore, if there was transportation of the gold it would concentrate and not be found scattered through the mass. We know that gold in other leads has been concentrated around various nuclei by chemical action. In the North lead in Kanowna, for instance, cracks in the "pug" were filled with gold assuming the shape of the rough gold at Siberia, the only difference being that the crystallisation was in individual rather than massive form, and therefore more easily crumbled under pressure than the pieces found in the Siberia Leads. Again, gold occurs in lodes similar in every respect to that found in the Siberia Lead.

That there has been a considerable amount of chemical action in the lead since it was formed is evidenced by the nodular ironstone, segregation of magnesium in the form of magnesite nodules, plating of the ironstone nodules with gold, etc. I saw no gold which could be directly associated with reef gold.

Taking the evidence as it stands, I am more inclined to believe that the gold has originated from chemical action rather than the transportation in the solid form of gold from disintegrating lodes or veins.

Other than the leads there is little mining going on in the district. Three leases, the Hazel, Hazelmere and Hazelmere South, are being prospected to shallow depth, and show a long run of lode almost through the three holdings. I am led to believe these are at present under option for sale. Corrill is doing a little work in the old Siberia Consols mine.

The country is very dry, and unless rain comes in the near future there will be a water drought.

APPENDIX No. 19.

Report on the Lady Shenton Gold Mine.

(By T. BLATCHFORD, Assistant State Mining Engineer, 3rd September, 1924.)

The State Mining Engineer.

A loan of £1,000 was approved to the Lady Shenton Syndicate to unwater the old workings of the Lady Shenton and Alpha Lease (3031Z) at Menzies, to the No. 2 level, the object being to prospect for the southern continuation of the Lady Shenton reef into the Alpha Leases (Stirling Lease 3031Z).

The water has been lowered and the mine is now dry to the No. 2 level (345 feet). Unfortunately for the members of the syndicate they were not aware of the prospecting which had been carried out by cross-cuts and boring, otherwise they would not have gone to the expense of unwatering the mine.

In company with Inspector Gourley, I went through the workings of the mine as far as possible, and made a survey showing the bores and crosscuts which were not on the syndicate's plan. On my return to Kalgoorlie I was able to obtain complete plans from Mr. Francis, the attorney of the old Company.

The point at issue is what has happened to the reef south of the southern crosscourse or shear zone. In Bulletin 22, written by the late H. P. Woodward, of the Geological Survey, the mines in question have been described in detail.

The main features in this report which have a bearing on the subject are that—

- (1.) The Shenton lode has been faulted in several places in the north end of the workings but not to any great extent.
- (2.) The throw of the faults are either to the east or west along shear zones, striking in a general east to west direction with a steep dip to the north.
- (3.) To the west of the line of lode, and running parallel to it is a granitic dyke. This dyke Woodward asserts, is older than the quartz lodes. The dyke does not show any signs of extensive faulting. In the present case, this is an important point to consider, for if there is no sign of extensive faulting in the dyke, there is little chance of extensive faulting in the reef.
- (4.) Woodward is very positive in his statement that the "shoots" in the Shenton mine fanned out in the upper levels but gradually die out to a point in the bottom of the mine.

I was, of course, unable to see all he saw, but my observations confirm his opinion.

In the No. 1 level at the end of the crosscut from the main shaft (3031Z) there is a good example of faulting on a shear zone. The strike of the fault is 115deg., with a dip of 75deg. to the north. The strike of the reef is 142deg. on each side of the fault. The reef has been overthrust from east to west, the displacement being about 20 feet.

Practically all the stone in the Shenton and Alpha leases has been stoped out to the southern slide and down to the No. 2 level. Tributaries have evidently let the mullock run from many of the passes so that they could ascertain whether any would be rich enough to send to a mill. I was, therefore, unable to see any portions of the payable lode (Shenton) which may have been left.

The No. 2 level has been driven north and south on an ore channel showing quartz most of the way, but this quartz occurs as veins rather than a regular reef. These veins do not contain payable gold. There is no doubt that the north level is immediately under the old stopes and except that the gold values have disappeared, there is no evidence to show that the quartz in the level is not a continuation of the ore body which has been stoped above. As I am submitting the plans

for your perusal, it is unnecessary to give a list of the bores, details of which are unobtainable. There seems no reason to assume that values were struck in any of the cores. I wish, however, to refer to one which was put down just inside the north-east corner of Lease 3031Z and struck the reef at a depth of 250 feet. It was on account of this bore that the shaft was sunk. This bore reached a depth of 800 feet, and is north of the south shear zone.

There is little to notice in the crosscuts except that there is evidence of rock crushing throughout. The country rock is of fine-grained greenstone variety. Small quartz veins were found in the intermediate level in the Alpha lease, and also in the minor workings from the main crosscut to No. 10 bore from the No. 2 level. (*Vide* plan.)

The veins in the intermediate level are no doubt a continuation of those in the No. 2 level.

Viewing the case of further prospecting for a southern continuation of the Shenton reef, the position seems pretty hopeless for the following reasons:—

- (1.) There seems every probability that the ore channel opened out in the No. 2 level is a continuation of the Shenton reef channel.
- (2.) If Woodward's observations are correct the shoots have cut out at depth.
- (3.) There is no evidence of extensive faulting and the fact that the granitic dyke to the west has not faulted is confirmatory evidence that extensive faulting is not probable.
- (4.) The prospecting south of the south crosscourse has been systematic and extensive. There is no chance of a reef being missed unless faulted and thrown a considerable distance to the west. Any down throw to the east would have to be a great distance to escape the footwall workings. Unfortunately, No. 2 bore is only a short one, and an overthrust fault might have carried a reef further out than the end of this bore. The bore at the bottom of the winze from the main shaft goes further out, but is deeper than the Shenton reef apparently reaches.

The case appears to me hopeless; the only remote chance being to bore in the hanging wall close up to the southern crosscourse, or continue No. 2 bore. Up to the present advances have been made to the extent of £317 19s. 11d.

APPENDIX No. 20.

Report on the North White Feather Gold Mine.

(By T. BLATCHFORD, Assistant State Mining Engineer, 14th October, 1924.)

The State Mining Engineer.

In accordance with your oral instructions I have inspected the workings of the North White Feather Mine with the object of a reconsideration of the terms of the loan, portion of which has already been spent, as set out in your minute hereunder.

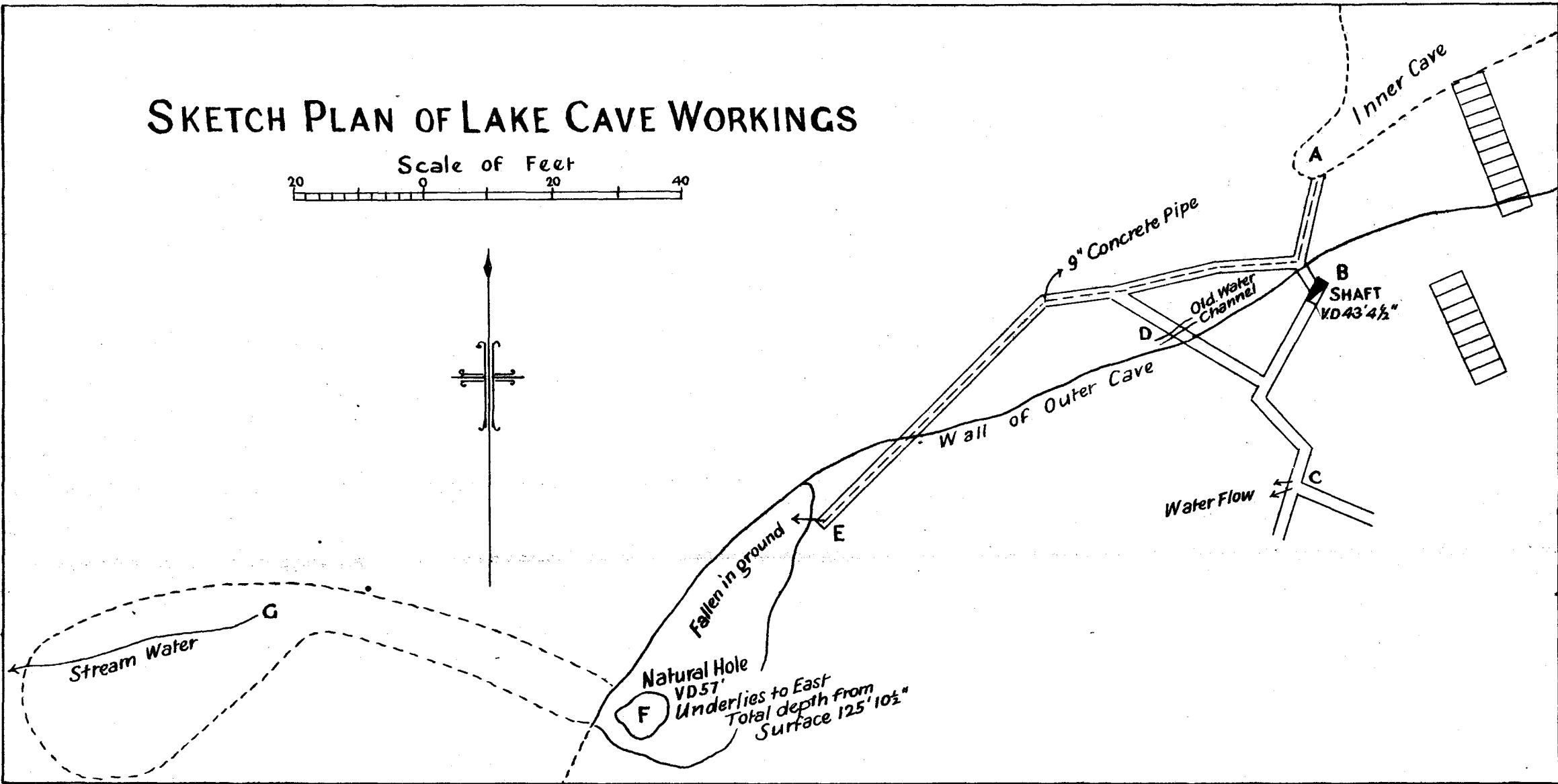
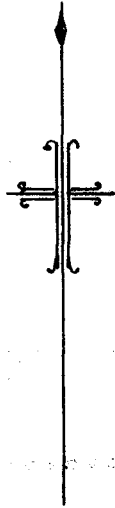
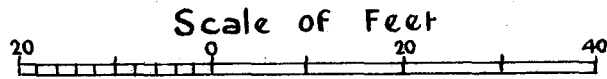
A better conception of the conditions can be obtained from perusing the accompanying plans than by a mere description.

Two lodes have been worked on the White Feather leases, the extent of the workings showing on the stopping plans. At a point some 880 feet north of the main shaft the two lodes are supposed to have junctioned, and though a good wall has been followed 1,500 feet north, no payable lode was exposed except in one short lens 900 feet north of the shaft. In the main workings the eastern lode lay east of a well-defined granitic dyke, the western lode being to the west of this intrusion. A narrow granite dyke of a like character runs parallel to the quartz reefs on the western side. This dyke has been picked up in the northern workings, but there was

no sign of it further north than 1,160 feet from the shaft. The theory is that though it has not been noticed in the workings there is a fault which throws the northern section of the mine to the east, and that the Eastern reef and the large dyke have been faulted in that direction. I might state here that the Reward reef in the block north of the Cement lease has been worked to the northern boundary of the latter with profitable results. If this is the Eastern reef, as it is supposed to be, it would bear out the argument as regards faulting. A quartz was also found in the shaft marked A on the plan, but this shaft at present is filled in. The evidence is that the reef in this shaft is to the east of a granite dyke, the latter forming the western wall. The present endeavour is to crosscut through the granite dyke and explore this reef at the No. 4 level. The present position of the new work is shown on the plan.

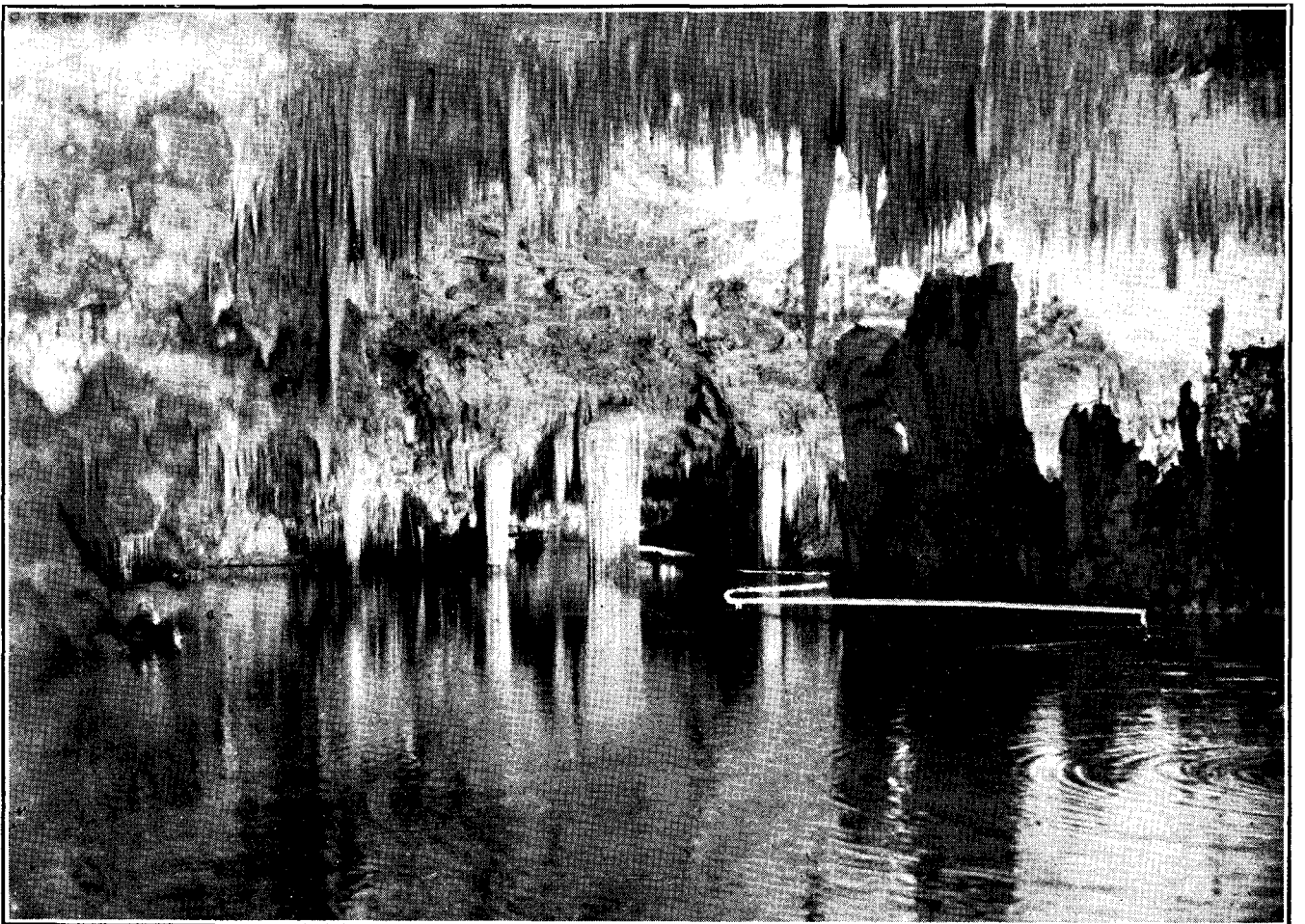
Taking the case as it stands, the proposal to continue the crosscut through the granite dyke seems to me quite a reasonable scheme.

SKETCH PLAN OF LAKE CAVE WORKINGS





Lake before flooding.



Lake after flooding.

APPENDIX No. 21.

The Flooding and Drainage of the Lake Cave at Margaret River.

(By T. BLATCHFORD, Assistant State Mining Engineer.)

Before dealing with the subject under review it may be of interest to the reader to have a brief history of the origin of the coastal cave system.

There is little doubt that the old surface of the coast was occupied originally by a ridge of granite which had been crushed by earth stresses and foliated into a gneiss. This mass of rock must have risen from some considerable depth, and probably formed a ridge extending parallel to the present coast and at no great distance from it. An arm of the ocean at this period probably extended from Busselton to Augusta behind the ridge, the depression having been filled up since from the materials carried down by the waters falling coastwards from the Darling Range. Shells and sand from the beaches were blown up on the ridge and coated it with a variable mixture of sand and beach refuse, which eventually, by the action of circulating waters, turned into an imperfect sandy limestone deposit. As the gneiss gradually subsided these surface beds became thicker, and eventually resulted in what are now known as the coastal limestones.

It is in the limestone beds that the caves occur. Their origin, which probably commences in early Pliocene time, some 2,000,000 years ago, is due to the solution of the lime in circulating waters, and particularly water containing carbonic acid gas; the water dissolves the lime and carries it away to deposit it in some fresh locality or discharge it into the ocean. Hence, where the circulation is in open channels the action is greatest, and the erosion more extensive. This action is common to practically all limestone deposits, provided circulating water is present. After the cave is cut out, and probably during the process, minor channels and cracks in the roofs and sides provide the courses for lime-charged waters to permeate, which, when they leave the rock, deposit lime, and thus stalagmites, stalactites, and the numerous other forms of lime which beautify the caves are formed. One series of water cuts out the cave and the other endeavours to refill it.

One of the most beautiful of our coastal caves is undoubtedly the Lake cave, so named on account of the floor being permanently covered with natural running water. The word lake, however, does not really convey the true impression of the beauty of the whole formation, and as a rule visitors are much impressed with what they see when they approach the cave and long before they actually enter the Lake cave proper.

The correct history of the formation is that at one time the roof of an extensive underground cavern partly collapsed, forming a deep hole of an area of approximately an acre. The original depth of the floor of this cavern was about 200 feet. As we see it now it is a large hole with a sloping floor, the highest point being 60 feet, the lowest 174 feet below the surface. Some fine karri trees are still growing on the slopes, their trunks being in the hole with the branches projecting above the surface. Ladderways and steps have been fixed for visitors to descend to the bottom, but to reach the lake one must leave the daylight and climb still further through a narrow opening which enters the northern wall from the lowest point of the outer cavern. The walls of the outer cavern are more or less vertical, though the northern wall has a distinct overhang.

The outside cavern is in itself well worthy of a visit, though of course the internal lake and cave, being one of the most beautiful of its class, is naturally the chief attraction.

One can scarcely imagine the consternation of the guide, who has been in charge of this cave for many years, when, on 11th May, he found the whole of the lower ladderways and steps had been torn away, and that there had been a perceptible movement of the floor of the outer cavern. He was naturally more perturbed when he found the water had risen 4 feet above the normal level in the lake.

There was no difficulty in predicting what had happened, for on the previous night an unusually heavy rain had caused flood waters to pour over into the side of the outer cave, and this no doubt caused the floor to move and blocked the natural underground water channel which was the drain for the lake waters. It was a more difficult matter, however, to locate this channel, as there was practically no surface evidence to work on, and the only information available of the underground flow was that at the bottom of a hole (G) on the north side of the outer cave some 126 feet deep, water was running away to the west, presumably towards the ocean.

Prospecting for the underground channel was commenced by sinking a shaft (B) some 20 feet away to the west of the entrance to the lake and close up to the wall of the outer cave. Unfortunately water was struck at the same level of the lake water. There was no other alternative than to drive in the direction (C) the water was running and trust to finding a fall to the required level.

Though the water was lowered some 7 inches by this means, the workings were going further under the broken ground, which could not be considered either safe or fit for permanent work.

At this juncture the flow of the water was tested by adding a dye, fluorescein, 4 grains of which will perceptibly colour 500 gallons of water, and which limestone will not affect, at the point (C). The result was, it was proved conclusively that the flow at the bottom of the natural hole (G) referred to previously was the same as that in the workings at (C). Here again trouble was experienced in going down the hole, as owing to loose rock and debris the passage was far from safe. However, a rough survey was eventually made of the direction and level of the water, and as there was sufficient fall in the stream to take a drainage from the lake even at its original level, any risk was amply justified. The underground work was therefore deviated towards this spot, but fortunately the water level fell sufficiently long before it was reached, and a concrete pipe 9 inches in diameter was laid and connected to the lake waters, which soon drained to their natural level. It should be added here that the tunnelling was by no means an easy or inexpensive undertaking. The ground was often cavernous, and at best was a mixture of wet sand and loose limestone boulders. Close timbering was essential throughout.

The extent of the workings can be readily seen from the accompanying plan.

Attached are two photographs, one showing the lake before, the second the lake after flooding.

APPENDIX No. 22.

Braeside Mineral Belt and Coobina Chromite Discovery.

The Under Secretary for Mines.

BRAESIDE MINERAL BELT.

Herewith is submitted, for the information of the Hon. the Minister, a brief report by Mr. T. Blatchford, B.A., Assistant State Mining Engineer, on the Mineral Belt near Braeside Station, in the Pilbara Goldfield. It has long been known that this outlying district contains promising lead and copper deposits, and about ten years ago it was examined by representatives of an English syndicate to whom some of the discoveries had been offered, but did not appeal then to them as having lodes of a magnitude and value to warrant the large expenditure of capital which they anticipated would be necessary to provide railway transport to the coast or to the Marble Bar-Port Hedland railway. Since then a good deal more prospecting has been done, and transport by motor-traction has now rendered the conditions of ore-carriage much less formidable than they were formerly. Recently it was found that there was a good deal of vanadium associated with some of the ores, and as this element is now used industrially in very considerable quantities, its discovery added largely to the interest, and possibly to the value, of the ore deposits. Mr. Blatchford's visit was of a preliminary nature, to run rapidly over the field, and form an opinion as to its prospects and the advisability of stimulating its development, and to ascertain if a detailed examination and mapping would be warranted at the present stage of progress. Such an examination would require the expense of a well-organised party.

The report shows that there are numerous lodes of lead and copper ores, almost untouched even by preliminary prospecting, of great length, and of widths which though mostly not great are often quite sufficient for working purposes and some of which may yet prove to be large, extending through a belt of country over 40 miles in length. From the description it seems probable that it is in the narrower lodes that the metallic sulphides appear close to the surface, and that in the wider ones the metals may have been much leached out from the outcrops and carried downwards to near the water level. There is every inducement to sink shafts on some of these wide weathered portions of the lodes, particularly where these are gossans, as such often cover rich secondary deposits near the water level in the case of lead and copper ores.

Mr. Blatchford's description suggests that this mineral belt is decidedly well worth very thorough exploration by sinking and driving on the lodes. Lead has maintained a high price of late, and well-informed market forecasts agree that the demand for and price of this metal are likely to increase in the near future rather than decrease, while visible sources of lead production appear in many cases to be faced with decrease in output in the near future rather than improvement. A good new lead-field would therefore be a valuable discovery at the present time.

It is obvious that the difficulties of the pioneering work in an outlying district like this must be very serious, and that the expenses of getting ore to mar-

ket must at first be very heavy, but if the field be proved to be a good one these difficulties could soon be got over by improvement of transport facilities. The district will not really be difficult of access once it is well opened up and warrants extension of roads and railways.

I am in entire accord with Mr. Blatchford's recommendations that a close geological survey be made of the whole mineral belt in the Braeside district as early as possible, and that assistance by loans under the Mining Development Act be made available liberally to prospectors and others prepared to undertake approved development work.

COOBINA CHROMITE DISCOVERY.

Mr. Blatchford has also submitted a short report on the recent discovery of chromite at Coobina, on the overland route from Peak Hill to Nullagine. At present this is not workable with any hope of profit on account of the mineral being a low priced one, worth at present about 87s. per long ton, c.i.f. European ports for ore of 48 per cent. Cr₂O₃, and a long way from the rail-heads at Meekatharra and Marble Bar, the distances, sealed from the map, being about 255 and 175 miles respectively. Transport charges by road in this region are rarely less than 1s. 6d. per ton per mile, but even if they could be brought down by motor transport to, say, 6d. per ton per mile it is clear that they would absorb the whole price obtainable for the mineral. The discovery, therefore, cannot be regarded as of much practical importance until such time as the region becomes sufficiently developed to allow of the extension of the railway system from Meekatharra or Wiluna through to connect with the Pilbara line, now ending inland at Marble Bar, but which has been surveyed to Nullagine. The chromite deposit and the copperfields at Kumarina and Ilgarare would be of much importance in considering when the time should be deemed to be ripe for such railway extension.

The deposit is as yet unbroken and in a state of nature, and a good deal of work would be required before even approximate estimates of available tonnage could be put forward. The quantity, however, appears to be large, probably running into hundreds rather than tens of thousands of tons. Deposits of chromite of this order of magnitude are sure to become valuable in course of time. The world's production of chrome ore is given in the "Statistics" issued in 1924 by the Imperial Mineral Resources Bureau for 1919-1921, as—

	1919.	1920.	1921.
	Long tons	Long tons	Long tons
Total from British Empire	75,966	93,167	83,194
Total from Foreign Countries	64,000	120,000	50,000
Total from World (roundly)	140,000	213,000	133,000

The largest producers in 1921 were—

	Long tons.
Southern Rhodesia	44,811
India	34,762
Greece	7,900
New Caledonia	28,986

The prices of chrome ore per long ton basis 48 per cent., scale 2s. c.i.f. United Kingdom port on the authority of the same "Statistics" were—

	s.	d.
1919	252	0
1920	165	0
1921 (first half)	150	0
1921 (second half)	90	0
1922 (first half)	75	0
1922 (second half)	82	6

The four samples taken by Mr. Blatchford, and referred to in Dr. Simpson's attached report, were "grab" samples from the outcrop, and averaged 41.4 per cent. chromium sesquioxide (Cr_2O_3), equivalent to 82.1 per cent. of chromite with 17.9 per cent. of earthy matter, principally serpentine. There can be little doubt that in actually working it would be possible to pick out cleaner chromite, and to concentrate the poorer material to a high grade concentrate, probably well over 50 per cent. Cr_2O_3 .

A. MONTGOMERY,
State Mining Engineer.

20th November, 1924.

The State Mining Engineer.

BRAESIDE MINERAL BELT.

Object of Report.—The object of the inspection was primarily to ascertain—

1. Whether the various reports which have been coming to hand for some years past, as to the occurrence of extensive lead, copper, and lately vanadium ores were authentic.
2. The extent and character of the lodes.
3. To examine the area sufficiently to ascertain whether a detailed survey is warranted.
4. To what degree aid should be given the prospectors now in the field.

Location.—The Braeside mineral belt lies between the Oakover River on the west and the Rabbit-proof Fence on the east. The area examined was between these boundaries and from Water Reserve 11474 on the north to Wandy Wandy Creek on the south (*vide* Lands litho. 108:300). The belt apparently extends further south, but was not examined.

Field Work.—On my arrival at Barramine Station I joined Messrs. Swan and Barker with a team of five camels and equipment. Owing to the phenomenal drought horses were out of the question, as all the surface waters had dried up, and there was practically no natural feed left; as a matter of fact the country is a very poor class for pastoral pursuits, the vegetation being very sparse, and consisting mainly of the rank form of spinifex. No attempt was made to plot a geological map, as to do this a topographical map would first be necessary, for there are practically no fixed landmarks on the existing Lands' maps.

The course adopted was to work down the belt and examine the lodes which were known by the prospectors, both of whom have an excellent knowledge of the area. The portion of the various lodes examined have been approximately located on the accompanying plan.

Geology.—The geology of the area examined can be summed up briefly as a double series of rocks, consisting of—

1. A narrow belt, from three to five miles wide, of various schists and altered greenstones, possibly of the Mosquito Creek or Whim Creek series.

2. A later series, corresponding most likely to the Nullagine beds, of quartzites, limestones, mudstones, and vesicular lavas, and flanking the first series on the east and west sides.

The first or central series stand more or less vertically with a fairly regular strike of north by west. This series forms the core of a distinct anticlinal fold. The surface of this formation is much broken and weathered, forming a succession of small extremely rough ridges and hills. In many places the overlying strata have either not been completely worn down or the detritus has covered the surface, so that the underlying rocks are often effectively masked. Well defined parallel lines of earth fracture follow the strike of the rocks for considerable distances. In these fractures the lead, copper, and vanadium minerals have been deposited, together with large quantities of quartz forming well defined lodes. Owing to the insoluble nature of the quartz these lodes form razor-backs which can be easily traced on the surface.

Amongst the rocks noted in this series were actinolite schist identical in appearance with those found in the Mosquito Creek formation, a fine grained slaty rock containing traces of copper, and very similar in hand specimens to the country rock of the Whim Creek copper mines, several varieties of fine to coarse grained basic schists, no doubt crushed greenstones, and occasionally fine grained, very dense narrow dykes, probably dolerites. These are the most recent rocks of the district. No granitic rocks of any description were noticed.

On the east and west side of the central zone a well defined series of bedded quartzites, limestones, and basalts are found forming the flanks of the anticline of which the central area is the exposed core. On the western side the dip of these rocks is to the west, and on the eastern to the east. At times a reversal was noticed, but this is due to local faulting and is uncommon. The angle of dip as a rule is low, and seldom if ever exceeds 30° .

With the exception of the limestones the beds do not assume any great thickness. One bed of limestone on the west flank, however, stands out in a fairly massive form though the exact thickness was not obtained.

With regard to the basalts, the evidence in most cases is in favour of their being lava flows, not sills, as no metamorphism of the overlying or underlying beds was noticed, and they are for the most part extremely vesicular. On the other hand it was noticed in one case in particular that the basalt had caught up fragments of the underlying quartzite, which is rather evidence of a sill. The spot where this was noticed is just beside Barramine homestead.

Up to the present the lead, copper, and vanadium minerals and lodes have not been found in this series. On the other hand considerable quantities of ironstone and manganese exist, and irregular masses of these minerals can be found on the western flank from Barramine to Braeside; how much further I am unable to state, except that they are reported considerably further to the south than Braeside.

Ore Deposits.—As already pointed out the lead, copper, etc., occur in long lines of lodes in the central core and not in the flanking beds. These lodes can in several instances be traced on the surface by their outcrops for many miles. They owe their origin, no doubt, to the deposition of the minerals in persistent parallel shear zones or fault planes. Associated with the base metals are well defined quartz veins or reefs. The lead and copper contents, however, do not as a rule occur in the quartz reefs themselves, but rather appear to follow along the sides of the reefs or, when there is more than one reef, between them. On the other hand, when the ore is broken, the principal impurity is siliceous material. Owing to the fact that very little work has been done on the outcrops and largely to the fact that there is usually a mantle of broken rock lying above the outcrops, the real width of the lodes is not ascertainable. In places they appear to be narrow, at other times they show signs of widening out to from 50-100 feet *i.e.*, if the whole width of the sheared zone be included. One fact is evident, and that is they are very persistent in respect to length, and on this account depth can also be reasonably assumed. With regard to mineral contents, if the lodes be traversed galena or the carbonates of lead can be seen repeatedly showing in the outcrops, and the green stains of vanadium are extremely common. In at least three instances solid galena can be seen outcropping for a width of from three to five feet, and in one instance this mineral was traceable for 500 feet almost without a break. In this case, however, the vein was narrow—six to 15 inches. The general impression, however, is that the galena will be found to occur in lenses similar to the habit it has in the Northampton lead belt.

Though carbonate ore is sometimes found in the outcrops, it is not so common in occurrence as the galena.

Green stains of vanadium are extremely common, and at times the vanadates of lead or copper and lead may be seen in the surface outcrops.

With reference to vanadium oxidised ores the accepted theory is that they are formed by the reaction of solutions containing traces of vanadium with lead or copper ores, the reaction resulting in a vanadate of lead or copper or both. As this action would take place in the upper zones, it is unusual to find vanadium ores extending to any great depth below the level of ground water.

The principal vanadium ores found in the Braeside area are vanadinite and mottramite, the former being a vanadate of lead, the latter a vanadate of lead

and copper. In neither mineral, even when pure, does the percentage of vanadium pentoxide exceed twenty. The greatest quantity of vanadium ore which has been exposed at Braeside is on the walls of a lead vein, in one of the lodes at Vanadium Gully. Here the vanadates are found between the walls of the galena and the country. The greatest width was not more than eight to 10 inches, and included a considerable quantity of gangue.

With reference to the copper deposits, these so far have only been worked in trenches along the outcrops where rich ore was easily obtained. They are closely associated with the lead lodes, and are frequently found in the same ore channels, and occasionally intermixed in the same lode.

Green carbonate is the prevailing copper mineral, though a little blue carbonate is sometimes seen, and rarely chalcocite. A little black oxide also occurs, but is inconsiderable.

What has been written with reference to the occurrence of the lead ores also applies to the copper, except that the latter are apparently not so persistent. There is little doubt, however, that the ore occurs in lenses the length and width of which can only be ascertained by systematic development.

So far none of the lead or copper ores which have been analysed by the Department have yielded any important amount of silver or gold. Traces of gold are sometimes present, and silver, though persistently found in the lead mineral, has not been in quantities exceeding nine ounces to the ton.

Zinc sulphide (zinc blende) sometimes occurs as an impurity in some of the galena ore, but is in such small quantity as to be negligible either as an ore or an impurity.

Manganese ore is fairly abundant in the sediments forming the western flank, but before anything definite can be said as to quantity or grade, considerable time would have to be spent mapping these deposits, which are scattered over a large area. Though probably worthless on their own account, under existing conditions there is sufficient reason for taking stock in the event of the consideration of the establishment of cheaper transport for other purposes.

Timber.—In the immediate vicinity of the lodes examined there is rather a scarcity of good mining timber. A limited amount would no doubt be obtained on the spot, but the main supply would be cut near the roads to the railway, and carted to the mines as back loading.

Water.—At the time of my visit the country was suffering from an unprecedented drought. Under normal conditions there should be good water for most of the year in the rockholes and watercourses. Water can also be found by boring to a depth of some 40 feet to strike the limestones on the dip. By following this practice Mr. Barker has already obtained a good supply in two bores of very good drinking water. Under normal conditions there should be no trouble with regard to a domestic supply of fresh water. For large supplies of mining water there should be an abundance in the vicinity of the Oakover, which is no great distance to the west of the belt.

Descriptions of the Individual Lodes.—When reading the following descriptions it must be borne in mind that very little development has been done, so the lodes are really in their virgin state. Information of actual widths and values is at present unobtainable. Fortunately most of the lodes occur on the

higher ground, which make their outcrops more easily traceable. Even then the position is most unsatisfactory for forming anything like an accurate estimate of the possibilities of the field, and until some prospecting is done to open up the deposits below the surface it will be impossible to form any reliable estimate of the intrinsic value or extent of the ore bodies. In the following pages the characteristics of each ore body will be described as they present themselves in the field and deductions drawn from the data thus obtained in a generalisation of the whole.

Starting from Barramine Homestead the first lodes visited were two small copper deposits in a valley some two miles to the south-west. The most northern of these showed a small vein not more than one to one and a-half feet in thickness, which had been worked in an underlay shaft to a vertical depth of about 10 feet. The country rock is foliated greenstone. Some two to three tons of ore had been mined from the shaft, and were lying on the surface. A sample from the heap gave a return of 5.77 per cent. copper, silver 1 dwt. 2grs. per ton.

Half a mile south of this vein another shaft had been sunk on a shear zone, showing copper ore to a depth of about 12 feet in similar country to the first. A sample taken across a width of four feet six inches gave a return of 25.32 per cent. of copper, lead trace, silver 8ozs. 17dwts. 21grs. per ton.

There are no surface signs of the permanency of these two veins, and until further developed it is impossible to say what the size or value is other than can be drawn from the results of the two samples, which are distinctly favourable for further prospecting.

Seven miles from Barramine Homestead on a bearing of 140° there is a very conspicuous landmark known as the Camel Hump. This hill, which has no very great individual height but stands on high ground, consists of a silky schist very much like the country rock of the Whim Well Copper Mine. The rock contains a small percentage of green copper carbonate, which leaches to the exposed surfaces colouring them green. When the surface is broken fresh the copper is not visible to the naked eye. It would be quite worth while, however, to try and locate a continuance of this belt of country north and south, for if it is similar to the Whim Creek rock it should well be worth further investigation. One mile south-west from the Camel Hump a small lead vein was visited, which had been worked some years ago, but has since been abandoned. The outcrop has been trenched for a distance of 50 feet for a width of from one and a-half to two feet, which is apparently the width of the lode. There is also a shallow shaft sunk on the lode, but this is at present inaccessible. Fragments of lead and copper carbonates were frequent on the sides of the trench, and there was a small heap of hand-picked ore left behind. The picked ore had been shipped abroad, but returns not known. The strike of the lode is 319° . The country rock is grey weathered greenstone.

Quite a long well-defined lead-bearing lode lies half a mile south 14° west from No. 1 water bore. The lode apparently consists of two quartz bands with galena veins running between. The width of the combination is from 20 feet to 30 feet. Galena can be seen freely in the outcrops for a distance of at least 600 feet. The lode strikes north 20° west with a

slight dip to the west. The country rock is much weathered foliated greenstone. In the western lead vein a shallow costean shows a width of five feet of solid fine-grained galena, but has only been exposed for a limited length. The central portion of the lode is more oxidised, and the outcrop is now a more or less typical gossan, though galena is also visible every here and there. Traces of galena are also found further to the east, but there is too much detrital rock to follow any distinct run of ore. An indistinct outcrop of this line of lode can be traced considerable distances further north and south.

A sample of the galena in the costean in the west lode broken over five feet yielded 43.13 per cent. lead with 1oz. 4dwts. 4grs. silver per ton. A grab sample of the central portion of the outcrop was also tested, and yielded lead 10.10 per cent., copper 1.21 per cent., silver 16dwts. 18grs. per ton.

Gossan Hill.—Gossan Hill is the northern extremity of a conspicuous razor-back ridge lying three miles west by north from Koongalin Hill. The main ridge only extends for about half a mile before it is broken by a watercourse, but continues in a succession of smaller ridges many miles southward. The crest of the ridge consists of two quartz reefs in a gossan lode formation. The quartz reefs are persistent for about half a mile, when the lode splits, one branch continuing on the true course, the other turning slightly to the east.

A shaft has been sunk to a depth of 20 feet on the northern end of the ridge. A section shown in the shaft shows the formation to consist of oxidised lode material intermixed with jasper veins and a large percentage of quartz. Unfortunately there is no crosscutting in the shaft, so the width of the lode is not exposed. The dip of the lode is slightly to the east, with a general strike of 152° .

A sample broken across the wall of the shaft near the bottom yielded gold trace, silver trace, lead .50 per cent., copper .19 per cent. per ton.

In a gully, Koongalin Creek, which lies at the base of the northern slope, galena shows up in the outcrop. Galena and stains of vanadates are also fairly common in the southern portions of the main lodes, some three-quarters of a mile south of the shaft.

The western leg of the lode does not outcrop so boldly as the main portion, but is very persistent. Following it down for the first six miles from where the lode split, traces of galena, lead carbonates, vanadate, and copper stains were frequently observed in the outcrop; at a point one mile south of shaft a grab sample gave gold trace, silver 9ozs. 17grs., lead 17.24 per cent., copper .79 per cent. Seven miles south a sight back to Gossan Hill read 336° , which showed how regular the strike must be. Eight miles south of the shaft galena was observed outcropping almost solidly over a width of four feet six inches. There is quite a nice patch of galena showing here in a shallow costean. As this galena had been assayed previously and given a high return of lead no sample was taken.

The lode continues some considerable distance further to the south from this point, but was not traversed. Summing up the main features of the Gossan Hill lode, one is impressed with the following facts:—

1. The length and persistence of the ore channel, which cannot be other than a true earth fissure.

2. The width.
3. The persistent appearance of traces of galena and oxidised lead minerals.
4. The oxidised nature of the outcrops gives favourable indications for an extensive ore deposit.

On the other hand there is a preponderance of barren quartz reef at the surface which may have an important bearing on the deposition of the lead minerals if persistent at depth. The deposit taken as a whole looks too promising to pass by, and were it not for the location would certainly have been exploited long ago. I would certainly recommend an advance to any prospecting party who would sink shafts to the sulphide zone, and develop the lode in one or two places at or about such a depth.

Ragged Hill.—Ragged Hill is a high point on the southern end of a ridge lying a little to the north of Wandy Wandy Creek, as marked on the accompanying map. The crest of this ridge is a well defined quartz gossan lode striking north-west (152°) through mineral leases 63, 64, and 65, and south-east past the east side of Mount Sydney. I traversed the lode from Wandy Wandy Creek to some three miles north of the three leases. On the crest of Ragged Hill a shaft has been sunk by the prospectors to a depth of 40 feet on a slight underlay to the east. The foot-wall is a very weathered greenstone. No hanging wall was exposed. At the bottom of the shaft five feet of the lode was exposed. At this spot the lode consists of sintery quartz and oxidised lode material, but is too leached to be likely to contain high metallic contents. This shaft should be sunk to the sulphide zone and one or two crosscuts made to the east to ascertain the width and value of the lode. A sample broken across the side at the bottom of the shaft gave the following result:—Gold trace, silver 1oz. 1dwt. 19grs., lead 13.65 per cent., copper nil. On the dump taken from the shaft lead carbonates are fairly plentiful. A nice lens of galena with a maximum width of five feet outcrops 100 feet south of the shaft. Galena in smaller quantity is also visible fairly frequently in the outcrop over some distance, but has not been opened up. A sample across the widest portion of the galena, five feet, gave 60.34 per cent. lead, silver 9ozs. 17dwts. 18grs. per ton with a trace of gold.

Following the lode north from the shaft another sample was taken of a galena outcrop, but only to ascertain whether the latter contained appreciable amounts of silver. The result of this assay was 83.54 per cent. lead, copper and gold traces, silver 9ozs. 10dwts. 18grs. Owing to the broken nature of the outcrop it was not possible to break reliable samples, and in any case such would be worthless unless they were broken out from well below the surface.

A small copper-bearing lens has been worked at the surface some 800 yards north of the shaft, from which three tons of hand-picked ore still remain bagged at the dump. A grab sample of the bagged ore gave a return of 18.98 per cent. copper, 31 per cent. lead, 16dwts. 18grs. silver per ton, with a trace of gold. This lens does not appear to be of any great length, but in one place is at least five feet wide. Until further developed it is not possible to form any definite opinion of either the value or size of this occurrence. In the north end of the lens the presence of carbonates of lead show that the

copper is probably giving place to the latter. From this lens north, though the main lode was persistent, there were no conspicuous outcrops of either lead or copper minerals, until a spot was reached about three miles north of the Ragged Hill shaft. Here the lode has been opened out with a shallow costean showing five feet of mixed quartz and lode stuff, and a vein of solid galena 15 inches thick on the east side. Evidences of vanadates are also fairly frequent in this portion of the lode. A sample of the galena was taken for silver contents, and gave a return of 85.34 per cent. lead, 1oz. 7dwts. silver to the ton with a trace of gold, but no copper.

Mineral Leases 63, 64, and 65.—There is little doubt that the Ragged Hill lode passes through these leases, although the strike has varied from 152° to 145° . A little development has been done on one of the leases by means of a costean cut through the lode to a depth of 12 feet, and a shaft on the east side of the lode which, however, was abandoned before the lode was cut in the shaft or a crosscut. In the costean the lode is about six feet wide, but is very siliceous, and shows only small veins of galena and patches of carbonates of lead.

On the west side of the lode a vein about four to six inches in width contains appreciable quantities of vanadate of lead and copper.

The country rock is sheared greenstone. The lode extends for some miles to the north of the leases, but no prospecting has been done in this direction. As will be seen in the attached photographs Nos. 1 and 2, a splendid view of the lode can be seen from the line on which the costean has been cut, the well-defined outcrop showing up for miles to the north and south.

With regard to the possibilities of this line of lode becoming a lead ore producer, so little work has been done that at present it is impossible to do more than generalise. The main features are the same as exist in the gossan lode, viz.:—length with scattered values in the outcrops. There is no doubt that the lode deserves attention, and should at least be exploited below the oxidised zone to ascertain values and widths.

From Moxon's Camp three distinct lines of lode were inspected. In each case these lodes are the typical varieties, viz.:—quartz reefs with which are associated the lead and copper minerals.

The first of these lodes lies approximately two miles south of the camp. The outcrop, which can be traced for a mile or more, shows a fair amount of lead and copper carbonates at the surface.

The strike is north-west with a slight underlay to the south-west. Where the best metallic values occur the lode has a width of three feet, but in several places is apparently much wider. No prospecting has been done on this line with the exception of a few pieces broken from the outcrop.

At a distance of about one and a-half miles up the creek from the camp a lead lode is seen outcropping across the watercourse. When followed east a short distance the lode branches, the strike of one arm being east 17° south, the second east 55° south.

Both these lodes are more or less narrow siliceous veins carrying lead and copper ores with a fair amount of vanadates and a small amount of zinc sulphide. A little work has been done to open out the lodes below the surface. One hole which is down some eight feet shows a galena vein some 12 to 15

inches wide, with vanadate of lead and copper on each side. The width of the vanadium ore is about four inches on one side and six inches on the other.

An assay of a picked sample forwarded to the Department from this spot by Mr. Swan yielded 16 per cent. V_2O_5 , 11 per cent. copper and 34 per cent. lead.

There is no doubt that vanadium ores occur here in some quantity, but not sufficient to offer much encouragement to the prospector with the present market price for V_2O_5 , unless the ore can be mined in conjunction with lead ore. Unfortunately the lead-veins appear to be small in this locality. They are really cross veins and not on a parallel with the main fissures of the district. On the other hand there is an increasing demand for vanadium ores, and if the price advanced materially these lodes might be well worth further development.

Four and a-half miles east by north of the camp there is a long line of outcrop carrying galena. The strike of this lode is north 15° west. An almost unbroken vein of galena, six to 18 inches wide, can be traced for a distance of 500 feet. Though very persistent the lode is narrow, and does not offer on surface evidence the same possibilities as the Gossan Hill or Ragged Hill lines. There is little doubt that it is a parallel line to the Gossan Hill lode, and as the country rock is foliated greenstone it is well worth prospecting for lead ore. A sample broken out of the vein referred to above yielded silver 6ozs. 3dwts. 9grs., lead 83.26 per cent., copper nil, per ton. No prospecting has been done on this line.

Manganese.—On the western flank considerable quantities of manganese and iron ores are found outcropping from or capping the sediments. Such lodes no doubt extend from Barramine to Braeside, and the prospectors assure me they may be found still further south on the same strike. I had the opportunity of seeing two of these lodes, and examined one on Vanadium Creek closely. In this instance the manganese was too intimately associated with the iron ore to be of much commercial value.

	%
Metallic Mn	43.49
Ferric Oxide	21.67
Equal to metallic iron ...	15.17

A closer investigation of all the deposits might, however, disclose some of much higher grade which, though of no market value at present, would still remain as an asset for the future. In the deposit examined on Vanadium Creek the manganese occurs (associated with iron ore) at the top of a quartzite bed which overlies one of the limestone beds. The origin of the mineral is not quite clear, but it has the appearance of being of lateritic origin, and derived from the quartzite. Certainly at the base of the deposit both the iron and manganese are very siliceous and seem to merge into the quartzite. The sample broken was picked, and would not represent a very large tonnage of even that grade.

TRANSPORT AND REALISATION CHARGES ON LEAD ORES OR CONCENTRATES.

If ore or concentrates were sent from the Braeside belt they would be first transported to Coongan Siding on the Marble Bar-Port Hedland railway. In the event of the shipment being sent to

Perth for realisation the charges from Coongan would be—

	£	s.	d.
Railway, wharfage and freight to Fremantle by Government boats	3	10	0
Assay charges, wharfages, etc., Fremantle	0	14	0
Realisation charges less 6 per cent of lead contents	5	10	0
	<hr/>		
	£9	14	0

In addition mining, bagging, and transport from the mine to Coongan must be added. Mr. Swan assured me he had a quote of 1s. 3d. per mile per motor tractor, and as the average distance would be about 110 to 120 miles, the cartage to the railway would amount to £7 10s. per ton. Bagging should not cost more than £1 per ton, making a grand total of £18 4s. less mining costs.

If the concentrate could be picked to average 76 per cent. lead, with lead at £35 per ton, the value would be £24 5s. per ton, leaving a balance of £6 per ton for mining and profits.

On 66 per cent. ore the margin would be £2 16s. with lead at the same price.

The charge which is the most difficult to cope with is the transport (£7 10s.) from the mine to the siding, and it is evident if lead were to drop to under £30 a ton the position would be hopeless for the small prospector unless this charge were reduced, the profit on 76 per cent. ore with lead at £30 being only £2 16s., and on 66 per cent. ore a loss of 4s., not including mining costs.

Unfortunately, though silver would bring in a little further revenue, in some cases the assays show that the silver contents are too variable to be seriously considered.

Summary.—Summing up the possibilities of the Braeside area as a mineral belt, my conclusions are:—

1. *Lodes.*—That there are several well-defined lead, silver, copper, and vanadium-bearing lodes, which show great persistence as regards length, some of the outcrops being continuous for several miles. Little, however, can be gathered as to what the average size of these ore channels will be except that in places there are surface indications that they will be of fair width when opened below the surface.

The outcrops are for the most part oxidised and leached, though there are instances where very high grade galena (up to 85 per cent. lead) outcrops for considerable distances at the surface. Associated with the lead ores are high-grade copper ores and vanadates of lead and copper combined. The possibilities of obtaining payable copper ore are quite promising, but there is no direct evidence as to what the quantity is likely to be. On the other hand if the surface indications be compared with other localities where similar lodes have been worked, it is quite within the limits of probability that considerable quantities of payable copper ore may be eventually recovered.

With regard to the vanadium ores, there are two minerals, mottramite and vanadanite, which contain from 17 to 19 per cent. of vanadium

pentoxide when pure. The latest quote for V_2O_5 is 1s. 10d. per lb. f.o.b., New York, equivalent to £35 16s. per ton of 15 per cent. ore, which is as high a grade ore as could be reasonably expected in bulk.

If there were any appreciable quantity this grade and price would pay quite well, and if the vanadium ore is found when mining for lead it should be kept separate. The prospects for mining vanadium ores do not present much encouragement on the present showing, but may easily improve, and these ores prove to be of commercial value in conjunction with lead and copper.

2. *Transport and Realisation Costs.*—The natural course to ship ore would be to forward by most suitable transport to Coongan Railway Siding. This charge is uncertain, though it is asserted by the prospectors as being under £7 10s. per ton. In addition railway charges to Port Hedland and shipping freights to Fremantle amount to £3 10s., with assay sampling at Fremantle 14s., and realisation £5 10s., with a 6 per cent. deduction of lead contents. These do not include bagging and mining.

It has not been proved to date what a parcel of lead ore can be dressed to, but as several parcels of galena have yielded 83 to 86 per cent. lead it should be quite possible to obtain limited parcels of 76 per cent. lead. With lead at £35 a ton after deducting the foregoing charges a profit of £6, less mining costs, per ton would be left on ore of this grade. On 76 per cent. lead ore the profit, less mining, would be £2 16s. calculated on the same basis.

Taking only what can be seen at the surface as a basis, the Braeside mineral belt appears to offer quite reasonable chances as a mineral producer, the great objection being its isolation, and hence abnormal cost of transport. Were the field closer in to the coast there is no doubt that it would receive quite a considerable amount of attention.

Timber.—Though timber is not plentiful, there would not be any serious trouble to obtain mining timber at a reasonable cost as back loading on the return transport from Coongan. The supply in the vicinity of the mines would be sufficient until such a stage of advancement was reached.

Water.—For domestic use in normal seasons there is ample. Further extensive supplies could be obtained either from Oakover River or by sinking wells on the river flats.

Recommendations.—Bearing in mind that there is a possibility of the Braeside area developing at some future date into a mining field which may warrant the installation of some cheaper means of transport to the coast, and realising that such a state of affairs will not eventuate until such time as some of the existing lines of lodes are opened up at depth, a state of affairs which can only be brought about by encouraging prospecting, I advocate that the following steps be taken:—

1. That a thorough detailed survey be made from Barramine on the north-southward to connect to Mr. Talbot's maps, which cover the area 20 miles south of Mount Sydney, *e.g.*, Bulletin 83. This work should be commenced about the end of March and terminate not later than the middle of November, *i.e.*, after the heavy rains and before the excessive heat sets in.

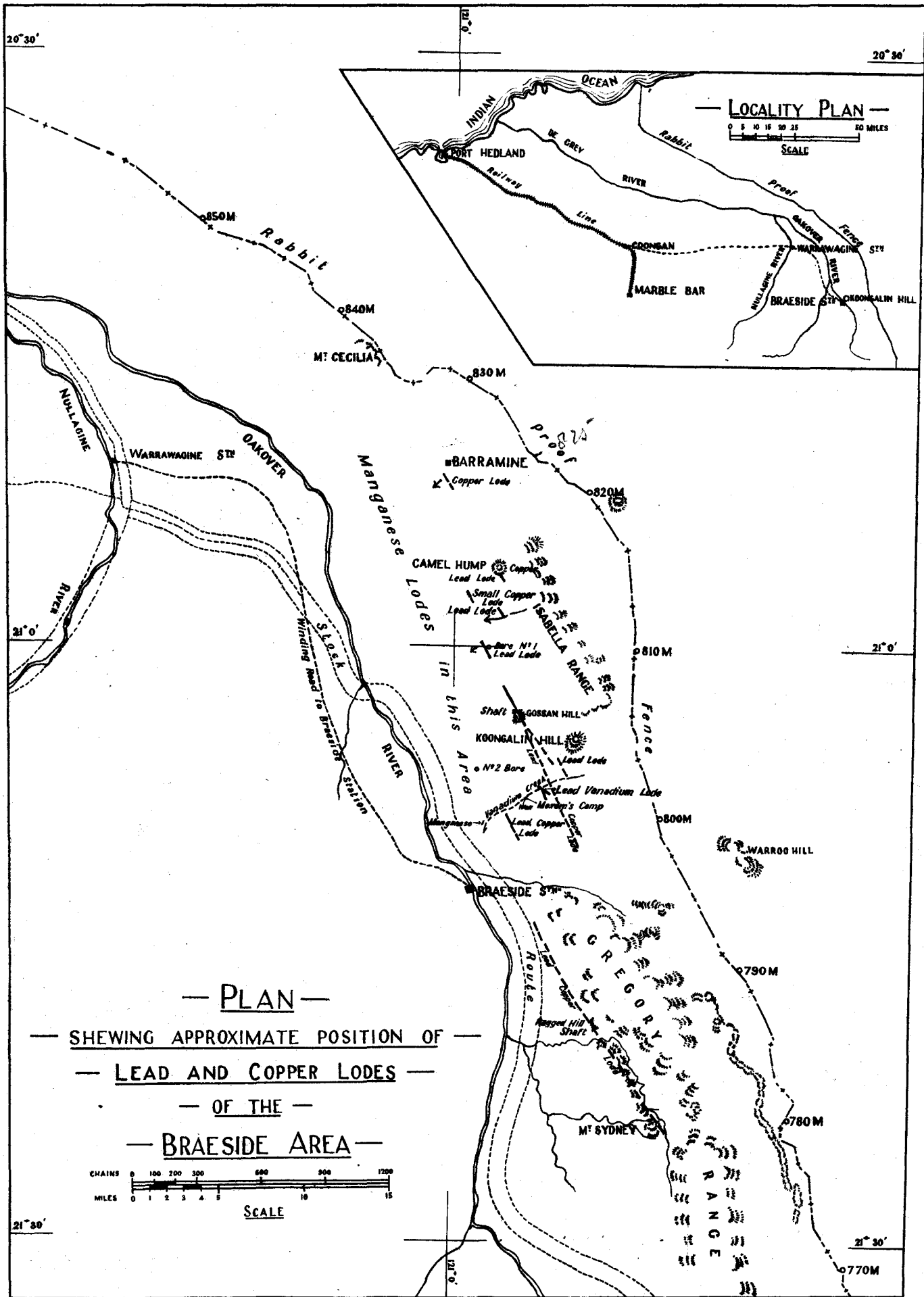
2. That the prospectors be allowed an advance of £ for £ to sink shafts, particularly on the Gossan Hill and Ragged Hill lodes to the sulphide zone, also further advances be made to crosscut and drive to prove the width and values.

Further that a special subsidy be allowed for the shipment of the first 200 tons of lead ore on the same lines as is being done on the gold-fields for ore not easily accessible to a crushing plant.

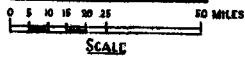
T. BLATCHFORD,

Assistant State Mining Engineer.

18th November, 1924.



— LOCALITY PLAN —



— PLAN —

— SHEWING APPROXIMATE POSITION OF —

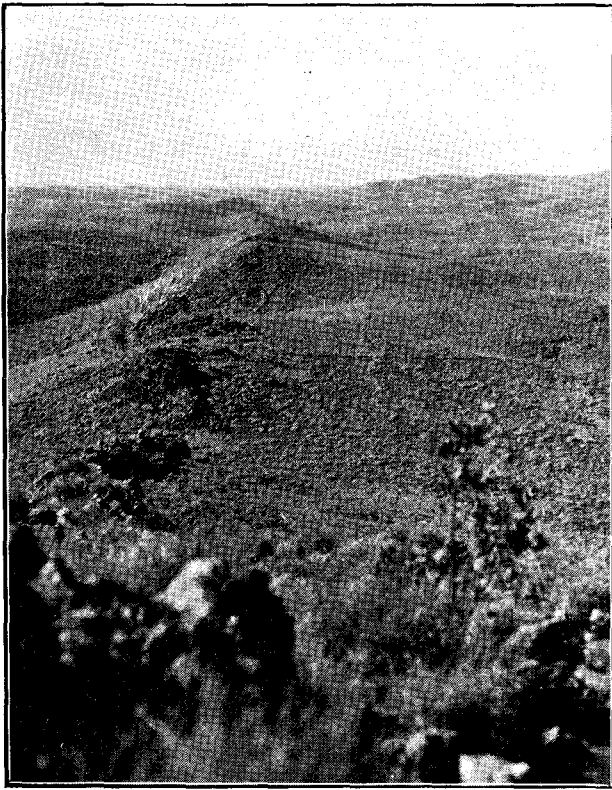
— LEAD AND COPPER LODES —

— OF THE —

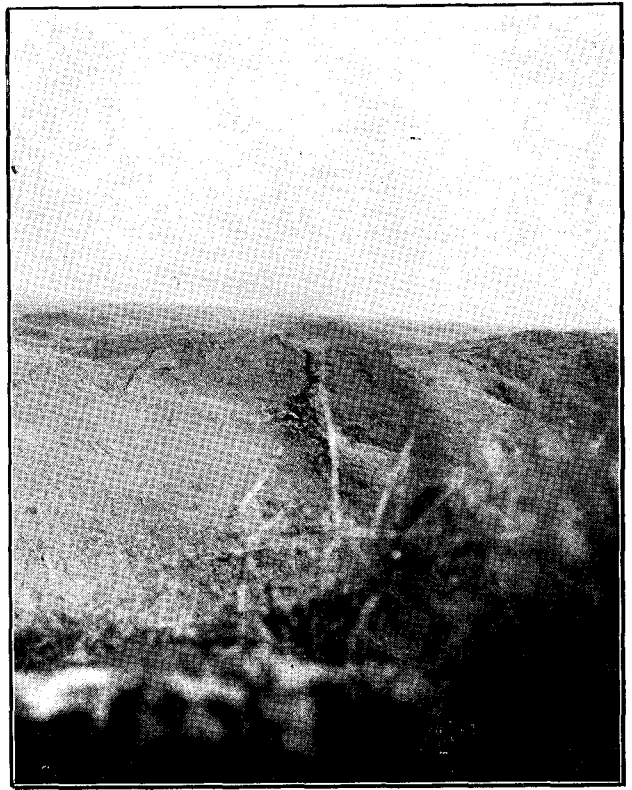
— BRAESIDE AREA —



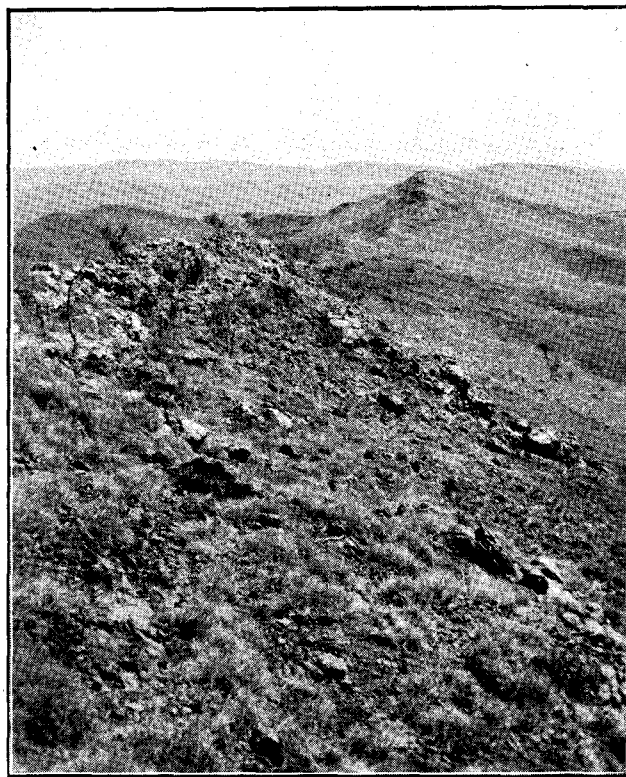
SCALE



Ragged Hill lode, viewed from Lease 64, looking South to Mount Sydney.



Ragged Hill lode viewed from Lease 64, looking North.



Gossan Hill lode.

COOBINA CHROMITE DEPOSITS.

On my way to Marble Bar I was able to make arrangements with the motor proprietor to stop for a few hours to examine the chromite deposits in a small range of hills some four miles south of Well 43. This range is the eastern extremity of a belt of country described by Mr. Talbot (Bulletin 83, pages 109, 155, 192) as the Coobina belt. According to Mr. Talbot the belt extends from Skeleton Creek westward along the southern flank of the Ophthalmia Range. The rocks consist mainly of highly altered dolerites invaded by more recent dolerites. The width of the belt is 10 miles. At the east end he describes a narrow belt of serpentine rock. The chromite occurs in this serpentine belt. Whether there is more serpentine in the Coobina belt I am unable to state positively, but Mr. Talbot has marked one other patch on the main belt, which will probably prove to be of a serpentinous character.

The chromite occurs in narrow parallel veins traversing the serpentine in a north-west-south-east direction. They may be followed right across the belt, which is from three-quarters to a mile wide. The outcrops are very conspicuous, and at first sight resemble black basic dykes. I passed over at least six of these chromite veins, which lie about half-a-mile apart. In addition to the main veins there are numerous smaller veins, the whole formation forming a rough network.

It is difficult to estimate the width of the veins with the exception of one section in a narrow gorge. Here there are four distinct massive chromite veins lying close together, and averaging from three to six feet solid. The other veins will probably average about the same, *i.e.*, from three to six feet.

As this section is some 40 to 50 feet below the outcrops on the flanks of the gorge, there is little doubt that the veins will be persistent for a considerable depth. This being the case there seems to be every possibility that a large tonnage of chromite ore exists in this belt. In addition to the solid ore there is quite a large quantity of fine ore in the serpentine walls which could be easily recovered by concentration. Four samples were broken from some of the major veins, the analysis of which show rather a pronounced uniformity in Cr_2O_3 . Unfortunately the grade is slightly below 48 per cent., which is the standard required for a source of chromium or ferro chrome.

For a refractory the mineral would be of some use, but the price is not sufficient to warrant working the deposits at present. However the chrome ore of Coobina, though not a payable proposition at present, will at some time in the future no doubt prove to be a realisable asset.

T. BLATCHFORD,
Assistant State Mining Engineer.

19th November, 1924.

Government Chemical Laboratory,
Wellington Street, Perth
10th November, 1924.

REPORT ON 13 SAMPLES FOR MR. T. BLATCHFORD, ASSISTANT STATE MINING ENGINEER.

Reg. No.	LOCALITY— BRAESIDE Mark.	Result of Assay.
2608/24	No. 1	Basalt with siderite (carbonate of iron), calcite (carbonate of calcium), magnesite (carbonate of magnesium), malachite (carbonate of copper), and iron hydrates. Gold, trace (under 5 grains per ton). Silver 1 dwt. 2 grains per ton. Lead, nil. Copper, 5.77 per cent.
2609	No. 2	Kaolin, malachite, quartz, chalcocite (sulphide of copper), iron hydrates, calcite, magnesite, and azurite (carbonate of copper). Gold, trace; Silver, 8 ozs. 17dwts. 21 grs. per ton. Copper, 25.32 per cent.; Lead, trace.
2610	No. 3	Galena, anglesite (sulphate of lead), quartz, cerussite (carbonate of lead), and iron hydrates. Gold, trace; Silver, 1 oz. 4 dwts. 4 grs. per ton. Lead, 43.13 per cent.; Copper, nil.
2611	No. 4	Quartz, galena, iron hydrates, cerussite, anglesite, malachite and pyrite. Gold, trace; Silver, 16 dwts. 18 grs. per ton. Lead, 10.10 per cent.; Copper, 1.21 per cent.
2612	No. 5	Quartz, limonite, cerussite, manganese oxide and malachite. Gold, trace; Silver, trace. Lead, .50 per cent.; Copper, .19 per cent.
2613	No. 6	Altered basalt and schist with cerussite, quartz, anglesite, iron hydrates, malachite, siderite, calcite, magnesite, manganese oxide. Gold, trace; Silver, 9 dwts. 17 grs. per ton. Lead, 17.24 per cent.; Copper, .79 per cent.
2614	No. 7	Galena, quartz, anglesite, cerussite, iron hydrates. Gold, trace; Silver, 9 ozs. 17 dwts. 18 grs. per ton. Lead, 60.34 per cent.; Copper, nil.
2615	No. 8	Quartz, iron hydrates, cerussite, anglesite, manganese oxide, galena. Gold, trace; Silver, 1 oz. 1 dwt. 19 grs. per ton. Lead, 13.65 per cent.; Copper, nil.
2616	No. 9	Galena, cerussite, anglesite, kaolin, iron hydrates, quartz, chalcopyrite and covellite in small quantities. Gold, trace; Silver, 9 ozs. 10 dwts. 18 grs. per ton. Lead, 83.54 per cent.; Copper, trace.
2617	No. 10	Quartz, malachite, iron hydrates, cerussite. Gold, trace; Silver, 16 dwts. 18 grs. per ton. Copper 18.98 per cent.; Lead .31 per cent.
2618	No. 11	Galena, quartz, kaolin, cerussite, anglesite, iron hydrates. Gold, trace; Silver, 1 oz. 7 dwts. 0 grs. per ton. Lead, 85.84 per cent.; Copper, nil.
2619	No. 12	Manganite, pyrolusite, iron hydrates and quartz. Manganese dioxide, MnO_2 , 64.22 per cent. Manganese monoxide, MnO 3.76 per cent. equal to Metallic Manganese, Mn, 43.49 per cent. Ferric Oxide, Fe_2O_3 , 21.67 per cent. equal to Metallic iron, Fe 15.17 per cent.
2620	No. 13	Galena, quartz, cerussite, anglesite, iron hydrates, kaolin. Gold, trace; Silver, 6 ozs. 3 dwts. 9 grs. per ton. Lead, 83.26 per cent.; Copper, nil.

These samples contain no appreciable amount of vanadium.

(Sgd.) Edward S. Simpson,
Government Mineralogist and Analyst.

Government Chemical Laboratory,
Wellington Street, Perth,
12th November, 1924.

T. Blatchford, Esq.,
Assistant State Mining Engineer, Perth.

CHROMITE, MURRAMUNDA (4 miles South of Well 43)

The assays made of your four samples of Chromite from Murrumunda disclose the following proportions of chromium sesquioxide.

L.2604	...	No. 1	Cr_2O_3	%	Chromite	%
				44.74	(calculated)	82.7
2605	...	2	"	46.53	"	86.0
2606	...	3	"	43.85	"	81.0
2607	...	4	"	42.58	"	78.7

Pure chromite of iron, $FeO \cdot Cr_2O_3$ contains 68 per cent. of Cr_2O_3 , but the natural mineral seldom goes beyond 58 per cent. because of the constant replacement of some Cr_2O_3 by Al_2O_3 .

Chromite has two main uses—(1) a source of chromium compounds including ferro-chrome, (2) a refractory.

For the first use its Cr_2O_3 content determines absolutely its value, and ore under about 48 per cent Cr_2O_3 is not acceptable

rather the purity of the mineral from contamination with easily fusible silicates, etc. From the figures of a complete analysis made of the Murrumunda mineral, the above tabulated percentages of chromite in your sample have been calculated. In each instance the main gangue is serpentine.

McDowell and Robertson in a recent paper on chrome refractories say that ores high in Cr_2O_3 are not generally used for this purpose, two ores largely used in the U.S.A. containing respectively 41 and 46 per cent Cr_2O_3 . During war time ores as low as 25 per cent. were sold, and large tonnages of Rhodesian ore assaying 42 to 51 per cent. Cr_2O_3 were disposed of at an average price of £4 10s. per ton.

I understand that at present New Caledonian ore averaging 50 to 56 per cent. Cr_2O_3 is purchasable in Sydney at £4 per ton.

(Signed) EDWARD S. SIMPSON,
Government Mineralogist and Analyst.

APPENDIX No. 23.

The Wilga Coalfield.

Mines Department,
Perth, 30th October, 1924.

The Under Secretary for Mines.

Sir,

In accordance with the instructions that a general report be made on the Wilga Coalfield, giving a summary of the results obtained in proving the coal there, and the prospects of the locality from a coal-mining point of view, I have the honour to submit the following:—

The patch of coal-bearing country forming the Wilga field lies about 20 miles S.S.E. from the town of Collie, and is manifestly part of the same coal-bearing formation as the Collie field. The two areas of coal-bearing ground are, however, separated by a belt of granite about 10 miles wide at the narrowest place between the two fields. From the Cardiff colliery in the southern part of the Collie field to No. 3 deep bore at Wilga is about 14½ miles, and the same bore is about five miles N.E. from the Wilga siding on the Donnybrook-Katanning railway. Connection of the proved part of the Wilga field with the railway might, perhaps, be obtained with a slightly shorter distance than to Wilga siding at a point about three miles from the latter towards Donnybrook. The boundaries of the Wilga field have not yet been exactly determined, but the patch of coal-measures country appears to be of a roughly oval shape, nearly 10 miles long and up to five miles wide, with its long axis running north-westerly parallel with the Collie River and Preston River valleys at this portion of their course. The Katanning-Donnybrook railway runs in the Preston River valley close alongside the western side of the coal area. The area of coal-measures ground is probably about 24 square miles, but it has not been proved yet whether coal exists throughout the whole area. The working tests have been confined up to the present to less than two square miles on the eastern side, close to the Collie River. The coal area lies between the heads of the Preston and Collie River basins on fairly flat ground, over which railway and road construction should be easy.

The most complete report on the Wilga coalfield as yet published is that of Mr. R. C. Wilson, B.Sc., B.E., in the Annual Report of the Department of Mines for 1921, which has been added to in that for 1923, now on the point of being issued. These reports contain plans showing the relation of the Collie and Wilga fields to one another, and the railway system and ports, and of the bores which have been put down, with sections of O'Grady's shaft, and of the field as shown by the borings. The detailed section of the bores and analyses of the coal from them are also given, and it is unnecessary, therefore, to repeat these details in the present report, so only a summary of the results will be given. The general description of the coal deposits of Western Australia, given by the Government Geologist in Chapter II. of "The Mining Handbook, 1919," should be referred to for comparison of the Collie field with that at Wilga,

and also with the Irwin River coal deposits, and there is a more condensed but more recent synopsis of the coals of Western Australia, with comparative analyses, in the folder on the Mineral Resources of Western Australia, published for the British Empire Exhibition, 1924.

Mr. Wilson's latest plans and sections, now on the point of being published with the Annual Report of the Department of Mines for 1923, show the boring work which has been done in deep bores Nos. 3 and 4, and in the two lines of hand bores put out from No. 3 bore to cut the various seams at shallow depth close to their respective outcrops. This shallow boring was very successful in locating near surface the seams which were cut in the deep bores, and the regularity with which these seams were met with where expected is very satisfactory, as showing the probable absence of any considerable faults in the part of the field actually proved by Nos. 3 and 4 deep bores and the hand bores. It is known, however, that there is a large fault at O'Grady's shaft, and there must also be one or more between Nos. 1 and 2 deep bores, but in the portion of the field tested by Nos. 3 and 4 deep bores and the hand bores the close correspondence in position of the seams does not appear to be compatible with any serious amount of faulting, and the part proved by these bores gives a fairly large area of probably undisturbed coal. From a working standpoint this is a very considerable advantage. It will be seen later on, however, that strong faulting must be anticipated to the east of No. 1 deep bore.

The borings have shown that the strike of the seams is nearly due north and south, and dip west about 1 in 6.

The corresponding seams are mostly thicker in No. 4 deep bore than in No. 3, which would seem to indicate an increase in the size of the seams going north-westward, which should encourage prospecting in that direction. The bores have been kept towards the east edge of the coal area to try to locate the seams near their outcrops, but it is seen from the plan of the coal area given in 1923 report by Mr. Wilson that the main area lies to the west, to the dip of the coal, and if the dip should continue at 1 in 6 the depth of the seams would soon be considerable. One in 6 gives a dip of 880 feet per mile, and the area extends over 4½ miles west of No. 4 bore. This makes it quite possible that seams corresponding with the Collieburn and Cardiff groups of seams in the Collie field may occur at Wilga also, towards the western side of the area. The Wilga seams already found lie upon the marine beds at the base of the series, and therefore correspond with the lowest group of the Collie seams, and there is therefore a possibility that the higher groups may also be found at Wilga at their corresponding higher horizon. The

succession of the seams at Collie is well shown in Fig. b of the article on Coal in the above-mentioned "Mining Handbook."

O'Grady's discovery shaft (his No. 8) in the north-east part of M.L. 229H was described in Mr. Blatchford's reports of December, 1918, and August, 1919, quoted in Mr. Wilson's published paper in Annual Report of the Mines Department, 1921. This shaft, after passing through a 5 feet seam of coal at 55 feet and one of 4 feet thickness at 85 feet, dipping westerly at high angles up to 70°, cut coal in the bottom of the shaft at 105 feet, and on cross-cutting eastward found a strong fault, striking N. 10° W. and dipping 70° westerly, on which fragments of another seam were turned up against the fault plane. It was then evident that the high dip of the strata in the shaft was due to their being bent up against the fault. On the east side of the fault were two small seams of coal dipping westerly about 8°, which seem to have about the normal strike and dip of the coal-bearing strata. These little seams probably correspond to one or other of the small seams below 390 feet in No. 2 deep bore, and the fault must have a downthrow at the shaft of probably from 30 to 50 feet. It is not yet possible to correlate the seams in the shaft exactly with those in the bore, which would enable the downthrow to be established pretty closely.

The No. 1 deep bore put down by the Government to test the field was 1,100 yards S. of W. from O'Grady's shaft, in the N.E. portion of what is now M.L. 311H. This bore struck a seam of coal, 18 inches thick, at 47 feet, and from 47 to 186 feet passed through the following seams:—

No.	Seam	Start	End	Thickness	Depth	Notes
No. 1	seam	47ft. 0in.	to 48ft. 6in.	thickness 1ft. 6in.	of coal	
No. 2	"	66ft. 0in.	" 69ft. 0in.	" 3ft. 0in.	"	
No. 3	"	87ft. 0in.	" 92ft. 0in.	" 5ft. 0in.	"	
No. 4	"	138ft. 6in.	" 138ft. 0in.	" 2ft. 6in.	"	but with a stone band in the middle.
No. 5	"	149ft. 0in.	" 150ft. 0in.	" 1ft. 0in.	of coal	
No. 6	"	186ft. 0in.	" 187ft. 0in.	" 1ft. 0in.	"	

The coal seams were spaced over a vertical distance of 140 feet. The 5 feet seam at 87 to 92 feet was of good quality, having a calorific value of 9,502 B.t.u. The other seams are too small or contain too much earthy matter to be considered at present from an economic point of view.

The No. 1 bore was continued to a depth of 598 feet 6 inches, and passed through strata which gradually changed to marine deposits, mudstones, shales, and limestones to 540 feet. From this depth to the bottom the bore passed through shales and sandstones full of large boulders of crystalline rocks of various sorts, which was assumed to be the basal bed of the coal measures. Boring was very difficult in this conglomerate, and was discontinued without penetrating right through it.

The No. 2 bore was next made 473 yards S. 58° W. from O'Grady's shaft on M.L. 299H. It struck 13 seams, viz. :—

No.	Seam	Start	End	Thickness	Depth	Notes
No. 1	seam	at 148ft. 6in.	to 149ft. 0in.	thickness 5ft. 6in.	of coal	
No. 2	"	160ft. 6in.	" 163ft. 6in.	" 3ft. 0in.	"	
No. 3	"	220ft. 6in.	" 222ft. 0in.	" 1ft. 6in.	"	
No. 4	"	268ft. 6in.	" 277ft. 6in.	" 9ft. 0in.	"	
No. 5	"	300ft. 0in.	" 303ft. 0in.	" 3ft. 0in.	"	
No. 6	"	304ft. 0in.	" 304ft. 6in.	" 0ft. 6in.	"	
No. 7	"	338ft. 4in.	" 343ft. 6in.	" 5ft. 2in.	"	
No. 8	"	345ft. 0in.	" 345ft. 8in.	" 0ft. 8in.	"	
No. 9	"	359ft. 0in.	" 365ft. 6in.	" 6ft. 6in.	"	
No. 10	"	376ft. 9in.	" 382ft. 9in.	" 6ft. 0in.	"	
No. 11	"	392ft. 0in.	" 394ft. 6in.	" 2ft. 6in.	"	
No. 12	"	411ft. 0in.	" 414ft. 8in.	" 3ft. 8in.	"	
No. 13	"	426ft. 0in.	" 426ft. 6in.	" 0ft. 6in.	"	

And was discontinued at 550 feet 6 inches, being considered to have entered the marine beds below

the coal-bearing strata, though still probably far from having reached the crystalline bed-rock underlying the coal measures. The coal seams in this bore were met with through a vertical distance of 278 feet, as compared with 140 feet in No. 1 bore, and comparison of the sections makes it fairly certain that seams 1 to 6 of No. 1 bore are represented by 7 to 13 of No. 2 bore, the upper seams in the latter not being cut in No. 1 but probably outcropping under the superficial sand and ironstone covering to the west of it. The 9 feet seam at 268 feet 6 inches to 277 feet 6 inches in No. 2 bore should be found by shallow boring or sinking only a short distance west of the No. 1 bore.

Tabulated analyses of the seams in No. 2 bore are given in Mr. Wilson's 1921 report. The 9 feet seam (268 feet 6 inches to 277 feet 6 inches) averages 19.32 per cent. moisture, 32.40 per cent. volatile hydrocarbons, 41.01 per cent. fixed carbon, 7.27 per cent. ash, with a calorific value of 8,852 B.t.u., and should be a good workable seam. The 5 feet 2 inches seam at 338 feet 4 inches to 343 feet 6 inches contains 15.93 per cent. of ash, which is too much for ordinary use, but could be used by pulverised coal firing. The 6 feet 6 inches seam at 359 feet to 365 feet 6 inches, and the 6 feet seam at 376 feet 9 inches to 382 feet 9 inches are practicable fuels with 8.88 per cent. and 7.84 per cent. of ash respectively, and the other seams may be disregarded as too small for working at present or too high in ash.

The dip of the field being to the west and No. 1 bore lying considerably west of No. 2, the fact that the corresponding strata in No. 1 are about 265 feet higher up than those in No. 2, instead of being some 330 feet lower, as would be the case if the dip west at 1 in 6 continued for the horizontal distance between them (over 30 chains), indicates a very large fault running between them, with a downthrow to the east, or opposite to that seen in O'Grady's shaft. This aspect of the matter will be reverted to later on.

No. 3 bore was started one mile N.W. from O'Grady's shaft, and carried down to 608 feet. The full section is given in Mr. Wilson's 1921 report.

Eleven coal seams were cut, as follows:—

No.	Seam	Start	End	Thickness	Depth	Notes
No. 1	seam	at 80ft. 0in.	to 81ft. 6in.	thickness 1ft. 6in.	of coal	
No. 2	"	110ft. 6in.	" 113ft. 0in.	" 2ft. 6in.	"	
No. 3	"	169ft. 0in.	" 174ft. 0in.	" 5ft. 0in.	"	
No. 4	"	189ft. 6in.	" 194ft. 4in.	" 6ft. 10in.	"	
No. 5	"	216ft. 0in.	" 219ft. 0in.	" 3ft. 0in.	"	
No. 6	"	222ft. 3in.	" 228ft. 0in.	" 5ft. 9in.	"	
No. 7	"	235ft. 6in.	" 238ft. 0in.	" 2ft. 6in.	"	
No. 8	"	249ft. 8in.	" 253ft. 3in.	" 3ft. 7in.	"	
No. 9	"	287ft. 6in.	" 293ft. 10in.	" 6ft. 4in.	"	
No. 10	"	301ft. 10in.	" 304ft. 11in.	" 3ft. 1in.	"	
No. 11	"	347ft. 5in.	" 349ft. 0in.	" 1ft. 4in.	"	

Below the coal horizon the bore penetrated strata very similar to those below it in No. 1 bore, and had similar conglomerate in the last 12 feet, so it was not thought necessary to continue it. The 11 seams in this bore correspond very fairly with the 13 in No. 2. The seams are contained within 269 feet of thickness of strata, as against 278 feet in No. 2 bore. No. 3 bore is about 45 chains west of No. 2, and if the true strike of the coal be N. and S. and dip west 1 in 6, as shown in Mr. Wilson's plan in 1923 annual report, the seams in it should be some 495 feet deeper from surface than the corresponding ones in No. 2. But in fact they are about 73 feet higher, showing a total dislocation of about 568 feet verti-

cally. All the figures of distances and the surface levels require verification by survey, and are only very roughly measured, and no doubt may modify the conclusions as to the great downthrow of the fault which is here concerned, but the total downthrow of 568 feet estimated from the rough measurements available in respect of Nos. 2 and 3 bores agrees not at all badly with that of 595 feet above deduced from Nos. 1 and 2 bores. The fault between Nos. 1 and 2 bores must therefore pass also between Nos. 2 and 3. It apparently does not pass between 1 and 3, for the coal horizon in the latter is only about 142 feet below the corresponding part of that in No. 1, which would be fairly well accounted for by the more westerly position of No. 3. The big fault must, therefore, run nearly north and south, or to the east of north, which greatly improves the chances of the field of coal west of Nos. 3 and 4 bores being little disturbed by faulting.

Analyses of the seams in No. 3 bore are given in Mr. Wilson's paper in the 1921 Annual Report of the Department of Mines. The 5 feet seam at 169 feet to 174 feet, and the lower half of the 6 feet 10 inches seam at 189 feet 6 inches to 196 feet 4 inches are good workable coals, as is also the 5 feet 9 inches seam at 222 feet 3 inches to 228 feet. The others are rather small to work.

The No. 4 deep bore 60 chains N.W. of No. 3 is shown in detail in Mr. Wilson's paper in annual report for year 1923. It is the furthest north and west of the bores which have been made, and is particularly interesting, as showing a considerable thickness of beds without coal lying immediately above the coal horizon. The first seam of coal was not struck until a depth of 391 feet 6 inches had been reached. The section of the Collie field in the "Mining Handbook" shows a space of 375 to 650 feet between the top of the lowest group of the Collie seams and the bottom of the Collieburn group, and if the same succession be repeated at Wilga the middle or Collieburn group of beds should be found not very far west of the No. 4 bore. The distance between the two localities is too great to allow very close agreement to be expected, still there is a very strong probability that a line of bores west from No. 4 deep bore might pick up further seams.

The No. 4 bore cut eleven coal seams, as under:—

No.	1 seam at	6in.	to	392ft.	6in.	thickness	ft.	6in.	of coal
No. 2	443ft.	2in.	443ft.	5in.	0ft.	6in.			
No. 3	445ft.	10in.	448ft.	5in.	0ft.	7in.			
No. 4	500ft.	3in.	510ft.	9in.	10ft.	6in.			
									with 2in. shale band at 508ft.
No. 5	537ft.	0in.	541ft.	0in.	4ft.	0in.			of coal
No. 6	563ft.	0in.	570ft.	0in.	7ft.	0in.			
No. 7	573ft.	2in.	578ft.	2in.	5ft.	0in.			
No. 8	591ft.	0in.	601ft.	1in.	9ft.	1in.			
No. 9	627ft.	0in.	628ft.	0in.	1ft.	0in.			
No. 10	643ft.	8in.	652ft.	8in.	8ft.	7in.			
No. 11	660ft.	0in.	663ft.	9in.	3ft.	9in.			

the bore showing 44 feet of coal in 5 seams not less than 4 feet in thickness. The analyses quoted in Mr. Wilson's paper show Nos. 4, 5, and 8 seams to be coal of good quality, but 6 and 7 are rather too high in ash, and the analysis of 10 is not given. The coal group in this bore extends from 391 feet 6 inches to 663 feet 9 inches, a total vertical distance of 272 feet 3 inches, closely agreeing with the 269 feet in No. 3 bore and 278 feet in No. 2. The seams in the various bores do not correspond very closely in thickness, being apparently inclined to vary a good deal in this respect, but it must be remembered that the bores are a considerable distance apart.

The lines of hand bores east and northeast from deep bore No. 3, shown in Mr. Wilson's paper in 1923 annual report, were put down by the Wilga Proprietary Coal Prospecting Company, Limited, to try to cut the seams found in the deep bore where they rose close to surface. As shown in Mr. Wilson's sections the agreement of the seams cut in these bores with those in the deep bores is remarkably good, and the two lines have permitted the true strike of the seam to be determined at this point as being very nearly north and south, and dip west about 1 in 6.

These shallow bores show that there will be no practical difficulty in working these mines, if desired, by inclined shafts from the outcrop downwards, as is the prevailing practice at Collie. The extent to which the strata will be charged with water is not yet known, but the presumption is a fair one that it will be little different from the Collie conditions in the same respect.

The boring results have shown that the Wilga field contains several seams of coal of good quality, very similar to that from Collie and good workable size, capable of being easily worked from the outcrop downwards. The following assays give an idea of the composition of the workable seams of the coal:—

		Thick- ness.	Moisture.	Vol. Hydro- carbons.	Fixed Carbon.	Ash.	Cal. Value B.t.u.
No. 1 Bore	No. 3 seam	ft. in.	%	%	%	%	
2	4	5 0	13·12	36·71	43·76	6·41	9,502
2	9	9 0	19·32	32·40	41·01	7·27	8,852
2	10	6 6	27·24	27·76	36·12	8·88	7,838
3	3	6 0	27·65	29·45	35·06	7·84	8,199
3	3	5 0	17·14	29·22	47·63	6·01	9,205
3	4	3 5	16·48	32·83	44·76	5·93	9,913
3	6	5 9	18·86	30·40	43·22	7·52	8,858
3	9	6 4	20·04	33·96	36·54	9·46	8,832
*4	4	10 4	12·00	34·80	45·79	7·41	9,552
4	5	4 0	11·70	37·22	45·10	5·98	9,928
4	7	5 0	11·30	37·43	42·62	8·65	9,645
4	8	9 1	12·72	35·15	45·25	6·88	9,625
Average		...	17·29	33·11	42·24	7·36	9,162

* The cores from No. 4 bore were stored for a long time before being analysed, and were doubtless much drier than if taken directly from the bore.

The average of Collie coals as received by the Railway Department at the Collie depôt is given by Dr. Simpson in "Mineral Resources of Western Australia" (1924), as follows:—

—	Thick-ness.		Moisture.	Vol. Hydro-carbons.	Fixed Carbon.	Ash.	Cal. Value.
	ft.	in.	%	%	%	%	B.t.u.
Co-operative Colliery	7	0	17.50	26.97	46.11	7.85	10,017
Westralian No. 1 Colliery	10	0	17.50	27.50	45.04	8.30	9,997
Proprietary Colliery	9	0	21.50	27.30	42.91	6.67	9,500
Premier Colliery	5	6	23.00	39.30	33.70	2.40	9,670
Cardiff Colliery	7	0	23.00	33.00	37.63	4.63	9,157
Average ... ..	...	...	20.50	30.81	41.08	5.97	9,668
(Not including sulphur) ... ..	...	...	0.552	and Nitrogen		1.086	

The comparison shows the coal from the two fields to be very much the same in average composition, the slight superiority of the Collie average being probably due to the samples being taken from the parts of the seams chosen for actual working, and from coal from which shale has been picked out before sending it for sale, while the Wilga assays are from bore cores. There seems to be quite a reasonable probability that the average Wilga coal will be equal to the average from Collie when actually worked. The Wilga coals will probably show more moisture when actually worked than in the partially dried cores.

Up to the present time only a small part of the eastern side of the Wilga field has been tested by boring, and the full value of the area cannot be estimated until a great deal more boring has been done. Two lines of bores running due west from Nos. 4 and 1 deep bores, and spaced about a mile apart on each line would give valuable information as to the presence or otherwise of the middle and upper groups of the Collie coal series which may very reasonably be expected to be met with, and which would, if found, greatly increase the amount of coal obtainable from the field. These bores would probably also show if there are any other large faults in the field similar to those at O'Grady's shaft between Nos. 1 and 2 deep bores, and would indicate if the areas are or are not much disturbed by faults. It is rather likely that considerable faults will exist, as the whole coal-bearing area, as at Collie, owes its preservation to its having been faulted down into a deep "grave" or "sunkland" in the granite. The Collie and Wilga coal patches indicate that at one time the granite plateau of the Darling Range was overlaid by a thick and extensive series of Permo-carboniferous strata, quite probably extending continuously to connect with the similar ones in the vicinity of the Irwin River, and well over 2,000 feet in thickness. Subsequent violent movements of the earth's crust led to extensive rending of the country and dislocation of the ruptured blocks, allowing some to subside into trough-like depressions between portions of the bed-rock thrust upwards, and thus dropping areas of the superficial strata into troughs in the old hard rocks which have preserved them from removal by erosion. The coal areas are then found to be bounded by faults on all sides, and it would obviously be rather remarkable if they were not themselves also more or less fractured and faulted. There is at present, however, no reason to anticipate any greater amount of faulting in the Wilga area than in the very similar Collie field, where faulting has not been found to be of very serious importance in the actual working of

the coal, and where there are large areas of ground quite undisturbed by faults. The portion proved by Nos. 3 and 4 deep bores gives quite a fair area of ground to keep a colliery going for many years.

It is quite premature to make any estimate of the quantity of coal in the Wilga field, as so little of it has yet been tested by boring. The bores show the following thickness of coal:—

No.	Total	14ft. 0in.,	of which	5ft. 0in. are in seams of workable size and purity
No. 1	42ft. 6in.	21ft. 6in.	do.	do.
No. 2	41ft. 5in.	20ft. 6in.	do.	do.
No. 3	50ft. 4in.	28ft. 6in.	do.	do.
No. 4				

Each foot in depth of coal means about 1,500 tons of coal per acre, or 960,000 tons per square mile. Supposing 20 feet of coal to be workable in the various seams with an extraction of 40 per cent., and the area of the field to be 24 square miles, the available coal would calculate out at—

$$24 \times 4 \times 20 \times 960,000 \text{ tons} = 184,320,000 \text{ tons}$$

which cannot be taken as even an approximately proved figure, but will serve to enable the order of magnitude of the probable coal supply in this area and the importance of the national asset to be visualised.

Working conditions and costs should be very much the same as in the Collie field when the Wilga one has been similarly opened up. When the latter field is opened up the Collie-Cardiff railway will doubtless be extended to it and to connect with the Donnybrook-Katanning railway, giving the coal from both fields both east and west outlets to the railway system. The difference in railway freight on coal from Collie *via* Wilga, or from Wilga *via* Collie, would not be sufficient to give either centre any considerable advantage over the other, and the connection between the fields would be of great advantage to the working population of both, enabling men to travel from one to the other very readily as work might be available. The outlet from both fields to the railways south of Boyanup and Katanning *via* Wilga would give a perceptible saving in railway freight over existing facilities. While Wilga and Collie remain unconnected by railway, the Wilga coal would have a quite considerable advantage in railway freight in supplying all railway lines south of that from Donnybrook to Katanning, but would be under a handicap of added freight for extra mileage to the north of Boyanup Junction. Railway traction to the coast from Wilga, however, would find some advantage in avoiding the rather heavy uphill grade on the existing railway from Collie to Brunswick Junction between Collie and Penrith stations.

As a national asset for future development the Wilga coal discoveries are undoubtedly of great importance and value, and sooner or later no doubt they must be further developed and worked. Whether it would be a paying business proposition to open them up now in competition with the existing Collie mines is another matter, into which intending investors should inquire fully. The coal is of much the same value, and when railway connections have been made there will be little to choose between the two places in respect of cost of putting the coal into the hands of consumers. Mines at both places would compete on nearly a practical equality in almost all respects, so far as can be seen at present. For successful competition therefore with the older established collieries it will be necessary for the newer ones either to improve their mining methods and equipment so as to be able to raise coal at a less cost, or to accept a less profit in order to undersell their competitors. The Collie mines are well developed, and if required could double or even treble their output of coal with very little difficulty, but at existing prices they have rather to restrict their production than increase it. The price is kept up as high as the market will pay, in competition with New South Wales and even South African imported coals, and the aim of the coal owners appears to be to make a large profit on the minimum of output so long as they can maintain their existing trade without attempting much expansion.* There is no doubt the bunkering trade with shipping could be very greatly increased if the coal were made available to vessels at a lower price, which would make it worth their while to take as much Collie coal as possible instead of merely enough to carry them to the next coaling port, and a lower price of coal, and consequentially of power of all sorts, would inevitably greatly increase the output of this State's manufacturing industries. Collie coal is being sold at the railway sidings at the mines at around 17s. per ton,† and the working cost to place it there is probably not more than 12s. a ton,‡ a figure which could doubtless be

considerably reduced if the men could get constant work instead of only nine days per fortnight, and if the output were increased so as to lessen the overhead costs per ton by dividing their total by a considerably increased tonnage.

If there were open competition between the various producers there can be little doubt that it would soon result in increased production of coal at lower prices, by which the community as a whole would greatly benefit, but the existing policy is practically one of all producers sharing the trade at fixed prices instead of competing for it in an open market. If still more producers start up new collieries at Wilga, they will have to expect either to have to force competition by trying to undersell the older established producers, or to share with them in the limited amount of trade available at the ruling prices. Unless expansion of trade be visible in some direction or other, there will be no hope of bettering the position by increasing the production of coal, and it appears fairly clear that the present policy of high prices for coal, limited only by the fear of being beaten in our own markets by imported coal, makes any considerable expansion impossible. While the present policy maintains its sway, therefore there does not seem to be any advantage to anybody to open up new collieries at Wilga. There is good coal there and a rather favourable position in regard to the railways, and if all the collieries were competing in an open market, some of the Wilga mines could probably succeed in maintaining themselves against the older concerns on their own merits, but while the existing system persists of high prices, low outputs, and sharing of trade by arrangement instead of by competition it can only make the position worse to open new mines. It will be seen, therefore, that the trading position and policy of new mines at Wilga will require consideration by investors quite equal to those of the mining production part of the proposition.

A. MONTGOMERY,
State Mining Engineer.

* See Addendum for modification of this statement.

† When published in the "West Australian" of 1st November, 1924, these figures were given as 19s. and 9s. 6d. per ton respectively, but have been corrected as shown in the later Addendum to this report.

ADDENDUM TO WILGA COAL REPORT.

The Under Secretary for Mines.

On publication in the "West Australian" of 1st inst. of my report on the Wilga coal position, the Hon. R. J. Lynn, M.L.C., Managing Director of The Amalgamated Collieries of W.A., Ltd., telephoned to me at once taking exception to the figures 19s. and 9s. 6d. given as approximate selling price and mine cost respectively. He has been good enough to show me the company's figures for the year 1923-4, which show that 374,531 tons of coal were sold for £316,953, or at the average rate of 16s. 11.1d. per ton. He explains that 19s. is the maximum price obtainable for best screened coal under the agreement with the Railway Department, and that coal is sold to the general public at 1s. per ton over the

Railway contract price. The average price of small coal is stated to be 12s. 6d. a ton and of fines or duff coal 7s. 6d. a ton, and the latter two grades are stated now to amount to 35 per cent. of the total raised. In 1920 large coal constituted 77 per cent. of the gross output of the Proprietary mine, or 86 per cent. of the total coal sold, the smaller return of large coal now prevailing being said to be due to coarser screens being now specified than formerly, and shaking screens instead of fixed ones.

In my report the approximate cost stated at 9s. 6d. per ton was intended to be taken as the mine costs only, and was arrived at from figures of the earlier part of 1920, overlooking the rise of 3s. per ton

which was allowed for cutting coal towards the end of that year. The Amalgamated Company have now given me the mine cost of the 374,531 tons of coal sold in 1923-4 as £223,894, equal to 11s. 11½d. per ton. These are stated to be by no means the whole of the costs, however, such items as audit fees, accident insurance compensation, depreciation, State and Federal income taxes, interest, legal costs, rent, rates and taxes, stamps and telegrams, Perth office expenses, and bad debts not being included.

After hearing the Hon. Mr. Lynn's side of the matter, also, I find I must modify my remarks as to its being the policy of the mine owners to maintain high prices, the existing position being due more to pressure of circumstances and conditions than to policy. The price of coal has been forced up at the mines by a succession of rises in the price of getting it, and in the town and port markets by a rise in railway freights in addition. Prior to 1st April, 1917, the selling price of coal to the Railway Department at the mines was 11s. and rose to 11s. 6d. a ton, but on that date it was increased by 1s. 11d. to 13s. 5d., and again on 5th July, 1919, another increase was given of 2s. 7d., making the price 16s., and yet again on 27th September, 1920, it rose by a further 3s. to 19s., these increases being awarded to meet prices of getting coal simultaneously allowed.

The result is that the price of coal for bunkering purposes, which is the use of it most capable of large expansion, has become much too high to attract ship owners in competition with the coals they can get outside this State. They are also increasing the use of oil both as oil-fuel for steam-raising and for internal combustion engines, which obviously would not

be preferred to the use of coal unless there were advantages in costs of power on board the vessels. Cheaper coal would retain its old position of supremacy.

In June and July, 1916, the Proprietary Company's mine costs were very close to 6s. per ton of coal sold, and the coal brought an average return at the mine of 9s. 10d. per ton for all sales; in 1924 the mine costs have become practically doubled per ton, and the average return increased at the mines to 16s. 11d. per ton. I have no figures on which to compare the relative earnings per annum of the coal-getters in the two years, or the relative profits of the coal owners, but am very doubtful whether the increased prices for labour and coal have materially increased either the standard of living of the workers or the profits of the owners. But there is no doubt at all that the consuming public have suffered from the increase in the cost to them of coal, or that the export trade is languishing for the same reason. Surely it is manifest that there must be something radically unsound in the manner in which the business is being carried on when coal-mining in Western Australia does not make the rapid progress in output which its naturally favourable working conditions and geographical situation give good warrant for expecting. As things are, there is no inducement to open up new mines either at Collie or Wilga, and coal production is being practically limited to supplying the local consumption.

A. MONTGOMERY,
State Mining Engineer.

11th November, 1924.

Annual Report of the Board of Examiners for Colliery Managers' and Under-Managers' Certificates under "The Coal Mines Regulation Act, 1902."

*The Under Secretary for Mines,
Perth, W.A.*

Office of the State Mining Engineer,
Mines Department, Perth,
21st April, 1925.

Sir,

We forward herewith, for the information of the Hon. the Minister for Mines, Annual Report of the Board of Examiners for the year 1924.

BOARD MEETINGS.

Two Board Meetings were held during the year, the first on the 23rd April and the second on the 22nd October, 1924; all members of the Board were present at each meeting.

EXAMINATIONS.

Examinations for first and second class Certificates of Competency were advertised to take place in April and October, but no applications to sit for Certificates were received.

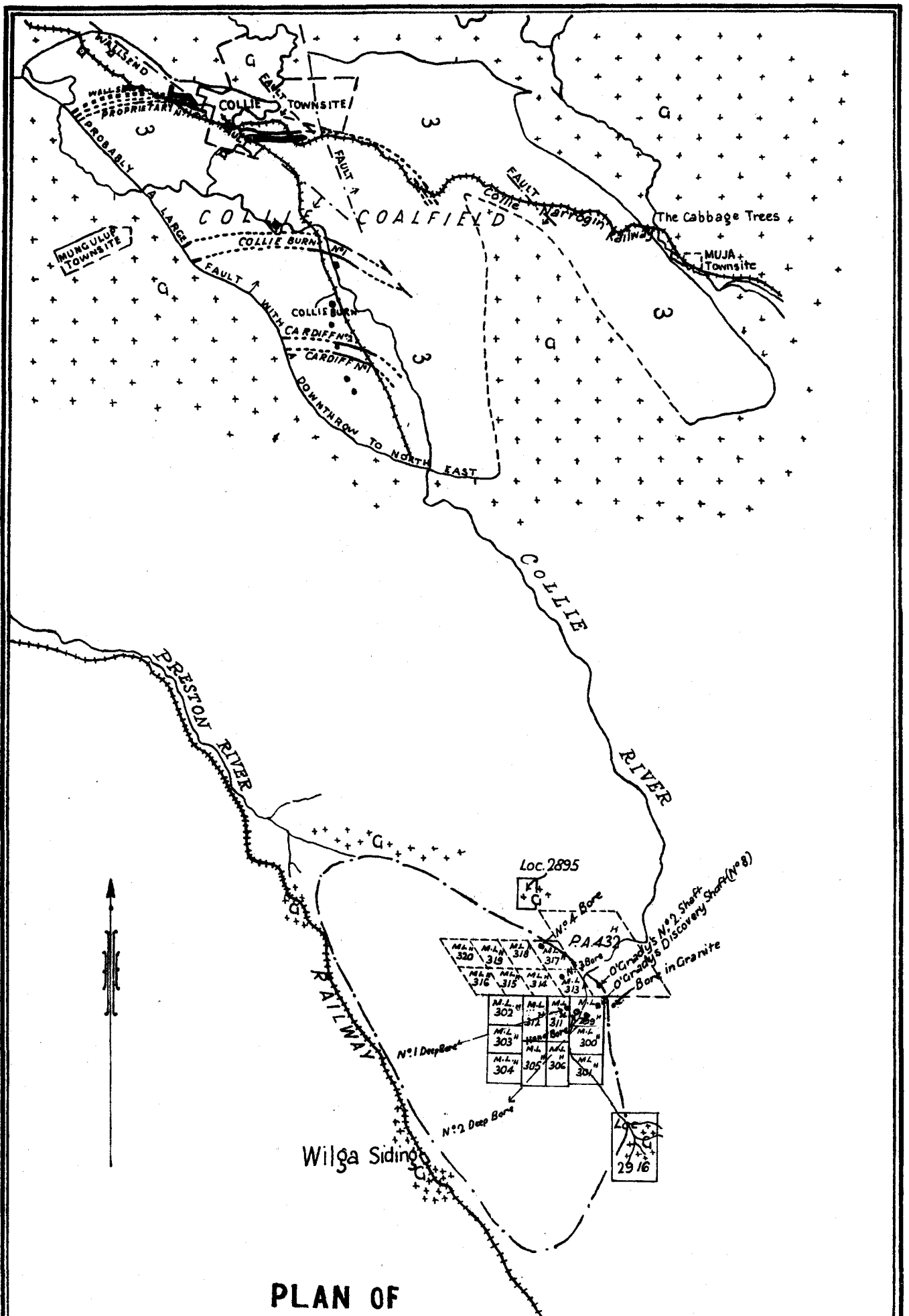
We have the honour, etc.,

A. MONTGOMERY,
State Mining Engineer, Chairman.

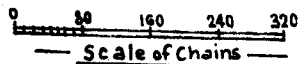
A. GIBB MAITLAND,
Government Geologist, Member.

JAS. McVEE,
Inspector of Mines, Member.

F. A. LANE,
Secretary.



**PLAN OF
WILGA COALFIELD**
shewing relation to Collie Coalfield

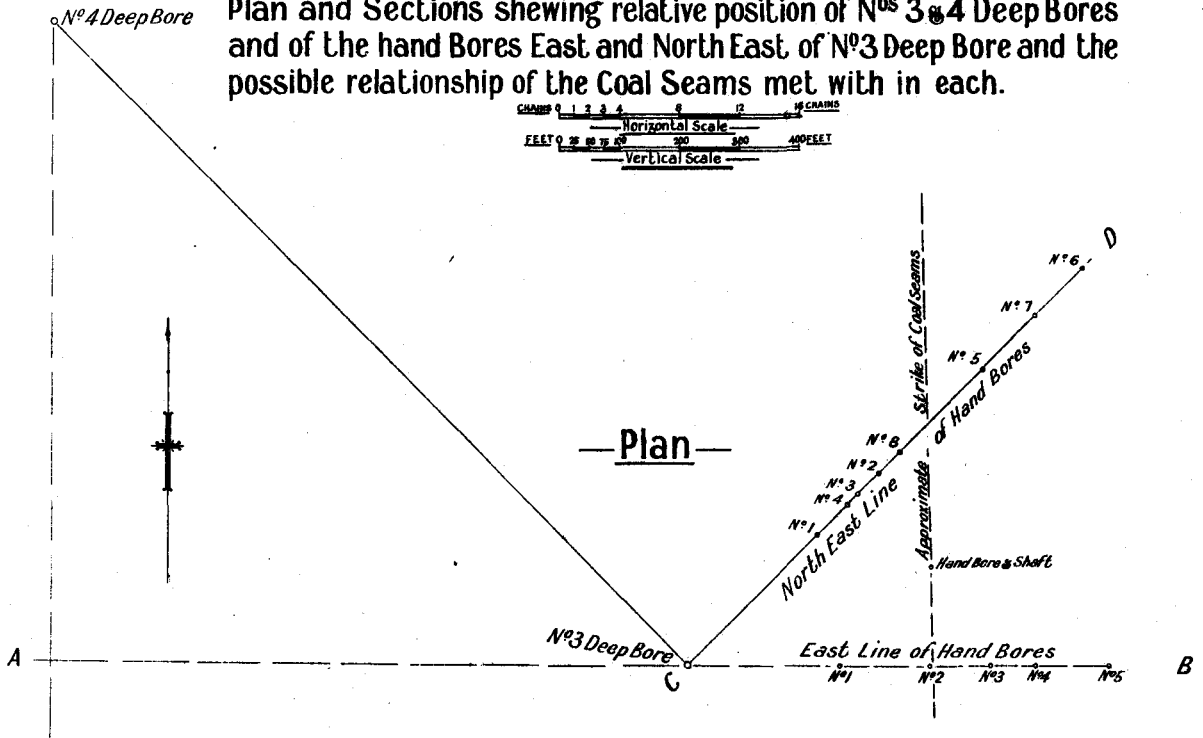
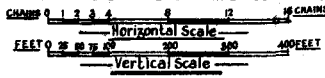


Collie River Beds -- (W) Granite -- (+G+)
 Coal Seams --- Bores Diamond Drill Calyx + ore

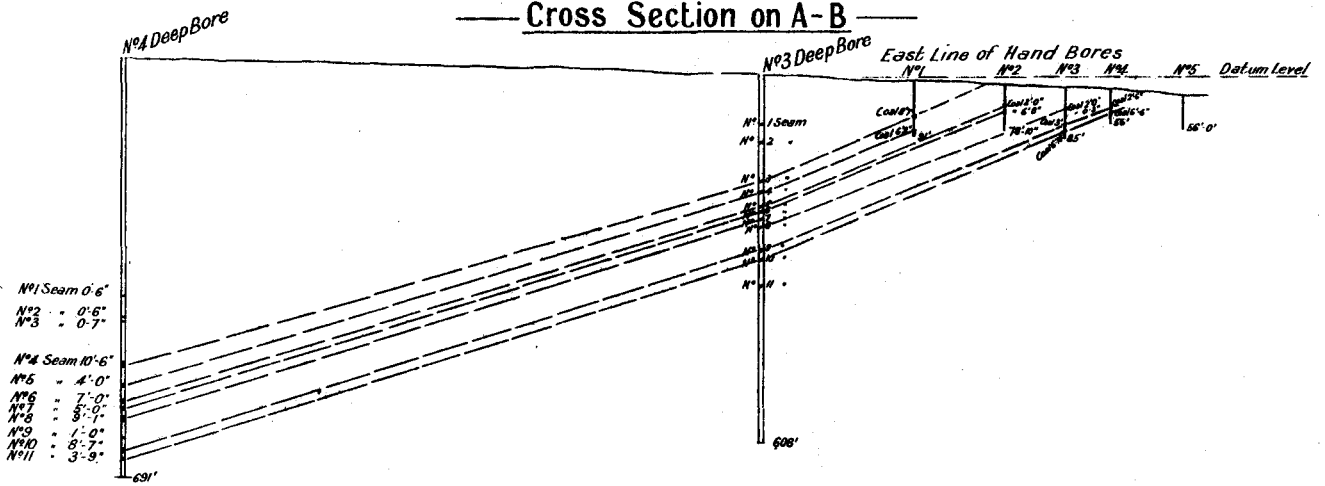
Possible extent of Coal bearing area at Wilga

— WILGA COAL FIELD —

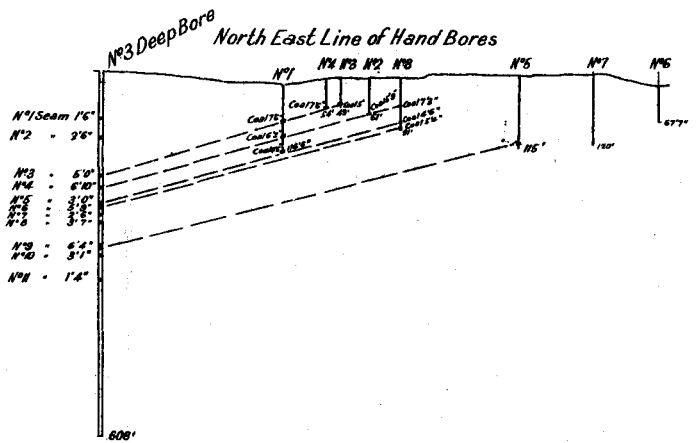
Plan and Sections shewing relative position of Nos 3 & 4 Deep Bores and of the hand Bores East and North East of No 3 Deep Bore and the possible relationship of the Coal Seams met with in each.



— Cross Section on A-B —



— Cross Section on C-D —



DIVISION III.

Report of the Superintendent of State Batteries.

Department of Mines,
State Batteries Branch,
Perth, 22nd June, 1925.

The Under Secretary for Mines.

Sir,

I herewith submit my report on State Battery operations for the year 1924, being the twenty-seventh Annual Report.

MILLING.

In last year's report I anticipated a serious falling-off in the tonnage coming forward to our batteries, mainly on account of the options taken on the Gwalia Consolidated line of leases at Wiluna practically stopping the supplies of lode material to our mill at that centre; but unfortunately nearly all districts produced decreased tonnages.

Excluding four batteries operated by lessees, six 10-stamp and fourteen 5-stamp mills were available for treating auriferous ores, and ran 12.18 per cent. of full time, crushing 439 parcels totalling 18,063 tons.

In 1923 twenty mills were employed 18 per cent. of full time, crushing 29,714.75 tons.

Coolgardie, with 2,650.25 tons, was the only battery which crushed over 2,000 tons; and Wiluna 1,923.5 tons, Cue 1,617.5 tons, Meekatharra 1,555.5 tons, the only mills to exceed 1,500 tons for the year.

Stamp Duty.—Our 5-stamp batteries crushed 4.42 tons per stamp per 24 hours, which is a satisfactory result, and much higher than the 3.36 tons per stamp per day crushed by five 10-head plants.

Some of these latter mills are old and light, whilst most of the 5-stamp batteries are more recent types. The best duties were Youanmi 7.52, Peak Hill 6.38, Ora Banda 5.70, and Siberia 5.60.

Amalgamation.—With the exception of the small quantity of Wiluna lode material crushed, all ore was treated by amalgamation. 18,082 ozs. of bullion were recovered, containing 15,330 fine ozs., equal to 75.84 shillings per ton. The head value of the ore was 100.72 shillings, so that the average recovery by amalgamation was 75.29 per cent. The percentage recovery in 1923 from ore worth 78s. per ton was 73.5 per cent., and in 1922 from ore worth 99s. 8d. the recovery was 74.4 per cent.

Charges.—No alteration has been made in our charges, and the 5s. per ton minimum charge has been operative and has resulted in an increased revenue. Rebates were allowed on 3,932¾ tons of low-grade ore amounting to £536 7s. 7d. The previous year's figures were 5,533½ tons, on which £745 ls. were allowed.

Fuel Consumption and Power Cost.—Our steam-driven plants ran intermittently and on small tonnages, and the consumption of firewood was higher than usual. Yarri, a reconditioned power plant, with one round of crushings consumed 10 lbs. per h.p.h., and Coolgardie 10.3 lbs., and a cost per h.p.h. of 0.78 and 0.86 pence respectively.

Charcoal Producer Plants showed a normal consumption, Payne's Find 1.2 lbs. per h.p.h. and a cost of 0.44 pence showing the most economical figures.

Wood Producer Plants.—Ora Banda and Norseman continued to give very good figures, the cost per h.p.h. being 0.23 pence and 0.26 pence respectively, and a consumption of 2.7 lbs. per h.p.h. at the former place. At both these centres the fuel used was salmon gum.

Revenue.—The total revenue collected was £9,749 17s. 4d., including a refund of the amount allowed to owners on the low-grade ore rebates. The revenue per ton was 10s. 9.52d., an increase of 1s. 2.68d. over that received in 1924.

The increased revenue is due to the 5s. per ton minimum charge and the generally higher grade of ore milled.

Expenditure.—The expenditure for the 18,063 tons milled was £18,980 16s. 4d., equal to 21s. 0.19d. per ton, as against 29,714.75 tons milled for a cost of 17s. 0.45d. in 1923, an increase of 3s. 11.74d. per ton. The very large decrease in the tonnage, especially at Wiluna where the lode material was cheaply crushed, is wholly responsible for the rise in expenditure per ton.

Loss.—Though the cost per ton increased as a result of the fall in tonnage, the actual loss in milling was reduced from £11,044 9s. 4d. in 1923 to £9,230 19s.

TAILING TREATMENT.

14,657¼ tons of tailing, containing 4,554.4 ozs. of fine gold, were accumulated during the year, and 19,767.5 tons containing 4,336.15 ozs., consisting of part of the above tonnage and accumulations of previous years, were treated.

Thirteen plants were utilised, an increase of three over the preceding year. The work of reinforcing our vats and tanks was practically completed, and though the cost was considerable, £1,392 13s. 2d. being expended on repairs and renewals, these plants should be permanent and cost little for maintenance. The 19,767.5 tons treated had a head value of 5,403

dwts., and a residue value of 1.008 dwts., equal to 4s. 3d. per ton, and the actual extraction was 80.6 per cent., or 0.7 per cent. below the theoretical. These figures are good, and show an improvement on last year's figures of 2.1 per cent., though the head value dropped from 6.602 dwts. to 5.403 dwts.

Revenue.—The total revenue received was £10,531 14s. 6d., equal to 10s. 7.87d. per ton, a considerable decrease in the figures for 1923, when the revenue amounted to 14s. 2.16d. per ton, but is mainly due to the falling-off in the amount of gold premium received through the Gold Producers' Association.

Expenditure.—The total expenditure amounted to £10,600 7s. 7d., or 10s. 8.68d. per ton, a decrease of 8.88d. over the figure for 1923. The working cost per ton, excluding repairs and renewals and administration, was 7s. 1.58d., or 11.18d. lower than in the preceding year.

Considering the cost of reinforcing our vats, and the expenditure on repairs and renewals, the cost is as good as can be expected.

SLIME TREATMENT.

4,615 tons were treated by our vacuum plant at Wiluna at a cost of 12s. 4.10d. per ton and revenue of 8s. 7.69d. In 1923, 8,848 tons were treated, and the falling-off is due to the leases supplying the Tode material being under option to the Wiluna Gold Mines Development Company. The loss on slime treatment was £854 5s. 10d.

The continued decrease in the tonnage handled, with the inevitable rise in costs, has become so pronounced that it has been decided to revert back to the system prevailing at all other batteries of amalgamation and leaching of the resultant tailings, and the slime plant has been thrown out of commission.

TAILINGS PURCHASE.

Only 10,038¾ tons were purchased, giving a net return to customers of £9,180 15s. 2d. In 1923, 21,911 tons were purchased for £21,612 9s. 8d. This very large decrease is mainly due to the decline of lode material purchased at Wiluna

TAILING TREATMENT AND EXTRACTION.

For Year ended 31st December, 1924.

Battery.	Tons Treated.	Head Value.	Contents.	Tail Value.	Con-tents.	Percent-age Ex-traction.	Short-age.	Sur-plus.
		dwts.	dwts.	dwts.	dwts.	%	£	£
Bamboo Creek	440	9.66	3,253	1.75	770	81.9	...	113
Boogardie	1,464	8.12	11,889	1.86	2,732	77.02	50	...
Coolgardie	3,345	4.22	14,120	0.97	3,250	77	130	...
Cue	1,905	3.915	7,459	0.685	1,305	82.4	23	...
Laverton... ..	980	7.237	7,092	1.016	996	85.9	83	...
Meekatharra	1,921	5.480	10,527	1.035	1,405	81.1	75	...
Norseman	541.5	8.275	4,480	1.51	817	81.7	...	...
Ora Banda	1,072	5.976	6,397	0.806	865	86.3	...	74
Payne's Find	612	1.841	1,127	0.75	459	...	...	...
Peak Hill	802	5.071	4,067	0.918	737	81.8	8	...
Sandstone	2,020	7.366	14,880	1.236	2,507	83.2	...	194
St. Ives	1,290	4.88	6,295	.921	1,188	81.1	...	27
Yarri	3,375	4.508	15,226	.856	2,892	81.01	187	...
	19,767.5	5.403	106,812	1.008	19,923	81.3	556	408
Wiluna Slime	4,615	9.985	46,085	2.185	10,088	78.1 (83.47)	...	546

Synopsis of Tailing Treatment.

Tons treated	19,767.5
Head value (dwts.)	5.403
Tail value (dwts.)	1.008
Theoretical extraction	81.3
Actual extraction	80.6

work will be reflected in our subsequent upkeep charges.

Milling repairs cost 3s. 1.68d. per ton, a very high figure, but unavoidable when one considers the expense of starting old plants on small rounds of crushings after prolonged idleness.

TOTAL OPERATIONS.

42,837¾ tons were treated in all sections at a cost of £32,692 9s. 7d., or 15s. 2.90d. per ton, as against 52,869¾ tons and a cost of 14s. 6.35d. in 1923.

The revenue was £22,347 0s. 4d., or 10s. 5.2d. per ton, compared with 10s. 8.61d. in 1923.

The loss on all operations was £10,345 9s. 3d.

Comparative Synopsis of Results at State Batteries for 12 months ended 31st December, 1923 and 1924.

	1924.			1923.		
	Tonnage.	Expenditure.	Revenue.	Tonnage.	Expenditure.	Revenue.
		s. d.	s. d.		s. d.	s. d.
Milling	18,063	21 0.19	10 9.52	29,714½	17 0.45	9 6.84
Tailing Treatment	19,767½	10 8.68	10 7.87	14,307	11 5.56	14 2.16
Slime Treatment	4,615	12 4.10	8 7.69	8,848	11 1.36	8 11.73
Tin Treatment	392½	13 4.89	3 7.70	...	...	...

Receipts and Expenditure, 1924.

	Tonnage.	Expenditure.	Revenue.	Profit.	Loss.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.
Milling	18,063	18,980 16 4	9,749 17 4	...	9,230 19 0
Tailing Treatment	19,767½	10,600 7 7	10,531 14 6	...	68 13 1
Slime do.	4,615	2,848 5 10	1,994 0 0	...	854 5 10
Tin do.	392½	262 19 10	71 8 6	...	191 11 4
	42,837½	32,692 9 7	22,347 0 4	...	10,345 9 3

OUTPUT SINCE INCEPTION.

Tons of Ore milled	1,401,788.44
Production:	
By Amalgamation	4,771,663.06
„ Sand Treatment	723,029.12
„ Slime Treatment	264,951.41
„ Residue Treatment	9,353.37
	£5,768,996.96
Tons of Tin Ore, 80,460.	
Production:	
By Black Tin	92,682.19
„ Residue Treatment	572.32
	£5,862,251.47

STAFF.

Mr. W. E. Eyres, who had been appointed to the North-West circuit, resigned, and was replaced by Mr. G. S. Skuthorp, who also resigned later in the year to take up the management of the Menzies Consolidated Gold Mine. Mr. T. E. Prosser, who was acting manager at Yarri, was appointed to take Mr. Skuthorp's place.

A general transfer was inaugurated and partly completed. This transfer necessitated a slight alteration in the grouping of the batteries.

I wish to bring before your notice the ever increasing disabilities under which our staff now work. With the general decline in the industry, living conditions, in centres where our mills are operating, are constantly becoming more trying. Centres on the railway, with some social advantages, have declined to such an extent that we cannot make them headquarters, because the men in charge would be absent from home most of their time. The loyal service given by the staff under prevailing conditions is most praiseworthy.

GENERAL REMARKS.

The total tonnage handled dropped from 52,869¾ to 42,837½ tons. Milling tonnage showed a decrease of 11,651¾ tons, due mainly, as previously mentioned, to the big falling-off at Wiluna. Owing to the repairs to tailing plants during the last two years we were able to treat 5,460½ tons more tailings than in 1923, but heavy repairs from revenue prevented our showing a profit.

Notwithstanding the increased price of tin, and our stationing a manager at Greenbushes for six months, the tin ore produced, amounting to 392½ tons, was very disappointing.

Our arrangement with the North-West Department to appoint a manager capable of determining minerals, etc., has not borne much fruit, but our manager has been of great assistance to other branches of this Department, and also to other Departments.

Now that State Batteries are so long idle, caretakers' wages are a big item, and amounted to £536 7s. 7d. exclusive of Mt. Ida, where we have a caretaker-manager. Although some years ago, at my suggestion, prospectors were informed that they would be expected to take care of plants free of cost where little or no ore was crushed, we are finding a growing disinclination on their part to do so without emolument.

I am pleased to say that we have used our local Portland cement for all our reinforced work, and with excellent results. The reinforcing of tailing vats was an experiment, and called for a specially good concrete, as the coating is thin and the vats have to hold pregnant gold solution, necessitating absolute freedom from cracking.

Although £3,996 16s. 7d. was expended from loan on new work, no new batteries were erected, the bulk of the money being expended on the reconstruction of the Yarri plant and the installation of a rail siding at Coolgardie.

The prospects for 1925 are not bright. I estimate about the same tonnage as that crushed for 1924, and an increase in tailings treated, as we will have all our plants in commission, and will be able to treat all our present accumulations and part of our current tailings.

Economy on the Fields has been practised as far as possible during the year, and Head Office and administration have been further reduced by approximately £200.

Now that Regulation 6 has been amended to permit of batteries starting up on 150 tons minimum, we find it difficult with our limited staff to cope with the work at times. If we are to handle the crushing and tailing treatment expeditiously and economically, I would recommend setting out a definite programme for each circuit. We would be faced with a certain amount of criticism, but owners should understand that under present conditions such a course as that recommended is quite a reasonable one.

Thirteen schedules are attached showing figures for the year and the system generally.

I am indebted to Mr. D. F. Browne, Inspector of State Batteries, for the preparation of this report.

A. M. HOWE,
Superintendent of State Batteries.

Schedule 1.

Return showing the number of tons crushed, gold yield, average per ton in shillings, and total value for year ended 31st December, 1924.

Battery.	Tons Crushed.	Gold Yield, Bullion.	Average per ton in shillings.	Total Value.
Bamboo Creek	474.75	ozs. 897.00	136.03	£ 3,229.20
Boogardie	1,259.75	1,204.95	68.86	4,337.82
Coolgardie	2,650.25	2,452.81	66.63	8,830.11
Cue	1,617.50	2,400.80	106.86	8,642.88
Laverton	216.0	437.17	145.72	1,573.81
Leonora	171.75	184.70	77.42	664.92
Marble Bar	399.75	386.70	69.64	1,392.12
Meekatharra	1,555.5	2,081.67	96.84	7,494.01
Norseman	1,155.75	1,549.70	96.54	5,578.92
Ora Banda	849.0	783.35	66.43	2,820.06
Payne's Find	1,005.0	1,286.30	92.15	4,630.68
Peak Hill	1,362.0	1,285.25	67.94	4,626.90
Sandstone	619.0	558.60	64.96	2,010.96
St. Ives	1,516.5	1,132.65	53.76	4,077.54
Siberia	325.0	84.35	18.68	303.66
Warrledar	176.5	102.75	41.94	369.90
Wiluna	1,019.0	877.65	62.01	3,159.54
Yarri	495.5	329.85	47.92	1,187.46
Youanme	290.0	39.60	9.83	142.56
Wiluna Lode	17,158.5 904.5	18,075.85 440.03	75.84 35.02	65,073.10 1,584.10
	18,063.0	18,515.88	73.80	66,657.15
TIN PLANTS.		Yield Tons.		
Greenbushes	392.25	2.76	...	...

Schedule 2.

Return showing the number of tons crushed, gold yield, average per ton, and value since inception to 31st December, 1924.

Battery.	Tons Crushed.	Gold Yield.	Average per ton.	Value.
Bamboo Creek	11,105.00	ozs. 19,271.96	ozs. 1.73	£ 69,379.06
Boogardie	69,821.40	47,124.05	.67	171,040.76
Coolgardie	120,567.00	80,096.07	.66	288,399.49
Cue	14,114.75	17,250.75	1.22	62,102.69
Darlot	33,210.00	37,637.74	1.13	138,928.25
Laverton	19,126.25	21,032.58	1.09	76,889.01
Leonora	56,535.45	62,592.25	1.10	228,806.42
Linden	19,783.00	22,531.70	1.14	81,114.21
Marble Bar	12,207.75	15,364.10	1.26	55,310.91
Meekatharra	81,019.50	95,387.86	1.17	346,075.68
Mt. Egerton	7,893.25	4,084.86	.52	18,972.32
Mt. Ida	43,259.15	54,648.86	1.26	200,038.07
Mt. Keith	9,787.00	8,618.75	.88	31,027.50
Mt. Sir Samuel	9,681.25	7,505.97	.77	27,021.48
Mulline	77,008.45	98,573.64	1.28	354,035.25
Niagara	64,866.00	57,770.81	.89	210,163.11
Norseman	66,389.20	74,714.96	1.12	272,156.32
Ora Banda	22,063.50	11,924.87	.54	42,929.48
Payne's Find	27,752.75	34,415.86	1.24	123,897.09
Peak Hill	24,140.80	23,854.87	.98	87,048.77
Sandstone	74,662.40	76,323.27	1.02	274,959.10
Siberia	16,024.00	16,625.59	1.03	59,777.45
20-Mile Sandy	12,184.15	19,055.77	1.56	68,930.34
St. Ives	6,197.50	4,561.74	.73	16,422.26
Tuckanarra	15,476.85	21,276.06	1.38	78,217.53
Warrledar	7,643.25	4,525.20	.59	16,290.72
Wiluna	58,239.00	32,045.74	.55	115,509.84
Yarri	48,735.25	32,572.03	.67	117,259.13
Youanme	31,675.50	10,615.39	.33	38,215.39
Batteries closed	259,629.34	270,313.31	1.04	981,998.47
Wiluna Lode	1,320,780.69 81,001.75	1,282,316.61 34,284.50	.97 .42	4,647,916.10 123,746.96
	1,401,782.44	1,316,601.11	.94	4,771,663.06

Tin Plants.

	Tons.	Tons Black Tin.
Greenbushes	1,183.25	6.326
Plants Closed	79,276.75	969.276
	80,460.00	975.602

Milling.		Tailing Treatment.		Tons.
Up to 1901 (3 yrs.)	Tons.	ozs.	1913	...
1902	68,791	75,553	1914	13,078
1903	39,517	57,255	1915	32,728
1904	49,233	58,305	1916	81,887
1905	71,616	78,309	1917	34,725
1906	85,018	92,327	1918	24,890
1907	95,831	94,187	1919	15,764
1908	95,280	97,962	1920	2,364
1909	95,624	89,875	1921	15,437
1910	94,218	83,127	1922	19,763
1911	89,278	80,074	1923	24,234
1912	59,373	56,265	1924	14,307
1913	56,636	53,888		19,767
1914	60,573	52,515		
1915	56,570	45,641		
1916	49,595	39,095		
1917	47,330	31,734		
1918	42,947	38,015		
1919	39,829	33,523		
1920	40,291	27,027	Up to 1904	691
1921	46,494	28,450	1905	7,028
1922	34,761	24,035	1906	8,220
1923	35,722	32,736	1907	5,818
1924	29,715	21,876	1908	16,848
	18,063	18,515	1909	28,819
			1910	20,821
			1911	8,085
			1912	6,089
			1913	6,246
			1914	3,454
			1915	15,536
			1916	13,086
			1917	11,892
			1918	12,736
			1919	11,525
			1920	7,370
			1921	7,492
			1922	8,848
			1923	4,615
			1924	

Sand Treatment.		Tons.
Up to 1902	...	29,255
1903	...	33,369
1904	...	42,559
1905	...	54,420
1906	...	60,422
1907	...	63,778
1908	...	62,081
1909	...	61,265
1910	...	43,915
1911	...	27,444
1912	...	18,599
1913	...	18,300
1914	...	6,219

Schedule 3.

Tailing Treatment for 1924.

Battery.	Tons.	Yield.	Value.
Bamboo Creek	440	Fine ozs. 208.76	£ 886.63
Boogardie	1,464	446.23	1,895.07
Coolgardie	3,345	610.16	2,591.35
Cue	1,905	302.78	1,285.94
Laverton	980	136.46	579.58
Meekatharra	1,921	401.47	1,705.03
Ora Banda	1,072	284.67	1,209.00
Norseman	541.5	193.92	823.60
Payne's Find	612	64.41	273.58
Peak Hill	802	163.79	695.65
Sandstone	2,020	664.66	2,822.95
St. Ives	1,290	287.54	1,221.22
Yarri	3,375	571.30	2,426.31
	19,787.5	4,336.15	18,415.91
	SLIMES.		
Wiluna	4,615	1,961.12	8,334.24

Schedule 6.

Expenditure from Consolidated Revenue Vote and Loan Expenditure Fund on Erection of State Batteries, for Year ended December 31st, 1924, and Totals since inception.

Battery.	From Revenue.	From Loan.	Total.
	£ s. d.	£ s. d.	£ s. d.
Erection Cyanide Plant, St. Ives	...	79 17 0	79 17 0
Reconstruction State Battery, Yarri	...	1,699 5 4	1,699 5 4
Installing Leaching Vats, Ora Banda	...	161 9 0	161 9 0
Installing Siding, Coolgardie	...	1,881 19 3	1,881 19 3
Equipping Cyanide Plant, Peak Hill	...	174 6 0	174 6 0
		3,996 16 7	3,996 16 7
Erection of State Batteries—Expenditure to 31st December, 1907	91,981 1 8	...	...
Loan Expenditure to 31st December, 1923.	...	305,608 7 5	397,589 9 1
	91,981 1 8	309,605 4 0	401,586 5 8

Schedule 7.

Direct Purchase of Tailings for year 1924.

Battery.	Tons.	Amount.
Bamboo Creek	380	£ s. d. 414 8 0
Boogardie	1,064½	1,295 15 7
Coolgardie	1,477	668 12 2
Cue	504	371 18 5
Laverton	216½	147 10 2
Leonora	209½	142 17 4
Meekatharra	1,159½	1,121 15 3
Norseman	964½	741 10 0
Ora Banda	638	581 15 8
Payne's Find	14½	2 2 7
Peak Hill	565½	568 7 3
Sandstone	475½	281 3 7
St. Ives	258½	141 16 8
Warriedar	317½	202 11 9
Wiluna	1,051½	2,394 13 4
Yarri	146½	74 5 9
Youanme	...	29 11 8
	10,038½	9,180 15 2

Schedule 7a.

Return showing Tailings payable and unpayable and Gross Contents for year 1924.

Battery.	Tailings payable.		Tailings unpayable.		Totals.	
	Tons.	Gross Contents.	Tons.	Gross Contents.	Tons.	Gross Contents.
Bamboo Creek	380	ozs. dwts. grs. 185 11 0	...	...	380	185 11 0
Boogardie	875	429 19 0	192	22 14 19	1,067	452 13 19
Coolgardie	1,761	537 12 2	375½	38 8 17	2,136½	576 0 19
Cue	427	148 7 17	834½	85 4 3	1,261½	233 11 20
Laverton	183½	60 11 8	...	...	183½	60 11 8
Leonora	111½	37 13 9	34½	4 4 0	146	41 17 9
Marble Bar	339	81 0 3	...	...	339	81 0 3
Meekatharra	1,041½	474 8 19	260½	29 5 2	1,302	503 13 21
Norseman	923½	378 12 23	58½	6 3 1	982	384 16 0
Ora Banda	539½	261 6 16	175½	18 8 14	715	279 15 6
Payne's Find	34½	6 13 5	791½	76 5 19	826½	82 19 0
Peak Hill	582½	279 0 22	525½	50 5 20	1,107½	329 6 18
Sandstone	400½	140 5 16	124½	8 19 8	525½	149 5 0
St. Ives	234½	43 1 0	615½	52 3 0	849½	95 4 0
Siberia...	193½	52 6 18	83	6 14 1	276½	59 0 19
Warriedar	145	50 10 3	...	...	145	50 10 3
Wiluna	757½	354 2 22	105½	12 12 0	863½	366 14 22
Yarri	146	43 2 12	253½	32 6 19	399½	75 9 7
Youanme	...	...	246½	25 3 12	246½	25 3 12
	9,075	3,564 6 8	4,677½	468 18 15	13,752½	4,033 4 23
Wiluna (Lode)	904½	521 3 1	...	...	904½	521 3 1
	9,979½	4,085 9 9	4,677½	468 18 15	14,657½	4,554 8 0

Schedule 8.

Statement of Receipts and Expenditure for Year ended 31st December, 1924.

MILLING AND TIN TREATMENT.

Plant.	Tonnage.	Management.		Wages.		Stores.		Total Working Expenditure.		Cost per ton		Repairs and Renewals.		Sundries.		Gross Expenditure.		Cost per ton.		Receipts.		Per ton.		Profit.		Loss.			
		£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.		
Bamboo Creek	474.75	112	12 7	303	16 4	231	5 5	647	14 4	27	3.43	130	0 1	66	10 9	844	5 2	35	6.79	293	16 6	12	4.53	...	...	550	8 8
Boogardie	1,259.75	140	14 4	401	3 7	311	14 8	853	12 7	13	6.62	109	1 8	164	18 8	1,127	12 6	17	10.89	634	6 2	10	0.84	...	...	493	6 4
Coogardie	2,650.25	217	19 4	579	18 4	644	16 10	1,442	14 6	10	10.63	247	0 11	321	10 1	2,011	5 6	15	2.13	1,473	9 5	11	1.41	...	...	537	16 1
Cue	1,617.5	182	4 5	465	15 11	563	14 0	1,211	14 4	14	11.78	135	0 11	209	0 1	1,575	15 4	19	5.80	766	14 1	9	5.76	...	...	809	1 3
Darlot
Laverton	216.0	23	11 0	140	14 9	48	4 0	212	9 9	19	8.08	60	18 4	40	14 6	314	2 7	29	1.03	115	7 9	10	8.20	...	...	198	14 10
Leonora	171.75	36	9 1	103	14 4	103	17 9	244	1 2	23	5.04	22	5 3	86	8 8	352	15 1	41	0.91	105	11 1	12	3.48	...	...	247	4 0
Linden
Marble Bar	399.75	208	2 8	253	1 3	245	7 0	706	10 11	35	4.17	140	14 9	100	0 3	947	5 11	47	4.72	284	14 11	14	2.95	...	...	662	11 0
Meekatharra	1,555.5	123	7 3	425	13 6	445	14 1	994	14 10	12	9.48	159	3 6	186	1 3	1,339	19 7	17	2.73	609	12 9	7	10.05	...	...	730	6 0
Mt. Ida	...	261	7 6	1	16 0	19	3 0	282	6 6	...	...	...	...	2	5 0	284	11 6	...	...	18	6 6	...	...	...	...	266	5 0
Mt. Keith	41	5 10	41	5 10	41	5 10	41	5 10	
Mt. Sir Samuel	1	9 5	1	9 5	1	9 5	14	12 9	13	3 4	
Mulline	23	15 0	23	15 0	50	0 0	73	15 0	39	11 8	34	3 4	
Mulwarrie	27	3 6	27	3 6	
Niagara	...	11	4 3	12	11 10	34	12 0	58	8 1	15	10 7	73	18 8	73	18 8	
Norseman	1,155.75	132	6 5	451	1 1	265	13 3	849	0 9	14	8.30	79	4 10	157	3 5	1,085	9 0	18	9.38	612	14 8	10	7.23	...	...	472	14 4
Ora Banda	849.0	209	14 2	283	12 1	218	14 3	712	0 6	16	9.26	168	15 2	130	7 11	1,011	3 7	23	9.84	359	19 3	8	5.73	...	...	651	4 4
Payne's Find	1,005.0	248	12 3	367	15 6	409	18 2	1,026	5 11	20	5.08	278	10 9	156	7 10	1,461	4 6	29	0.96	529	0 0	10	6.31	...	...	932	4 6
Peak Hill	1,362.0	102	0 10	351	2 0	308	19 8	762	2 6	11	2.28	125	15 0	162	3 0	1,050	0 6	15	5.02	459	12 0	6	8.97	...	...	590	8 6
Sandstone	619.0	127	16 3	182	16 11	170	5 8	480	18 10	15	6.45	178	12 3	110	13 8	770	4 9	24	10.63	326	9 6	10	6.57	...	...	443	15 3
St. Ives	1,516.5	185	11 8	496	8 8	339	0 11	1,021	1 3	13	5.59	161	8 9	159	12 7	1,342	2 7	17	8.40	761	17 11	10	0.57	...	...	580	4 8
Sandy Creek
Siberia	325.0	47	2 0	103	10 2	107	10 11	258	3 1	15	10.63	132	4 7	38	10 10	428	18 6	26	4.72	142	5 6	8	9.04	...	...	286	13 6
Tuckanarra
Warriedar	176.5	33	12 10	71	17 7	68	13 0	174	3 5	19	8.83	23	13 6	37	14 4	235	11 3	26	8.30	93	18 4	10	7.70	...	...	141	12 11
Wiluna	1,019.0	105	0 7	216	14 4	127	0 5	448	15 4	8	9.69	135	15 0	89	0 0	673	10 4	13	2.61	579	16 3	11	4.56	...	...	93	14 1
Yarri	495.5	66	6 1	173	3 3	210	3 9	449	13 1	18	1.77	199	17 8	76	0 7	725	11 4	29	3.43	266	13 3	10	9.14	...	...	458	18 1
Yonanme	290.0	60	10 0	129	17 11	87	9 0	277	16 11	19	1.94	152	14 2	44	1 2	474	12 3	32	8.78	79	16 4	5	6.04	...	...	394	15 11
Wiluna Lode	17,158.5	2,636	5 6	5,641	11 1	5,051	14 2	13,329	10 9	15	6.43	2,730	12 1	2,357	13 8	18,417	16 6	21	5.61	8,634	19 1	10	0.76	57	15 2	9,840	12 7		
	904.5	95	0 0	178	15 0	104	7 0	378	2 0	8	4.32	112	0 4	72	17 6	562	19 10	12	5.37	1,114	18 3	24	7.82	551	18 5	...	...
Greenbushes	18,063.0	2,731	5 6	5,820	6 1	5,156	1 2	13,707	12 9	15	2.11	2,842	12 5	2,430	11 2	18,980	16 4	21	0.19	9,749	17 4	10	9.52	609	13 7	9,840	12 7		
	392.25	169	14 4	33	9 9	42	2 2	245	6 3	12	6.09	...	...	17	13 7	262	19 10	13	4.89	71	8 6	3	7.70	...	...	191	11 4
	18,455.25	2,900	19 10	5,853	15 10	5,198	3 4	13,952	19 0	15	1.44	2,842	12 5	2,448	4 9	19,243	16 2	20	10.24	9,821	5 10	10	7.70	609	13 7	10,032	3 11		

Schedule 9.

Statement of Receipts and Expenditure for Year ended 31st December, 1924.

TAILING AND SLIMES.

Plant.	Tonnage.	Management.	Wages.	Assays.	Stores.	Total Working Expenditure.	Cost per ton.	Repairs and Renewals.	Sundries.	Gross Expenditure.	Cost per ton.	Receipts.	Per ton.	Profit.	Loss.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	s. d.	£ s. d.	£ s. d.	£ s. d.	s. d.	£ s. d.	s. d.	£ s. d.	£ s. d.
Bamboo Creek ...	400.0	27 13 11	114 0 0	18 5 0	91 5 0	251 3 11	11 5-01	52 13 6	56 6 3	360 3 8	16 4-46	374 4 10	17 0-12	14 1 2	...
Boogardie ...	1,464.0	91 7 10	245 17 9	51 5 7	133 10 1	522 1 3	7 1-58	1 10 0	132 17 1	656 8 4	8 11-59	952 0 10	13 0-07	295 12 6	...
Coolgardie ...	3,345.0	147 12 1	573 5 1	61 10 8	191 18 8	974 6 6	5 9-88	21 14 10	279 6 6	1,275 7 10	7 7-48	1,627 14 10	9 8-78	352 7 0	...
Cue ...	1,905.0	171 0 9	357 12 0	20 17 4	130 0 0	679 10 1	7 1-60	167 18 10	181 15 3	1,029 4 2	10 9-64	943 19 4	9 10-92	...	85 4 10
Laverton ...	980.0	90 16 8	144 17 6	42 3 1	109 16 6	387 13 9	7 10-94	7 9 6	121 1 10	516 5 1	10 6-43	579 7 7	11 9-88	63 2 6	...
Leonora ...	...	...	...	1 19 9	...	1 19 9	...	...	9 12 10	11 12 7	...	18 9 0	...	6 16 5	...
Linden ...	...	...	...	2 14 8	9 1 4	11 16 0	...	168 19 0	...	180 15 0	...	...	...	...	180 15 0
Meekatharra ...	1,921.0	124 9 6	324 8 0	30 0 4	165 19 2	644 17 0	6 8-56	0 8 11	201 11 5	846 17 4	8 9-79	823 16 11	8 6-91	...	23 0 5
Niagara ...	...	...	...	...	...	...	...	...	6 16 1	6 16 1	...	36 12 0	...	29 15 11	...
Norseman ...	541.5	26 18 3	79 0 0	7 7 9	51 2 2	164 8 2	6 0-86	51 16 9	101 9 9	317 14 8	11 8-80	267 3 6	9 10-41	...	50 11 2
Ora Banda ...	1,072.0	80 14 11	164 0 6	13 14 10	96 4 9	354 15 0	6 7-41	33 15 8	144 4 3	532 14 11	9 11-25	598 9 3	11 1-96	65 14 4	...
Payne's Find ...	612.0	84 10 6	102 9 6	59 2 5	141 1 4	387 3 9	12 7-82	306 0 4	71 16 0	765 0 1	25 0-00	265 18 5	8 8-28	...	409 1 8
Peak Hill ...	802.0	44 17 1	136 17 6	8 6 1	104 10 2	294 10 10	7 4-12	82 1 10	132 16 5	509 9 1	12 8-44	426 8 0	10 7-58	...	33 1 1
Sandstone ...	2,020.0	130 10 6	331 12 0	91 7 9	202 8 8	755 18 11	7 5-80	246 2 6	241 3 10	1,243 5 3	12 3-69	1,045 9 7	10 4-20	...	197 15 8
St. Ives ...	1,290.0	65 12 2	239 4 1	79 16 9	173 2 6	557 15 6	8 7-77	20 11 3	140 6 6	718 13 3	11 1-70	927 2 8	14 4-48	208 9 5	...
Warriedar ...	...	10 0 0	...	...	...	10 0 0	...	107 17 0	3 11 7	121 8 7	...	...	...	...	121 8 7
Yarri ...	3,375.0	191 12 3	460 9 1	48 4 1	351 17 6	1,052 2 11	6 2-30	13 1 8	327 1 6	1,392 6 1	8 3-00	1,644 17 9	9 8-97	252 11 8	...
Yonanme ...	...	...	...	...	...	...	...	110 11 7	5 14 0	116 5 7	...	...	...	...	116 5 7
Wiluna Slimes ...	19,767.5	1,287 16 5	3,273 13 0	536 16 1	1,951 17 10	7,050 3 4	7 1-58	1,392 13 4	2,157 11 1	10,800 7 7	10 8-68	10,531 14 6	10 7-87	1,288 10 11	1,357 4 0
	4,615.0	250 9 10	1,135 7 1	90 16 6	797 0 2	2,273 13 7	9 10-22	92 13 3	481 19 0	2,848 5 10	12 4-10	1,994 0 0	8 7-69	...	854 5 10
	24,382.5	1,538 6 3	4,409 0 1	627 12 7	2,748 18 0	9,323 16 11	7 7-77	1,485 6 5	2,639 10 1	13,448 13 5	11 0-36	12,525 14 6	10 3-26	1,288 10 11	2,211 9 10

Schedule 10.

Balance Sheet to 31st December, 1924.

		£	s.	d.	£	s.	d.			£	s.	d.	£	s.	d.	
To Capital Expenditure—								By Batteries, Tailing and								
From General Loan Fund	309,605	4	0					Slime Plants	...	401,586	5	8				
From Consolidated Revenue	91,981	1	8					„ Less Depreciation	...	334,554	15	11				
					401,586	5	8						67,031	9	9	
To Treasury	...	...	...		150,012	16	6	By Stores	...	...	...	...	13,823	14	8	
„ Interest and Sinking Fund	...	...	...		346,245	12	1	„ Sundry Debtors	...	...	...	...	3,182	3	4	
„ Sundry Creditors	...	...	...		1,492	15	1	„ Profit and Loss Account	...	...	...	...	815,300	1	7	
					£899,337	9	4						£899,337	9	4	

Profit and Loss Account.

		£	s.	d.			£	s.	d.		
To Expenditure—					By Revenue	...	...	...	1,279,962	9	3
Head Office and all Batteries	1,414,462	2	10	„ Loss on Working carried down	...	...	134,499	13	7
									1,414,462	2	10
To Loss on Working brought down	134,499	13	7						
„ Interest at 3½ per cent. and Sinking Fund at 1½ per cent. on Capital Expenditure	346,245	12	1						
„ Depreciation	334,554	15	11						
			£815,300	1	7	By Gross Loss	...	...	£815,300	1	7

Schedule 11.

Working Profit and Loss Account for Year ended 31st December, 1924.

		£	s.	d.			£	s.	d.		
To Working Expenditure—					By Revenue—						
Batteries and Tin Plants	19,243	16	2	Batteries and Tin Plants	...	...	9,821	5	10
Tailing and Slime Plants	13,448	13	5	Tailing and Slime Plants	...	...	12,525	14	6
						„ Loss on Year's Operations	...	...	10,345	9	3
			£32,692	9	7				£32,692	9	7

Schedule 12.

State Battery Statistics from Inception to 31st December, 1924.

Year.	Milling.				Sand and Tailing Treatment.				Slime Treatment.				Tin Treatment.				Gross Loss. †
	Tons.	Expenditure per ton.	Revenue per ton.	Loss.	Tons.	Expenditure per ton.	Revenue per ton.	Profit.	Tons.	Expenditure per ton.	Revenue per ton.	Loss.	Tons.	Expenditure per ton.	Revenue per ton.	Loss.	
		s. d.	s. d.	£		s. d.	s. d.	£		s. d.	s. d.	£		s. d.	s. d.	£	£
1899	18,806	...	...	2,827	...	...	...	...	...	...	...	...	...	...	...	...	2,827
1900	22,675	22 10.1	17 4.5	7,611	...	...	...	...	...	...	...	...	...	...	...	...	7,611
1901	26,775	18 0.0	16 6.0	1,983	9,534	16 9	...	1,337	...	...	...	...	...	...	...	...	646
1902	39,516	14 8.6	14 8.2	169	9,721	22 3	...	724	...	...	...	...	1,170	12 2	...	286	†269
1903	49,233	13 6.8	12 10.6	1,250	33,369	7 7	...	1,442	...	...	...	...	2,009	8 2	...	153	†2,539
1904	71,616	14 4.4	12 6.5	6,423	43,251	7 10	...	1,448	...	...	...	...	2,337	8 2	...	165	5,141
1905	85,018	12 4.0	12 2.5	957	54,420	7 3	9 8.5	6,689	7,028	12 1	...	410	3,697	5 8	5 0.3	324	†3,342
1906	95,831	12 2.0	11 3.8	4,076	65,159	7 4	9 2.1	5,549	4,737	11 8	12 1.1	†2,254	11,428	4 2	4 3.3	†156	†2,880
1907	95,280	12 6.0	11 4.8	8,724	64,514	6 8.7	9 2.8	6,474	8,220	8 7.6	13 5.5	†1,983	10,496	4 4.4	4 8.8	†191	1,688
1908	95,628	12 1.9	9 3.6	13,669	62,272	6 4.7	8 11.0	8,017	5,818	12 0.9	11 8.0	120	5,573	4 5.2	3 6.3	254	7,278
1909	94,218	11 1.7	9 6.6	7,568	61,032	6 5.8	8 9.7	7,096	16,848	10 0.7	9 6.7	423	5,043	4 8.2	3 7.5	267	1,965
1910	89,278	11 3.3	9 6.6	7,709	43,391	6 2.9	8 6.1	4,903	28,600	8 9.1	9 11.5	†1,723	3,769	5 5.5	3 4.1	401	2,365
1911	59,373	12 6.9	9 10.3	8,058	27,362	6 5.9	8 9.7	3,173	28,183	10 10.5	9 5.3	1,666	6,061	4 0.3	3 4.9	188	7,490
1912	56,636	12 9.2	9 8.7	8,616	18,600	8 3.5	8 8.6	397	8,085	11 8.6	10 5.2	519	5,330	4 5.1	3 7.6	210	9,786
1913	60,573	12 5.6	9 5.4	9,155	31,378*	7 5.0	9 5.2	3,160	6,089	12 4.1	9 6.1	862	8,032	5 5.1	4 1.7	513	7,711
1914	56,570	12 6.8	9 2.9	9,413	38,942	6 6.5	8 2.2	3,202	6,246	10 10.2	9 0.0	578	3,340	7 10.6	4 6.6	557	7,418
1915	49,595	11 10.7	9 2.6	6,642	31,887	6 9.3	8 0.6	2,041	3,454	12 6.2	9 10.1	462	1,767	8 1.2	3 11.7	364	5,415
1916	47,304	12 6.7	9 1.9	8,018	35,665	7 1.7	8 7.3	2,510	15,536	8 8.2	8 7.3	56	943	11 11.6	4 0.3	374	5,982
1917	42,947	12 1.5	9 0.0	6,714	24,674	8 3.3	8 10.3	727	15,408	9 8.5	8 3.1	1,104	1,118	11 2.9	3 8.2	422	7,554
1918	39,330	13 2.9	8 11.4	8,442	24,364	8 3.7	9 5.7	1,420	11,892	9 4.8	7 9.0	982	5,985	4 10.2	3 0.2	558	8,650
1919	40,290‡	12 4.1	8 2.0	8,426	15,764	9 2.4	9 3.8	91	12,780	9 1.1	7 4.6	1,089	1,204	10 0.9	3 11.2	369	9,925
1920	46,494‡	12 6.4	7 11.5	8,954	15,437	9 0.4	13 4.1	3,325	11,525	9 11.2	8 8.4	713	737	8 11.2	9 3.3	†12	6,363
1921	34,761	17 3.8	9 0.7	14,361	19,763	10 0.8	17 10.0	7,677	7,370	10 11.6	8 5.7	918	54	82 0.5	8 0.4	200	7,802
1922	35,722	16 11.8	9 2.3	13,862	24,234	9 11.7	15 8.9	6,988	7,492	11 10.5	8 5.8	1,271	...	...	...	55	8,200
1923	29,714	17 0.4	9 6.8	11,044	14,307	11 5.5	14 2.1	1,943	8,848	11 1.3	8 11.7	945	...	...	...	26	10,072
1924	18,063	21 0.1	10 9.5	9,231	19,767	10 8.6	10 7.8	£69	4,615	12 4.1	8 7.6	854	392	13 4.8	3 7.7	192	10,346

* Tailing Treatment commenced 1913.

† Profit.

‡ Details of Ore dressing and Residue Treatment not shown, but financial result included in the figure of this column.

§ Loss.

DIVISION IV.

ANNUAL PROGRESS REPORT

OF THE

GEOLOGICAL SURVEY

FOR THE

YEAR 1924.

With Two Plates.

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Annual Progress Report he Geological Survey for the Year 1924.

The range of activities of the Geological Survey during the year 1924, as has been the case in the past, has been of a varied nature and carried out along the usual lines. Good progress, considering the limited personnel, has been made in the field work, and those related investigations to which such gives rise. Full details of the field work and the deductions drawn therefrom are given in different sections of the report.

In addition to what may be called the regular work of the department, endeavours have been made to collect information bearing upon the geological side of mining, and also to obtain records of and examine the specimens from borings for water and other minerals as occasion arises.

Several advisory reports, in which geological considerations are involved, were made in connection with (a) the alienation of mineral-bearing lands, (b) matters raised under Section 40b of the Mining Act, and (c) subsidies under the Mining Development Act.

ADMINISTRATIVE AND OTHER DUTIES OF THE GOVERNMENT GEOLOGIST.

Administrative, routine, and other duties left little time for work in the field; nevertheless, it was found possible to devote 98 days to outside work in different parts of the State.

The period between the 12th of May and the 26th of July was devoted to a reconnaissance of the country in the vicinity of Israelite Bay.

Having been appointed Chairman of the Interstate Conference on Artesian Water Supplies of Australia, the period intervening between the 1st and the 16th of October was devoted to the main work of the conference. This, *inter alia*, entailed a short journey with the visiting members between the 6th and 14th October to the Gascoyne River at Bidjemia, starting from Meekatharra and returning *via* Mullewa.

Portions of the months of November and December were spent at Kalgoorlie in connection with the underground geological survey of that field.

A traverse of the country from Bullabulling to Red Hill, near Lake Lefroy, was made between the 18th of November and the 15th of December.

THE STAFF.

The manifold work of the Geological Survey during the year 1924 has been carried out by six classified officers, and there has been no change in the personnel.

FIELD WORK.

The record of the field work for 1924 has been, on the whole, one of progress; it has been carried out over a wide extent of country, of which little detailed geological data was available, but on a less extensive scale than hitherto. Goldfields surveys and

investigations of mineral resources occupied by far the greater portion of the time of the available staff. The underground geological survey of Kalgoorlie was continued; the work is necessarily very intricate, and if it is to be effective, requires the most careful compilation and correlation of details, which entails relatively slow progress if scientific and official accuracy is to be attained. Several important advances in our knowledge of the field have already been made, and will be found set out on pages 10-15.

A more or less detailed survey was made of Paynesville and the surrounding district on the Murchison Goldfield, and a good deal of information obtained regarding the gold occurrences of a portion of the State about which very little or nothing was known.

Details regarding the surveys are shown in the table hereunder, which indicates the distribution of the work of the field geologists, together with the names of those engaged thereon:—

*Table showing the distribution of field work during
the year 1924.*

Goldfield or Land Division.	F. R. Feldtmann.		A. G. D. Eason.	
	No. of days in field.	Percentage of working days.	No. of days in field.	Percentage of working days.
Murchison Goldfield ...	...	...	226	61.92
East Coolgardie Goldfield	64	17.63	...	...
South-West Division ...	4	1.10	...	...
Total ...	68	18.63	226	61.92

F. R. Feldtmann.

The early portion of the year up to the 13th of April was devoted to various duties at headquarters, amongst which were the work on the report, maps, and diagrams of the Youanmi district, and bringing up to date of the black and white geological map of the State, included in Bulletin 89.

The gypsum deposits of Lake Cowcowing were examined during the 14th to the 18th April, and the preparation of the report occupied Mr. Feldtmann up to the 7th May.

Mr. Feldtmann took charge of the office during my absence in the field, and on the 20th October he proceeded to Kalgoorlie, for the purpose of carrying out geological investigations at the North End, particular attention being devoted to the more important mining work carried out in that area, since the detailed survey has been made.

An examination of G.M.L. 5372, P.A. 1991E, and a report made in connection with an application for State assistance under the terms of the Mines Development Act.

Mr. Feldtmann spent in all 68 days in the field during the year, 64 of which were in the East Coolgardie Goldfield.

Alexander G. D. Esson.

During the early part of 1924, Mr. Esson was occupied with a portion of his annual recreation leave for 1923, and thereafter in the preparation of "An Interim Report upon the Paynesville Centre and District," for the Annual Report for 1923, in addition to various details in connection with field plans necessary for further field work at Paynesville, and also in consultation with Dr. Larcombe, Acting Petrologist, regarding specimens of rocks submitted for examination, as well as in other multifarious duties necessitated by the nature of the geological work upon which he was engaged.

On Monday, February 11th, 1924, this officer left Perth for the resumption of his field work at the Paynesville centre and surrounding district, and he arrived back at the Head Office in Perth on Tuesday, September 23rd, 1924. The work covered in that time included an examination of about 300 square miles of country, some of which was carried out in very careful detail, but the main portion, as would be expected, was executed in a broad way. The final reports and maps of the Paynesville centre and district are now in course of active preparation, and ought to be available shortly.

Notes upon the results of various broad driving traverses have been prepared, and are to be found in that portion of this report dealing with the principal results of the year's field operations.

From the date of return to Head Office, Mr. Esson was occupied in the preparation of maps and final report upon Paynesville, in consultation and collaboration with the Acting Petrologist regarding specimens submitted for examination and correlation in various duties, and in annual leave for 1924.

In all 226 days were spent in the field, giving a percentage of total working days of 61.8 per cent. in field work. All the field work by Mr. Esson having been on the Murchison Goldfield.

PRINCIPAL RESULTS OF THE YEAR'S FIELD OPERATIONS.

1.—INTERSTATE ARTESIAN WATER CONFERENCE.

(A. GIBB MAITLAND.)

The Fourth Interstate Conference on the Artesian Water Supplies of Australia was held in Western Australia during the month of October. The Conference, which was attended by representatives from New South Wales, Victoria, South Australia, and the Commonwealth Government (unfortunately Queensland did not officially participate), sat in Perth between the 1st and 6th of October and again from the 14th to the 16th of October, the period intervening being occupied in travelling to the Gascoyne River for the purpose of enabling some of the members to obtain a personal acquaintance with the basal beds of the strata forming part of what is known as the North-West Basin.

The members attending the Conference were:—

Commonwealth—

Thos. Hill, M.V.I.E., Chief Engineer, Works and Railways, Melbourne.

New South Wales—

E. C. Andrews, B.A., Government Geologist.

H. H. Dare, M.E., M.Inst.C.E., Commissioner for Water Conservation and Irrigation.

Victoria—

W. Baragwanath, Director of the Geological Survey.

A. S. Kenyon, State Rivers and Water Supply Commission.

South Australia—

L. Keith Ward, B.A., B.E., Government Geologist and Director of Mines.

J. G. Stewart, M.Inst.C.E., Engineer-in-Chief.

Western Australia—

A. Gibb Maitland, Government Geologist, Chairman.

P. V. O'Brien, M.Inst.C.E., Chief Engineer for Water Supply, Irrigation, and Drainage.

F. W. Lawson, Engineer for Metropolitan Water Supply, and

The Permanent Secretary to the Conference—

Mr. J. E. Slade, of the Water Conservation and Irrigation Commission, New South Wales.

One of the chief objects of these periodical Interstate Conferences is to ascertain the extent, the effective yield, and the amount of stability of Australian artesian supplies with a view to an equitable policy of conservation in order to make them serve as large an area and as large a population as long as possible. It may be of interest to direct attention to the fact, as pointed out on page 11 of the Annual Progress Report of the Geological Survey for the year 1912, that the Interstate Conference "virtually forms a part of that great modern scientific movement of the Conservation of the Natural Resources which is slowly but surely making itself felt throughout the whole civilised world."

Amongst the important matters dealt with during the course of the deliberations of the Western Australian Conference were: temperatures of artesian water at considerable depths; sources of supply of artesian water; chemical composition of the water; leakage of artesian water; palaeontology of the different water-carrying formations; diminution of bore flows, and the means to prevent exhaustion of the supply.

It has been found that in most areas there is an appreciable diminution in the yield from the artesian wells. In the case of Queensland, which draws its supplies from the Great Australian Basin, the following figures, as made available by the Government Geologist, relating to the diminution of the flow in the basin, are significant. Between the years 1914 and 1923 the yield from the artesian wells fell from 500,000,000 gallons to 300,000,000 gallons per day, although 300 additional bore holes were put down. This represents a diminution in the supply of water equal to about 4.6 per cent. per annum, or 6 per cent. if the yields are averaged with the number of bores; at this rate of diminution it has been estimated that in 50 years the basin will only be yielding 20,000,000 gallons of artesian water per diem, an amount about equal to that from 50 of the bores at the present time.

A lessening or even cessation of flow does not of necessity indicate a permanent exhaustion of a basin for there are always fluctuations in the level of underground water. Diminished yields due to (a) lateral leakage of the water; (b) choking of the bores as a result of "creep"; (c) accumulation of sand, fine mud, or some mineral product; and (d) wearing out of or defects in the casing are capable of remedy by methods known to engineers. A permanent decrease in the supply as a result of the

exhaustion of the head by an uncontrolled draft is, however, irremediable; hence in the absence of a healthy public opinion on the matter, legislative enactment is the sole preventative.

2.—GRAPHITE ON THE LOWER PALLINUP RIVER.

(A. GIBB MAITLAND.)

A brief account of the graphite deposit of the Lower Pallinup River appeared as Article 2 in the Annual Progress Report of the Geological Survey for the year 1923. Since that article was written the following report on a sample (1/3865) collected by myself, and submitted to the Government Chemical Laboratory has been received:—

<i>Proximate Analysis</i> (L. 898/24).	
Volatile matter	6.54
Carbon	54.72
Ash	38.74
	100.00

“The gangue is mainly kaolin. This sample is of no value as a source of flake graphite owing to the graphite being present in minute scales. It contains too much mineral matter to be of use for foundry work or pencil making, but might be used for stove polish.”

3.—NOTES ON THE COUNTRY IN THE VICINITY AND TO THE NORTHWARD OF ISRAELITE BAY, EUCLA DIVISION.

(A. GIBB MAITLAND.)

The period between the 12th May and the 26th July was devoted to a reconnaissance of the geologically little known country between Esperance, Israelite Bay, and Fraser's Range. The country was reached by an overland journey from Ongerup *via* Ravensthorpe.

An examination of the country between Norseman and Esperance had been made prior to the present journey by travelling from Norseman *via* Moir's Rock and the Fitzgerald Peaks, thence down the Salt (or Lort) River to the coast. From the mouth of the Lort River the road to Esperance was followed as far as Gage Lake, into which the Dalyup River discharges its waters, thence up the river to the Norseman road as far as the Government tank at the Salmon Gums. A return to Esperance *via* the Grass Paddocks and Bostock Swamp was made. The eastern margin of the country was examined from the Old Fraser's Range Road, *via* Mount Ridley, Clear Streak Well, and Boojebeenyer. The route followed, involving about 800 miles on horseback, enabled a general idea of the geology of the whole of the Esperance hinterland to be obtained, the salient features of which have been included in these notes.

The country in the neighbourhood of Esperance Bay and the hinterland is a tableland made up mainly of granitic rocks of which that [11847] from Mount Ridley is typical. Mount Ridley (N. 24) is a very conspicuous granite ridge trending generally east and west, with a fairly bold escarpment on the northern face. The ridge is about a mile in length, and the highest point rises to a height of about 340 feet above the level of the well.

At Cowalyina (Reserve 2790), several miles to the north of Mount Ridley, the granite has given place to granitic gneiss [11848], the foliation planes of which are vertical and have a dominant strike of northwest and southeast.

The surface of the tableland is of extreme irregularity, and is occupied by a series of salt pans and lakes. These dry or salt lake basins are exceptionally numerous; they are very variable in their outline, are in some cases many miles wide, and the area of some of them is very great. These salt lakes are often very isolated, though at other times loosely strung together, being separated by narrow divisions. Their resemblance to and connection with river channels may be noted in their elongated shape, of which Lake Raeside, over 100 miles in length, may be cited as a typical example. Lake Raeside constitutes the main channel of the central group of lakes forming an ancient water course flowing into the upper reaches of the Ponton River, which is the only defined water channel of any length. The Ponton River in parts of its course is a deep channel with well-defined banks and empties into a large clay pan at a point about 40 miles from where it crosses the Trans-Continental Railway line between Zanthus and Kitchener. Its course from the clay-pan is represented by a broad ill-defined channel trending southward for about two miles, when it loses itself in a large salt-bush flat broken by low banks of powdery gypsum. The flat represents the uplifted estuary into which the Ponton flowed north of Balladonia. The estuary of the Ponton is 120 miles due north of the coast line along the Great Australian Bight.

The series of which Lakes Dundas and Cowan form part are not lakes in the ordinary sense of the word, with a well-defined basin, but are merely parts of another independent river system which had its mouth in the Miocene Sea near Norseman, and the Archipelago of the Recherche near the Lort River. In traversing the Lort (or Salt) River in August, 1911, it was then a strong deep running river of salt water, almost a brine, owing to the fairly heavy rains which had fallen in the hinterland, and was carrying off the overflow from the lakes. A similar condition of affairs was noticed in 1919 by my colleague, Mr. Talbot, when traversing the Ponton; at that time, after a rainfall of two and a half inches, the upper reaches of the river were running very strongly with salt water derived from the salt lakes which form the upper portion of its course.

The existence of such river systems points to the fact that this portion of Western Australia had a heavier rainfall and was much better watered than it is at present, and implies a comparatively recent desiccation of the country which resulted from a regional uplift of about 1,000 feet. Such an uplift tends to cause the rainfall to become heavier on the coastal areas and lighter in the interior. The increase of rainfall in the coastal areas tends to hasten the lowering of their level by denudation and the cutting back of their channels, with ultimately the restoration of a more even distribution of the rain.

Many of the salt lakes contain gypsum deposits. The large lake to the east of Stennet's Rock (Reserve 3045)* has along its edge a deposit about 12 inches in thickness of small crystals of gypsum, whilst near the centre of the lake they are of larger size, often over an inch in length. The crystals in the centre of the lake are not perfectly formed, whilst those along the banks have as a rule all their edges rounded as a result of wind erosion.

Along the shores of some of the lakes horizontal beds of gritty ferruginous sandstone are met with.

* Lands and Surveys Department, Lithograph 11/300.

These sandstones are nowhere very thick. In other localities outliers of quasivitreous quartzites occur and testify to the former wide extension of sedimentary rocks in this portion of the State.

With the exception of a *Pecten* (?) [1/3916] obtained by Mr. C. Hancock from the Oil Prospecting Area 154H, no fossils have yet been met with in the more immediate vicinity of Esperance.

These thin sediments are in all probability only the remnants left in the Plantagenet (Miocene) Beds which are met with at intervals along the maritime districts of the southern portion of the State. Remnants of an extensive limestone deposit of Miocene age occur at Norseman at an altitude of 900 feet above sea level and about 100 miles distant from the coast, and which forms part of the same series.

There is in addition a soft white siliceous rock made up almost entirely of the spicular remains of siliceous sponges. Representatives of these sponge beds have also been met with on the northern shores of Lake Cowan. The deposit consists of a fine-grained marine silt exposed in a series of low white cliffs near the head of Lake Cowan, about 35 miles above Norseman, thus furnishing an indication of the wide area over which these Miocene beds at one time extended.

Cape Paisley Mica Deposit.—A very coarse grained pegmatite [1/3696] dyke, measuring 15 feet in width and of considerable horizontal extent, occurs on the seaward slope of hill No. 61* at Cape Paisley, which rises to a height of 545 feet† above sea level. The dyke occurs along the vertical foliation planes of a highly micaceous gneissic granite, which constitutes the staple formation in the vicinity of the cape, and which has a general northeast and southwest strike. The pegmatite, so far as can be seen, contains potash mica in the form of small books, from which fair quantities of scrap mica are obtainable, although from the material lying on the surface there were sheets capable of being cut into sizes averaging about 2 by 3 inches. In addition to the mica the dyke contains some large fragments of the potash feldspar, microcline [1/3705], which in this locality forms an important constituent of the pegmatite and might under suitable conditions prove capable of being exploited as a source of commercial potash, for the deposit appears capable of yielding a considerable tonnage of feldspar.

Other mica deposits occur in the vicinity of Cape Paisley. One is situated about three miles north of Belling Sand Patch. The mica occurs in pegmatite dykes as "books," from some of which sheets three by four inches could be cut. The quality proved to be excellent, and when submitted to electrical tests proved to be of very high grade.

What is shown on the maps issued by the Department of Lands and Surveys and the Admiralty charts as Mica Hill, some miles to the north of Cape Paisley, takes its name from the mineral occurring in that locality. Some of the mica from Mica Hill (?) contains inclusions of magnetite (magnetic oxide of iron).

The mica-carrying belt of this portion of the State is of considerable extent, having been noted at Simon's Hill, in the Fraser's Range, at which locality several coarse-grained pegmatite veins occur. One

of these dykes, about 6 to 10 feet wide, in which "books" of mica two or three inches square occur, has been opened out to a depth of from 6 to 8 feet. Large crystals of black tourmaline occur in the dyke in addition to the mica crystals.

Mount Ragged Range.—Opportunity was taken to make a brief examination of that group of hills of which Mounts Ragged, Dean, and Russel Range constitute the most conspicuous and outstanding features. Mount Ragged (Rugged) was described by Matthew Flinders in January, 1802, as "lying N. 8° W., 9 or 10 leagues from Cape Paisley." The natives of the interior gave the name of Barningunyah to the mountain, whilst those of the coastal tribes called it Carta-curup. It was referred to as a "jagged peak" by Mr. E. J. Eyre on the 16th May, 1841, in the journal describing his overland journey from Adelaide to King George's Sound.‡

The Russel Range, "lofty and abrupt mountain masses," which lies to the north of Mount Ragged, was named by Eyre on the 26th May, 1841, in honour of Lord John Russel, who at that time occupied the position of Secretary of State for the Colonies.

Mount Ragged, situated about twenty-five miles west-north-west of Israelite Bay, forms one of the landmarks on the dividing line between the Eastern and the Eucla land divisions. The mount forms the highest summit of a very narrow razor-backed ridge with very deep sides, alpine in its grandeur, which extends for some three miles in a direction about north 20 to 30 degrees east.

Mount Ragged is separated from Mount Russel by a well-defined valley trending generally northwest and southeast, and suggesting the possibility of its marking the trend of a fault which extends to the southeast and truncates the southwestern continuation of that range, the principal and most conspicuous summit being formed by Mount Dean. The Mount Dean Range lies to the eastward of Mount Russel and is separated from it by a longitudinal valley from three to four miles wide, and which trends generally northeast and southwest with a gradual fall to the south. No opportunity presented itself of visiting either Mounts Dean or Russel, but from what could be seen from Mount Ragged, they seem to be similar in geological constitution and structure.

The Mount Ragged Range is made up of granitic gneisses and allied schistose rocks, the foliation planes of which dip to the southeast at angles varying from 50 to 60 degrees, and have a general strike of north 20 to 30 degrees east. The mineral constituents of the schists are mainly quartz, with silvery white mica giving them a characteristic lustre, oxide of iron, and a few small zircones. The schists seem to be genetically related to plutonic igneous rocks and probably owe their origin to the transmutation of a granite as a result of the stresses and strains to which it has been subjected since consolidation.

There is a highly plicated thin micaceous band near the southern end of the range, which appears to mark a shear zone along a highly inclined thrust plane. There are numerous contorted quartz veins which conform to the folding which the laminae have undergone. The band contains some fairly large crystals of andalusite [1/3718]. The mineral was

* Lands and Surveys Department Lithograph 3/300. † Admiralty Chart 1059 gives the height as being 345 feet.
‡ Natural Features of Israelite Bay. J. P. Brooke, Aust. Assn. Adv. Sci., Brisbane, 1895, p.p. 561-569.

examined by Dr. E. S. Simpson, who reported that "This has density of 3.22 with a mean refractive index 1.63. It is andalusite, crowded with minute inclusions chiefly carbon, but also rutile, quartz, gas, etc. Similar specimens were received from this locality in 1910, and recorded in the census published by the W.A. Museum in 1912."*

Two schistose rocks [1/3698] and [1/3699] from different portions of the Mount Ragged Range have been examined by the Acting Petrologist, Dr. Larcombe, and chemical analyses made in the Government Laboratory under the direction of Dr. Simpson.

[1/3698, S. 4515.] South end of Mount Ragged. Macroscopic features: A very fine grained granular and somewhat foliated rock with a saccharoidal appearance. It consists of grains of sand with specks of white mica, which are abundant enough to give a powerful sheen to fractures in the direction of the planes of schistosity. Microscopic features: In section the rock is made up of a more or less even granular aggregate of quartz grains averaging about 1/5 m.m. or 1/130 of an inch in diameter. The quartz grains are irregular in shape and do not show much rounding. Between the quartz grains are small rods of white mica arranged with their lengths in more or less parallel direction. The average length of the rods of mica is about 1/125 of an inch. The only other constituents in the rock are a few black specks of oxide of iron and an occasional minute prism of zircon. The rock is a quartz sericite schist the cataclastic microstructure of which suggests strongly a sedimentary origin.

[1/3699, S. 4517.] Spring, East of Tower Peak, Mount Ragged Range. Macroscopic features: A pinkish, medium-grained somewhat saccharoidal-looking quartzitic rock, the foliation planes of which are coated with sealy white mica. Microscopic features: In section the rock is similar to [1/3698] in that it is a quartz sericite schist, but it differs from [1/3698] in fabric. The quartz grains are much larger, their average diameter being about 1/40 of an inch. These large quartz individuals are wrapped round and separated by a very fine grained quartz sericite mosaic. The mica rods are, in places, squeezed and drawn out between the large quartz grains. The section shows strong schistosity and the microstructure indicates a sedimentary origin.

A representative suite of the rocks from the Mount Ragged Range has been analysed in the Government Chemical Laboratory, under the direction of Dr. E. S. Simpson:—

TABLE I.
Chemical Analyses of Rocks from Mount Ragged Range.

Registered No., Name, and Locality.	1/3698. Quartz Sericite Schist, South end of Mt. Ragged.	1/3699. Quartz Sericite Schist, Spring East of Tower Peak, Ragged Range.
SiO ₂	92.46	90.46
Al ₂ O ₃	4.11	4.88
Fe ₂ O ₃	1.34	1.47
FeO ... ..	.08	.10
MnO ... ..	.09	.15
MgO ... ..	.42	.42
CaO	Nil	.09
Na ₂ O ... ..	.04	.02
K ₂ O	1.26	1.49
LiO ₂ ... ..	...	Nil
H ₂ O— ... ..	.08	.04
H ₂ O ... ..	.53	.67
TiO ₂ ... ..	.11	.11
P ₂ O ₅	Nil	.05
ZrO ₂	trace	...
CO ₂	Nil	.07
FeS ₂	Nil	.11
	100.52	99.85
Sp. Gr.	2.69	2.69
Analyst	H. P. Rowledge	H. Bowley

* Census of the Minerals of Western Australia: E. S. Simpson. Guide Book to the Western Australian Museum, Part VI., Minerals. Perth. By Authority, 1912.

The open bay, with a base trending generally northwest and southeast, lying to the westward of the bold headland of Cape Arid and the cape to the south of Tragon Harbour, near the mouth of the Thomas River, in all probability has been determined by the fractures which are responsible for the formation of the bold Mount Ragged Range and that to the east, of which Mount Dean forms the most prominent feature and upon which the Trig. Station has been built.

The shape and general northeasterly arrangement of the coastline from Cape Paisley through Israelite Bay to the neighbourhood of Wattle Camp, suggests that it has been in the main determined by that of the trend of the foliation of the gneisses, which is also parallel to that of the ranges referred to.

Point Dempster, a bold headland which shelves gradually into the ocean, is made up of a coarse granitic gneiss, upon which rest sand dunes. The headland is probably continued to the southeast and forms the bold islands of the "Eastern Group," which lies about two miles from the coast. About four miles northeast of the Israelite Bay Telegraph Office, and on the western side of the telegraph line, are a series of low rises made up of granitic gneiss of the type which characterises Point Dempster; the gneiss is first seen near the northern end of the Yellow Lake, which crosses the northern boundary of Reserve 3805. Near the sea coast the gneisses are covered by blown sand. Similar gneisses are visible along the north-western shores of that long salt lagoon, which extends from Point Malcolm to Point Dempster. The road from Israelite Bay to Mount Ragged skirts the northwestern shores of the lake and surmounts the tableland of the interior at an altitude of about 500 feet by aneroid above sea level. The summit of the tableland, about 12 miles from the Post Office, is made up of granitic rocks, upon which there is a thin covering of horizontal white limestone, forming a low escarpment representing in all probability the southerly extension of the Eucla Limestone.

Leaving the Mount Ragged Range, the main road to Balladonia was followed, and at Junana Rocks gneissic rocks of the prevailing type are exposed. A characteristic specimen has been described by the Acting Petrologist as:—

[1/3697, S. 4513.] Junana Rocks, North-West of Mount Ragged, Neridup District. Macroscopic features: A white granulose rock with gneissose structure and well-marked foliation planes coated with black lustrous biotite. When viewed along the cross fracture the biotite takes the form of disconnected black streaks averaging about 1/5th of an inch in length, though in places the streaks are half an inch long. The granulated material consists of glassy quartz and felspar, many plates of the latter showing cleavage faces. Microscopic features: The minerals observed were quartz, microcline, plagioclase and biotite. In plain light the section is made up of a holocrystalline aggregate of slightly clouded and cleaved felspar, clear quartz and flakes of brown biotite. The bulk of the felspar has a refractive index less than Canada balsam and shows typical cross-hatched twinning. It is therefore microcline, possibly with a little orthoclase. There is a small amount of acid and finely striped plagioclase. The quartz is clear, allotropic and intergrown with microcline in granitic fashion. The biotite occurs in flakes, strongly pleochroic, in dark brown to almost black colours. The rock is a granulated biotite gneiss of igneous origin.

The road from Junana trends generally due north to what is known as Pine Hill, where there is an excavated tank. The rocks in the neighbourhood are fine-grained granitic gneiss traversed by pegmatite dykes. A typical specimen of the gneiss has been examined and described by Dr. Larcombe:—

[1/3702, S. 4520.] Pine Hill, Dempster District. Macroscopic features: An even grained pink to flesh-coloured rock of aplitic texture and somewhat granulose appearance. The constituents are glassy quartz and cleavage facets of felspar. Small flakes of black biotite, with a tendency toward parallel arrangement, are uniformly scattered throughout the rock. Microscopic features: The minerals observed were quartz, microcline, orthoclase, and biotite. In section the rock is an even grained admixture of quartz and microcline in about equal proportions, with, if anything, more microcline than quartz. The quartz is colourless, shapeless, and intimately intergrown with microcline in granitic fashion. The microcline is for the most part hypidiomorphic with well developed "gridiron" texture. A few plates of plagioclase, with very finely striated lamellae and extinction angles of less than five degrees are evidently oligoclase. Dark brown lath-shaped flakes of biotite, with a parallel arrangement of their direction of elongation, are uniformly distributed throughout the rock. The rock is a fine-grained aplitic biotite microcline gneiss. It bears a strong resemblance to [1/3697] and evidently belongs to the same family. It differs textually from [1/3697] in being finer in grain and typically aplitic as well as not being so gneissic. On the other hand, it has the same mineralogical constitution as [1/3697]. The biotite is identical in pleochroism and the plagioclase is quite similar.

An analysis of this rock is given in the table appended. Gneissic rocks occupy the country as far north as Pownia, to the west of Curnading Rock.* At Pownia the gneisses are vertical, and have a general strike of north 20 degrees east. The gneisses of Pownia give place at Balladonia Station to coarse grained massive granite, made up of quartz, microcline and biotite, with a little magnetite, rising to a height of about 50 or 60 feet above the general level of the limestone [1/3703], by which it is everywhere surrounded, and covering an area of about 200 acres. The granite is traversed by pegmatite dykes. The limestone, which is very hard, is only about five or six feet thick, and rests upon a thin bed of reddish sandstone which directly overlies the granite. A suite of fossils was collected from the Balladonia limestones, but this yet awaits determination and description. The limestones of Balladonia form the western portion of the Miocene beds, which constitute the Nullabor Plains. The limestone occupies a portion of the country along the road to Newman's Rocks* for about 20 miles with two relatively small outcrops of granitic rocks at Booma Rocks and Woolganyia (Wahgoninya or the 15-Mile Rocks); at the latter locality the granite is lithologically identical with that at Balladonia, being very coarse in grain.

Newman's Rocks (264/97) are made up of coarse garnetiferous gneiss, which rises to a height of about 60 feet above the general level of the surrounding country. These gneissic rocks occupy the country as far as Fraser's Range; they are, however, intersected by basic dykes, one of which has a north-westerly strike, being met with on the main road at about six miles from Newman's Rocks.

The whole of the country, therefore, inland between Esperance and Israelite Bays is made up of

gneissic rocks of igneous origin, which have had impressed upon them a dominant northeast and southwest foliation. They are traversed by numerous pegmatite dykes, and so far as observations have been carried these appear to have escaped sensible mechanical deformation; hence they are of a younger generation than the gneisses, which occupy a stratigraphically inferior position.

Fraser's Range.—Passing through Fraser's Range, "Orrallinna," en route from Balladonia to Norseman, exigencies of travel necessitated a day or two's delay at the Fraser's Range head station, latitude 32° 2' 15" S., during which opportunity was taken to make a very brief examination of the country in the vicinity, and to collect samples of the different rocks for investigation.

Numerous references to the geology of the Fraser's Range have been made in several publications issued since 1891, but no systematic description and investigation of the country within the limits of the Fraser's Range has yet been attempted nor been found possible.

In the year 1890 a well organised party equipped by Sir Thomas Elder with the object of exploring the country to the westward of Warrina, on the Great Northern Railway line, 633 miles from Adelaide, lying between the parallels of 27° and 29° South latitude, spent some time in the vicinity of Fraser's Range. The brief account of the geology was written by Mr. Victor Streich, the geologist attached to the party, and published as part of the Scientific Reports of the Expedition by the Royal Society of South Australia.†

The highest summit of the range, The Peak, was determined by hypsometric measurements as being 2,010 feet above sea level, and 761 feet above the station hut. The loftiest portion of the range was stated to be about 15 miles in length with a width of from six to eight miles, though it really has a very much greater extension and gradually merges into the surrounding country.

The main mass of the Fraser Range, according to Streich, consists of indistinctly striated hornblende schists, traversed by more or less parallel granitic dykes, the outcrops of some of which stand up above the surrounding country like walls of masonry.

The distinctly banded rock, forming the main mass of the range, collected and described by Streich as hornblende schist, was submitted with the others in the collection to Professor A. W. Stelzner, of Freiberg, who referred to it as "an undecomposed diabase."‡

In 1911 Mr. J. Allan Thomson§ re-examined the duplicate collection and described the rock as "a norite with feeble protoclastic structure, and well marked fluxion banding"; the rock was made up chiefly of schillerised hypersthene, with a little mica and very little hornblende.

Mr. H. P. Woodward, in 1894, gave the geological constitution of the Fraser's Range as being that of

* Lands and Surveys Department Lithograph 17/300.

† Trans. Roy. Soc., S.A., Vol. XVI., Pt. II., 1893, p.p. 74-115.

‡ Loc. cit.

§ Thomson, J. Allan: On Rock Specimens from Central and Western Australia, collected by the Elder Scientific Exploring Expedition of 1891-2.—Proc. Roy. Soc., N.S.W., Vol. XLV., 1911, p.p. 292-317.

massive hornblendic rocks, intersected by basic dykes together with "quartz blows and veins of magnetite and manganese."*

During the course of his investigations into the geology of the country traversed by the Trans-Australian Railway, Mr. C. G. Gibson† referred to the Fraser's Range as being made up of rocks varying from garnetiferous quartz-schist to garnetiferous biotite-gneiss, intersected by coarse-grained pegmatite dykes containing books of mica about two inches square, large crystals of tourmaline, and some allanite.

The two trig. stations, Mount Pleasant‡ to the north, and Wyalinu to the south, of the homestead at Fraser's Range, are made up of garnetiferous pyroxene-gneiss [1/3700] and [1/3707], which may be merely granular varieties of the hornblende granite [1/3704] and [1/3706] frequently met with in the country between the range and Norseman.

The hill known as Mount Pleasant is made up of garnetiferous-gneiss [1/3700] and gneissic hypersthene-gabbro [1/3719] with a marked northeast and southwest vertical banding. The individual bands are not very wide, reaching in the vicinity of the trig. station on Mount Pleasant a thickness of about three of four feet.

A basic rock [1/3707] with a very marked mineral banding forms Wyalinu. The strike of the banding is northeast and southwest, and the rock is virtually a garnetiferous gneiss; it contains in places very large crystals of felspar, too much decomposed, however, to enable specimens to be obtained.

At the Fraser's Range station is a biotite hypersthene-gabbro or norite [1/3708], exhibiting a distinct mineral banding identical in its character with that which constitutes the gneissic gabbro [1/3719] of Mount Pleasant. A similar garnetiferous pyroxene gneiss has recently been obtained by Mr. Inspector of Mines Phoenix from Simon's Hill, about 20 miles to the northeast and near the northern extremity of Fraser's Range. The rock has been examined by Dr. C. O. G. Larcombe, the Acting Petrologist. The gneisses of the Simon's Hill neighbourhood vary somewhat in their lithological character, passing in places from garnetiferous quartz-schist to garnetiferous biotite-gneiss. These gneisses extend over a considerable area of country, and form part of that belt occurring at Buninginia, about 40 miles to the northeastward, where the trend of the foliation is also northeast and southwest.

According to the observations of Streich, as indicated in the section forming Fig. 12 of Plate V., accompanying the scientific results of the Elder Exploring Expedition, the Fraser's Range is made up of hornblendic, felspathic, and siliceous schists.

The southeastern extremity of the Fraser's Range, about 22 miles from the head station, is stated to be made up of "hornblende schist."

The configuration of the range appears to have an intimate connection with the trend of the banding of the rocks, which is on the whole northeast and southwest.

Four analyses of the rocks in the vicinity of Fraser's Range have been made in the Government

Chemical Laboratory, under the direction of Dr. E. S. Simpson:—

TABLE II.
Chemical Analyses of Rocks from Fraser's Range.

Registered No., Name, and Locality.	1/3700. Garnetiferous gneiss, Mount Pleasant.	1/3707. Garnetiferous gneiss, Wyalinu.	1/3708. Norite, Fraser's Range Station.	1/3719. Norite, Fraser's Range.
SiO ₂ ...	60.86	77.10	49.11	52.21
Al ₂ O ₃ ...	14.79	11.89	16.98	17.37
Fe ₂ O ₃ ...	1.12	.36	1.94	.78
FeO ...	7.05	.80	8.87	8.55
MnO ...	.28	.15	.37	.47
MgO ...	2.17	.44	8.44	6.43
CaO ...	4.91	1.31	9.69	8.67
Na ₂ O ...	2.02	1.68	2.29	2.60
K ₂ O ...	4.48	5.90	.81	1.38
H ₂ O ...	.08	.08	.06	.09
H ₂ O ...	.22	.03	.52	.03
TiO ₂ ...	1.60	.29	.95	.60
CO ₂ ...	.04	.06	Nil	.89
P ₂ O ₅ ...	.46	.15	.24	.18
FeS ₂ ...	...	Nil	.04	.09
Cr ₂ O ₃ ...	...	...	.06	.02
	100.08	100.24	100.37	100.36
Sp. Gr. ...	3.02	2.64	3.05	2.98
Mode ...	Felspars Quartz Garnet Augite Ilmenite Apatite Magnetite Zircon	Felspars Quartz Garnet Augite Hornblende Magnetite Ilmenite Apatite Zircon	Andesine Hypersthene Hornblende Biotite Ilmenite Apatite Limonite	Andesine Hypersthene Hornblende Biotite Calcite Quartz Ilmenite Apatite Pyrite Zoisite Zircon
Class ...	...	...	III.—5, 4, 4 Auvergnose	
Analyst ...	J. N. A. Grace.	J. N. A. Grace.	H. P. Row- ledge.	H. E. Hill.

The principal point of interest and importance brought out by the reconnaissance of the country in the vicinity of Fraser's Range is the igneous nature of the rocks examined. Some of these are characterised by the presence of hypersthene, garnets and a marked persistent mineral banding. These rocks appear to bear some resemblance to that group of hypersthene-bearing rocks of India (the Charnockite series) and elsewhere.

Hypersthene bearing rocks, however, have already been described from Norseman, on the Dundas Goldfield, 60 miles east from the Fraser's Range. The hypersthene rock (norite) of Norseman occurs as an east and west dyke, varying from half a mile to a mile in width, which has been proved to extend in an uninterrupted line about 12 miles eastward as far as Mount Norcott, and for a considerable distance to the westward of Norseman itself. This rock, which bears some resemblance to that at Fraser's Range, if not actually part of the same rock mass, exhibits noticeable variations "ranging from hypersthene, through olivine norite to quartz norite with enstatite augite and pyroxene-perthite in many of the specimens." Detailed chemical analyses of the Norseman norite are given in Table "C" on pages 30 and 31 of Bulletin 67, "Analyses of Western Australian Rocks, Meteorites, and Natural Waters," by Edward S. Simpson, 1916.

Norites have also been described from Ora Banda, Broad Arrow Goldfield [12466]; from Cue, Murchison Goldfield [3832]; and from the Cavenagh Range, Eastern Division [1/1099], [1/1098], and [1/1107]; whilst at Cohn Hill, in the same division, a garnetiferous hypersthene-gneiss [1/1095] occurs, which resembles the gneisses of Fraser's Range, where it is associated with other rocks similar in character to those constituting the Charnockite Series of India.

* Woodward, H. P.: On the Country between Broome Hill and the Dundass Hills and the Mines in that neighbourhood. Ad. interim Report of the Department of Mines for the year ending 30th June, 1894. Perth: By Authority, 1894, p. 17-18. † Gibson, C. G.: The Geological Features of the country lying along the route of the proposed Transcontinental Railway in Western Australia.—Geol. Survey Bull., 37. Perth: By Authority, 1909, p. 14-21. ‡ Lands and Surveys Department Lithograph 17/300.

Following the main road from Fraser's Range Station to Norseman, the basic rocks continued for about seven miles, when they gave place to granitic gneiss at what is known as the Ten Mile Rock.* The gneiss at the Ten Mile Rock is vertical, and has an average strike of north 10 to 15 degrees east. At a rock hole 38 miles from the station a hornblende microcline granite (soda granite) [1/3704] occupies the country and continues as far westward as Buldania Rocks (A.8) to the north of Mount Northcott [1/3706]. The granite continues as far as Norseman, where its apophyses, the quartz-porphyrines and the soda-porphyrines (ceratophyres), penetrate all the rock series developed on the field other than the metamorphic sedimentary beds and the newer norite dyke.

Chemical analyses of the two soda-granites and two gneisses were made in the Government Chemical Laboratory, under the direction of Dr. E. S. Simpson; these are given in Table III. hereunder.

TABLE III.

Chemical Analyses of some Rocks from the Country between Mount Ragged Range and Norseman.

Registered No., Name, and Locality.	1/3702. Biotite gneiss, Pine Hill.	1/3697. Microcline biotite gneiss, Junana Rocks, North West of Mt. Ragged.	1/3704. Soda granite, Rock Hole, 38 miles East of Fraser's Range Station.	1/3706. Soda granite Buldania Rocks (A. 8).
SiO ₂ ...	75.00	73.23	71.32	69.88
Al ₂ O ₃ ...	12.57	12.78	15.14	15.18
Fe ₂ O ₃ ...	.85	1.06	.67	1.21
FeO ...	1.00	1.98	.54	1.19
MnO ...	.15	.15	.08	.12
MgO ...	.17	.50	.43	1.13
CaO ...	.87	1.27	1.47	2.86
Na ₂ O ...	2.90	3.66	5.25	4.78
K ₂ O ...	5.82	4.92	3.14	2.15
H ₂ O ...	.04	.03	.16	.06
H ₂ O + ...	.23	.46	.40	.60
TiO ₂ ...	.24	.48	.11	.31
P ₂ O ₅ ...	.07	.17	.57	.15
CO ₂ ...	Nil	.02	.20	.04
FeS ₂ ...	Nil	Nil	Nil	trace
S ...	...	...	.13	...
Less F ...	...	...	99.61 0.06	...
	99.91	100.71	99.55	99.66
Sp. Gr. ...	2.63	2.66	2.65	2.68
Mode ...	Microcline Quartz Oligoclase Biotite Magnetite Limonite Sphene Apatite Riebeckite (?) Garnet (?)	Microcline Oligoclase Quartz Orthoclase Biotite Hornblende Sphene Magnetite Calcite Apatite Riebeckite	Oligoclase Quartz Microcline Hornblende Epidote Biotite Apatite Magnetite Calcite Sphene Fluorite Limonite Kaolin	Oligoclase Quartz Microcline Biotite Hornblende Epidote Muscovite Zoisite Sphene Magnetite Ilmenite Apatite Limonite Zircon
Class ...	I.—4 (3), 1 (2), 3 Liparose, near Alaskose and Toscanose	I.—4, 1(2), 3 Liparose, near Toscanose	I.—4, 1, 4 Kallerudose	I.—4, 2, 4 Lassenose
Analyst ...	D. G. Murray.	D. G. Murray.	H. P. Rowledge.	J. N. A. Grace.

In addition to the magnetite and manganese referred to in the report by Mr. Woodward, previously quoted, ilmenite (titanite of iron) occurs in some portion of Fraser's Range, for a sample of this was handed to me while at the head station. No opportunity, however, presented itself of making an examination of the locality from which the mineral was obtained.

4.—THE GYPSUM DEPOSITS AT DUKIN, AVON DISTRICT, SOUTH-WEST DIVISION.

(F. R. FELDTMANN.)

GEOGRAPHY.

Location.—Dukin Siding is situated in the Avon District on the Wyalcatchem-Mount Marshall branch railway about 115 miles NE. of Perth, as the crow flies, and approximately 159 miles by rail. It is close to the southeastern edge of Cowcowing Lake, a large and, in this area, comparatively well-defined salt lake, extending in a southwesterly direction.

Mineral Claim 29H—the only area being worked during my visit—is situated on the southeastern edge of the lake from half a mile to a mile north of the siding. It is within Location 16454,† formerly held by the Plaster of Paris and Gypsum Company, Ltd., and adjoins part of the western boundary of Lot 124.

Topography and Vegetation.—The surrounding country is gently undulating, there being no hills of any size. There is, for the most part, a gentle slope towards the lake, but in places the lake is fringed by fairly steep, but comparatively low, banks.

The chief timber is salmon gum, which is fairly thick on those areas left uncleared. Some small areas of ti-tree occur along the edge of the lake.

Geology.—The country is largely covered by detrital material, the surface soil being of a fairly light sandy character. A few fragments of travertine were seen in places.

The underlying rock is, without doubt, granite, but only one small outcrop, on the northwest shore of the lake at a point 3¼ miles NW. of the siding and immediately north of the re-entrant angle of Location 18932, was seen. This outcrop was in the form of a low breakaway, and consisted of much decomposed granite, showing incipient laterisation at the surface.

The Gypsum Deposits.—Cowcowing Lake consists, in the vicinity of Dukin, of a number of small clay pans, either more or less oval in shape, or forming narrow winding channels, of which one follows the southeastern edge of the lake. These clay pans are separated by low irregular banks composed chiefly of fine clay and sand, with some gypsum in the form of crystals or the earthy variety kopai, and in places small gasteropod shells and fragments thereof.

The bed of the clay pans consists of a dense, fine, puggy grey clay, extending in potholes in Mineral Claim 29H to a depth of about five feet. A pothole a few feet from the edge of the lake shows the material underlying the grey clay to consist of clay of paler and more reddish colour, containing a large proportion of quartz grains. This deposit was exposed to a depth of about four feet, but no information was available as to its total depth.

The gypsum deposits appear to be chiefly confined to the southeastern side of the lake. In the dry season the floor of the clay pans on this side of the lake, with the exception of the lowest-lying portions, is covered by a layer of gypsum, mainly of the seed type. This layer ranges in thickness from a mere film to nearly a foot. The main deposit on Mineral Claim 29H is usually from four to six inches in

* Lands and Surveys Department Lithograph 18/300.

† Vide Lands and Surveys Department Lithograph 56/80.

thickness. The surface portion of the deposit is fairly white and pure, but the lower portion contains a proportion of fine clay, increasing with the depth. As a rule, only the top two inches is taken off, and this is roughly washed before bagging for transit.

The lowest portions of the clay pans are usually covered by a thin film of salt.

The water level in the dry season is approximately one to two feet below the surface. The water is extremely salt, and in places contains gypsum in solution, as may be seen by the growth of gypsum on grass tufts blown into the potholes.

The extent of the gypsum deposits is said to vary from year to year. One portion of the southeastern channel which was said to be covered by a salt film the previous year was, at the time of my visit, covered by a layer of coarse seed gypsum.

A few shallow potholes near the northwest corner of the claim, in a low bank forming the western edge of the southeastern channel, disclosed a layer, at a depth of about $1\frac{1}{2}$ to 2 feet, containing, in some of the potholes, fairly well developed, usually single, crystals of clear gypsum up to $2\frac{1}{2}$ inches in length and $1\frac{1}{2}$ inches in diameter. Some of the crystals are markedly elongated, one, two inches in length, having a diameter of not less than one-fifth of an inch. In other potholes the gypsum is of a rounded flake-like form.

In places, on the southeastern edge of the lake, are irregular narrow banks of seed gypsum, evidently wind-blown. These banks are probably several feet thick in places. The gypsum composing them is cleaner than that on the floor of the clay pans, but the presence of numerous small bushes, the roots of which penetrate the gypsum, would interfere with the working of this deposit to some extent.

In a few places, for example near the northwest and southwest corners of Lot 124, there are fairly high dunes on or near the edge of the lake. Unlike the dune fringing the southeastern portions of the gypsum lakes at Hine's Hill, where the composing material consists largely of seed gypsum, these dunes are composed mainly of kopai, that composing the dune near the southwest corner of Lot 124 being almost pure. A shallow pothole near the bottom of the western slope of this dune shows the kopai, at this point, to be underlain by discoloured seed gypsum, apparently to a depth of several feet.

As at Hine's Hill, the position of the dunes and of the low banks of seed gypsum indicates that the prevailing wind is from the northwest.

About $1\frac{1}{2}$ miles SW. of Mineral Claim 29H and 24 chains WNW. of the southwest corner of Lot 125, a deposit characterised by unusually large gypsum crystals has been cut in a shallow trench at the foot of a low bank on the lake. The gypsum is distributed as large crystals of arrowhead or of elongated spearhead form, or as irregular aggregates of these forms, mostly arranged with their longer axes nearly vertical, in a band of very puggy grey clay. This band is from $1\frac{1}{2}$ to 2 feet thick and is covered by an overburden, from a few inches to about 2 feet thick, of fine, dusty clay. The base of the gypsum deposit is at about water-level in the dry season. The deposit is underlain by dense, puggy clay. The largest mass of gypsum seen in this deposit was about $2\frac{1}{2}$ feet in length, and was composed of two

imperfect crystals, joined irregularly. The crystals are mostly imperfect, but one nearly perfect arrowhead measuring about $11\frac{1}{2}$ inches in length by $5\frac{1}{4}$ inches in maximum width was obtained, and also a crystal of the spearhead type measuring $16\frac{3}{4}$ inches by a little more than one inch. The crystals are fairly clear, but some are stained slightly brownish, probably by organic matter, and contain small inclusions of clay, arranged parallel to the re-entrant angle of the crystals.

Owing to the difficulty of working this last deposit, and particularly of separating the crystals from the dense, puggy clay, it is unlikely that it will prove payable.

5.—RECENT DISCOVERIES AND DEVELOPMENTS AT THE NORTH END, KALGOORLIE.

INCLUDING THE SURPRISE NORTH CROSS LODE AND THE PAYMASTER LODE.

(F. R. FELDTMANN.)

During the recommencement of the Kalgoorlie survey, it was considered advisable to examine some of the work done at the North End since the survey by myself of that area, the results of which were given in Bulletins 51 and 69 of the Geological Survey, and since my brief visit in 1917. It was hoped that an examination of the recent work, in particular that in the vicinity of the largest albite porphyrite dyke (*vide* Bulletin 69, page 39), which runs through the middle of the Younger Greenstone belt, would supply information that was not available at the time of my original survey. The area occupied by, and that for some distance east of, this dyke, particularly to the north of the Transcontinental Railway, is almost completely obscured by superficial deposits, and at the time of the original survey but few shafts in that area were of sufficient depth to give any indication as to the nature and relative positions of the rocks. From the appearance of the material on some of the dumps north of the Kanowna railway, the presence of a second albite porphyrite dyke, east of the main dyke, was suspected, but no data were available as to its strike and extent. The mining work done since my survey affords a considerable amount of information, still unfortunately incomplete, as to the occurrence of this dyke, as well as of the main dyke and associated lodes.

The leases examined in most detail were the Surprise North G.M.L. 5193E and the Paymaster and Paymaster Proprietary G.M.Ls. 5333E and 5167E, adjoining the Surprise North on the northeast and southeast respectively. The northwestern boundary of the Kanowna Railway Reserve forms the southeastern boundary of G.M.L. 5193E, and that of the Transcontinental Railway Reserve, the southeastern boundary of G.M.L. 5333E. The southeastern boundary of G.M.L. 5167E runs a few feet northwest of the Transcontinental Railway Reserve.

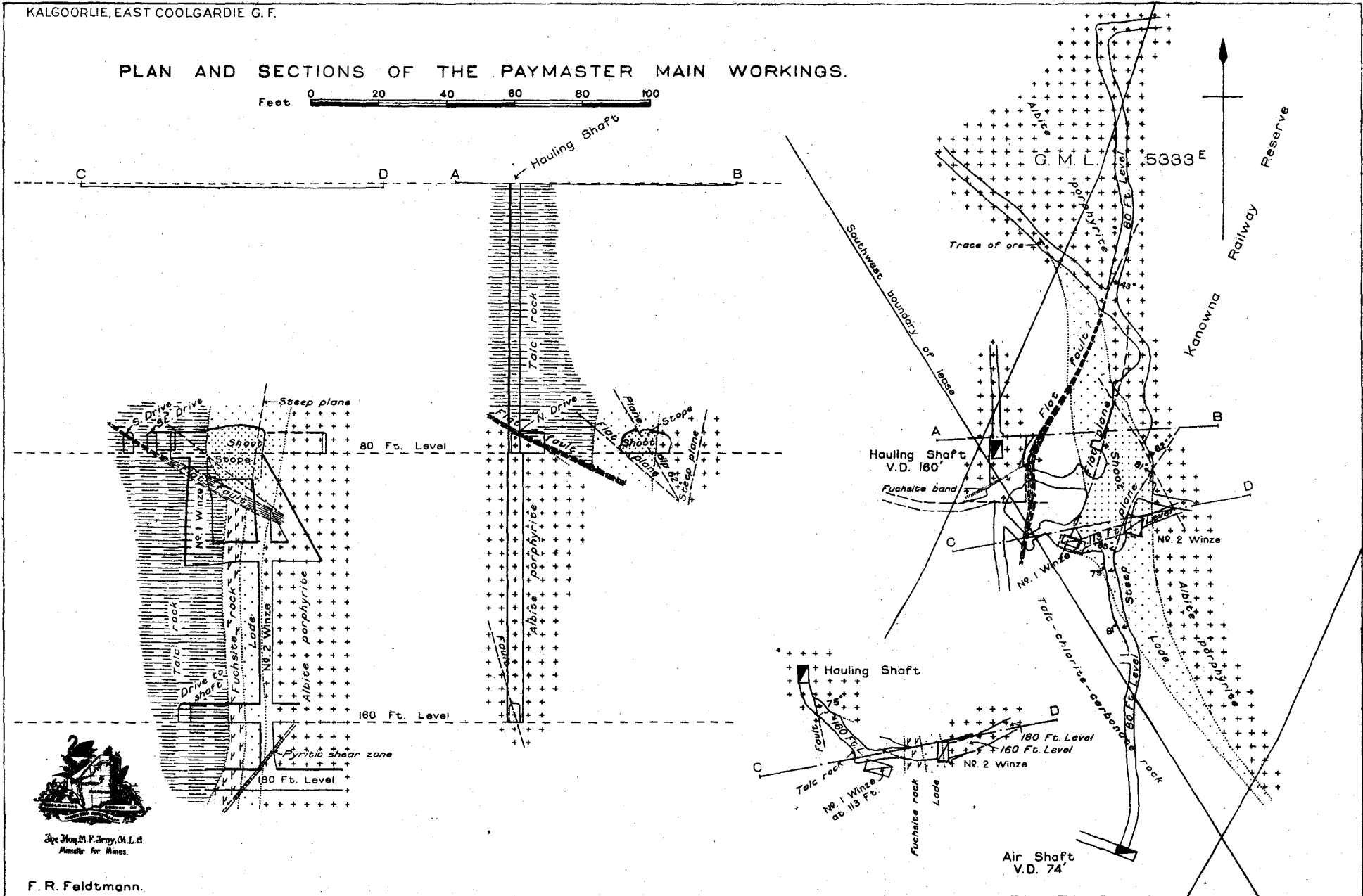
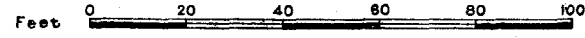
THE SURPRISE NORTH G.M.L. 5193E.

(Plate I.)

General Geology.—This lease, which is held by Mr. M. Hartigan, covers part of the southern portion of former G.M.L. 4461E (4419E), Lone Hand No. 2 (Bulletin 51, pages 42 and 43; Bulletin 69, Plate XIII, sheet 10), and part of the western portion of former G.M.L. 4146E (1121E), Devon Con-

KALGOORLIE, EAST COOLGARDIE G. F.

PLAN AND SECTIONS OF THE PAYMASTER MAIN WORKINGS.



The Hon. M. F. Gray, O.L.S.
Minister for Mines.

F. R. Feldtmann.

sols Consolidated. The main albite porphyrite dyke runs through the middle of the lease. That portion of the lease west of the dyke is partly in talc-chlorite-carbonate rock—derived by incipient vein alteration from hornblendite—partly in quartz dolerite greenstone. The boundary between these two rocks, which both represent portions of the great dyke of Younger Greenstone, is indefinite. That portion of the lease east of the main porphyrite dyke is in talc rock, but an undetermined area of albite porphyrite which may represent a cross band joining the main dyke with the dyke to the east, or be a faulted portion of the eastern dyke, occurs near the northeastern boundary of the lease, a short distance northwest of the Kanowna Railway Reserve.

At the surface, the higher ground in the northern portion of the lease is covered by a deposit of dense laterite. In the lower-lying ground, the rocks near the surface, in addition to ordinary weathering, are largely obscured by detrital material.

The Lodes.—The southerly continuation of the Mystery-Lone Hand line of lode, at or near the northeastern boundary of the main porphyrite dyke, runs through the lease. This lode, which is usually at the junction, but in places is entirely in the porphyrite, is on the whole ill-defined and variable in width and gold content. The workings on this lode in the northern portion of the lease were described in Bulletin 51 (page 43 and figure 23).

A lode of unusual type, discovered since the previous survey, is the Cross Lode, worked from a hauling shaft, approximately 200 feet WNW. of the east corner of the lease. This shaft follows the lode on the underlay—the general dip being approximately 78° —to a vertical depth of 164 feet from the surface, levels being driven at depths of 93 feet, 125 feet, and 164 feet.

A total length of 107 feet of driving—the last 9 feet trending NNW.—has been done west of the shaft at the 164 feet level, and 15 feet east of the shaft. At the 125 feet level, drives have been put in west for 175 feet and east for 163 feet. At the 93 feet level the east drive has a length of 17 feet. The west drive at this level was examined, but, as the stoping between it and the 125 feet level rendered it difficult to survey this drive single-handed, was not surveyed; it is, however, probably fully 140 feet in length. In addition, an intermediate level between the 93 feet and 125 feet levels has been driven east for a considerable distance.

A very considerable amount of stoping has been done between the 125 feet level and the surface west of the shaft, and between the 125 feet level and the intermediate level east of the shaft.

The Surprise North Cross Lode differs from the other lodes yet found at the North End in its strike, direction of dip, and enclosing rock. Although lines of weakness striking nearly east and west are common at the North end, these, with the exception of this lode, are seldom more than one or two inches in width, are filled by typical vein quartz of the fissure type, and, with few exceptions, dip north, and occur mainly in the greenstones. The strike of the cross lode is, on the average, a few degrees north of west. The dip south at angles ranging, so far as determined, from 70° to nearly vertical, the western portion of the lode appearing on the whole to be somewhat steeper than the eastern. The average dip is

probably about 78° . The lode extends from the western edge of the main albite porphyrite dyke—cutting completely through that dyke—to the western edge of the more easterly dyke, the total length being approximately 400 feet. The lode has been formed by intense shearing followed by vein alteration, now consisting of a shear zone of more or less schistose rock with veins and lenses of metasomatic quartz, of a brownish grey colour in the oxidised zone, the middle of the lode being, as a rule, occupied by a main quartz vein.

The lode, where examined, ranges approximately from 1 foot 3 inches to 4 feet 6 inches in width, averaging probably between 2 feet 6 inches and 3 feet, but in places near the surface the lode has been stoped over a greater width, this being probably due to secondary impregnation in the zone of oxidation. The main quartz vein ranges from a thread to 1 foot 3 inches, the greatest width seen being in the shaft about 10 feet above the 125 feet level.

Although the lode occupies a zone of intense shearing, faulting of the porphyrite dyke along it is not noticeable. Striae on the footwall of the lode, in the talc rock immediately east of the main dyke, pitch east at about 50° , and apparently the hanging-wall portion has moved in this direction relatively to the footwall.

The lode itself is completely oxidised even at the 164 feet level, but from 17 to $18\frac{1}{2}$ feet, and also from $20\frac{1}{2}$ to 28 feet, from the face of the west drive at this level, hard compact fuchsite-carbonate rock, associated with a shear zone striking NNW. is noticeable on the south side of the drive, and from 19 to 27 feet on the north side. At the 125 feet level, the wall rock, to about 110 feet west of the shaft is too completely decomposed for determination, but west of this point the rock is distinctly fine-grained albite porphyrite, the porphyrite continuing to a point about 156 feet west of the shaft. West of the point where the porphyrite is first determinable, the lode shear gradually dies out, and near the western edge of the dyke is represented only by the hanging-wall and footwall planes, about 2 feet apart, a vein of oily white quartz up to 3 inches in width occupying the hanging-wall plane. West of the porphyrite is a band—about 10 feet wide in the drive—of weathered carbonated sericitic rock, evidently derived from the talc rock, which, in a partly oxidised form, adjoins it on the west. At the 164 feet level the lode does not appear to extend so far west, and is very narrow for the last 30 feet of the drive, being represented near the face only by a single plane, which at the face is practically vertical. In the east drive at the 164 feet level, the lode is in the porphyrite, which, however, is indeterminable for the most part, for about 97 feet, at which point it enters the talc rock. In the talc rock it consists of a somewhat ill-defined shear zone without quartz. The drive starts to bend north about 24 feet east of the junction of the two rocks and leaves the lode at 30 feet east. At about 46 feet east of the edge of the main dyke the drive again enters porphyrite in which it continues to the face—a distance of about 20 feet. This porphyrite, which is hard and compact and comparatively unweathered, may either represent a faulted portion of the Paymaster dyke or be a tongue joining that dyke with the main one. The boundary strikes northwest and dips southeast at 87° .

The lode cuts and is cut by numerous shear zones or lodes striking in the normal northwesterly direction. Two of these have been driven on—one, consisting of a narrow shear zone with stringers of milky quartz, about 40 feet west of the shaft, has been driven on north for a fair distance at the 93 feet level. The shear zone is apparently younger than the cross lode as its planes cut those of the latter, and if auriferous at all is evidently of low grade. The other shear zone, which is at the shaft at the 125 feet level and about 20 feet west at the 164 feet level, is from $1\frac{1}{2}$ to 2 feet in width, and strikes between NW. and NNW. The dip is steep, ranging from about 70° SW. to nearly vertical. At both levels this lode or shear zone has been driven on southeast for a few feet. The shearing is more marked than in the first shear zone and the lode is apparently cut by, and is older than, the cross lode, but the gold content, if any, is low.

A few feet west of the eastern margin of the main dyke at the 125 feet level is a lode or shear zone, about 5 feet wide, striking northwest and dipping southwest at a steep angle. This lode contains stringers of quartz similar to those of the cross lode and apparently formed at the same time. Some of the planes of the cross lode cut through those of this lode. This lode is very probably the southerly continuation of the Mystery-Lone Hand lode, but appears to carry little or no gold at this point.

Mention should be made of a flat fault or shear zone, striking almost due north or slightly east of north and dipping east at about 45° , from about 103 feet to 110 feet west of the shaft at the 125 feet level and from 59 feet to 62 feet west at the 164 feet level, at which level it is better defined. It cuts through and faults the cross lode slightly. It probably belongs to the same period as the flat fault in the Paymaster hauling shaft at the roof of the 80 feet level.

Official returns for the lease to the end of March, 1925, give a total of 937.93 tons of ore treated for a return of 1,359.36 fine ounces of gold, but the amount of stoping done indicates that a somewhat greater tonnage has been taken out, returns for portion of which may be included in those for earlier leases. The rate per ton—1.45 fine ounces—is unusually high for a lode at this end of the field, particularly considering the nature of the enclosing rock. The gold content is probably patchy, but in the absence of work below the oxidised zone it is impossible to determine what influenced its distribution. The well-defined character of the lode and the high gold content shown by the returns give promise of payability at depth, despite the usually unfavourable nature of the enclosing porphyrite.

THE PAYMASTER G.M.L. 5333E AND PAYMASTER
PROPRIETARY G.M.L. 5167E.

(Plate II.)

The rocks within these two leases are almost entirely obscured at the surface by superficial deposits, and below these are weathered to a considerable depth—about 170 feet in the Paymaster main workings. In addition to normal weathering, incipient laterisation appears to have taken place to a considerable depth in places.

The second albite porphyrite dyke, the western boundary of which is in the vicinity of the main working, situated from about 100 to 140 feet NE.

of the main dyke, runs through the western portion of the Paymaster lease. The general strike of this dyke appears to be about N. 30° W., and the dip probably about 85° WSW. The maximum width is probably about 180 feet. The remainder of the lease is in the talc rock.

The only places where the western boundary of this porphyrite dyke can be determined with any certainty are the Paymaster main workings and those from a shaft—known as the "Green Shaft" from the pale emerald-green colour of the dump—situated 120 feet SE. of the Kanowna railway line and about 190 feet SE. of the Paymaster hauling shaft. In the Transcontinental railway cutting the rocks along the line of the dyke are too completely weathered for determination. From an old shaft on the Paymaster southwestern boundary, 220 feet from the west corner of the lease, a crosscut, now inaccessible, was driven east for 50 feet. This crosscut, which is in completely weathered rock, does not appear to have cut the porphyrite, but from the material on the dump it is probable that the face is very near the western boundary of the dyke.

The position of the eastern boundary is even more uncertain. In a shallow shaft 200 feet ENE. of the Paymaster hauling shaft the rocks are too decomposed for determination, but it is possible that a shear zone, striking about N. 25° E., on which the shaft has been sunk, marks the eastern boundary of the dyke. The only point where this boundary is definitely determinable is in a crosscut driven SW. for 77 feet from an old shaft 300 feet N. of the west corner of the Paymaster lease. This shaft was recently reopened by Messrs. Baudinette and Cousins, and continued to a depth of 58 feet. The crosscut was driven from the bottom of the shaft in the hopes of cutting the northerly continuation of the Paymaster lode. The eastern boundary of the dyke was cut 68 feet west of the shaft, and the crosscut continued in the albite porphyrite for a further 9 feet. About 250 WNW. and 340 feet NW. of this last shaft, and about 50 feet and 40 feet, respectively, east of the Broadarrow Road are two old shafts, both in the talc rock. The dyke should, on its strike from Baudinette and Cousin's shaft, pass between these two shafts, if it continues so far north, but must be narrower than to the south.

G.M.L. 5167E is almost entirely occupied by the main porphyrite dyke, except for a strip of talc rock along its northeastern boundary.

The Ore Body and Workings.—The Paymaster hauling shaft, which has a vertical depth of 160 feet, is situated just within the Kanowna Railway Reserve immediately east of the junction of its northwestern boundary with the southwestern boundary of G.M.L. 5333E. An air shaft and travelling way, 74 feet in depth, is situated 125 feet south of the hauling shaft, with the 80 feet level from which it is connected, and within G.M.L. 5167E and the southeastern portion of the Railway Reserve. The Green Shaft, already mentioned, is 100 feet ESE. of the Air Shaft; it has a vertical depth of 77 feet. In addition, there are a number of shallow shafts in the eastern portion of the Paymaster lease, mostly sunk in the early days of the field and now inaccessible.

The Old Thunderbolt main shaft, now covered by the Transcontinental railway embankment, is situated about 90 feet south of the south corner of the Paymaster. From this shaft crosscuts extend west

for about 130 feet and east for 200 feet, at a vertical depth of 200 feet. These crosscuts, which must cut both porphyrite dykes and would have thrown much light on the geology of this area, were unfortunately inaccessible at the time of the original survey.

The main workings are those at the 80ft. level of the hauling shaft. From this shaft drives extend north and south for about 30 feet and 45 feet respectively, both being now partly mullocked up. The north drive is in porphyrite, which extends for 9 feet south of the shaft, but the porphyrite ends on a flat shear or fault zone at the roof of the plat, above it being talc rock. The south drive is in talc rock. From a point in the south drive about 15 feet south of the shaft, a crosscut, now mullocked up, has been driven westward for about 35 feet, partly on what is probably the easterly extension of the Surprise North Cross Lode, here represented by a thin band of fuchsite-quartz rock, carrying pyrite, at the junction of the porphyrite and talc rock. The crosscut was started in the talc rock, but was said to pass into the porphyrite.

From a point 6 feet south of the shaft a crosscut extends east for 58 feet. In the western portion of this crosscut, in talc rock, was an irregular thin seam, with quartz in places, carrying gold. This may be the continuation of the Cross Lode. The main ore body was cut in the crosscut from 25 to 56 feet east of the south drive. It consists at this level of fuchsite-bearing kaolinic material with, in places, ferruginous patches. East of the ore body the crosscut is in kaolinised porphyrite. From the crosscut drives were extended north and south on the ore body, which has been largely stoped out at this level, the stope extending for about 18 feet south and 40 feet north of the crosscut and for a maximum depth of 8 feet below the floor of the level, but only a short distance above the roof in places.

The south drive off the east crosscut connects with the air shaft. This drive leaves the ore body about 41 feet south of the crosscut, or 23 feet south of the stage, and continues in talc rock—the lode lying to the east of the drive.

The stope passed out of ore at about 30 feet, and 20 feet north of the crosscut on the west and east sides, respectively, and north of these points was in highly ferruginous matter. From a point 41 feet north of the crosscut the drive was continued northwest for 85 feet. This portion of the drive is entirely in weathered porphyrite, the only traces of ore occurring on the west side from 44 to 47 feet from the face, and in the roof of the drive at 40 feet from the face. As no payable body of ore was found in this drive, another drive was put in due north, from a point 18 feet northwest of the stope, for a distance of 85 feet and a crosscut driven east for 18 feet from the end of the drive. Both are entirely in weathered porphyrite.

Two winzes have been sunk in the southern portion of the stope. The No. 1 winze at the southwest corner of the stope has a vertical depth of 32 feet. It is entirely in talc rock. At the bottom a crosscut connects with the No. 2 winze. This crosscut is partly in decomposed fuchsite-carbonate rock, partly in decomposed porphyrite, the lode being at the junction of the two rocks. The crosscut extends east of the No. 2 winze for 15 feet, in porphyrite.

The No. 2 winze is on the east wall of the stope, from 6 to 12 feet south of the main east crosscut.

This winze was started with an easterly underlay, but passed out of the ore body and was restarted vertically and sunk to a depth of 180 feet from the surface, or 92 feet below the floor of the stope. It is partly in the porphyrite and partly in the lode which is very ill-defined. From this winze crosscuts have been driven at depths of 160 feet and 180 feet from the surface. At 160 feet the crosscut was driven west for 26 feet with the intention of connecting with the hauling shaft, but as a result of my survey was turned northwest from this point, and the shaft reached after driving a further 30 feet. Porphyrite was entered about 11 feet from the shaft, the margin striking approximately WNW. at this point. At the 180 feet level from the winze crosscuts extend west for 19 feet and east for 22 feet. The east crosscut is entirely in dense, hard, practically unweathered albite porphyrite, the west crosscut mainly in fuchsite-carbonate rock, carrying some porphyrite. The lode is particularly ill defined at this level, and the gold content low.

The geological structure in the vicinity of the hauling shaft at the 80 feet level is complicated. As stated, the north drive from the shaft is entirely in porphyrite, which extends to about nine feet south of the shaft, its junction with the talc rock striking approximately ENE. The west crosscut is also stated to be mainly in porphyrite. From about 5 feet and 8 feet above the floor of the level, however, the shaft passes into talc rock, the junction, which is marked by a shear zone about a foot wide, striking about NNE. and dipping ESE. at a very shallow angle, the dip ranging from about 30° to 40°. What is probably the same shear zone occurs at the junction of the northwest and north drives from the stope, the dip here being 43°. This remarkably flat junction marked by shearing is highly suggestive of a fault, particularly as what appears to be the southwest boundary of the same mass of porphyrite is cut in the east crosscut at the 125 feet level from the Surprise North hauling shaft. The position of the porphyrite in the crosscuts from No. 2 winze, below the possible fault, indicates, however, that the movement along this fault cannot have been more than two or three feet at most, unless block faulting has taken place, with another nearly vertical fault, along the southern boundary of the porphyrite south of the hauling shaft. Against this is the occurrence of traces of ore in the northwest drive from the stope, unless the lode is younger than the faulting, or the ore is of secondary origin. An alternative solution is that this body of porphyrite is an original tongue connecting the Paymaster porphyrite dyke with the main dyke. Against this last suggestion is the flat dip of the upper boundary which is most unusual for the Kalgoorlie field. Further evidence is necessary to solve this problem satisfactorily.

Conclusions and Recommendations.—There is little doubt that the lode or shear zone worked at the 38 feet and 77 feet levels from the Green Shaft is the southerly continuation of the Paymaster lode. At the 38 feet level it consists of a shear zone, about 3 feet in width, stained pale-green by fuchsite. It is nearly vertical, with a slight dip southwest. It appears to have contained little or no gold in these workings.

In the Transcontinental Railway cutting, immediately east of the projection of the line of the Paymaster southwest boundary, is a shear zone, about

12 feet in width, striking in the direction of the Green Shaft. This may be the southerly continuation of the same lode, in which case it does not follow the southwestern boundary of the porphyrite for any great distance, as is also suggested by the trace of ore in the northwest drive in the Paymaster main workings.

The comparatively short length of the ore body in the main workings, and the fact that the lode is unpayable in those of the Green Shaft suggest two alternatives. Either the supposed lode is a barren shear zone of later origin than the true lodes, and is of the same type as the barren shear zones of the Hannans Reward and other mines (*vide* Bulletin 69, pages 76 to 81 and pages 98 and 101), and the gold in the shoot at the Paymaster 80 feet level has been leached by surface solutions from the eastern portion of the Surprise North cross lode or parallel auriferous quartz leaders; or it is a true lode and the gold has been deposited from deep-seated solutions with concentration at the junction with the cross lode, the extent of the shoot being possibly later modified by surface solutions.

In the first case the shoot is not likely to extend below the zone of oxidation. In the second case the gold will extend to greater depths, but the shoot will most probably be restricted more closely to the junction of the two lodes. As the cross lode has a distinct southerly dip, the pitch of the shoot will be to the south at a steep angle. Short drives north and south might be put in at the 160 feet immediately west of No. 2 winze, to test whether a shoot occurs at this level.

As the shoot at the 80 feet level extends diagonally across the northern portion of the stope, and traces of ore occur in the northwest drive, a crosscut might be put in west from the northwest corner of the stope for a distance of 12 or 14 feet, to see whether payable ore extends in this direction.

As already stated, the south drive between the stope and the air shaft leaves the lode about 23 feet south of the stope. A drive put in in a southeasterly direction from a point about 20 feet south of the stope would test the lode south of this point. A crosscut or borehole might also be put in east for 10 or 12 feet from this point, to test the width of the lode and its gold content. The lode should lie from about 40 to 45 feet northeast of the air shaft, but it is doubtful whether it will be payable so far south. Should the lode prove payable in this direction a drive continued south would, if deepened 4 or 5 feet, connect with the workings from the green shaft.

Official returns for the Paymaster G.M.L. 5333E to the end of March, 1925, give a total of 393.80 tons of ore treated for a return of 161.01 fine ounces of gold—a rate of 0.41 fine ounces of gold per ton.

OTHER RECENT WORK AT THE NORTH END.

Surprise South G.M.L. 5244E.—During my visit work was being done at a shallow depth on a narrow steeply-dipping lode southwest of the Kanowna railway and near the southwest corner of G.M.L. 5244E, which adjoins G.M.L. 5167E on the southwest and covers part of the old Milanese G.M.L. 4293E (Golden Dream G.M. Company, No-Liability). This lode was being worked close to its junction with a jasper which could be seen at the surface during my first examination of this area, but was later covered by the tailings from the Golden Dream treatment plant. The lode, which is fairly well defined, appears

to be the southerly continuation of the Golden Dream middle lode, worked from the old hauling shaft, north of the Kanowna railway, to a depth of 184 feet. At the time of my first survey the lode had been driven on at the 82 feet level from this shaft for a distance of about 80 feet, and at the 112 feet level for 120 feet. The Golden Dream lodes were all of low grade, but the oxidised ore was easily treated.

Fair Play G.M.L. 4069E (Bulletin 69, Plate XIII, Sheet 17, and Fig. 16).—Descriptions of the ore bodies and workings on this lease, formerly G.M.Ls. 4052E Fair Play, and 4063E Fair Play Extended, were given on pages 67 to 70 and 135 to 136 of Bulletin 69, and on page 14 of the Annual Report for 1917. Since the examination of this mine in 1917, some work has been done on a small cross shear zone, parallel to the "Green Shear Zone" and that to the south, at its junction with the main lode. The new cross shear zone is south of those previously worked, and a few feet north of the hauling shaft at the 107 feet level. It has been worked from a short crosscut north of the shaft, and followed in a winze for 10 or 12 feet below its junction with the lode. A small patch of good ore was obtained at the junction. The lower portion of the winze appears to be east of the main lode which is ill-defined south of the junction.

In addition to this work, about 40 feet of driving has been done south of the hauling shaft at the 197 feet level without, however, discovering payable ore. This drive appears to be on one of the barren shear zones of later origin than the lodes, and not on the true lode. This shear zone, which is highly carbonated, but contains practically no pyrite, is identical with the supposed northwest branch of the lode which cuts the true lode about 20 feet north of the shaft at this level. The true lode strikes approximately NNE. and, unless faulted, should lie a few feet west of the shaft. A short crosscut should therefore be driven west from the shaft. The Green Shear Zone, which forms the southern wall of most of the ore shoots and dips south at about 60° to 65°, passes through the shaft just above the 197 feet level, but is not well-marked at this level. Should the suggested crosscut locate the lode, a winze sunk on the lode with a southerly pitch of about 65° might locate another shoot.

Lucell G.M.L. 5375E.—This lease is situated southeast of Williamstown, and is entirely in the older fine-grained greenstones. It covers the greater portion of former G.M.L. 4499E, Williamstown (Bulletin 69, page 127), and the southern portion of G.M.L. 4550E, Marian Catherine, formerly G.M.L. 4450E, Great Secret (Bulletin 69, page 125). At the time of my visit work was being done near the northern end of the lease on the same lode as, but a short distance south of, that formerly worked by Barrass and Hamilton, with whose drive at a depth of 40 feet the work had been connected. The drives are on a lode which here strikes nearly northwest and dips southwest at about 65°. As is usual in the fine-grained greenstones the lode is of low grade.

It was stated on page 125 of Bulletin 69 that this lode should meet the main north and south line, which farther north closely follows the boundary between the Older and Younger Greenstones, at a point approximately 210 feet NNW. of the south corner of the old A.W.A. lease—approximately 34 feet due west of the east corner of G.M.L. 5338E,

Central South, and about 320 feet northwest of the more northerly of Barrass and Hamilton shafts. The ore shoots on the former Creswick and Isabel leases farther north have mainly occurred at the junction of the lodes striking northwest or northnorthwest with the main north and south line and the junction in the Central South is the most likely place along this line for the occurrence of another payable shoot. The surface round this point has been largely obscured by the tailings from the old A.W.A. United plant, and, so far as I know, has never been prospected.

6.—FIELD NOTES UPON THE RESULT OF VARIOUS RECONNAISSANCES AND OTHER EXAMINATIONS.

ALEXANDER G. D. ESSON, M.A. (Aberd.),
Field Geologist.

(a) *The country east, northeast and southeast of Mr. G. A. Moses' "Windsor" Station Homestead, Paynesville, Murchison Goldfield.*

"Windsor" Station, owned by Mr. G. A. Moses, adjoins on its western boundary Paynesville Commonage, and extends eastwards to Rabbit-proof Fence No. 1. Four and a half miles eastwards along the railway line from Paynesville Siding is situated the homestead close to the old abandoned "Windsor" Group of gold mining leases.

Near to this point and slightly east of it, a line running roughly north and south would divide the station into two portions, the eastern portion being mainly granite and the western portion greenstone. A number of prospecting areas and gold mining leases are to be found in the greenstone portion, and these will be fully dealt with in the final report upon Paynesville. It is sufficient to say, meantime, that this greenstone has been examined by the Acting Petrologist, Dr. Larcombe, who has determined it as epidiorite, and believes it to be *contemporaneous with the Kalgoorlie auriferous greenstone*. It is sheared in a north and south direction, a circumstance that is probably attributable to the granite. Reefs follow this main shear direction.

Whilst the writer was engaged in the examination of this portion of the Paynesville greenstone belt, opportunity was taken to examine some more or less new country in the northeast of the granite portion of Windsor Station. In the main this was found to consist of granite with, in places, small inclusions of very much sheared and altered greenstone which could be referred to the Paynesville belt of greenstones. The granite, upon examination by the Acting Petrologist, was found to consist of a large amount of orthoclase felspar, with muscovite, biotite and quartz, and with small quantities of plagioclase felspar. In short, it is a normal granite. There are numerous local variations of composition and form, giving muscovite granite and muscovite gneiss, biotite granite, pegmatite granite, graphic granite, etc.

Near the junction of the greenstone, the granite becomes more pegmatitic and contains numerous veins with large plates of white clear muscovite mica. This is particularly the case also south of and close to the Government Well, "Woodley's Soak," where there is a small sheared greenstone inclusion in the main granite mass. It is possible that, if the mica be found

sufficiently large in size, a marketable deposit may be found. Some specimens found by the writer were very promising and prospectors might be on the outlook for such a deposit. Considering the cost of transport, etc., small mica lodes are not meantime worth prospecting but, from the indications, it is concluded that some very large mica may be found.

Further to the north and to the east of Woodley's Soak, the granite outcrops as large breakaways whose rugged outlines form a prominent feature in the landscape. They form suitable holding ground for the retention and storage of rain water in the form of large gnamma-holes, and evidently these have been used for that purpose by the aborigines as is evidenced by the signs of native occupation around them. One such gnamma hole was about 30 feet or more deep, and even in very dry seasons was reputed by the aborigines to hold water.

The country between lines of breakaways consists of sandy flats derived from the denudation and weathering of the granite. In suitable basins or catchments it will be found that sand soaks can be obtained in this sandy detrital country. In places the aboriginal has utilised some of these as native wells.

It is not to be expected that gold will be found in this area, but minerals other than gold may be looked for, e.g., tin (cassiterite), molybdenite, hematite, mica, etc.

In one place a small bar of hematite was encountered. The hematite was fairly pure but, from a cursory examination, did not seem to be extensive. Other deposits of the same kind may, however, be found.

Further to the south, particularly below the railway line, the granite becomes more solid and outcrops in the characteristic "tor" and poised boulder form. In places shearing has taken place. There are also many coarse muscovite mica veins, which, also, may be worth prospecting. Only good veins of large mica will be worth while, and they ought to be in fairly soft sheared ground, as overhead expenses will cut down values greatly.

The scrub in the northeast portion of the granite area, near to Rabbit-proof Fence No. 1, consists of mulga, needlebush, occasional belts of sandalwood and solitary kurrajongs. It is particularly thick, and on account of its impenetrability, has been designated "The Dismal Scrub"—a very appropriate name in places where light has difficulty in filtering through. Few people, if any, until recently have been able to penetrate it for any distance. In one place near the Dismal Scrub, a small man-built stone mound was observed, but no identification marks could be found in or near it.

(b) *Two mining areas at Mount Magnet, Murchison Goldfield.*

(1) Richardson and Vidilini's P.A. 970M.

(2) J. A. Combe's "Royal Consols" G.M.L. 1029M.

While the writer was passing through Mount Magnet on 13th February, 1924, he was met by various miners and prospectors, and was asked for advice as well as to make a rough examination of the above-named shows. Only a very cursory examination could be made on account of the fact that the writer was proceeding to Paynesville in order to resume his field work there.

(1) Messrs. Richardson and Vidilini were working P.A. 970M, half a mile northwest of Mount Magnet town, and on the site of the old "Speedwell." The area taken up is 18 acres and, if values persist, a lease called "Rich Rock" is to be taken out.

The country rock is sheared epidiorite, similar to that found at Paynesville. The new workings were still in the surface cement and altered surface rock. There are a number of small quartz-hematite bars, much fractured, upon which the workings are situated, and fracturing seems to have been responsible for the gold deposition.

The gold found was extremely rich and coarse, consisting in places of solid plates and of semi-crystalline gold in fractures in the quartz-hematite. It is likely that the gold is secondary, but, nevertheless, it is very rich. It is possible that, from the nature of the occurrence, values will be patchy near the surface but, when found, they will be well worth while.

(2) Mr. J. A. Combe was working "Royal Consols" Gold Mining Lease, No. 1209M, some two and a half miles southwest of Mount Magnet town.

This lease has been successively worked by various parties. It is the original 1055M "Worker" G.M.L., and was held after 1912 as P.A. 807M in 1919, P.A. 826M in 1920, G.M.L. 1190M "Patagonia" in 1920, and 1209M "Royal Consols" from 1923 to present date.

It was not found possible in the limited time to examine all the workings which are somewhat irregular and fairly extensive, but Mr. J. A. Combe, at time of examination, was engaged in developing further a large irregular stoped excavation east of the lode in a crushed contorted black quartz-hematite (or jaspilite?) bar. This bar forms a prominent ridge, and it is banded with alternating vari-coloured bands of quartz, hematite, and possibly limonite.

It is quite evident that there has been a great amount of crushing, and Gibson and Jutson have noted (*vide* Geological Survey Bulletin 59, Misc. Rep. 39), that there is distinct evidence of a fault in the quartz-hematite bar to the east of the workings. Samples of the lode, collected by Mr. Mines Inspector Deeble, upon assay gave returns from 5 dwts. to 18 dwts. per ton.

The faulting and crushing of the quartz-hematite bars seem to be characteristic of the Mount Magnet Centre, and it seems probable that this is intimately associated with the gold deposition.

It is, however, to be noted in the case of the Royal Consols that the gold, which is fine, is found in the crushed zone of the quartz-hematite bar, and it is possible that values may live at depth. This latter is a point that, although possible, can be cleared up only by further exploratory work and a more detailed examination than it was possible for me to give at the time. The full width of the bar and the exact walls of the lode had not been reached. As a *low grade* proposition it may prove worth while exploiting.

To the south of "Royal Consols" Mr. Prospector Bell had found small specimens of gold associated with specks of iron and quartz. This also may be referred to the same bar, or at least to the east fault in the bar and probably, if the fault be followed carefully, small quartz leaders upon it may be found to be the place of origin of the specimens,

Generally in regard to the Mount Magnet Centre, it is to be noted that the auriferous area is of the following character.

(i.) The area consists of a comparatively narrow belt of greenstones of some form of epidiorite, with quartz-hematite bars probably derived from the greenstones.

(ii.) The east and west boundaries of the belt are of granite.

(iii.) The gold is associated with faultings and crushings of the quartz-hematite bars, and in all probability will in many cases be found to be very rich and patchy, and in other cases finely disseminated through the crush-lodes.

(c) *Mr. N. Trude's Prospecting Area upon the Magnet-Youanme Road.*

About 29 miles 32 chains from Magnet, upon the Magnet-Youanme Road, Mr. Prospector N. Trude was found at work some 100 feet south of the road upon a quartz-hematite bar running about south-southeast.

The country rock is coarse gabbroid epidiorite much obscured by ironstone gravel, and it is probable that it forms part of the Paynesville belt of greenstones. It has, where seen, a northwest and southeast strike.

The quartz-hematite bar has been fractured and portions of it have been assimilated, breccia-fashion, by a large quartz reef with a southeast strike.

On the north of these Mr. Trude found small specimens consisting of coarse gold with iron-coated and iron-stained quartz. These he traced up to the break where the quartz reef assimilates the quartz-hematite bar, but at the time of examination (February 15th, 1924) no definite ore body had been found.

It is probable that there is here a small patch of values, and that the cause of the gold deposition is the fracturing of the quartz-hematite bar. It is quite possible that other patches may be found, but, judging from what was seen at time of inspection, no extensive deposit may be expected.

(d) *A specimen handed to the writer by Mr. A. Sharpe, Paynesville, and collected at Eelya Hill, near Cue.*

Mr. Prospector A. Sharpe handed the writer for an immediate opinion some specimens of auriferous, cellular, iron-stained and coated gneissic quartz mica schist, which Mr. Sharpe collected in the vicinity of Eelya Hill, about 17 miles eastnortheast from Cue.

By panning, the specimens give about 15 dwts. of gold per ton. Apparently the specimens were found in granite country, and upon examination this fact is verified by the Acting Petrologist, Dr. Larcombe, who reports as follows:—

"The specimens consist of very coarse schistose rock made up of bands of quartz schist, ferruginous quartz, and ferruginous muscovite schist."

The material, then, has come from a shear zone in granite, and this shear zone has formed a suitable channel for the passage of gold-bearing solutions.

In the Annual Report of the Mines Department for 1906, Mr. A. Montgomery, State Mining Engineer, reports:—

"All the way to Errol's the road from Cue passes over granite country, which does not seem at all promising for new discoveries of gold. Almost on the

direct line to Barrambie, however, there has been some little mining at Eelya, about 20 miles from Cue, and some fairly rich crushings are recorded. The veins as yet tried are currently reported to be small and not likely to prove of permanent importance. From the information given to me in Cue about them, I did not think it advisable to go out of my way to see them."

Mr. Mines Inspector Landor also reports much to the same effect but, having visited Eelya, is more hopeful of gold permanence, and says the area is in granite country.

There seems to be very little doubt that the veins from which the specimen came, are in granite country probably highly sheared. That auriferous veins should occur in granites is not unknown, but it is not, nevertheless, common, and the occurrence is remarkable in that respect, as fairly good values have been obtained from similar veins in that district.

Although it is not likely that permanent auriferous reefs or lodes may be found in granite country, without personal examination, it is impossible to give a definite opinion, but it may be noted that the veins, where found, are occasionally fairly rich in gold values.

(e) *Lewis P.A. at Mooletar, 9 miles from Mount Magnet.*

Near to Mooletar Pool and on the south side of the Magnet-Youanmi road, Mr. Prospector H. Lewis has been working a small Prospecting Area, which is somewhat noteworthy in view of the fact that rich gold is here found associated with nontronite, an apple-green, unctuous-feeling, hydrated iron silicate, and a variety of chloropal.

The nontronite has no special economic value, but it is somewhat rare in occurrence, and particularly so in association with gold.

Its occurrence is in the form of narrow veins of no great length and, apparently, of no great depth in sheared epidiorite among the greenstone ridge outcrops, which are a feature of the landscape in this locality.

The gold is found very finely disseminated through the chloropal and also in small coarse fragments. It is found that the value cut out at depth, but the gold gained was extremely rich, and it is possible that more deposits of a similar nature, as well as associated with quartz, may be expected in this locality. There is a line of greenstone hills north of the road where prospecting might be carried on with this idea in view.

PETROLOGICAL WORK.

(C. O. G. LARCOMBE, D.Sc.)

The early part of the year 1924 was occupied in making a detailed examination of the bore cores from the South End of Kalgoorlie. On arrival at Kalgoorlie a complete survey and classification of all the bore holes—18 altogether—was made and a plan prepared, followed by the preparation of a summary of the results of the petrological investigations of the cores. This summary, together with the plan, was completed in June, and was published in the Annual Report for 1923.

Two visits to headquarters in Perth were made. On the first occasion, at the end of May, a conference took place with the Government Geologist as

to the preparation of the Annual Report for the year 1923, and also with the field officers regarding the petrological aspects of the work upon which they had been engaged. Preparations were also made for the possible return of Mr. Farquharson, the Petrologist. On the second occasion, during the month of July, I was present at a conference with the State Mining Engineer and Mr. John McDermott, the Superintendent of the Ivanhoe Gold Mine, at the opening of the boxes containing the core from the boring being carried out on the Wiluna Development Syndicate's Lease 6J, at Wiluna, under the supervision of Mr. McDermott. A microscopic examination of the core from the No. 2 Bore from the surface to 539 feet 4 inches was made. The zone of oxidation in this locality is very deep, altered and decomposed rock continuing to a depth of 383 feet. Only one rock section was made from the core at 391 feet; it proved that the country rock was originally a quartz dolerite, quite analogous to the country rock on the "Golden Mile," at Kalgoorlie. It will probably be proved on further microscopic investigation that the lodestuff is a metasomatic product of the quartz dolerite. No further details can be given until the company approves of the carrying out of the assaying and detailed petrological investigation, the results of which should throw much light on the origin and genesis of the ore, the primary origin of the ore in relation to any secondary enrichment, and finally the possible life and continuation of the ore body in the zone of fracture—a factor of great importance where it is proposed to heavily capitalise a mine.

Other work carried out during the year may be briefly summarised as follows:—

1. Reports and determination for the Government Geologist and officers of the Geological Survey.
2. Reports and determination for other Departments as well as for the general public.
3. The supervision and preparation of models for the British Empire Exhibition.

The following are synoptical notes on some of the more important investigations made in connection with items 1 and 2.

The Petrology of Paynesville.—Mr. Feldtmann spent part of his field season at Paynesville in 1923.

The rocks were classified as follows:—

1. Acid igneous rocks.
 - A.—Quartz porphyries and their sheared representatives.
 - B.—Felsite.
2. Basic igneous rocks.
 - A.—Epidiorite (gabbro amphibolite).
 - B.—Micropegmatitic quartz epidiorite (micropegmatitic quartz dolerite amphibolite).
3. Zoisite rock.

The Petrology of Youanmi.—The rocks from this district were classified as follows:—

1. Acid igneous rocks.
 - A.—Granite.
 - B.—Aplitic rocks (Alsbachite).
 - C.—Quartz sericite schists.
2. Basic igneous rocks.
 - A.—Coarse-grained greenstones.
 - (a) Epidiorite (dolerite amphibolite).
 - (b) Amphibolite (reconstructed from epidiorite).

- B.—Greenstone schists.
 - (a) Actinolite schist.
 - (b) Quartz-chlorite schist.
- C.—Fine-grained greenstones.
- D.—Gabbro (diagonal).
- 3. Epidosires.
- 4. Lodestuff.
- 5. Banded magnetite-quartz rocks.
- 6. Weathered products:
 - A.—Massive silicified clay.
 - B.—Schisted silicified clay.

The Youanmi and Paynesville areas are thus seen to be made up of a complex of acidic to basic rocks and their crushed and metamorphosed representatives.

The gold areas lie in contact zones of more or less sheared greenstone near granite or some grade of acid porphyry, a feature that, as time goes on, should be more clearly recognised by the prospector.

The complete conversion of the greenstones into lodestuff was no doubt brought about by solutions either concomitant with or as an aftermath of the acidic—either granitic or porphyritic—intrusions.

Rocks from Fraser Range and Israelite Bay.—The Government Geologist, during his field trip through the southeastern portion of the State, collected a more than ordinary interesting suite of rocks.

These consisted of garnetiferous pyroxene gneiss, garnetiferous gneiss, biotite norite, gneissic hypersthene gabbro, hornblende microcline granite, and biotite hornblende granite.

The hypersthene, the garnets, and the granulitic and other features of the rocks from Fraser Range make it clear that they form a most interesting series, which in some respects resembles the Charnockites of India and Ceylon, and perhaps the Hyperites of Sweden. This is not the first reference that has been made to these rocks. Dr. Thomson referred to a norite from Fraser Range, and Mr. Farquharson described a garniferous hypersthene gneiss or granulite from Cohn Hill, with an undoubted resemblance to some of the acid varieties in the Charnockite Series from South India.

The whole of the rocks from Fraser Range which have so far been examined, are of igneous origin. It is quite possible that this Charnockite Series may form a valuable addition to our knowledge of the petrography of the Western Australian Pre-Cambrian Areas.

Russell Range.—The specimens from the Russell Range consisted of granulated biotite microcline gneiss, fine-grained aplitic biotite microcline gneiss, and quartz sericite schist. The schists appear to be of sedimentary origin. The degree of metamorphism in these rocks indicates that they probably represent one of the oldest portions of the Western Australian Pre-Cambrian Areas.

North-West Artesian Water—No. 3 Bore, Mimilya Station.—In November an examination was made of a set of drillings from No. 3 Bore on the Mimilya Station, between the depths of 1,720 and 2,020 feet. The bore contained a large amount of limestone with some mudstone, shale, and fine-grained sandstone. The rock from the bottom was a very fine-grained arkose containing microcline. A descriptive report was prepared and summarised in the following words:—

“There are no geological reasons, judging from the micro-structure of the rock at the bot-

tom of the bore, for stopping the drilling. If large beds of rock like this are encountered, there may be others less clayey, which, provided the intake and rainfall were suitable, as well as the hydrostatic pressure, may contain artesian water.”

North-West Artesian Water Basin—No. 2 Bore, Byro Plains.—In the month of December an examination was made of drillings from between 2201 and 2218 feet (bottom) in No. 2 Bore on Byro Plains Station. All the samples contained water-worn grains of sand, which when compacted into rock might easily form a porous sandstone that would hold water. There is no lithological reason for stopping a bore that produced such material as indicated by the samples from this bore.

Emu Mine, Cue.—A set of highly weathered and decomposed samples from the Emu Mine was examined. So far as the extreme alteration of the material would admit of interpretation, the rocks from the centre of the lode, from the footwall, and from the western crosscut indicated originally argillaceous sandstones or graywackes, which, as a result of extreme metamorphism had been converted into micaceous (biotite) quartzitic sandstones.

1/3650: (a “bar” in the footwall) proved to be quartz felspar porphyry—an acid intrusive. It is important to ascertain the relation of this rock to the ore deposits, because, if it were intruded prior to the period of ore deposition the lodestuff will pass through it, perhaps with a change in values. If it is of newer or later origin than the lodes its influence so far as the displacement of the lode is concerned should be determined.

Experience has shown that porphyries of this nature in other mining fields do not occur in very large masses, and as a rule they do not displace the lodes to any material extent.

Surprise Mine, Northampton.—A sample from the Government Mineralogist and Analyst, Dr. Simpson, and a suite of specimens received from the Government Geologist, were examined.

As a result of detailed petrographic investigations, the following classification was put forward:—

1. Acid igneous rocks.
 - A.—Fine-grained garnetiferous biotite-microcline granite of aplitic texture. [1/3710] (2).
 - B.—Garnetiferous biotite granite. [1/3715] (7).
 - C.—Myrmekitic gneissose granite. [1/3711] (3).
2. Basic igneous rocks.
 - A.—Ophitic gabbro. [1/3716] (8).
 - B.—Massive chlorite rock (fine-grained greenstone). [1/3714] (6).
3. Ultrabasic igneous rocks.
 - A.—Talcose serpentine. [1/3709] (1).
 - B.—Biotitic serpentine. [1/3713] (5).
4. Metamorphic product.
 - A.—Siliceous epidosite. [1/3717] (9).
 - B.—Quartz-zoisite rock of aplitic texture.
5. Vein material.
 - A.—Quartz felspar rock. [1/3712] (4).

The interesting features in these rocks are the garnets with kelyphitic borders in [1/3711] and the myrmekitic intergrowths in the same rock; as well as the curious vein material [1/3712].

Dr. Simpson's quartz-zoisite rock of aplitic texture, with subordinate amounts of muscovite and chlorite, with possibly a little graphite, is of more than ordinary interest. It is desirable that the field relations of this rock be determined at a favourable opportunity. The rock may be of metamorphic origin, but it is open to argument whether, on the other hand, in view of modern research into the production of zoisite, it may be a product of igneous origin.

Rock specimens from Ord River and Oakover River respectively:

Mr. Blatchford, of the State Mining Engineer's Office, submitted two specimens collected by him, one from the Ord and another from the Oakover River, with a view to comparing one with the other. Although these two localities are more than 600 miles apart, it was not possible lithologically to distinguish specimen A (Ord River) from specimen B (Oakover River). Both rocks are creamy-white, dense, and compact, with a hardness of about 3 and a white streak. They each contain curious reddish-brown patches, somewhat elliptical-shaped in cross section, and of similar consistency and hardness to the white material, but with a brownish red streak.

Under the microscope the white portion of the rocks (A and B) is seen to consist essentially of a mass of impure clay, so fine in texture that it can scarcely be resolved with the highest powers of the microscope.

The brownish-red patches are simply ferruginous areas in the clay rock that have been coloured by oxide of iron deposited from iron-bearing solutions that have segregated along these specific areas. The ferruginous patches pass by insensible gradations into the surrounding clay rock. Minute grains of quartz are scattered throughout the oxide of iron, which presents the appearance of a pigment.

In both rocks the original material must have been of the consistency of silt, or finer, and such rocks would be expected to form in quiet water far from the land.

"A" and "B" are alike in the following respects: (1) They are lithologically the same; (2) they were originally of a silty, or finer, nature; and (3) the ferruginous patches in each are quite analogous and of the same origin.

"A" differs from "B" in the following respects: (1) The fact that it contains very minute grains of quartz, which are absent from "B"; (2) the absence of sericite which is abundant in "B"; and (3) the slightly greater hardness and density of "B," which may be due to its intense fineness in texture.

There is no reason why these rocks could not have formed in the same geological period, and under similar conditions.

I have gone into some detail in describing these rocks because there is an important geological problem involved, viz., whether it is possible for the older rocks of the Ord River to be continuous beneath the great Permo-Carboniferous area that extends from the Napier-Oscar Ranges southwesterly to the Paterson Range, a little north of the Oakover River.

Big Bell Mine:

Two samples were submitted from the 50ft. level and one from the south end of the open cut of the

Big Bell Mine near Cue, Murchison Goldfield. They all proved to be quartz-muscovite schists.

Griffith's Gold Mine, Coolgardie:

Two of the specimens from the Griffiths Gold Mine, at Coolgardie, consisted of biotitic syenite aplite. The other was a massive actinolite rock. The aplitic and more acid rocks form the ore-bodies of this region. They intrude the greenstones. The acidic dyke rocks present much interest, for they are analogous to similar rocks that produced a lot of gold at Treadwell, Alaska. Some day these dykes at Coolgardie may be tested at depth. There is little doubt that they are of deep-seated origin.

La Fortuna Mine, Balgarrie:

The rocks from La Fortuna Mine, Balgarrie, proved to be of unusual interest in so far as three of them represented the extreme acid and auriferous phase of a granitic magma. They were classified as follows:—

1. Aplitic alaskite.
2. Biotite alaskite.
3. Actinolite alaskite.
4. Massive chlorite rock.

The first three rocks are undoubtedly forms of alaskite, and bear strong petrographical resemblances to those described from Alaska and Silver Peak, Nevada.

Alaskite is a general term, without regard to texture, applied to siliceous end products consisting essentially of quartz and alkali feldspar from granitic magmas. It is known that alaskite may pass into quartz through all conceivable gradations, and these occurrences at Balgarrie form no exception to that rule, probably forming the end products of rock segregation in that region. A feature in these rocks (1, 2, and 3) is that in many places the magma became filled with large and contiguous feldspar crystals or segregated patches of quartz or of quartz and feldspar.

The presence of gold in these alaskites reminds one of the remarkable occurrence at Edna May, where the ore-body was undoubtedly a siliceous end product from some granitic magma.

The massive chlorite rock was lithologically similar to the chlorite rock at Mount Monger. It may have been formed by the breaking down and recrystallisation of the enclosing greenstone under the influence of the alaskite intrusion.

Sponge Spicules in a rock from the Plantagenet Beds, Lower Pallinup River, Plantagenet District, South-West Division:

The Government Geologist submitted a sample (1/3664) collected by him from the lower reaches of the Pallinup River in the Plantagenet District. It consisted of very light, porous, creamy-white sediment of the consistency of silt. It contained very minute irregular-shaped grains of quartz sand. The rock is non-calcareous and gave a poor reaction for alumina. The micro-organisms are present in the form of sponge spicules of the Demospongiae class and tetractinellida order. Other orders may also be present. In one or two places three rays were visible; in others only one ray; but each form contained the typical axial canal. The spicules were distinctly isotropic and consisted apparently of colloid silica.

*Rock from a large virgin lode near "The Chimney"
at Ajana, near Northampton, South-West Division:*

A compact greenish-grey felsitic rock crowded with shapeless areas of a glassy amethystine mineral and very minute metallic-looking black specks. The rock is a garnetiferous felspar porphyry impregnated by exceedingly small flakes of graphite. Microscopic investigations indicated that it is an acid eruptive of igneous origin. It was evidently at one time a felspar porphyry with a few quartz phenocrysts. The base is finely crystalline, extremely altered, and mostly felspathic. It is crowded with shapeless areas of garnet that are much cracked and altered into dirty green chlorite; in fact, in some places the garnets have been almost completely changed into chlorite. Minute flakes of crystalline graphite are distributed throughout the slide.

*The supervision and preparation of models for the
British Empire Exhibition:*

Right up until the first week in February was devoted to the supervision, construction, and preparation of two models made from actual rock taken from the mines on the "Golden Mile." These two models were designed to illustrate the geological structure of the lode formation and their relation to the surrounding rocks of the field, as well as the Oroya shoot, by means of cross sections down to 3,000 feet. A descriptive article was prepared and illustrated by a drawing made by Mr. Higgins of the Mines Office drafting staff. These models attracted considerable attention at the British Empire Exhibition, and it is hoped that when opportunity is favourable, the plan and descriptive account of the models will be printed in pamphlet form. Copies could then be sent to London where they should be instructive to those interested in the

great goldfield of Kalgoorlie, apart altogether from their educational and scientific value as a brief resumé of the gold contents and production of some of the greatest lodes in the world, as well as a short description of the geology, history, and origin of the ore bodies.

**GEOLOGICAL SURVEY MUSEUM AND
COLLECTIONS.**

The Geological Survey collections remain in somewhat the same condition as in the year 1923. The accessions to the collection during the year 1924 amounted to 81, thus bringing the total number registered up to 17,725. The number of microsections cut and registered was 30, thus making a total of 4,522 slides in the possession of the Survey.

LIBRARY.

The accessions to the library from cognate departments in all parts of the world numbered 585, whilst 19 were added to the collection by purchase. The publications during the period under review comprised the Annual Progress Report for the year 1923 of the usual series issued by the department, and Bulletin 89, a revised edition of Bulletin 50, "The Geology and Mineral Industry of Western Australia." Several of the Geological Survey publications are now out of print, and for some of them there has been a considerable demand; it is, however, obviously undesirable to issue new editions without such revision as is necessary to bring the information up to date. This, however, is at present an impossibility.

Bulletins 84, 85, 86, 87, 88, 90, 91, and 92 have been completed, and are now in the hands of the printer; they should be available for distribution at an early date. Had they been printed earlier the cost of issue would probably have been unduly high, hence the publication of the bulletins has been deferred.

Geological Survey Office,
Perth, 31st October, 1925.



Government Geologist.

DIVISION V.

SCHOOL OF MINES OF WESTERN AUSTRALIA.

The Under Secretary for Mines, Mines Department, Perth.

School of Mines,
Kalgoorlie, 29th January, 1925.

I beg to forward, for the information of the Hon. the Minister, my report for the year 1924.

For the first term of 1924, the number of individual students in attendance was nearly the same as at the beginning of 1923, but, during the year, in a large measure due to the unsettled condition of the mining industry, many families left the district, and the attendance of students at the school fell away. At the end of 1924 there were 117 individuals on the rolls. Owing to the restricted outlook as regards future employment, fewer students than usual entered upon, and more than usual discontinued classwork in the preparatory subjects. Senior students, also, experienced difficulty in securing suitable openings, and some were compelled to leave the district in search of employment elsewhere.

The students and the staff worked steadily throughout the year and, as shown by the fair average of passes which were secured at the annual examinations, the standard of classwork was well maintained.

There was an improvement in the work of the classes in Mathematics, but the subject continues to be a stumbling block for many students who come to the school with insufficient preparation in this important branch of study.

The Preparatory Drawing classes progressed steadily. The new laboratory specially fitted up for the conduct of practical experiments in Junior Physics enabled the instructor to set out his work to better advantage, with the result that there was a considerable saving in the time of the students as well as an increase in efficiency. By visiting the central power station, students of the Physics and Electrical Engineering classes gained a large amount of valuable information from the demonstrations which were given of different machines in operation. The thanks of the school are due particularly to Mr. Jones of the Kalgoorlie Electrical Corporation, to Mr. McGregor of the Kalgoorlie Municipal Light Station, and to Mr. Bosustow of the Boulder City Light Station, for their courtesy and the assistance they afforded the lecturer and his students during the various visits of inspection. Students who have completed the course in Electrical Engineering find little difficulty in securing suitable employment. Present indications are that those who possess a fair knowledge of engineering problems connected with the development and application of power will be increasingly in demand. The Mining and Surveying classes were attended by a small number of senior students. It is noteworthy that those who have been through the Surveying courses at the School of

Mines readily find remunerative employment, and it is not always possible to supply the demand for young men who have had a good training in Surveying at the school.

The enrolment in the Mechanical Engineering classes was satisfactory. Students were regular in attendance, diligent in their studies, and made good progress. The work of the Drawing classes was particularly good. Students recognise that a sound knowledge of machine drawing is a very valuable acquisition, and spare no pains to perfect themselves in the subject. The new models of machines and engine details, supplied during 1924, were a welcome addition to the equipment of the Drawing classes, and will be of great value for instruction purposes in the years to come. A good average attendance was maintained in the Gas Engine and Indicator classes, the students of which made satisfactory progress. The school possesses a good, though not extensive equipment for instruction in internal combustion engine work, and has been successful in training a large number of men who have taken up responsible positions in many parts of the country, but another producer is now required to enable the instructor to extend the scope of his classwork. In Fitting and Turning, there were good classes, although many students were compelled to leave the district to take up positions elsewhere. First year students made many useful workshop tools and received good practice in the use of tools and on the shaping and drilling machines. The second year students, besides making various tools and simple instruments, gained all-round experience in screw-cutting and in accurate workmanship. The knowledge they acquired during the course enabled a number of the students to secure positions on the mines and in the lighting plants of the district. The tools and equipment in the fitting and turning workshop have been kept in good condition by the instructor, but there is need of another large-sized lathe to enable students to obtain more practice in better-class work.

On 31st October, Mr. Millar, Chief Engineer for the Vacuum Oil Company Proprietary, Limited, delivered to students at the School of Mines a very interesting lecture on lubrication as applied to petroleum products. This lecture was a synopsis of those which Mr. Millar delivered in Perth to the Institute of Engineers, the Railway Institute, and officers of the Railway Department, and was on the same lines as the lectures delivered to similar bodies and to University and Technical School students in Melbourne and Sydney.

Although the enrolment of students was not large, a considerable amount of good work was done in the Geology, Mineralogy, and Petrology classes—Preparatory Geology being the most satisfactory. The lecturer devoted a large portion of his time to reclassifying the plans in his department and the mineral and rock specimens used for class purposes, and in connection with the Museum. Thanks are due to Mr. Thomas Esdaile for the donation of a fine set of modern shells from the north coast of the State. These, when the necessary labelling has been completed, will form an interesting and valuable addition to the school collections. During the year the lecturer took his students on several field excursions, and gave them a good training in geological surveying and mapping. Field work is an essential part of the course recognised by the University, and the attached statement shows the usual round of outside work undertaken by the classes. Besides carrying on his ordinary classwork at the School of Mines, Dr. Larcombe has performed the duties of Acting Government Petrologist throughout the year.

Notice has been received that the University will give recognition to work done at the School of Mines during 1925 by students desirous of sitting for the University examinations in Chemistry I. and Geology I.

Although fewer students than usual joined the preparatory classes in Chemistry, and some of the senior classes were not in operation, a large amount of satisfactory work was accomplished in Chemistry and Metallurgy during 1924. The following investigations were made in the metallurgical laboratory:—Cyanidation of Lady Carmen pyritic ore and residues; flotation of Mount Zion pyritic ore (two samples); magnetic concentration of manganese ore; flotation of South Kalgurli ore; and flotation of Gwalia Consolidated pyritic ore. Full reports of the tests conducted by Messrs. Moore and Winter have been forwarded to the Department, and it is recommended that these be printed in the Annual Report. At the end of 1924 it was decided to appoint a Research Metallurgist to devote his whole time to investigations in the Experimental Plant, and applications were invited from the whole of the Commonwealth. Mr. A. S. Winter, who, for several years past, has occupied the position of Assistant in Chemistry at the School, and has taken part in all the tests that have been conducted in the plant, was selected as the most suitable candidate. He will commence his duties at the beginning of 1925. His place as Assistant in Chemistry will be filled by the appointment of Mr. F. F. Allsop, B.Sc.

By furnishing reports as to assay values and by indicating means of utilising and disposing of base metal ores, every effort has been made to give prospectors information likely to be of assistance to them. During 1924, 366 free assays and mineral determinations were made for prospectors of mater-

ial from Crown lands not held under lease for mining purposes, as follows:—

Assays for gold and silver	306
Assays for copper	1
Analyses	16
Determinations of rocks, minerals, etc.	43
	—
Total	366
	—

The statistics dealing with the enrolment of students and the examination results have already been forwarded.

F. B. ALLEN,
Director, School of Mines.

FIELD WORK CARRIED OUT BY THE LECTURER IN GEOLOGY, MINERALOGY, AND PETROLOGY AT THE SCHOOL OF MINES.

1. A detailed geological survey of a small area of country to the west of Kalgoolie.

Students are required to prepare from their field notes a geological map and section setting out the structural geology of the area.

2. A reconnaissance geological survey of 100 square miles of country between Broad Arrow and Ora Banda. This will extend over three or four days.

Students are required to make a special study of the area and to prepare maps and sections from the data and material collected. They are also required to write a thesis.

Bulletin 54 of the "Geological Survey" must be carefully studied.

Petrology students collect and examine microscopically the type rocks of the region.

Special study is made of the lode formations, laterite deposits, and physiographic features.

3. An examination of the 13-mile geological section from Trafalgar through the "Golden Mile" to the conglomerates at Kurrawang.

This enables students to gain a knowledge of the Kalgoolie Series in relation to the Kurrawang Series and the great faulted Rift Valley.

A close study is made of the older fine-grained amphibolites and the newer coarse-grained greenstones.

4. An examination of the area to the south of Kalgoolie, with special reference to the bore sites and an explanation of the extensive boring that has taken place.

An examination is also made of the so-called hematite quartzites, the serpentines and carbonated peridotites, the acid eruptives, and the geological features of the Lake area.

5. A visit to Coolgardie and the Griffiths gold-mining area.

Students are required to make maps and sections of the auriferous acid dyke formations and the enclosing greenstone schists.

6. The geology of Siberia (Waverley). An extensive study is made of shallow and deep alluvials, as well as of the lode formations associated with acidic dyke intrusions into fine-grained amphibolites.

Students prepare a map and section of a large area of this district.

7. A reconnaissance geological survey of the country between Bulla Bulling and Coolgardie.

8. A special study of the geology of the North End at Kalgoolie as set down in Mr. Feldtmann's Bulletin.

Note.—Items 1, 2, 3, and 4 constitute the usual work. Items 5, 6, 7, and 8 may replace one or other of items 1, 2, 3, and 4.

SCHOOL OF MINES OF WESTERN AUSTRALIA.

EXAMINERS.

The following Examiners conducted the Examinations in November, 1924 :—

Subject.	Examiners.
Preparatory Mathematics ...	F. B. Allen, M.A., B.Sc. ; R. Davis, B.Sc., and E. Illidge, B.Sc.
Preparatory Chemistry ...	A. S. Winter
Preparatory Physics and Electricity	C. Cecil
Preparatory Geology ...	C. O. G. Larcombe, D.Sc., F.S.T.C., F.G.S.
Preparatory Mechanical Drawing	C. Cecil
Mathematics I. ...	E. H. Illidge, B.Sc., and R. Davis, B.Sc.
Mechanics—Theoretical ...	R. Davis, B.Sc., and E. H. Illidge, B.Sc.
Physics I. ...	R. Davis, B.Sc., and D. McDougall, A.I.E.E.
Chemistry I. ...	A. S. Winter and R. R. Baxter, B.Sc.
Engineering Chemistry I. and II.	L. W. Phillips, B.Sc., and B. H. Moore, B.E., F.S.A.S.M.
Assaying I. ...	A. S. Winter and R. E. Parry, M.Sc.
Assaying II. ...	B. H. Moore, B.E., F.S.A.S.M.
Metallurgy I. and II. ...	F. C. Stockwell, B.Sc.
Petrology ...	C. O. G. Larcombe, D.Sc., F.S.T.C., F.G.S., and R. E. Parry, M.Sc.
Mineralogy ...	C. O. G. Larcombe, D.Sc., F.S.T.C., F.G.S.
Geology ...	E. H. Illidge, B.Sc.
Mining Geology ...	J. H. Tate
Practical Mathematics ...	B. H. Moore, B.E., F.S.A.S.M., and J. H. Tate
Mechanical Drawing I. and II. ...	J. H. Tate and T. Butement, A.O.U.S.M.
Applied Mechanics ...	T. Butement, A.O.U.S.M.
Mechanical Engineering I. and II.	D. McDougall, A.I.E.E.
Surveying I. and II. ...	C. E. Roberts
Mining I. and II. ...	C. C. Meredyth
Electrical Engineering I. and II. ...	A. R. E. Bosustow
Fitting and Turning I. and II. ...	
Engine-driving I. and II. ...	
Gas Engine ...	
Indicator ...	

JUNIOR SCHOLARSHIP.

Subject.	Examiners.
English ...	B. H. Moore, B.E., F.S.A.S.M.
Physical Geography ...	C. O. G. Larcombe, D.Sc., F.S.T.C., F.G.S.
Mathematics ...	F. B. Allen, M.A., B.Sc.

ATTENDANCES, 1924.

Subjects.	Effective Enrolment		
	1st Term.	2nd Term.	3rd Term.
Elementary Mathematics ...	30	29	23
Preparatory Mathematics ...	33	31	27
Mechanical Drawing ...	41	32	25
Physics ...	26	23	18
Chemistry ...	37	33	22
Geology ...	11	12	10
Mathematics, First Course ...	26	26	23
Practical Mathematics ...	5	4	4
Theoretical Mechanics ...	7	5	5
Physics, First Course ...	15	15	11
Chemistry, First Course ...	17	16	14
University Chemistry, First Course ...	2	1	1
Engineering Chemistry, First Course ...	2	1	1
Engineering Chemistry, Second Course ...	3	4	3
Assaying, First Course ...	2	2	2
Assaying, Second Course ...	1	1	1
Metallurgy, First Course ...	1	1	1
Geology ...	1	1	1
Mineralogy ...	2	2	2
Petrology ...	3	2	2
Mining Geology ...	2	3	3
Mining, Second Course (Mine Sampling) ...	2	1	...
(Ore Dressing) ...	1	1	1
(Mine Accounts) ...	...	...	1
(Mine Administration) ...	...	...	1
Surveying, First Course ...	5	5	5
Second Course ...	4	5	5
Mechanical Drawing, First Course ...	19	18	16
Second Course ...	7	7	7
Building Construction ...	6	5	5
Machine Design ...	5	4	4
Mechanical Engineering, First Course ...	9	9	8
Electrical Engineering, First Course ...	9	7	7
Second Course ...	2	2	2
Fitting and Turning, First Course ...	17	17	12
Second Course ...	10	5	5
Gas Engine and Indicator ...	16	14	14
Totals ...	379	344	292

	1923.			1924.		
	1st Term.	2nd Term.	3rd Term.	1st Term.	2nd Term.	3rd Term.
Total Enrolments ...	430	414	368	379	344	292
Individual Students	172	160	144	174	133	117

EXAMINATION RESULTS.

The following table shows the passes obtained by students of the Western Australian School of Mines, Kalgoorlie, at the Annual Examinations held in November, 1924, including the supplementary Examinations held in February, 1924 :—

Subject.	Class of Pass.		
	Credit.	Pass.	Totals.
Elementary Mathematics ...	2	6	8
Preparatory Mathematics ...	1	8	9
(Arithmetic) ...	...	8	8
(Algebra) ...	...	3	3
(Geometry) ...	...	5	5
Chemistry ...	5	16	21
Drawing ...	7	10	17
Physics ...	7	11	18
Geology ...	2	6	8
Mathematics, First Course ...	...	4	4
(Algebra) ...	...	2	2
(Trigonometry) ...	...	5	5
(Geometry) ...	...	4	4
Theoretical Mechanics ...	...	3	3
Physics, First Course ...	...	8	8
Chemistry, First Course ...	1	9	10
Engineering Chemistry, First Course ...	...	1	1
Second Course ...	1	3	4
Assaying, First Course ...	...	2	2
Mineralogy ...	...	1	1
Geology ...	...	2	2
Petrology ...	1	...	1
Mining Geology ...	...	...	...
Mining, Second Course (Mine Sampling) ...	2	1	3
(Mine Accounts) ...	1	...	1
(Mine Administration) ...	1	...	1
Surveying, First Course ...	1	2	3
Second Course ...	1	3	4
Mechanical Drawing, First Course ...	7	10	17
Mechanical Drawing, Second Course ...	6	1	7
Mechanical Engineering, First Course ...	2	5	7
Mechanical Engineering, First Course (Gas Engine) ...	5	3	8
Mechanical Engineering, First Course (Indicator) ...	2	3	5
Applied Mechanics ...	...	1	1
Building Construction ...	2	4	6
Electrical Engineering, First Course ...	1	6	7
Electrical Engineering, Second Course ...	1	1	2
Fitting and Turning, First Course ...	3	7	10
Fitting and Turning, Second Course ...	1	4	5
Machine Design ...	2	4	6
Practical Mathematics ...	...	3	3
Totals ...	65	175	240

ASSAYER'S CERTIFICATES.

The following have gained certificates :—

Adams, H. ...	P.T.S. ...	March, 1904
Adams, P. ...	P.T.S. ...	February, 1905
Beech, S. J. ...	K.S.M. ...	November, 1906
Brown, T. ...	P.T.S. ...	November, 1906
Brooking, J. ...	P.T.S. ...	November, 1906
Hutchinson, D. M. ...	K.S.M. ...	November, 1906
Banks, R. ...	K.S.M. ...	November, 1908
Gabel, J. ...	K.S.M. ...	November, 1908
Pike, R. W. ...	P.T.S. ...	November, 1908
Wolf, M. ...	K.S.M. ...	November, 1908
Baxter, R. R. ...	P.T.S. ...	November, 1909
Bradley, W. S. ...	K.S.M. ...	November, 1909
Burrows, M. F. ...	P.T.S. ...	November, 1909
Compton, G. S. ...	P.T.S. ...	November, 1909
Cook, H. J. ...	P.T.S. ...	November, 1909
Klem, L. G. ...	P.T.S. ...	November, 1909
Fraser, W. ...	K.S.M. ...	November, 1910
Rowledge, H. P. ...	P.T.S. ...	November, 1910
Benjamin, L. R. ...	P.T.S. ...	November, 1911
Jackson, L. T. C. ...	P.T.S. ...	November, 1911
Leevers, J. C. ...	K.S.M. ...	November, 1911
Lapsley, R. G. ...	P.T.S. ...	November, 1912
Kurth, E. E. ...	K.S.M. ...	November, 1913
Grace, J. N. A. ...	P.T.S. ...	November, 1916
Noall, J. C. ...	K.S.M. ...	November, 1917
Cecil, Clyde ...	K.S.M. ...	November, 1918
Terrell, J. H. ...	K.S.M. ...	November, 1918
Nairn, T. W. ...	K.S.M. ...	November, 1918
Roberts, T. J. ...	K.S.M. ...	November, 1919
Chapman, F. E. ...	P.T.S. ...	November, 1920
Lethlean, H. V. ...	K.S.M. ...	November, 1921
Carrigg, C. G. ...	K.S.M. ...	November, 1922
Greer, J. H. ...	K.S.M. ...	November, 1922
Mundle, E. B. ...	K.S.M. ...	November, 1922
Esdalle, A. N. ...	K.S.M. ...	November, 1923
Paterson, A. V. ...	K.S.M. ...	November, 1923

INDUSTRIAL CHEMIST'S CERTIFICATES.

The following have gained certificates :—

Cecil, C. ...	K.S.M. ...	November, 1921
Chapman, F. ...	P.T.S. ...	November, 1922
Carrigg, C. G. ...	K.S.M. ...	November, 1922
Esdalle, A. N. ...	K.S.M. ...	November, 1922
Paterson, A. V. ...	K.S.M. ...	November, 1924

MINE SURVEYOR'S CERTIFICATES.

The following have gained certificates:—

Peat, J.	...	...	K.S.M.	...	November, 1909
Adams, H.	...	...	K.S.M.	...	November, 1910
Banks, R.	...	...	K.S.M.	...	November, 1911
Gabel, J.	...	...	K.S.M.	...	November, 1911
Pike, R. W.	...	...	K.S.M.	...	November, 1912
Godden, F. R. W.	...	...	K.S.M.	...	November, 1915
Mundle, E. B.	...	...	K.S.M.	...	November, 1915
Leevers, J. C.	...	...	K.S.M.	...	November, 1916
Crutchett, I. A.	...	...	K.S.M.	...	November, 1920
Powell, T.	...	...	K.S.M.	...	November, 1921
Agnew, R. J.	...	...	K.S.M.	...	November, 1922
Crutchett, E. G.	...	...	K.S.M.	...	November, 1922
Davies, I.	...	...	K.S.M.	...	November, 1922
Eddy, J. T.	...	...	K.S.M.	...	November, 1922
Rosenberg, J. M.	...	...	K.S.M.	...	November, 1923
Gibbons, L. P. J.	...	...	K.S.M.	...	November, 1924
Terrell, J. H.	...	...	K.S.M.	...	November, 1924

DRAUGHTSMAN'S CERTIFICATES.

The following have gained certificates:—

Galt, W.	...	...	K.S.M.	...	November, 1915
Butement, J. C.	...	...	K.S.M.	...	November, 1915
Edmondson, F. C.	...	...	K.S.M.	...	November, 1915
Lang, J. H.	...	...	K.S.M.	...	November, 1915
Davies, W.	...	...	K.S.M.	...	November, 1917
Weselman, C.	...	...	K.S.M.	...	November, 1917
Thompson, E. P.	...	...	K.S.M.	...	November, 1920
Gill, L. J.	...	...	K.S.M.	...	November, 1921
Macbeth, R. A.	...	...	K.S.M.	...	November, 1921
Rosenberg, J. M.	...	...	K.S.M.	...	November, 1921
Spalding, J.	...	...	K.S.M.	...	November, 1922
Taylor, H.	...	...	K.S.M.	...	November, 1922

ELECTRICIAN'S CERTIFICATES.

The following have gained certificates:—

Galt, W.	...	...	K.S.M.	...	November, 1915
Butement, J. C.	...	...	K.S.M.	...	November, 1915
Edmondson, F. C.	...	...	K.S.M.	...	November, 1915
Lang, J. H.	...	...	K.S.M.	...	November, 1915
Davies, W.	...	...	K.S.M.	...	November, 1917
Weselman, C.	...	...	K.S.M.	...	November, 1917
Thompson, E. P.	...	...	K.S.M.	...	November, 1920
Gill, L. J.	...	...	K.S.M.	...	November, 1921
Macbeth, R. A.	...	...	K.S.M.	...	November, 1921
Rosenberg, J. M.	...	...	K.S.M.	...	November, 1921
Spalding, J.	...	...	K.S.M.	...	November, 1923
Taylor, Harry	...	...	K.S.M.	...	November, 1923

GEOLOGIST'S CERTIFICATES.

Gabel, J.	...	...	K.S.M.	...	November, 1911
Leevers, J. C.	...	...	K.S.M.	...	November, 1916
Mundle, E. B.	...	...	K.S.M.	...	November, 1920
Agnew, R. J.	...	...	K.S.M.	...	November, 1923

DIPLOMAS.

The following students have gained diplomas:—

Beech, S. J. (K.S.M.), Diploma in Metallurgy, November, 1906.
 Adams, P. (P. and K.), Diploma in Metallurgy, November, 1907.
 Adams, H. (P. and K.), Diploma in Metallurgy, November, 1908.
 Banks, R. (C. and K.), Diploma in Metallurgy, November, 1910.
 Burrows, M. F. (P. and K.), Diploma in Metallurgy, November, 1910.
 Compton, G. S. (P.T.S.), Diploma in Metallurgy, November, 1910.
 Cook, H. J. (P.T.S.), Diploma in Metallurgy, November, 1910.
 Gabel, J. (K.S.M.), Diploma in Metallurgy, November, 1910.
 Gabel, J. (K.S.M.), Diploma in Mining, November, 1911.
 Pike, R. W. (P. and K.), Diploma in Metallurgy, November, 1911.
 Galt, W. (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1915.
 Butement, J. C. (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1915.
 Edmondson, F. C. (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1915.
 Lang, J. H. (K.S.M.), Diploma in Mechanical and Electrical Engineering November, 1915.
 Grace, J. N. A. (P.T.S.), Diploma in Metallurgy, November, 1915.
 Bradley, W. S. (K.S.M.), Diploma in Metallurgy, November, 1915.
 Kurth, E. E. (K.S.M.), Diploma in Metallurgy, November, 1916.
 Getty, A. (K.S.M.), Diploma in Metallurgy, November, 1916.
 Le Mesurier, C. R. (K.S.M.), Diploma in Metallurgy, November, 1916.
 Leevers, J. C. (K.S.M.), Diploma in Mining, November, 1916.
 Davies, Watcyn (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1917.
 Weselman, Carl (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1917.
 Nairn, T. W. (K.S.M.), Diploma in Metallurgy, November, 1919.
 Mundle, E. B. (K.S.M.), Diploma in Mining, November, 1920.
 Thompson, E. P. (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1920.

DIPLOMAS—continued.

Gill, L. J. (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1921.
 Macbeth, R. A. (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1921.
 Rosenberg, J. M. (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1921.
 Rowledge, H. P. (P. and K.), Diploma in Metallurgy, November, 1922.
 Taylor, Harry, (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1923.
 Spalding, J. (K.S.M.), Diploma in Mechanical and Electrical Engineering, November, 1924.

ENGINE-DRIVER'S CERTIFICATES.

The following students of the School of Mines passed examinations held by the Chief Inspector of Machinery during 1924, for various Engine-Drivers' Certificates:—

Name.	Class.
McNeill, J. B.	... First Class Competency.
Rasmussen, L. P.	... First Class Competency.
Smythe, T. P.	... First Class Competency.
Thrupp, T. W.	... First Class Competency.
Scott, T. C.	... Second Class Competency.
Lloyd, R. F.	... Second Class Competency.
Yews, D. C.	... Second Class Competency.
Allen, G. W.	... Second Class Competency.
Elsbury, J. A.	... Third Class Competency.
Bosustow, A. R.	... Internal Combustion Competency.
Boulter, J. H.	... Internal Combustion Competency.
Johns, E. N.	... Internal Combustion Competency.
McCahon, J. H.	... Internal Combustion Competency.
Donovan, J. G.	... First Class Certificate.
Godfrey, P. H.	... Winding Certificate.

SCHOLARSHIP EXAMINATIONS, 1924.

JUNIOR SCHOLARSHIP.

Candidate.	District.
Harman, C. H.	... Kalgoorlie.
Bell, W. R.	... Kalgoorlie.
McConnell, T.	... Kalgoorlie.
Williams, J. D.	... Kalgoorlie.
McMahon, E.	... Boulder.
Scott, J.	... Boulder.
Lehman, K.	... Boulder.

C. H. Harman gains the Junior Scholarship.

ENTRANCE SCHOLARSHIP.

Candidate.	District.
Neville, R. L.	... Kalgoorlie.
Wynne, W. E.	... Kalgoorlie.

R. L. Neville gains the Entrance Scholarship.

SENIOR SCHOLARSHIP.

Candidate.	District.
Bell, C. H.	... Kalgoorlie.
Sargent, R. A.	... Kalgoorlie.

C. H. Bell gains the Senior Scholarship.

CHAMBER OF MINES SCHOLARSHIP IN METALLURGY.

Candidate.	District.
Wynne, W. E.	... Kalgoorlie.
Nicholson, A. W.	... Kalgoorlie.

W. E. Wynne has been recommended for the Scholarship.

CHAMBER OF MINES SCHOLARSHIP IN MINING.

Candidate.	District.
Jensen, Harold	... Kalgoorlie.

Scholarship recommended.

THE CRITCHLEY PARKER PRIZE.

The following Students have been recommended for the prizes offered by Critchley Parker, Esq., Melbourne:—

R. J. Agnew—The Industrial Australian and Mining Standard.
 E. L. Rosenbrock—Mining Standard Publication.

MECHANICS' INSTITUTE (KALGOORLIE) FREE MEMBERSHIP PRIZES.

The following have been recommended:—

D'Almeida, J. M.; Ferguson, J. W.; Forbes, G. E.; Glendinning, A. R.; Jensen, Harold; Leslie, B. H.; Nicholson, A. W.; Thompson, A. F.

DIVISION VI.

OPERATIONS UNDER "THE INSPECTION OF MACHINERY ACT, 1921."

Annual Report of the Chief Inspector of Machinery and Chairman of the Board of Examiners for Engine-drivers, for the Year ending 31st December, 1924, with Statistics.

Office of the Chief Inspector of Machinery,
Central Government Buildings,
St. George's Terrace,
G.P.O., Box 358,
Perth, 31st March, 1925.

The Under Secretary for Mines.

Sir,

I have the honour to submit, for the information of the Hon. the Minister for Mines, the following report on the operations of "The Inspection of Machinery Act, 1921," in the districts proclaimed thereunder, together with statistical tables, for the year ending 31st December, 1924.

The report is divided as follows:—

- (1) Inspection of Boilers.
- (2) Explosions and interesting defects.
- (3) Inspection of Machinery.
- (4) Prosecutions under the Act.
- (5) Accidents to persons caused by machinery.
- (6) Engine-drivers' examinations and kindred matters.
- (7) General.

DIVISION I.

Inspection of Boilers.

The number of useful boilers on the register at the end of the year was 3,199 as against 3,135 at the end of 1923, showing an increase of 64 boilers. There were 103 new registrations during the year, including air receivers and steam-jacketed vessels, and two boilers which had been permanently condemned were reconstructed and reinstated as boilers. As against this there were 25 permanently condemned, and 16 were transferred beyond the jurisdiction of the Act.

Of the 103 new registrations 37 were imported from the United Kingdom, 10 from America, 13 from the Eastern States, and 23 (mostly air receivers), whose origin could not be traced. Twenty were made in this State, including one loco portable, one locomotive, one vertical stationary, seven air receivers, seven steam-jacketed vessels, two small cylindrical gas-fired boilers, and one digester.

Operations in the Various Districts.

The following return shows the operations in the various proclaimed districts in connection with boilers as compared with 1923:—

*Return showing operations in the Proclaimed Districts
(Boilers only) during the year ended 31st December, 1924.*

	Totals.	
	1924.	1923.
Total number of boilers registered and capable of being used as steam generators	3,199	3,135
New registrations during the year	103	84
Boilers re instated	2	1
Inspections for year—		
Thorough	1,598	1,494
Working	164	154
Boilers condemned during year—		
Temporarily	96	62
Permanently	25	20
Boilers transferred beyond the jurisdiction of this Act	16	12
Number of notices issued for repairs during the year	462	374
Number of certificates issued (including those issued under Section 30) during the year	1,606	1,519
Total amount of fees for 1924 ...	£ 3,023 8 3	£
Total amount of fees for 1923 ...	... ..	2,841 17 2
Total number of Inspectors ...	8	8

The revenue from boilers shows an increase of £181 11s. 1d., as compared with revenue from this source for 1923.

The number of thorough and working inspections was 1,598 and 164 respectively, making a total of

1,762, showing an increase of 104 thorough inspections and 10 working inspections.

In the South-Western district 1,362 inspections were made, or over 77 per cent. of the total number made in all districts. The inspections made in this district show an increase of 136 as against 1923.

In the Kalgoorlie group 307 inspections were made, being 17 per cent. of the total inspections. The inspections in this district showed a decrease of seven.

In the North Coolgardie and Mount Margaret districts 53 inspections were made, or three per cent. of the total number. The number of inspections made is the same as in 1923.

In the East Murchison and Murchison and Yalgoo districts 40 inspections were made, or 2.27 per cent. of the total number, and the inspections showed a decrease of 14.

No inspections were made in the Carnarvon district. The Nor'-West Meat Works, Limited, had not commenced operations, and it was therefore considered unjustifiable to incur the expense of this long journey. It is hoped that a visit may be made to this district during the present year.

The following table shows the number of boilers temporarily or permanently condemned, as a percentage of inspections made each year, since the inception of the Act controlling boilers:—

Number of Temporarily and Permanently Condemned Boilers per 100 Inspections made since 1899.

Year.	Temporarily.	Permanently.
	Per Cent.	Per Cent.
1899	2.64	1.42
1900	2.21	.498
1901	4.34	.511
1902	5.00	.958
1903	2.43	.697
1904	3.08	.389
1905	2.84	.388
1906	3.98	.960
1907	4.36	.802
1908	3.18	.599
1909	2.89	.797
1910	4.49	1.382
1911	3.54	8.070
1912	3.93	2.471
1913	2.64	2.431
1914	2.97	2.178
1915	4.72	1.538
1916	3.97	1.456
1917	3.19	1.301
1918	3.25	1.563
1919	3.14	3.547
1920	3.28	2.171
1921	4.33	1.358
1922	5.22	.940
1923	3.76	1.213
1924	5.44	1.418

It will be seen from the above table that the number of boilers temporarily condemned for repair during the year has been unusually large, the largest, in fact, since 1899. Now that the difficulty in regard to the supply of plates has been overcome, new material has been available for repairs, and these have been carried out in such a manner as to restore the boiler, as far as possible, to its original strength. Repairs, with the exception of a few of minor importance, have been executed by skilled tradesmen, and boilers have been subsequently tested by hydraulic pressure.

The number of boilers permanently condemned as being no longer safe to be used as steam generators

was not unusually large. I anticipate, however, that in the near future this item will show a considerable increase. Further on in this report a table will be found showing the ages of the various types of boiler in the State, and it will be seen that there are many boilers of considerable age which, in the nature of things, cannot last much longer. This matter is referred to later.

DIVISION II.

Explosions and Interesting Defects.

I have again to report that during the year under review no boiler under the jurisdiction of the Act has exploded. Many of the boilers are now well over 20 years old, and these aged boilers are being watched with special care. Their complete history as far as could be obtained has been carefully kept, and inspectors, knowing the records, are enabled to make due allowance for their age, taking into consideration the workmanship, maintenance, and treatment in past years. They are thus able to avoid mistakes which might easily occur if the records were other than they are.

During the year the cast-iron column carrying the valve of a dead weight safety-valve fractured. The weights and broken column fell over sideways on to the boiler top, and all the steam in the boiler was suddenly released. The driver turned on the feed pumps to their full capacity and drew the fires. His action is to be commended. No damage, other than to this fractured casting, was done. The casting appeared amply strong. The fracture, however, revealed three small flaws which were probably original defects caused in cooling the casting. The column has been replaced by a cast steel one.

A peculiar case of rapid corrosion occurred in a Lancashire boiler on a mine in the Mt. Margaret district. The boiler was fitted with entirely new flue tubes in November, 1923. In October, 1924, it was thoroughly inspected, and the flue tubes, particularly at the parts exposed to greatest heat, were found badly corroded. The reduction in thickness in places amounted to 3/16ths of an inch.

The feed water used was the ordinary well water of the district, which contained considerable quantities of sodium chloride, magnesium chloride, calcium chloride, calcium sulphate, etc. The water was treated with soda ash and aluminous ferric. In spite of treatment the flue tubes became coated with scale, and some corrosion took place. In March, 1924, a new treatment plant was put into operation, using lime to get rid of hardening and Witherite (Barium carbonate) to get rid of sulphates. All scale forming salts were eliminated, and after 12 months it has not been necessary to use a chipping hammer. Frequent analysis of the feed water is made, and in April, 1924, the presence of sulphates was detected. The source was traced to a leaky tube in the condenser. It was found that some of the scrubber water from the gas producer had been introduced into the cooling water, as an experiment, to clean the scale out of the gas engine's water jackets, and the leaky tube allowed the condensate to be contaminated by sulphate from the scrubber water.

The new treatment, and the very careful system adopted of frequent analyses of the water, appears

to be giving excellent results, both in the matter of prevention of corrosion and of scale-forming matter.

During the year several boilers of different types, which were imported and made by various makers, were found to have the glass water gauges fixed too low with regard to furnace crowns or other highest part exposed to heat. In one case the holes in the plate, to which the lower glass water gauge fittings were attached, were found to be 2in. below the furnace crowns of a Lancashire boiler. As these boilers are often at least 1½in. lower at the front end than at the back, these holes would be about 3½in. below the tops of back ends of flue tubes, and these plates consequently, would not be covered when water was just in sight in the glass.

Of course, a case of this kind shows gross carelessness on the part of the persons responsible for the fitting of the glass water gauges, but, as several such cases have been discovered, purchasers of boilers should make sure that these fittings are properly placed.

DIVISION III.

Inspection of Machinery.

The following return shows a classification of the power-driven machinery in the proclaimed districts.

The total number of groups now registered is 5,563, which shows an increase of 348 for the year.

Electrically-driven groups now number 3,251, showing an increase of 329 during the year. Steam-driven groups remain stationary. Suction gas-driven groups have increased by five. Ordinary town gas groups remain as in 1923. Hydraulic groups have increased by one, and compressed air groups have increased by two.

Return showing Classification of various sources of power-driven Machinery in use or likely to be used again in Proclaimed Districts during the year ended 31st December, 1924.

Classification.	Totals.	
	1924.	1923.
No. of groups driven by—		
Steam Engines	1,106	1,106
Oil Engines	925	914
Ordinary Gas Engines	11	11
Suction Gas Engines	224	219
Compressed Air Engines	36	34
Electric Motors.	3,251	2,922
Hydraulic Pressure	10	9
	5,563	5,215

The following table shows the number and description of all lifts in this State:—

<i>Passenger lifts—</i>	
Electrically-driven	82
<i>Goods lifts—</i>	
Electrically-driven	88
Hydraulically-driven	9
Belt-driven	10
Hoists	68
	257

Eight new passenger lifts, eight goods lifts, and five hoists were erected during the year.

Several of the older goods lifts were scrapped, so that there were 21 new lifts and hoists erected during the year, the actual increase is only 12.

The provisions of the Act with regard to machinery are being carried out satisfactorily, and instructions given relative to guards, etc., are, in the majority of cases, cheerfully complied with. The number of notices ordering guards, fences, etc., may appear somewhat large (350), but when it is considered that there were 348 new registrations during the year, and that nearly all of these required some detail to be guarded, the number is not high.

The life service in the metropolitan area is increasing not only in numbers, but in general safety and efficiency. Several of the newer installations are equipped with safety devices not dreamed of when the original Act was passed, and every innovation of this kind makes, of course, for greater security. The provision for the inspection of lifts every six months under the new Act is proving a wise measure, and greatly minimises risks by giving inspectors a chance to detect defects which might easily cause serious stoppages, and possibly accidents, if they were only inspected yearly, as under the 1904 Act, now repealed.

The provision in the existing Act requiring plans and specifications to be lodged with the Department before granting a permit to erect a lift is working satisfactorily, and practically insures each new lift being erected in such a way that it can be certificated at once on completion, instead of having to delay the certificate while alterations are being made, as was often the case under the 1904 Act.

The following return shows the work done in connection with machinery inspections:—

Return showing Operations in the Proclaimed Districts (Machinery only) during the year ended 31st December, 1924.

	Totals.	
	1924.	1923.
Total registrations of useful machinery	5,563	5,215
Total inspections made ...	4,169	3,935
Certificates bearing fees ...	3,718	3,481
Certificates (steam) without fees	451	454
Extension certificates granted under Section 42 of Act.	8	17
Notices issued "Machinery dangerous"	350	245
Total amount of fees for 1924 ...	£1,972 10s.	...
Total amount of fees for 1923 ...	...	£1,865 7s. 6d.
Number of Inspectors ...	8	8

The total number of registrations shows an increase of 348, mostly electrically-driven groups. This is quite satisfactory, considering the very large number of groups exempted under the 1921 Act, and shows that already progress is being made in the State.

In the South-Western district there was an increase of 337 in the number of useful groups registered.

In the other districts the number of registrations has increased by 11.

In all districts the number of inspections made was 4,169, as against 3,935 in 1923. This shows an increase of 234.

Interesting Accidents to Machinery.

The only accident to machinery that presents any interesting features occurred in connection with a geared winding engine. At the time of the accident the engine was hauling ore. The loaded skip was on west drum, and the empty skip descending, on east drum. When the ascending skip was about 300 feet from the surface, and the empty descending one about 700 feet down, the pinion gearing into east drum spur wheel parted in two and fell off shaft. The engine-driver immediately stopped engine and applied brakes to stop the runaway skip. The skip was stopped before it reached bottom, and no damage was done except to the pinion wheel. No teeth were broken in either pinion or spur wheel, which is remarkable. A fine crack was discovered in the spur wheel on under side of periphery, and this wheel was temporarily plated over till a new one was available.

The pinion was made of cast-iron in halves, which were held together by two $1\frac{1}{4}$ in. bolts and steel rings shrunk on to projecting lugs at each side. Both bolts were broken with clean fractures, and presumably this occurred first. The lugs proved insufficiently strong to stand the stress without the help of bolts and broke off. The pinion then dropped on to the floor of engine-house, doing no further damage. The driver of the engine acted with commendable promptness in stopping the runaway skip before it reached bottom. A new spare pinion to replace broken one was on hand and was at once fitted. It is made of mild steel. Later on a new cast-iron spur wheel was procured and fitted, and no further trouble is anticipated.

DIVISION IV.

Prosecutions under the Act.

During the year there were three prosecutions for various breaches of the Act, viz.:—

- (a) For working a contractor's crane without certificate after important structural alterations had been made. Defendant was fined 40s. and costs.
- (b) For non-registration of certain wood-working machinery and working same without a certificate. Defendant was fined 40s. on each count and costs.
- (c) For driving a steam wagon without holding the proper certificate. Defendant was fined £1 and costs.

DIVISION V.

Accidents to Persons caused by Machinery.

During the year accidents to 38 persons were reported, including two which ended fatally. This shows an increase of nine as compared with 1923. There has been a decrease of three in the number of accidents in the Goldfields districts, and an increase of 11 in the South-Western district, as against the year 1923.

The following table shows the number of accidents and the percentage of these, based on the total num-

ber recorded for the year, caused by various kinds of machinery mentioned:—

No. of Accidents.	Class of Machinery.	Percentage of total accidents.
5 (1)	Circular Saws	15.79
5	Buzzers	13.16
4	Shapers (wood-working)	10.53
3	Printing Machinery	7.89
2	Boiler Water Gauges	5.27
2	Suction Gas Engines	5.27
2*	Lifts	5.27
1	Gantry Crane	2.63
(1)	Jib Crane	2.63
1	Belting	2.63
1	Conveyor Belt	2.63
1	Screw Conveyor	2.63
1	Push Conveyor	2.63
1	Punching Machine	2.63
1	Clay Crushing Rolls	2.63
1	Rubber Working Rolls	2.63
1	Bag Manufacturing Rolls	2.63
1	Steam Calender	2.63
1	Chaff Cutter	2.63
1	Cocoa Winnower	2.63
1	Book Binding Stapler	2.63
36 (2)	Total, 38.	

NOTE.—Accidents marked (1) were fatal.

* One of these lift accidents occurred during erection of a lift and was therefore not a lift accident in ordinary acceptance of the term.

As usual, accidents due to wood-working machinery head the list. Circular saws, buzzers, and shapers accounting for nearly 40 per cent. of the total number of accidents. All of these machines are obviously dangerous, and a mere momentary lapse of attention to the work in hand, or a flaw in the timber being worked, is very apt to lead to damaged fingers or other accident. Guards are provided wherever possible, but, especially in the case of buzzers, are frequently not used, the operatives in charge of them apparently preferring to take unnecessary risks.

There were, unfortunately, two fatal accidents during the year. The first of these occurred in February in connection with a circular saw. A piece of waste wood was caught by the saw, and was thrown forward, striking deceased on the head. The unfortunate man died under operation at the hospital.

The other accident occurred in August in connection with a contractor's crane. This crane had been certificated at a former site, but was removed, and after important structural alterations was re-erected and worked by the owner without having been inspected, as required by the Act, under the erroneous impression that a certificate issued for it when erected under different conditions on the former site held good under new conditions. No notification was received of its re-erection and alteration. It had therefore not been inspected, and had no certificate for working under the new conditions.

The crane was erected on top of one of three towers, and two back stays were carried down from the top of the "mast," one to each of the other two towers. These back stays were anchored by means of rods, coupled together by hooks on their ends, to a mass of bricks at the bottoms of the towers.

On the morning of the accident it was noticed that one of the connecting hooks (the one on the south tower) appeared to be opening. The crane driver was instructed to place the jib in a safe position with regard to the strained hook. This was done, but through some unfortunate misunderstanding the driver, almost immediately afterwards, picked up a rather heavy load and proceeded to slew the crane.

When the jib got into such a position that the anchor bolt in the north tower was becoming severely stressed one of the hooks on this bolt opened out, broke, and caused the whole crane with its back stays, sleepers, and platform to topple over and crash to the ground. The driver was killed.

At the inquest it was elicited that new sections of anchor bolt had been ordered of the same material as the others, viz., mild steel. After the accident it was discovered by test at the University Engineering Laboratory that the new material was *iron* and not *steel*.

The collapse of the crane was due entirely to the failure of the iron anchor bolt. Even if this bolt had been of steel the fact of the couplings being open hooks would probably, sooner or later, have caused an accident. Hooks for connecting rods of this description, unless very specially designed, and of large and suitable section, should not be used. The hook which failed and caused this accident was neither well made nor of suitable section.

A large electric gantry crane at Fremantle over-balanced and crashed to the ground. The driver miraculously escaped with some bruises and a few minor cuts. The crane at the time of the accident was lifting a load in excess of that for which it was designed.

One of the two lift accidents occurred to a man assisting to erect a new lift alongside one which was working. By some error of judgment he, being on top of the cage of the new lift, placed himself in such a position that he was caught by the descending working lift, and was severely bruised. This cannot be fairly classed as a lift accident, as it was not in any way the fault of the lift or its operator.

The other lift accident was caused through the shrinkage of the woodwork of a gate. This affected the adjustment of the lock. An employee came to the lift in the dark, and owing to the defective gate lock opened the gate, and because he was able to open it presumed that the cage must be at that floor. As a matter of fact the cage was at the next floor below. The man fell on to cage top, and, though badly bruised, was not seriously injured. Had the cage been at the bottom of the shaft he would certainly have been killed. The lift is of automatic type, and all of these lifts have notices, fixed to each door, warning intending users not "to attempt to open this gate until the cage is at this floor and is stationary." The fact of the locking gear having become defective was unfortunate, but nobody should open a lift door and step into the shaft without being perfectly sure the cage is there.

The remaining accidents call for no particular comment.

An unusual accident, *not* classified above, which could not in any sense be said to be caused by machinery, occurred at a timber mill.

Adjacent to the boiler-house was a large closed-in brick bin, which had been in use up to a few years ago as a receptacle for sawdust. The bin had

not been opened up for a long time, and the sawdust had become very dry. It was decided to remove the bin, but, prior to doing so, the sawdust had to be got rid of, and the most convenient way appeared to be to gradually consume it in the boiler furnace. A strong iron sliding door in the stoke-hole opened into the bin, and this was open on the date of accident. A good deal of sawdust had been scooped out, and a "cave" of considerable size was formed. Just as the fire-door of boiler was opened by a lad to get rid of a bundle of chips the roof of cave collapsed and filled the stoke-hole with fine dust. This ignited at the open fire-door, and a violent explosion occurred, cracking the brick walls of the bin, and damaging the boiler-room roof. The flames ignited the clothing of the fireman and the lad who brought the chips in, and both were somewhat severely burnt.

The incident is referred to as a warning to mill owners and others, as the explosive nature of very dry sawdust, coal dust (as is well known), or even flour will often cause similar explosions, and the greatest care should be exercised with regard to naked lights in the presence of any very dry carbonaceous dust.

DIVISION VI.

Engine-drivers' Examinations and kindred matters.

During the year four examinations were held in Perth, two in Kalgoorlie, one in Leonora, and one in Albany. Examinations were advertised to be held at Southern Cross, Mt. Magnet, and Geraldton, but fell through owing to the necessary number of candidates not being forthcoming.

The following table shows the certificates granted and their classification—

Return showing total number of Engine-drivers' and Boiler Attendants' Certificates (all classes) granted in 1924, compared with 1923.

Class of Certificate.	No. Granted.	
	1924.	1923.
Winding Competency (including certificates issued under Regulation 40 and Section 60 of the Act)	2	4
First Class Competency (including certificates issued under Regulations 40 and 45 and Sections 60 and 63 of the Act)	8	14
Second Class Competency (including certificates issued under Regulation 40 and Section 60 of the Act)	11	28
Third Class Competency (including certificates issued under Regulation 45 and Section 63 of the 1921 Act)	25	28
Locomotive Competency	4	10
Traction Competency	10	6
Internal Combustion Competency...	10	5
Internal Combustion Service	2	85
Crane and Hoist Competency	8	4
Crane and Hoist Service ... ..	...	8
Boiler Attendant's Competency ...	46	18
Boiler Attendant's Service ... ..	...	47
Interim	5	6
Copies	11	10
Transfers	22	99
Totals	164	372

In all, during the year there were 195 applications received, and of these 164 were granted certificates.

The revenue from application fees, and fees for granting certificates was £195 8s., which shows a drop of £235 14s. 6d., as against 1923. As anticipated in the Annual Report for 1923, there has been a considerable falling off in the number of applications, certificates granted, and revenue, all of which, however, are higher than the average for several years before the inception of the 1921 Act.

I have referred in several annual reports to a conference held in Sydney at the end of 1919, the object of which was to try and arrange for uniformity regarding the grades of engine-drivers' certificates and standard methods of examination. A uniform scheme, so far as grading is concerned, was agreed upon, and "The Inspection of Machinery Act, 1921," of this State was the first to embody the results of the decision.

In November, 1924, an Act to amend the Steam Boilers and Engine-driver's Acts of 1911 and 1915 was assented to in South Australia. The classification and grading of certificates is provided for in this Act, and is practically identical with that adopted in this State.

I regret to say that the other States have not yet legislated in this direction, and until they do it will be impossible to secure a uniform system of examination, and certificates issued in such States cannot be recognised in the States which have adopted the lines laid down by the conference referred to.

Inquiries, Prosecutions, etc., during the year ending 31st December, 1924.

Three overwinds and a runaway, due to a broken pinion wheel, were inquired into. The broken pinion wheel incident has already been referred to under the heading "Interesting Accidents to Machinery." The three overwinds fortunately did little or no damage, and the circumstances in connection with them were such that the Board did not find it necessary to take any action against the drivers involved.

One driver was prosecuted for being in charge of an engine without a proper certificate. This has already been referred to under "Prosecutions."

DIVISION VII.

General.

Brief Review of Operations since 1899.

As 20 years have elapsed since operations were commenced in 1905, under "The Inspection of Machinery Act of 1904," and over 25 years have passed since my appointment as Chief Inspector under the old Steam Boilers Act of 1897, it may be of some interest to briefly review the changes which have occurred during the time referred to.

In August, 1899, when I was first appointed, there were only 954 boilers registered. At the end of 1899 there were 1,486, and the number of inspections made during the year was 985.

The total revenue for the year 1899 was £1,610 5s.

At the end of 1924 there were 3,199 useful boilers on the register, and a large number which can no longer be regarded as useful. The 1,486 boilers at the end of 1899 included all the boilers registered under the Act up to that date, and a large number of these were not useful boilers.

In 1924 1,762 boiler inspections were made, and the revenue from boiler fees was £3,023 8s. 3d.

At the end of the year 1905 (the first year of "The Inspection of Machinery Act, 1904") 1,550 groups of machinery were registered, the revenue from inspection fees of which was £178.

At the end of 1924 the machinery registrations numbered 5,563, and the revenue derived from inspections of machinery was £1,972 10s. The number of registrations given for 1924 is the number of groups in use (or only temporarily out of use).

Since 1905 many hundreds of groups have been dismantled or exempted from the provisions of the Act.

Since 1899 725 boilers have been permanently condemned as being no longer safe as steam generators. Several of these have been converted into tanks, scrub rollers, etc. Many boilers have been transferred to the control of the Navigation Act, many more were exported to the Eastern States, and a few were transferred to the control of the State Railways.

It appears clear that steam is on the decline, and the day of the internal combustion engine and electricity has arrived.

The following table shows the number of groups driven by steam, electricity and internal combustion engines (hydraulic and air driven groups are negligible), and the percentage of each with regard to the total registrations in 1905 and 1924:—

Year.	Total Registration.	Number of groups driven.		
		By Steam.	By Electricity.	By Int. Comb. Engine.
1905	1,550	1,112 or 71·7%	232 or 13·6%	178 or 11·5%
1924	5,563	1,106 or 19·8%	3,251 or 58%	1,160 or 20·8%

From the above table it would almost appear that there had been a great falling off in the number of boilers in the State. This is not so, as there are to-day 3,199 useful boilers registered under the Act, as against 1,486 at the end of 1899, many of which were not useful.

In 1899 the work consisted of boiler inspections only, and there were at most 1,486 boilers to look after. In 1905 "The Inspection of Machinery Act, 1904," came into force, and to-day, in addition to 3,199 boilers, there are 5,563 groups of machinery to be inspected, and it is only by the most careful adjustment and arrangement of the work that the present staff of eight inspectors can cope with it.

Since 1899 and up to December, 1924, the total number of inspections made was 103,971, and the number of miles travelled to encompass these inspections by rail, road, and sea was well over a million, the average number of inspectors being eight. In the early days, all "out-back" travelling was done by buggy. Of late years motor cars have replaced horse vehicles with a great saving in time and money.

Everything possible has been done in the way of adoption of uniform methods and systematisation to lessen unnecessary work. Handy blue prints, containing formulæ for nearly all of the necessary computations, have been prepared, and have been in use for many years, and a book of Instructions to Inspectors has been issued, in which rulings are laid down on almost every point in connection with the work on which any doubt might exist.

Every inspector is therefore working on uniform lines, and using the same formulae adopted and authorised by the Department. This uniformity of method leads to much saving of time both in the original computations and in the necessary checking of them. Comparisons can be made almost at a glance, as the same formula is used for every similar case.

Engine-drivers' Board of Examiners.

In 1899 there were 19 Boards of Examiners. In November, 1900, I was appointed chairman of the majority of these boards, and I found that the methods of examination were by no means uniform, and in some cases the records were not kept as well as they should have been. It was found practically impossible to introduce a uniform system with so many boards, and when "The Inspection of Machinery Act, 1904," was passed it provided for the appointment of one board, with the chief inspector as chairman, to take their place. Since then examinations have been conducted on uniform lines throughout the State, and the records will bear the closest inspection.

From 1899 to 1924, inclusive, 6,229 certificates have been issued.

The appointment of the one board at once led to standardisation of the grades of certificates, uniformity in examinations, and resulted in better economy and efficiency.

During the year the old General Post Office was vacated by the Commonwealth, and the building was made available for State departments. In August this department moved from the Barracks into the new quarters, now to be known as "Central Government Buildings."

The move naturally caused a good deal of inconvenience and interference with ordinary routine work. The staff have now settled down, and work is proceeding smoothly in the new quarters.

Early in the year a conference was arranged between myself, the W.A. Chamber of Mines, and representatives of the Engine-drivers' Associations to discuss certain proposed amendments to the Regulations, chiefly affecting winding-engines and engine-drivers' engine-room record books.

The conference was held in Kalgoorlie on 23rd and 24th January, when the proposed Regulations were fully considered, and, after a little discussion and a few amendments, were unanimously agreed to in the form in which they now appear. The Regulations were approved by Executive Council on the 30th January, 1924.

It was decided, in view of the many alterations to the Regulations as first printed, to make a "Compilation of the Regulations," including all alterations, thus bringing them up to date, and making it much simpler for anyone who wished to consult them on any particular point.

Towards the end of the year "regulations relating to all types of power-driven cranes" were approved of by the Executive Council. These chiefly deal with the supply of certain data by manufacturers of cranes and certain fittings, such as load indicators and plates showing definitely the maximum load for which any crane was designed, and, in the case of crane with movable jibs, the radius at which such load could safely be lifted.

At the end of 1923 a short Bill to amend "The Inspection of Machinery Act, 1921," was introduced

by a private member, the effect of which was that "no person shall be employed in the control of a passenger lift unless he (a) has served the Empire in any war, or (b) is physically incapable of undertaking more exacting or more laborious work." This was assented to on 22nd December, 1923.

Late in 1924 the same member introduced another short Bill, the main effect of which is to substitute the word "and" for "or" in the amending Act above referred to. This was assented to on 31st December, 1924.

The effect of the two amending Acts is that no person, unless appointed before 22nd December, 1923, can be in charge of a passenger lift unless he is a disabled returned soldier.

Developments.

An important new industry was successfully inaugurated during the year, viz., the Woollen Mills at Albany. The plant is very complete, and is absolutely up-to-date in all respects, dealing with the wool from its raw condition to the finished cloth.

The plant consists of two large Babcock & Wilcox boilers supplying steam to high speed compound engines, driving electric generators for supplying current to 28 electric motors aggregating about 450 h.p.

In the districts worked from Kalgoorlie two points were noticeable, viz., the greatly increased use of electric power instead of steam, and the amalgamation of certain mines. Where electricity is being introduced small units are the order of the day, so that the stoppage of any particular unit or machine need not necessarily interfere with the general working of the remainder.

The South Kalgurli Consols has commenced the erection of a new air compressor by Allen, McLellan & Co. It is a vertical high-speed two-stage compressor with a capacity of 2,000 cubic feet of free air per minute, driven by a 350 h.p. electric motor.

The Boulder municipality has installed a couple of motor generators driven by current from the Kalgoorlie Electric Power and Lighting Corporation, and has definitely turned its back on steam.

In order to cope with the increased demand for current, the Kalgoorlie Electric Power and Lighting Corporation have installed a Belliss & Morcom impulse turbo generator of 1,250 K.V.A. (equivalent roughly to 2,300 h.p.). It is fitted with multiple jet condenser with automatic control to prevent flooding.

The Lake View and Star, Limited, after taking over the Ivanhoe plant, following the amalgamation of the two companies, proceeded to dismantle the plant. At present only the cyanide plant and winding-engines are in use.

A tramway has been laid down from the Ivanhoe main shaft, connecting with the Great Boulder company's rails, over which ore will be conveyed to the Chaffers plant, which is being enlarged to cope with the increased tonnage.

It will be seen by the above changes many steam engines and boilers are being thrown out of use on the Golden Mile, and consequently the inspection work in the district is, to some extent, easing up.

After due consideration it has been decided to work certain parts of the East Murchison and the Murchison and Yalgoo districts (which have hitherto been worked from the head office) from Kalgoorlie. This will give relief in the South-West district, where the work is rapidly increasing.

During the year a 20-ton capacity "flotation" machine was installed at the Brown Hill mine of the Oroya Links, Limited. Experiments are being carried out, which may lead to cheaper reduction costs. The results will be awaited with keen interest.

At Kanowna a 10-head mill and other plant driven by an 80 h.p. gas engine was installed by Messrs. Willmot & Whitfield, and I understand it is likely to be kept running for a long time.

At the Ives' Reward Mine a ten-head mill, grinding pans, Wilfley tables, and other plant was installed. The plant is driven by an 100 h.p. gas engine. Another gas engine drives an air compressor, which supplies air for rock drills and a small winding engine. No steam is used on the mine, as water is a scarce commodity in the locality. Water for the battery is supplied by an oil engine and pump about five miles away.

There appears to be a slight revival of mining in the Southern Cross and Marvel Loch districts, with indications of quite a marked improvement for the next year. The extension of the water main to Burbridge enabled the Great Victoria Mine to re-start, and probably a much larger tonnage will soon be treated.

At the Manxman the Radio mine still averages good values over a fairly wide ore body, and will probably soon warrant the erection of a fairly large milling plant.

On the Sons of Gwalia Mine a steam-driven direct-coupled 200 K.W. electric generator has been erected, and preparations are being made for installing two new four-cylinder gas engines.

In the East Murchison very little material change has occurred during the year, but prospects appear brighter, particularly at Wiluna where, if present indications continue, there may shortly be big developments.

In the South-Western district the timber industry is flourishing, and is extending considerably. Mills are gradually getting further away from the main railway lines, and this means a considerably increased amount of travelling, mostly by horse and trap, to make inspections.

Log-hauling plants are increasing in numbers, and are proving most useful as well as economical, being able to bring in logs from rough and hilly country where horse or bullock teams could not work.

Caterpillar tractors are also coming into use for log pulling, and there is no doubt as to their capabilities. It remains to be seen, however, whether they will prove a financial success as, owing to the very rough nature of the work, the upkeep will probably be very heavy.

A large and up-to-date saw mill is being erected at Nannup. It is being equipped with the latest labour-saving appliances, and includes a double cut hand-saw with teeth on both edges of the blade, which is about 15in. wide. The plant will be supplied with steam by water tube boilers of the latest design.

In connection with the boilers, a brick chimney (the first in the State for saw-milling purposes) 110 feet high, is being built. This fact is substantial evidence that the company have every confidence in their future prospects.

At Wychcliffe, on the recently-constructed Margaret River railway, a mill has been erected embodying a new departure in bush saw-milling as far as this State is concerned. The twin saws are being driven by steam, but the rest of the plant is driven by separate motors, deriving their current from an electric generator in the main engine-room.

The scheme certainly eliminates a lot of shafting and belts, but where fuel and water cost practically nothing, it appears questionable as to whether any economy will be effected as against a direct steam-driven plant.

Coal-mining has fallen off somewhat owing to the decrease in bunkering trade, but will no doubt soon revive again.

The Group Settlement Scheme is employing a large number of engines in tree-pulling, etc., and as many of these are working well in advance of the actual settlement, the difficulties in getting to them for inspection purposes are often considerable, and are the cause of a good deal of unavoidable waste of time.

In several of the larger country centres electric-power stations are being installed, and in connection with these, crude oil engines are beginning to make their appearance. These engines, according to users, compare very favourably with suction gas engines as to expense of running; they take up much less room, the producer, scrubbers, etc., being eliminated and entirely cut out the danger of burns through gas explosions and poisoning from the breathing of CO₂. In some instances these engines are so designed as to permit their being run through the night without an attendant. Generally the night load was carried by storage batteries, but now with such an engine as just referred to, the batteries, which are always a source of trouble, can generally be dispensed with.

The introduction of electric-power stations will, of course, mean that many small oil engines will be replaced by electric motors.

Another marked change is the greatly increased use of tractor engines for agricultural and other purposes.

The tractor is rapidly replacing the horse on the farm, just as motor lorries are taking his place in the cities.

Purchase of Second-hand Boilers.

I should like to call the attention of intending purchasers of second-hand boilers to the provision made in Section 28 of the Act, and the regulations thereon, for perusal of the records of boilers.

Many instances have come under my notice where a boiler has changed hands, and the purchaser finds he has landed himself with heavy repairs before he can work the boiler.

For a small fee an intending purchaser can (provided he is authorised in writing by the owner) make a search of the records of any boiler, and satisfy himself as to its condition. If, as often happens, the boiler has been lying idle for a long time, he should insist on an official inspection and report being made before completing purchase. If this procedure be followed he can be reasonably certain of not committing himself to the purchase of what may turn out to be merely scrap-iron.

Overstressing bolts and nuts of manholes, caps of water tube boilers, etc.

Many cases of severe damage to bolts of manholes, digester doors, and the bolts and pressed steel dogs of clamps holding the caps of water tube boilers in place have occurred through unskilled persons using too much leverage in screwing up such bolts.

The makers generally provide spanners of suitable length. An average man should be able to properly tighten up any of such bolts with the spanner provided.

It is, however, not uncommon to find the spanner being used with a piece of pipe several feet in length at the end of it. Unskilled persons do not appear to realise that by such means they very easily stress the bolts and nuts, etc., to their breaking point before steam is got up.

Cases have occurred where, by use of such improper leverage, the bolts of water tube caps have been pulled right through the pressed steel dogs or clamps, and in other cases these clamps have been found cracked all round the bolt holes. The nuts of the cap bolts are also often found cracked.

If the faces of caps and headers are kept in good condition such undue pressure is not necessary to make a good joint, and if faces are bad the proper remedy is refacing—not the use of a six-foot lever.

Aged Boilers.

As a very large number of the boilers imported into this State during the earlier days of goldmining were second-hand, many of them aged, and many more of doubtful age, it is obvious that the upkeep of those old boilers, which have not already been condemned as useless, is yearly becoming an increasingly difficult problem. Up to the present time, however, by insisting on the employment of skilled workmen, and by seeing that all repairs executed are of such a nature as to restore the boiler, as far as possible, to its original strength, many of these old boilers have been kept going, generally at somewhat reduced pressures. This, however, cannot go on indefinitely, and owners of such old boilers will be well advised to look ahead, and make provision for renewing any of their boilers which have been constantly repaired or have reached such an age that has necessitated reduction of pressure.

Table of Registered Boilers, Digesters, Air and Gas Receivers, etc., showing Classification and the Number at various ages to 31st December, 1924.

Types.	15 years and under.	Over 15 and up to 20.	Over 20 and up to 25.	Over 25 and up to 30.	Over 30 and up to 35.	Over 35 and up to 40.	Over 40 years.	Age unknown.	Totals.
Lancashire	7	6	57	33	...	...	...	...	103
Cornish	33	85	221	256	11	3	...	10	619
Semi-Cornish	3	1	14	26	5	...	...	4	53
Vertical	105	90	219	330	34	11	3	58	850
Loco. Type, Stationary	14	5	41	57	3	6	8	3	137
Loco. Type, Portable	96	120	77	95	32	25	13	9	467
Locomotives	50	12	12	29	9	1	1	...	114
Water Tube	47	68	89	19	...	...	...	1	224
Return Multi. Underfired, Stationary	8	13	40	66	2	...	...	8	137
Return Multi. Underfired, Portable	...	...	5	3	1	...	...	1	10
Return Multi. Internal Fired, Stationary	4	9	14	15	3	...	...	5	50
Return Multi. Internal Fired, Portable	...	...	1	1	...	...	...	...	2
Egg-ended and other types	20	5	5	9	...	...	...	2	41
Digesters	41	7	1	1	1	...	...	6	57
Air Receivers	37	13	51	19	...	...	...	70	190
Gas Receivers	3	...	...	...	...	...	...	...	3
Vulcanizers	20	2	...	...	...	...	...	3	25
Steam-jacketed Vessels	60	9	1	...	...	...	...	47	117
Totals	548	445	848	959	101	46	25	227	3,199
Percentage of Total Registration ...	17.16	13.91	26.51	29.97	3.15	1.43	.78	7.09	...

It will be seen that only about 17 per cent. of the total number are under 15 years old, and nearly 30 per cent. are between 25 and 30 years old. There are 101 over 30 years, 46 over 35 years, and 25 over 40 years old. The boilers the ages of which are unknown consist chiefly of small verticals, air receivers, and steam-jacketed vessels. Most of these were imported into the State from time to time without any history, and though every effort was made to trace them, 227 boilers have been registered whose date of make cannot be ascertained. It is evident, from a perusal of above table, that a large number of the older boilers will soon have to be replaced.

Work done for other Departments.

During the year several plants were inspected, reported on, and valued for other departments. For work of this kind no statutory charge can be made, but the department is generally, and should always be, recouped as far as expenses are concerned.

Inspectorial Staff.

The staff remains as in 1923, and has been kept very fully occupied. The work at the end of the year under review was well up to date, and has been performed in a careful and efficient manner.

Clerical Staff.

The clerical staff remains practically the same with the exception of the usual changes among junior clerks. The work of the staff was a good deal hampered in consequence of the removal of office quarters to the Central Government Buildings. The work, however, was well up to date at the end of the year.

Revenue.

The total revenue from all sources during the year was £5,445 7s. 5d., made up as follows:—

	£	s.	d.
Fees for boiler inspections	3,023	8	3
Fees for machinery inspections	1,972	10	0
Engine-drivers' fees	195	8	0
Incidentals (being fees for special inspections, expenses, etc.)	254	1	2
Total	5,445	7	5

The revenue for the year shows an increase of £99 1s. 7d., against that of the year 1923, made up as follows:—

	Increase.			Decrease.		
	£	s.	d.	£	s.	d.
Boiler Fees	181	11	1	...	...	...
Machinery Fees	107	2	6	...	...	...
Engine-drivers' Fees ... ..	...	...	...	235	14	6
Incidentals	46	2	6	...	...	...
	£334	16	1	£235	14	6
	235	14	6			
Total Increase	£99	1	7			

The following is an analysis of the increases and decreases in fees for boilers and machinery in the

Table showing Amounts Written Off as Bad Debts during the last ten years.

	1915.	1916.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	1924.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Amount written off ...	2 19 0	5 10 0	3 10 0	11 5 0	3 15 0	3 5 0	6 17 5	1 6 0	7 10 0	42 3 5
Percentage of total Revenue	.06	.13	.08	.25	.08	.07	.138	.022	.149	.774

Mileage.

The total distance travelled by inspectors during the year was 41,652 miles, of which 16,980 were by rail, 24,666 by road, and six by water. The distance travelled shows a decrease of 1,011 miles, as against 1923, with an increase of 340 in the number of inspections made. The decrease is, however, more than accounted for by the omission of the Carnarvon trip, reference to which has already been made in Division I. The average miles travelled per inspection was 7.03, showing a decrease of .61 miles per inspection as against 1923.

Every effort is being made to cut down the mileage as far as possible, but the State is large, the work much scattered, and the distances to be travelled are consequently very great.

various districts, and also shows the decrease due to engine-drivers' fees:—

	Increase.			Decrease.		
	£	s.	d.	£	s.	d.
South-West Group	282	11	3	...	...	...
Kalgoorlie Group	42	5	1	...	...	...
North Coolgardie and Mt. Margaret	31	19	0	...	...	...
East Murchison and Murchison and Yalgoo ... ..	...	...	...	17	8	3
Carnarvon ... ..	...	...	...	4	11	0
Engine-drivers' fees ... ..	...	...	...	235	14	6
	356	15	4	257	13	9
	257	13	9			
Total Increase	£99	1	7			

The loss of revenue to the department incurred by not charging fees for boilers and machinery belonging to Government non-trading concerns was £62 15s. 6d., and the expenses connected with such inspections amounted to £13 0s. 5d.

During the year the amount written off as bad debts was £42 3s. 5d., being about .774 per cent. of the total revenue.

This amount, though comparatively large, consisted of only two items, one of 5s. and the other of £41 18s. 5d. The latter represents fees and expenses for a special inspection trip at the request of a mining syndicate in the Murchison district. The syndicate, immediately afterwards, went bankrupt, and the Hon. Minister consented to the amount being written off.

A claim was lodged with the Official Receiver to rank for a dividend, if any. None, however, has as yet been declared.

The following table shows the losses over the last 10 years, due to amounts written off as bad debts. Considering the multiplicity of small fees which have to be collected, the result is, I consider, very satisfactory, and is evidence of good work in that part of the staff responsible for collection of the revenue:—

Conclusion.

In conclusion, I wish to tender my sincere thanks for assistance rendered by officers attached to the Crown Law, Police, and Postal Departments in various districts in connection with the administration of the Act.

My staff have continued to carry out their duties efficiently, and to them also my thanks are due.

I have, etc.,

C. J. MATHEWS, M.Inst.C.E.,
Chief Inspector of Machinery
and Chairman of the Board of Examiners.

DIVISION VII.

ANNUAL REPORT OF THE CHEMICAL BRANCH, MINES DEPARTMENT, FOR THE YEAR 1924.

The Under Secretary for Mines, Perth.

Government Chemical Laboratory,
Wellington Street,
Perth, 6th February, 1925.

I have the honour to submit my report for the year 1924 for the information of the Hon. the Minister.

Staff.—During the year I was absent for six months on long service leave, and during this time opportunity was taken to visit various State and private chemical institutions in Japan and the British East Asian colonies. In my absence my duties as Government Analyst were performed by Mr. C. E. Stacy, and those as Government Mineralogist by Mr. H. Bowley.

On my return the Public Service Commissioner reviewed the positions of the members of the staff as modified by the amalgamation of the two laboratories in 1922. As a result of his investigations a satisfactory reclassification of the professional staff was gazetted on 21st November. This amongst other things established a convenient organisation of the staff on the lines suggested in my annual report for 1922, and did away with the temporary status of several well qualified chemists who, in point of fact, were being employed in permanently necessary positions.

On the 31st December Mr. S. C. Palmer, A.A.C.I., Supervising Chemist in the section of Agriculture, Water Supply, and Sewerage, retired by reason of having reached the age limit. During his 22 years service in the Government Laboratory this officer has done much work of lasting value to the agricultural section of the community.

Foods and Drugs.—A great advance has been made this year in the official control and supervision of the public supplies of foodstuffs and drugs, by the adoption by all the States of the Commonwealth of a uniform set of "Food and Drug Regulations." In this State they were gazetted under the Health Act, 1911-19, on the 11th July, and they have already become law in Victoria. They are expected to be legalised in the other States at an early date. These uniform regulations will simplify the work and strengthen the hands of the various Government Analysts and Health Officers, and at the same time greatly facilitate interstate trade in the commodities affected. It is hoped that any future modification of them will be adopted simultaneously by all the States so as to preserve uniformity.

Under these regulations preservatives of various kinds are still allowed to be added to many foods and drinks, but there is a growing feeling all over the world that their use should be reduced to an absolute

minimum on account of their probable harmful effect upon the human organisation when constantly ingested even in quite small amounts. A committee of inquiry into this matter was appointed by the British Government, and submitted its final report in this year. They favour the total prohibition of preservatives in certain foods, such as butter, and the reduction in quantity in others, and the restriction of permitted preservatives to a very limited number which are considered in the light of experience to be least harmful. They favour the total prohibition of fluorides and formaldehyde, and the greatly restricted use of boric and salicylic acids and their salts. They consider the least harmful preservatives to be benzoic and sulphurous acids and their salts. This report is already under consideration by the local advisory committee on foods and drugs, whose meetings have been attended regularly during the year.

In Mr. Stacy's report, which is appended, details will be found of many of the samples examined under this heading. "Soft drinks" of various kinds still leave very much to be desired in regard to their compliance with the regulations. Misleading labelling is not uncommon, and the imitation cordials and similar beverages are frequently a very poor substitute for the genuine liquids.

Towards the end of the year an examination was begun into all the brands of "lemon cheese" or "lemon butter" on the local market. For this food-stuff there is no composition specified in the regulations, though custom suggests it should be made solely from butter, sugar, and lemons. In the light of analytical results obtained here and in Queensland it is evident that standards will have to be fixed to prevent excessive adulteration with starch, glucose, and inferior fats as well as to limit the use of preservatives in it.

Water Supplies.—Regular analyses of the water supplied by the Goldfields Water Scheme prove its continued purity. Samples supplied would pass the most rigid requirements for an European city supply.

The metropolitan water supply on the other hand still gives rise to considerable trouble owing to the large quantities of ferruginous sediment which makes its appearance from time to time in the service pipes. This is mainly traceable to the three Osborne Park bores, the waters from which, though otherwise ex-

cellent in quality, have been found to yield, on standing a short time in the air, from 0.3 to 4.2 grains per gallon of ferric oxide. The waters as they issue from the bores are quite pellucid, the iron being then in the form of colourless and soluble ferrous bicarbonate. It is only by loss of carbonic acid and absorption of atmospheric oxygen that the iron becomes apparent. Individual figures for iron content in the bores are:—

Robert Street Bore: 0.95, 0.29, 0.48, 0.98, 0.90
 Hector Street Bore: 1.53, 1.88, 1.50, 2.24, 4.20.
 King Edward Street Bore: 1.78, 3.15, 3.30
 Iron expressed as grains of Fe₂O₃ per gallon.

Such water would constitute an excellent supply for a chalybeate hydropathic establishment, but is unsuited for a city supply. It will shortly, however, be replaced by a hills supply of excellent quality. Evidence was given on this before a Select Committee of the Legislative Council in October.

Many details of private water supplies in the country districts are given by Mr. Palmer in his report, which is appended. East of the Darling Range a large number of bores and wells which are sunk continue to yield brackish or saline water, often unsuitable even for sheep or other stock. That much better water can be obtained in favourable situations in the same districts has, however, frequently been proved, and a systematic water survey, undertaken in conjunction with a soil survey, would lead to the ready recognition of these favourable sites, and save much useless private and public expenditure.

Soils.—Closely associated with the problem of saline underground waters is that of salty soils, areas of which exist of varying degrees of salinity, ranging from salt pans on which nothing whatever will grow to those on which certain commercial crops do not succeed though native vegetation apparently flourishes. Amongst many settlers in the Wheat Belt there is a conviction that areas of the latter type are appreciably extending their boundaries, whilst at the same time the water in local streams is becoming more saline. This is a matter of such importance that the Royal Society of Western Australia has appointed a special committee to inquire into it. This committee includes in an unofficial capacity the writer, as well as several other prominent Government officials who are specially interested. It held several meetings during the year, and is steadily collecting valuable data, including particulars of areas affected, quantities of salt in rainfall, etc.

Mr. Palmer draws attention in his report to the need for a systematic soil survey, which would undoubtedly facilitate the use of our soils to the greatest advantage. At present only desultory samples are received for analysis, taken on no fixed system and without careful record of the exact localities or condition of crops. Such analyses are of no permanent utility. It is hoped this year by co-operation with the Director of Agriculture to secure analyses of typical soils from various parts of the country which have proved to be specially suitable for the growth of specific crops such as wheat, oats, potatoes, citrus fruit, etc. These will constitute comparative standards for other soils of doubtful quality or adaptability.

Sewage.—A large number of analyses continue to be made of effluents from the main metropolitan treatment works, and from the smaller installations at public institutions. Much thought and experiment have been given to the improvement of the former, but the problem bristles with difficulties, chemical and mechanical, and very little progress has been made.

In connection with the related problem of the pollution of the Swan River, the regular investigation of the varying salinity of the water in Perth Water has now been carried on for about three years, and the results are shown graphically in the accompanying diagram. This shows a maximum salinity closely approaching that of the open ocean each March and April, and a minimum salinity approaching that of hill streams in July, August, and September. The minimum period varies somewhat with the time of heavy rainfall. The irregular tides in this part of the river strongly affect the salinity, abnormally high tides causing an inrush of ocean water, whilst abnormally low tides draw down fresh water from the upper reaches. As in such estuaries there is always an appreciable stratification of the water, it is necessary to note that all the samples were taken six inches below the surface and about 70 feet from the shore line on the Mends Street Jetty, South Perth. The figures for carbonate only include the mon carbonate of lime and magnesia. These figures were prepared at the request of the River Pollution Committee for use by the biologists studying the growth of algae and bacteria in the river, no previous data being available. They should also be of value to the Fisheries Department.

A leading article in a recent number of "Nature" (20th December, 1924) indicates that the problems of river pollution even in England are far from being solved, and a fresh attack upon them from all points of view is in active progress.

Child Welfare.—From the baby clinics established by the Infant Health Association a number of samples of human milk have been received for analysis. These, which apparently were only taken where the child showed signs of faulty nutrition, varied considerably in composition, the extreme figures being:—

	Minimum.	Maximum.	Barthel Average.
	%	%	%
Fats	1.45	6.55	3.43
Proteins	0.97	1.61	1.55
Sugar	6.67	7.37	6.44
Ash ... ..	.18	.35	.22
Total solids	9.69	15.29	11.64
Solids not fat	8.16	9.36	8.21

Barthel's average figures, which are the basis of those used in the Food and Drug Regulations, are shown for comparison. The wide range in fat content is noteworthy.

Explosives.—In order to check the quality and condition of imported and stored explosives, forty-nine (49) samples were received under this head from the Chief Inspector of Explosives. They included a number of moisture determinations of detonators and high explosives, as well as complete analyses of specimens of potassium chlorate, Viking powder, Monobel powder, gelatine dynamite, and gelnite.

British Empire Exhibition.—Early in the year the whole of the State mineral exhibit was shipped away. The collection and preparation of this had taken a large share of my own time for nearly a year, and the whole of Mr. Bowley's time for eleven months. The result was that at the end of the year considerable arrears existed in the mineral section of the laboratory, chiefly in regard to rock analyses required by the Government Geologist and the Petrologist. The material finally despatched to the Exhibition was typical of the mineral resources of the State, and in spite of the imperfect labelling and sorting provided by the Commonwealth authorities, should have done much to attract the attention of the British public to those resources. At this exhibition an effort was made to bring specially under their notice the State's reserves of metals and non-metallic minerals other than gold, which latter has frequently in the past been widely advertised. For any beneficial results which accrue from this exhibit the State has very largely to thank Mr. Bowley of this Branch, who devoted a large amount of thought, skill, and energy to its preparation.

Wiluna Bores for Gold.—Much time, including long hours of overtime, was spent by the members of the mineral section in sampling very carefully the hundreds of feet of cores from the bores put down on the Gwalia and Mararoa properties at Wiluna. The former were not assayed by the Government, but have been publicly stated to have given very promising results. Those from the latter property were assayed as well as sampled. It is interesting to note that the wide bands of completely kaolinised rock which for many years past have been worked for their gold contents near the surface at Wiluna, give place in depth to narrower shear zones of greenstone schist (altered quartz dolerite) of similar origin and type to the auriferous lodes of Kalgoorlie. The main difference lies in the absence of tellurides from the Wiluna lodes, which carry free gold only.

Vegetable Resins, Waxes and Oils in Swampy Deposits.—In their eagerness to detect surface indications of mineral oil in the South-West part of the State, undue prominence has been given by various oil concession holders to the minute amounts of hexane-soluble unsaponifiable matter occurring in the highly carbonaceous beds of numerous swamps along

the coastal plain. The quantities extractable from the dried soil by refined petroleum spirit have ranged from a mere trace to 0.128 per cent. of the soil. The extract has been of two kinds, occurring either singly or in association, viz., a white crystalline wax and a pale brown semi-fluid resembling an oil at first sight when examined in the minute globules in which it was obtained by extraction. It was felt that a crucial test of whether such material was to be looked upon as an indication of local oil seepage or not would be the proof that it was confined to a comparatively small area and not distributed far and wide wherever swamp conditions prevailed. Accordingly, samples of swamp soils were collected officially, not only on the coastal plain, where they were underlain by a great thickness of sediments, but also on the Darling Ranges where they were resting upon granite in the midst of a large granite batholith. The tests gave similar extracts from soils from all these swamps, which is strong evidence against their being an indication of a nearby supply of petroleum. Further, by extracting a very large quantity of a mixture of two swamp soils some distance apart in the Peel Estate area, a much more detailed examination was possible of the extract. The apparent heavy brown oil was proved to be mainly a resin or mixture of resins having an appreciable acid value, readily soluble in cold alcohol, and having a tacky consistency. Although some hydrocarbon was probably present, the main part of the "unsaponifiable matter" appeared to be a resin regenerated by hydrolysis of the alkali resinate. A search of the literature revealed the occurrence throughout the world in swamps, peat bogs, and lignite beds, of resins, waxes, fatty acids, and hydrocarbons, the residues of previously living vegetation. There is little doubt that the extracts obtained from the local swamps are of similar vegetable origin.

New Industries.—Under a policy initiated some years ago, this branch continues to give assistance to new and struggling secondary industries by way of expert advice and analyses. During the year attention was paid to three industries, viz., Lead Fume Paint, Cement, and Sand Lime Brick.

EDWARD S. SIMPSON, D.Sc., B.E., A.A.C.I.,
Government Mineralogist and Analyst.

SECTION I.—TOXICOLOGY, FOODS, AND DRUGS.

(C. E. STACY.)

During the absence of Dr. Simpson for six months on long service leave, I acted as administrative head of the Chemical Branch of the Mines Department.

During the past year samples were received from the following sources:—

Health Department	184
Police	152
Metropolitan Water Supply, Sewerage, and Drainage Department	17
Agricultural Department	40
Department of Works and Labour	6
Explosives Department	49
State Saw Mills Department	18
Government Railways	11
Government Tender Board	25
Other Departments	19
Departmental	39
Public (Pay)	26
Public (Free)	7
Total	593

Samples were as follow:—

Foods and Drugs	173
Spirits, Beverages, etc.	124
Toxicological	55
Explosives	49
Hydrometers	19
Powellising	18
Swan River Pollution	31
Waters	26
Oils	21
Limes, Bleaching Powders, etc.	5
Electroplating Fluid	9
Sheets for Test for Stain	11
Disinfectants	6
Miscellaneous	46
Total	593

In addition to the above a number of overflow samples were examined for the Mineral and Agricultural sections. The number of samples examined is about the same as last year, and it certainly appears as if the services of this section are not availed of as much as they might be. Last year 105 samples were received from the powellising plant at State Saw Mills and the year before 177. This year only 18 samples were submitted for examination. This either means that a lot of unnecessary work was done in previous years or that at present the efficiency of the process is not being tested as carefully as it might be.

FOODS AND DRUGS.

Samples from the Health Department show a slight falling off, and I should like to stress once more the absolute necessity for adequate inspection and chemical examination in order to provide a pure food supply, and the same applies to the drugs which are dispensed, and are consumed by the public. In Queensland for the year ending 30th June, 1924, no fewer than 1,533 samples were examined for the Health Department as against our 203. I am informed that our Health inspectors' time is fully occupied, and that an extra inspector would be required to adequately carry out food inspection in this State. I am of opinion that the comparatively small extra expense needed to supply an extra inspector would be amply repaid by an improvement in the quality of the articles of food and drugs supplied to the public. It is admitted that 557 samples

examined in the Queensland Government Laboratory were milk samples which, in this State, are done by the City Analyst or by private analysts, whilst the functions of this laboratory are reserved to provide an arbitrator in case of any dispute arising. But even deducting this large number of samples, the remainder is exceedingly large compared with the samples analysed in this section of the Chemical Branch.

A prosecution by the Health Department was instituted during the past year as a result of analyses, which disclosed the fact that the sample supposed to be essence of lemon contained no oil of lemon. In this case a fine of £3 was imposed. Five summonses were issued to merchants for selling self-raising flour which did not comply with the regulations, but these were subsequently withdrawn upon the assurance that the errors would be rectified, which was satisfactorily done. As a result of non-compliance with the regulations, disclosed by analyses, the Health Department have issued a number of warnings which, up to date, have been carefully complied with; this also applies to irregularities in regard to labelling, which are frequently noticed and which, at present, still leave much to be desired. The ingenuity of vendors in this respect would compel admiration if the object to be achieved were more worthy. I have before me a sample which bears all the appearance of a lemon squash—indeed the inspector himself was evidently deceived, for he labelled it as such. Lemon squash is lemon juice to which has been added sugar. And lemon juice must be the genuine expressed juice of the lemon. A small label at the top, however, describes it as "Lemon Syrup," for which there is practically no standard, except that it must contain 25 per cent. of sugar. Such a beverage might easily be bought as a genuine lemon squash, which has a definite food value. This is only one of hundreds of cases where the public are more or less wilfully deceived by the labelling of food.

There is no doubt that imitation cordials and syrups, etc., are freely bought and used by that section of the public who do not prefer to pay a higher price for pure fruit juices, and provided that the articles are wholesome and not over preservative, there is no reason why they should not do so. But it should be made perfectly clear on the label that they are buying an imitation and not a genuine fruit juice, and I would like to recommend that the size of the letters indicating this should be increased. In many cases the word "imitation" is put on with a rubber stamp in faint ink with half the letters illegible. The labelling provisions with regard to preservatives are also frequently unsatisfactory. They are, in many cases, placed on a small and separate label, sometimes in almost microscopic characters. Although the regulation does not definitely require it, it is clear that the meaning is, that the preservative substance shall be disclosed on the main label.

Butter.—Last year in my contribution to the Annual Report I pointed out that it would be a good thing to initiate a butter survey throughout Australia for the purpose of trying to establish a standard Reichert Meissl figure for Australian butters. This figure, as pointed out in last year's report, indicates the quantity of volatile fatty acids in the sample, butter having a very large amount of these com-

pared with other fats which might be used as adulterants. Unfortunately no step appears to have been made in this direction, and no samples of butter have been submitted for examination. I still urge the necessity of action in this direction.

The Comptroller General of Customs brought under the notice of the Health Department evidence that foreign fats were being incorporated with tinned cheeses sold in the Commonwealth. Three samples were accordingly taken by our local inspectors, and one was found to have a low Reichert-Meissl figure bearing out the contentions of the Customs Department.

Infants' Foods.—Only one sample of infants' food was examined during the year.

Drugs.—Five samples of drugs were tested, two of which were purchased for analysis by the Health Department.

Liquors.—Forty-one standard samples of spirits were analysed during the year, on the basis of which ten retail samples were examined for false trade description, eight of which were not genuine samples, and five for added water, all of which were below

the legal limit. Of 14 samples of hop beer taken from country districts, all but two went over the allowed standard of two per cent. proof spirit. One prosecution for this offence took place, and the vendors of the other samples were warned.

Toxicological.—It is pleasing to note that the year showed very few cases of suicide or accidental death by poison. Although 28 exhibits were received from the police in connection with supposed poisoning, only eight actual deaths from poison were recorded, whilst six tests were negative. Several cases of recovery from poisoning were recorded.

Other toxicological cases concerning animals are included under agricultural samples. The only instance worth recording is the death of a number of fowls due to excess of salt in their food, to which substance fowls are very sensitive.

Other interesting police cases involving chemical examination were a vitriol throwing case, and one of obtaining money under false pretences by using a solution of nitrate of mercury as an "electro-plating fluid."

C. E. STACY, A.A.C.I.,
Assistant Government Analyst and Toxicologist.

SECTION II.—MINERALOGY, MINERAL TECHNOLOGY, AND GEOCHEMISTRY.

(H. BOWLEY.)

After an absence of 11 months from the laboratory on British Empire Exhibition work I resumed duty on 1st February, bringing the staff of the mineral section up to its full strength, which is now placed on a more satisfactory basis owing to the appointment of the three temporary officers, viz., Messrs. H. P. Rowledge, A.W.A.S.M., A.A.C.I.; J. N. A. Grace, A.W.A.S.M., A.A.C.I.; and W. W. Saw, B.Sc., A.A.C.I., to the permanent staff during the year. During the absence of Dr. Simpson for six months on long service leave, I performed the duties of Acting Government Mineralogist.

A considerable amount of time was spent during the year in preparing exhibits of local economic minerals, one being placed in the exhibition hall attached to the Council of Industrial Development and a second one in the Immigration Hall at Victoria Quay, Fremantle.

The number of samples received in this section during the year totalled 2,043, the number of determinations for various metals, etc., was 3,190. The following list shows the source of the samples:—

Mines Department—	
Minister for Mines	2
Under Secretary for Mines	22
State Mining Engineer	901
State Batteries	520
Geological Survey	50
Government Stores	1
British Empire Exhibition	14
Mineral Laboratory	11
Police Department	3
Conservator of Forests	2
Education Department	1
Workers' Homes Board	1
Prospectors	476
Public Pay	39
	2,043

Classified as:—

Abrasive	1
Aluminium Ore	3
Arsenic Ore	1
Asbestos	8
Beryl	4
Chromium Ore	10
Clay	37
Coal	28
Copper Ore	27
Dust, Quarry	1
Felspar	1
Fluorite	1
Gems	6
Gold Ore	1,532
Gold Specimen	2
Graphite	20
Gypsum	4
Iron Ore	19
Lead Ore	70
Limestone	10
Magnesite	1
Manganese Ore	18
Metallurgical product	23
Mica	7
Mineral (miscellaneous)	67
Mineral pigment	20
Mineral oil	49
Potash ore	1
Platinum ore	6
Rock	23
Sand	10
Sulphur ore	1
Tantalum ore	2
Tin ore	4
Titanium ore	7
Vanadium ore	13
Zinc ore	3
Unclassified	3
	2,043

Included in the gold ores for the State Mining Engineer are 524 samples taken from the three bore cores from the Gwalia Consolidated Group of Gold Mines at Wiluna: this work was of a highly important and responsible nature in view of the large expenditure of money that may be incurred by the Government, and it involved a considerable amount of overtime being worked by the staff of this section.

Lake Eva Oil Case.—Early in the year considerable interest was shown in a reputed oil find at Lake Eva, near Southern Cross. Samples of the oil taken from the bores proved, on examination in this laboratory, that it was not a natural mineral oil. A report on a sample collected by the Assistant State Mining Engineer from the bore hole was as follows:—

Lab. No. 2342/23, Mark "A."—This was a bottle of water with about five cubic centimetres of a brown oily emulsion floating on the surface. A strong odour of kerosene was observed. Light petroleum spirit was added to collect the oil, and whilst this was proceeding small lumps of a greasy yellow material were noted. These were separated and weighed: they amounted to 0.4 gram, and dissolved in water with frothing, giving a strongly alkaline reaction. They were undoubtedly composed of soap, apparently originally present in the form of a lubricating grease.

The oil extracted with petroleum spirit was fractionated with the following results:—

Boiling Temperature °C.	Per cent. of Oil.	Nature.
Below 150°	Nil	} Kerosene.
150-200°	17.43	
200-250°	3.05	
250-300°	23.53	
300-350°	4.14	
Over 350°	36.60	} Lubricating Oil. Vaseline.
Still Residue	15.25	
	100.00	Vaseline with traces of Asphalt.

The facts are to be noted that this oil contained no fraction lighter than kerosene, and was associated with lumps of lubricating grease, one constituent of which was a soap, a purely artificial compound. These facts led one to doubt if this oily mixture was of purely natural origin.

Three further samples handed in by the Criminal Investigation Department gave:—

Lab. No.	2594	2595	2600
Fractional Distillation Test—			
Below 100°	% Nil	% Nil	% Nil
100-150°	4.58	8.54	7.62
150-200°	12.16	9.90	9.40
200-250°	14.88	14.78	12.80
250-300°	17.98	26.44	20.00
300-350°	13.46	12.94	14.36
Over 350°	24.46	25.00	22.44
Still residue	12.48	2.40	13.38
Chemical Test—			
Reaction	Acid	Acid	Acid
Water	Trace	Trace	11.4
Inorganic matter	1.0	2.5	3.6
Alkali soaps	Nil	Nil	Nil
Iron and Alumina	Trace	Trace	Traces
Free fatty and resin acids	0.6	Trace	0.7
Fatty acids formed by saponification	1.7	1.5	2.0
Hydrocarbon oils by difference	96.7	96.0	82.3

Source of samples—

2594. Oil found by Assistant State Mining Engineer in "prospectors'" camp at Lake Eva.

2595. Oil from tank in dug-out.

2600. Oil obtained from option holder.

These three samples differed from the sample from the bore hole in being acid and containing no soap. They did, however, contain a little free fatty acid and glycerides.

Investigations by the Criminal Investigation Department, following the examination of these samples, led to the discovery of a dugout under the prospectors' bed with a 100 gallon tank containing 80 gallons of oil with pipes leading to the bore, and to the issue of a warrant for the arrest of the two prospectors on a charge of conspiracy to defraud.

Oil in Swamps.—A special investigation was carried out during the year into the possible occurrence of mineral oil in the mud deposits of some of the coastal swamps. Samples were collected from several of the swamps to the north and south of the metropolis. In every case extraction with petroleum ether yielded a residue which was partly unsaponifiable, but the yield in each case, from the quantity of the samples collected, was far too small to permit of a detailed investigation of the extract. A bulk sample of the material yielding an extract with petroleum ether of 0.128 per cent. of the soil has been collected from the Rockingham district for further examination.

Metallurgical Tests.—Samples of gold ores were submitted during the year for experimental treatment to determine the most suitable methods for recovery of the gold, the following being of special interest.

AVERAGE SULPHIDE GOLD ORE, LALLA ROOKH GOLD MINE, LALLA ROOKH (QUARTZ AND PYRITE).

First Test—Amalgamation and Cyanidation.

Head Sample.—The ore, assaying gold 18dwts. 12grs. per ton, was crushed to pass through 60 mesh. The sample was amalgamated in a hand amalgamator.

Product.	Gold per ton.	Recovery percentage of original.
Amalgamated	dwts. grs. 7 20	42.34
Tailing	10 16	57.66

The amalgamation tailing was cyanided for six days without further grinding.

Product.	Gold per ton.	Recovery percentage of original.
Cyanided	dwts. grs. 4 21	26.35
Tailing	5 19	31.31
Total recovery of gold ...	12 17	68.69

Consumption of Cyanide, 6.25 lbs. KCN per ton of ore.

Second Test—Concentration and Cyanidation of Concentrate and Tailing.

Head Sample.—The ore, assaying gold 19 dwts. 1 grain per ton, was crushed through 30 mesh. The sample was concentrated by panning.

Product ...	Percentage of heads.	Gold per ton.	Recovery percentage of original.
Concentrate ...	15.6	ozs. dwts. grs. 4 6 19	70.45
Tailing ...	84.4	0 6 13	29.00

The concentrate was crushed through 100 mesh and cyanided for six days.

Product.	Gold per ton.	Recovery.	
		Percentage of Concentrates.	Percentage of original.
Cyanided ...	ozs. dwts. grs. 1 5 12	29.37	20.89
Tailing ...	3 1 7	70.63	50.21

Consumption of Cyanide 16.5 lbs. per ton of concentrate.

The tailing from concentration was crushed through 60 mesh and cyanided for six days.

Product.	Gold per ton.	Recovery.	
		Percentage of Tailing.	Percentage of original.
Cyanided ...	ozs. dwts. grs. 0 5 6	86.62	23.27
Residue ...	0 1 7	13.38	5.73

Consumption of Cyanide, 3.2 lbs. per ton of Tailing.

Total Recovery of Gold, 44.16 per cent.

Third Test—Amalgamation, Concentration, and Cyanidation of Concentrate and Tailing.

Head Sample.—The ore, assaying gold 19 dwts. 1 grain per ton, was crushed through 30 mesh. The sample was amalgamated in a hand amalgamator.

Product.	Gold per ton.	Recovery percentage of original gold.
Amalgamated	dwts. grs. 11 12	60.39
Tailing	7 13	39.61

The tailing from amalgamation was concentrated by panning.

Product.	Percentage of tailing.	Gold per ton.	Recovery percentage of original gold.
Concentrate ...	12.40	ozs. dwts. grs. 1 5 14	16.66
Tailing ...	87.60	0 4 19	22.04

The concentrate was crushed through 100 mesh and cyanided for six days in the presence of lime.

Product.	Gold per ton.	Recovery.	
		Percentage of concentrate.	Percentage of original.
Cyanided ...	ozs. dwts. grs. 1 1 0	82.08	13.67
Residue ...	0 4 14	17.92	2.99

Consumption of Cyanide, 2.4 lbs. per ton of concentrate.

The tailing from concentration was cyanided for six days with lime.

Product.	Gold per ton.	Recovery.	
		Percentage of tailing.	Percentage of original.
Cyanided ...	ozs. dwts. grs. 0 3 16	76.52	16.86
Residue ...	0 1 3	23.48	5.18

Consumption of Cyanide, 1.2 lbs. per ton of tailing.

Total Gold Recovery, 90.92 per cent.

Any discrepancies in the above are due to losses of material and the difficulties of manipulation in working with small quantities.

These tests show that an appreciable amount of the gold is in a comparatively coarse condition, and is not readily amenable to cyanidation: in order to make a good recovery of the gold, amalgamation would have to form part of the treatment.

Concentration and cyanidation of concentrate and tailing without amalgamation failed to give a satisfactory recovery with a very high consumption of cyanide.

Amalgamation followed by concentration, with cyanidation of concentrate and tailing in the presence of lime, gives a high recovery with a fairly low consumption of cyanide, and this seems to be the best method of treatment.

OXIDISED ORE FROM GREAT VICTORIA GOLD MINE, BURBRIDGE.

This highly ferruginous (gossany) ore was submitted for examination with a view to determining the cause of the high consumption of cyanide and lime experienced in its treatment. A partial analysis gave:—

Gr	oup II.A metals	...	...	Nil
Gr	oup II.B "	...	...	Nil
F	roup III.B "	...	...	Nil
	te acid	...	...	Nil (water extract neutral.)
	g			
	eWer soluble sulphates SO ₂	0.05	per cent.	
	Acid soluble sulphates, SO ₂	0.28	"	
	Sulphides, S	0.04	"	

A qualitative test showed the presence of much alumina soluble in dilute (5 per cent.) caustic soda solution. Such a reaction would be obtained when alunite or gibbsite (Al₂O₃.3H₂O) is present. Alunite

could hardly exist in the presence of so much iron, the acid soluble SO₂ being present probably as jarosite or a basic salt such as copiapite. Further, the quantity of caustic soda-soluble alumina was much greater than that required to form alunite with the acid soluble SO₂, and was therefore present as gibbsite.

Tests were made of the consumption of cyanide and lime, the figures obtained being:—

Lime alone ...	Consumption	11.7lbs. of CaO per ton.
Cyanide alone	"	10.89lbs. of KCN per ton.

Lime followed by cyanide:—

Lime present.	Cyanide consumption.
lbs. per ton.	lbs. per ton.
10.0	2.87
4.6	4.64

These high consumption figures cannot wholly be attributed to water-soluble and acid-soluble sulphates.

In view of the known interaction between gibbsite and alkalis a test was made of the consumption of cyanide by a typical Darling Range laterite carrying much gibbsite. This consumption was found to be 14.6 lbs. KCN per ton, due probably to the formation of potassium aluminate. A proportionate consumption of lime would no doubt occur owing to the formation of calcium aluminate.

The conclusion arrived at is that the high consumption of lime and cyanide is due partly to water soluble and basic sulphates of iron, partly to aluminium hydroxide in the form of gibbsite.

SULPHIDE GOLD ORE AND BATTERY RESIDUES FROM WATERLOO GOLD MINE, HOLDEN.

The minerals present in the ore were mainly quartz and galena, with an appreciable amount of dolomite, malachite, and a little covellite, chalcopyrite, and limonite.

A partial analysis of the battery residues gave the following figures:—Lead, 1.63 per cent.; copper, 0.90 per cent.; sulphur trioxide, 0.13 per cent.; gold, 6 dwts. 13 grs. per ton; silver, 12 dwts. 9 grs. per ton.

The residues were submitted to a concentration test by panning, yielding a concentrate equal to 6.3 per cent. of the original residue. This assayed:—Lead, 20.39 per cent.; copper, 10.19 per cent.; gold, 2 ozs. 10 dwts. per ton; silver, 6 ozs. 2 dwts. 12 grs. per ton, equal to a recovery of:—Lead, 78.8 per cent.; copper, 71.33 per cent.; gold, 48.20 per cent.; silver, 62.17 per cent. The tailings from the concentration test equalling 93.7 per cent. of the original residues, assayed:—Lead, 0.37 per cent.; copper, 0.28 per cent.; gold, 3 dwts. 16 grs. per ton; silver, 5 dwts. per ton.

It would appear from the above figures that the residues are too cupriferous to be amenable to cyanide treatment. By concentration, however, a fair recovery is made of the metallic value in a form which is probably best sold to a custom works.

MINERAL NOTES.

Coal.—A number of samples of coal from several new localities were received during the year, one sample from the Margaret River district gave the following figures—

Proximate Analysis—		%
Moisture	...	13.77
Volatile hydrocarbons	...	41.41
Fixed carbon	...	38.70
Ash	...	6.12
		100.00
Calorific Value	...	10,014 B.T.U.
Distillation Test—		
Water	...	27.76
Tar Oils	...	2.00
Residue	...	56.92
Gas by difference	...	13.32
		100.00

The water was acid to litmus. The specific gravity of the tar oils is 1.08.

This is a somewhat brittle, hydrous bituminous coal possessing a sub-conchoidal fracture; the fresh fracture is lustrous, jet-like, and does not soil the fingers, it possesses a distinct woody structure, but does not show any tendency to disintegrate on air drying. On burning, it yields a semi-coherent coke.

Chromite.—Chromite of marketable grade was received from Murra Munda; a bulk sample forwarded by the prospector gave the following figures on analysis:—

	%
MgO	11.04
FeO	20.48
MnO	.26
Fe ₂ O ₃	2.78
Al ₂ O ₃	10.89
Cr ₂ O ₃	46.16
SiO ₂	5.76
H ₂ O +	1.97
H ₂ O —	.24
99.58	
Sp. Gr.	4.03

The sample consists mainly of granular chromite (variety beresofite) with serpentine filling the inter-spaces.

Four samples of chromite from the same locality collected by Mr. T. Blatchford, gave the following figures for chromium oxide:—42.58 per cent., 43.85 per cent., 44.74 per cent., 46.53 per cent.

An average sample from the above four was assayed for platinum with a negative result.

Pigment.—Ilmenite suitable for the production of "Titanium White" paint was received from several localities. A sample from Kendenup consisting of a mixture of ilmenite and limonite contained 32.6 per cent. of titanium oxide.

Arsenical Ore.—An average sample of arsenical ore from the dump at the Transvaal Mine, Southern Cross, assayed:—Arsenic, 17.44 per cent.; gold, 18 dwts. 7 grs. per ton; silver, 1 oz. 6 dwts. 3 grs. per ton.

This ore is being utilised for the production of sheep dip and other arsenic compounds.

Fullers Earth.—A sample of fullers earth of a greyish white colour, highly plastic, and of an unusual composition was received from Watheroo. It

proved to be very effective in clarifying oils. An analysis gave the following figures:—

	%
SiO ₂	59.26
Al ₂ O ₃	4.29
Fe ₂ O ₃	1.45
FeO	.18
MnO	Trace
MgO	14.21
CaO	2.77
Na ₂ O	.58
K ₂ O	.42
H ₂ O —	7.03
H ₂ O +	5.32
TiO ₂	.34
SO ₃	.27
CO ₂	2.21
NaCl	.68
Organic matter	.96
99.97	

Absorption figure by Ashley's method, 671/700.

This is probably a mixture of sepiolite or saponite with halloysite and calcite.

Corundum (oxide of aluminium).—A number of crystals up to two inches in length of a whitish to cream yellow colour, with a badly corroded surface, and in some cases with a blue coating, were received from Cubbine. They possessed a distinct basal cleavage and were fairly brittle. Similar material has been collected by myself from Jacob's Well, a few miles west from this occurrence.

Mimetite (chloro-arsenate of lead).—A lead ore forwarded from 35 miles North-East of Nullagine was found to consist of quartz, mimetite, pyromorphite, cerussite, and limonite. It assayed:—Lead, 14.33 per cent.; arsenic, 2.27 per cent.; gold, 15 dwts. 9 grs. per ton; silver, 2 ozs. 2 dwts. 18 grs. per ton.

Xenotime (phosphate of yttrium).—A number of flat, tabular, alluvial grains up to quarter of an inch in diameter of a greyish colour from Nullagine, received through the Mining Registrar, proved to be xenotime. Further material has been asked for, in order to make a complete chemical examination of it.

Diamonds.—Two stones received from Nullagine proved to be diamonds, one being nearly pure white of moderate brilliancy weighing 0.3 carat, the other of a distinctly yellowish tint weighed 0.24 carat. Diamonds have been previously recorded from Nullagine.

Pickeringite (hydrous sulphate of magnesium and aluminium).—An efflorescence collected by Mr. R. C. Wilson from a slope in the Uarring Westralia Mine, at Mulline, gave the following figures:—

Lab. No. 731.	
Analysis:	
Insoluble in water—	
Natrojarosite, Na ₂ O 3Fe ₂ O ₃ 4SO ₃ 6H ₂ O	.39
Kaolin and quartz	1.65
2.04	
Soluble in water—	
Sulphur trioxide, SO ₃	35.17
Alumina, Al ₂ O ₃	5.76
Ferric oxide, Fe ₂ O ₃	.36
Ferrous oxide, FeO	.86
Magnesia, MgO	6.42
Lime, CaO	.06
Copper oxide, CuO	.80
Soda, Na ₂ O	.16
Potash, K ₂ O	Trace
Chlorine, Cl	.71
Water, H ₂ O	44.79
Less O = Cl	.16
97.93	
99.97	

These constituents are probably combined as follows:—

	%
Pickeringite, $\text{MgSO}_4 \cdot \text{Al}_2(\text{SO}_4)_3 \cdot 22\text{H}_2\text{O}$...	73.77
Epsomite, $\text{MgSO}_4 \cdot 6\text{H}_2\text{O}$...	15.02
Pisanite, $(\text{Fe}, \text{Cu})\text{SO}_4 \cdot 7\text{H}_2\text{O}$...	6.20
Coquimbite, $\text{Fe}_2(\text{SO}_4)_3 \cdot 9\text{H}_2\text{O}$...	1.29
Bischofite, $\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$...	1.53
Salt, NaCl} ...	.30
Gypsum, $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ...	.19
Natrojarosite, $\text{Na}_2\text{O} \cdot 3\text{Fe}_2\text{O}_3 \cdot 4\text{SO}_3 \cdot 6\text{H}_2\text{O}$	.39
Kaolin and quartz ...	1.65

British Empire Exhibition.—In connection with the British Empire Exhibition, I was released from my ordinary official duties to catalogue and prepare this State's mineral exhibit, but owing to the poor response to an appeal by the committee for suitable specimens it became necessary for me to go out and collect material, the Coolgardie, East Coolgardie, North Coolgardie, Yalgoo, and Yilgarn Goldfields, the Midland, Great Southern, and Coastal Districts being visited. I attended the conferences, as this State's delegate, held in Sydney and Adelaide of representatives of the various mineral committees called together by the Federal Commission to decide the form the Australian mineral exhibit should take, and the quantities and minerals to be supplied by each State.

In all 635 bags and 72 cases of mineral exhibits were forwarded to London, which included gold specimens to the value of £4,392, also asphaltum, Kimberley; antimony ore, Mallina, Wiluna; arseni-

cal ore, Southern Cross, Coolgardie; asbestos, Sherlock, Lionel, Goomalling; alunite, Kanowna; barytes, Ajana, Cardup, Cranbrook; bauxite, Sawyers' Valley, Wooroloo; beryl, Balingup, Poona, Melville; coal, Collie, Norrialup; corundum, Jacob's Well; dolomite, Kojonup; diatomite, Lake Gnangara; fuller's earth, Collie, Goomalling; gypsum, Hine's Hill, Cliff Head, Wubin; glass sand, Albany, Bassendean, Perth, Lake Gnangara; glauconite, Gingen; halloysite, Norseman; iron ore, Clackline, Tallering Peak, Yampi; jarosite, Ravensthorpe; lead ore, Galena, Narra Tarra; molybdenite, Mulgine; magnesite, Bulong, Coolgardie; manganese ore, Horsehoe; phosphate rock, Dandarragan; salt, Norseman, Dongarra, Rottnest, Esperance; sulphur ore, Anaconda; tin ore, Greenbushes; talc, Ravensthorpe; tungsten ore, Melville; topaz, Londonderry; vanadium ore, Gregory Range; zinc ore, Mundijong.

In addition there were bulk samples of typical gold ores from several of the more important gold mines at Kalgoorlie, as well as models of mines and ore deposits. A comprehensive exhibit of local ceramic materials loaned by this Branch was prepared and accompanied by bulk samples of white clays with kiln trials, specially prepared and burnt to a standard size under my supervision.

Spot maps showing the distribution of Western Australian minerals were prepared for incorporation in a Commonwealth mineral map to be displayed at the Exhibition.

H. BOWLEY, A.A.C.I.

AGRICULTURE, WATER, AND SEWERAGE.

(S. C. PALMER.)

The samples received for analysis during the year totalled 822, and were received from the following sources:—

Agricultural Department	...	...	182
Metropolitan Water Supply	...	...	472
Health Department	...	...	5
Department of Works and Labour	...	...	27
Royal Agricultural Society	...	...	17
Other Departments	...	...	6
Public Pay...	...	...	105
Public Free	...	...	8
Total	...	...	822

Samples received were classified under the following heads:—

Soils	...	...	...	63
Waters	...	...	...	191
Fertilizers	...	...	...	45
Sewage	...	...	...	387
Wheats and Flours	...	...	...	102
Grapes	...	...	...	9
Limes and Limestones	...	...	...	5
Fungicides	...	...	...	12
Miscellaneous	...	...	...	8
Total	...	...	...	822

Soils.—Of late years the progressive farmers of Western Australia having become more enlightened with regard to those sciences bearing particularly upon soils and their cultivation, an unusually keen interest has sprung up amongst them through their

realising the necessity of combining science with practice. The study of the variable soils of Western Australia is a very complex problem, and this study is engaging the close attention of individual members of the staff of our agricultural laboratory, and forms the most important part of their work.

For the past twenty years Western Australia has been reminded oftentimes of the great advantage to be gained by installing a systematic "soil survey," but such suggestions have up to the present remained unheeded. The knowledge obtainable through the installation of a soil survey would be invaluable. Every member of the farming community could not help but derive some benefit from the highly instructive information compiled in the form of analytical tables, maps, etc., showing the character and composition of the various soils of the country districts—good, bad, and indifferent—and if these data were hung upon the walls of the public institutions in the country such as town halls, libraries, agricultural halls, etc., they would rapidly disseminate invaluable and up-to-date knowledge, such as the farmers are so much in need of.

Appended are some interesting analyses of soils from various districts of this State.

Wyndham.—The subjoined six soils from the Wyndham district were received from the Agricultural Adviser for the North-West, and are of interest as they show the different types of soil to be found in the district. Leaving out the homestead and garden soils, the remaining soils are very poor, especially in phosphoric oxide. (Table 1.)

TABLE I.

ANALYSES OF SOILS FROM WYNDHAM DISTRICT.

Laboratory Numbers	1508.	1509.	1510.	1511.	1512.	1513.
Marks	Black soil South of Ningbing Homestead.	Garden at Ningbing near edge of laagoon.	Black soil near limestone at Knob Peak.	Sandy loam Box country near limestone.	Average sandy loam from box country.	Semi-alluvial loam from Ord River lands.
Roots	<i>nil</i>	<i>nil</i>	<i>nil</i>	<i>nil</i>	<i>nil</i>	<i>nil</i>
Stones	<i>nil</i>	<i>nil</i>	<i>nil</i>	<i>nil</i>	<i>nil</i>	<i>nil</i>
Fine Soil	100	100	100	100	100	100
Apparent specific gravity	1.05	1.15	1.26	1.46	1.58	1.42
Reaction	Neutral.	Slightly alkaline.	Neutral.	Slightly acid.	Neutral.	Slightly acid.
pH	7.3	8.5	6.9	6.5	6.7	6.4
Chemical analysis on steam dried sample—						
Loss on ignition	7.070	2.300	8.780	2.380	2.037	7.010
Organic Carbon ... ..	.950 N.	3.820 R.	2.340 R.	.660 N.	.480 L.	.704 N.
Salt ... ..	.059 D.	.163 D.	.013 G.	.010 G.	.007 G.	.007 G.
Nitrogen ... ..	.045 P.	.269 R.	.101 N.	.039 P.	.012 P.	.034 P.
Lime as carbonate ... ..	.032 P.	15.925 R.	.069 P.	.028 P.	.013 P.	.090 P.
Lime as sulphate, etc	1.005	.251	1.123	.223	.146	.510
Potash, acid soluble ... ..	.150 L.	.224 N.	.130 L.	.265 G.	.184 N.	.517 R.
Phosphoric oxide, acid soluble ... ..	.029 P.	.192 G.	.023 P.	.018 P.	.022 P.	.036 P.
Mechanical analysis on steam dried sample—						
Sand	2.4	4.6	27.0	8.1	13.7	2.40
Silt	83.4	67.3	45.8	85.2	76.3	68.10
Clay	14.2	28.1	27.2	6.7	10.0	29.50
Colour, wet	Black.	Black.	Black.	Brown.	Light Brown.	Reddish Brown.
Description	Loam.	Loam.	Loam.	Sandy Loam.	Sandy Loam.	Loam.

Standard for Plant foods—R. Rich; G. Good; N. Normal; L. Low; P. Poor.

Standards for salt—G. Good; D. Doubtful; E. Excessive.

Analysts: A. J. HOARE, B. L. SOUTHERN, S. C. PALMER.

Drysdale River Mission, Kimberley.—Rice and cotton had been grown on these soils without success. The fertilising constituents are very deficient, as the figures in Table 2 show. The mechanical condition is fairly good.

Derby.—This soil taken from Udella Springs, Derby, is a representative sample from what is known as "Pandanus" land; the soil contains an excessive amount of salt, and the amount of magnesia is high.

TABLE 2.—ANALYSES OF SOILS FROM WEST KIMBERLEY.

Laboratory Numbers ... Marks	Drysdale River.		Udella Springs.
	1219. Top soil.	1220. Sub soil.	332 Top soil.
Roots	% <i>nil</i>	% <i>nil</i>	% <i>nil</i>
Stones	<i>nil</i>	<i>nil</i>	<i>nil</i>
Fine soil—per cent. ...	100	100	100
Apparent specific gravity	1.53	1.56	0.82
Reaction... ..	Acid.	Acid.	Alkaline.
PH	6.2	6.2	8.8
Chemical analysis on steam dried sample—			
Loss on ignition ...	2.230	1.61	13.92
Organic carbon ...	.916N	.19P	3.30R
Salt ... ..	.007G	.014G	.808E
Nitrogen ... ..	.011P	.006P	.297R
Lime as carbonate ...	.038P	.033P	.255N
Lime as sulphate, etc.	.012	<i>nil</i>	.840
Potash, acid soluble ...	.020P	.022P	.280G
Phosphoric oxide, acid soluble	.019P	.013P	.082L
Magnesia, acid soluble	?	?	5.527
Mechanical analysis on steam dried sample—			
Sand, per cent. ...	49.3	45.3	3.8
Silt, per cent. ...	42.4	45.6	79.6
Clay, per cent. ...	8.3	9.1	19.6

TABLE 2—continued.

Laboratory Numbers ... Marks	Drysdale River.		Udella Springs.
	1219. Top soil.	1220. Sub soil.	332. Top soil.
Colour, wet	Brown	Light brown	Black.
Description	Sand	Sand	Silt.
Water soluble salts on steam dried sample—			
Total soluble salts—per cent.	.024	.075	...

Standards for plant foods—R. Rich; G. Good; N. Normal; L. Low; P. Poor.

Standards for salt—G. Good; D. Doubtful; E. Excessive.

Analysts: A. J. HOARE and B. L. SOUTHERN.

Bunbury.—Ten soils were analysed from lands submitted to the Government for sale in the Bunbury district. As will be seen from the figures in Table 3, the soluble salts, with the exception of those in No. 7 soil, are high, in some cases extremely high (Nos. 4 and 9). The phosphoric oxide and potash in all of them are low, but the nitrogen content is satisfactory, as is usually the case with swamp soils.

Peel Estate.—A sample was sent in from Magemup Swamp, Peel Estate, as the growth of crops was not so good as on other portions of the estate. On examination the dried soil was found to contain 5.32 per cent. of common salt, which fully explains the lack of fertility. In fact, but for the excessive moisture present, the soil would be utterly barren.

TABLE 3.—ANALYSES OF SOILS FROM BUNBURY DISTRICT.

Lab. Nos.	634	635	636	637	638	639	640	641	642	643
Marks	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10.
Chemical Analysis on Steam Dried Sample—										
Nitrogen	1.078 R.	1.442 R.	0.280 R.	0.147 N.	0.987 R.	0.130 N.	0.182 G.	0.826 R.	0.700 R.	0.504 R.
Phosphoric oxide ... ..	.083 L.	.073 L.	.038 P.	.021 P.	.197 G.	.042 P.	.090 L.	.119 N.	.074 L.	.074 L.
Potash ... ..	.039 P.	.042 P.	.032 P.	.038 P.	.078 L.	.041 P.	.059 L.	.038 P.	.099 L.	.042 P.
Lime	2.175	2.789	1.142	.968	2.730	3.510	.590	1.300	36.811	32.630
Water Soluble Salts on Steam Dried Sample—										
Water soluble salts at dull red heat	.492	.432	.242	1.890	.750	.590	.207	.370	3.032	1.086
Sodium chloride from chlorine	.309	.241	.143	1.438	.500	.369	.099	.269	2.448	.740
Calcium (Ca) ... ..	.044	.044	.040	.243	.107	.087	.028	.038	.177	.071
Magnesium (Mg) ... ..	.044	.035	.026	.083	.031	.025	.019	.020	.116	.030
Sulphate (SO ₄) ... ..	.091	.115	.058	.255	.060	.066	.058	.063	.303	.058
Iron (Fe)	<i>Nil</i>	<i>Nil</i>	<i>Nil</i>	<i>Nil</i>	<i>Nil</i>	<i>Nil</i>	<i>Nil</i>	<i>Nil</i>	<i>Nil</i>	<i>Nil</i>
Nitrate (NO ₃)	<i>Nil</i>	<i>Nil</i>	<i>Nil</i>	<i>Nil</i>	<i>Nil</i>	<i>Nil</i>	<i>Nil</i>	<i>Nil</i>	<i>Nil</i>	<i>Nil</i>
Alkalinity expressed as calcium carbonate	.080	.090	.060	.200	.40	.40	.12	.100	.455	.350
Reaction	Neutral	Neutral	Neutral	Slightly alkaline	Neutral	Alkaline	Neutral	Neutral	Alkaline	Alkaline
Description	Black peat	Black peat	Loamy peat	Loamy peat	Black peat	Marly loam	Loamy marl	Peat	Calcareous loam	Calcareous loam

Standards for Plant Foods—R. rich; G. good; N. normal; L. low; P. poor.

Analysts—S. C. Palmer, A. J. Hoare, B. L. Southern, J. C. Hood.

NOTE.—Samples were marked as follow:—

- No. 1—Myalup Swamp (North-West) Manning's cleared land.
- No. 2—Myalup Swamp (West) Piggotts' (bullrush).
- No. 3—Myalup Swamp (South) Reading's (bullrush).
- No. 4—Myalup Swamp (South) Reading's (paperbark).
- No. 5—Myalup Swamp Manning's (cleared paperbark).
- No. 6—Myalup Swamp (North Central) Manning's cleared.
- No. 7—Long Swamp Location 672 (North) Blister bush bank.
- No. 8—Long Swamp Location 672 (South) Paperbark.
- No. 9—Location 42, Lake Josephine, T. A. Piggott.
- No. 10—Location 42, Paperbark swamp, T. A. Piggott.

Grapes.—Several cases of drying grapes were sent in for the purpose of ascertaining whether the sugar percentage in the samples varied with the district where grown. The subjoined table gives the amount of invert sugar present in each variety:—

Lab. No.	Date of sampling.	District.	Variety.	Sugar (invert).
403	February	Upper Swan	Zante currant	23.2
431	Do.	Wagin ...	do.	22.5
463	Do.	Woodanilling	do.	22.3
548	March ...	Upper Swan	Sultana ...	22.5
680	Do.	Wagin ...	do.	22.6
464	February	Woodanilling	do.	18.0
709	March ...	Upper Swan	Gordo muscat	19.6
604	do.	Wagin ...	do.	21.2
733	do.	do. ...	do.	20.9

Analysts—S. C. Palmer, B. L. Southern, R. G. Lapsley, and A. J. Hoare.

Fertilisers.—Very few fertilisers have been received for analysis. All those submitted were in good physical condition and suitable for the drill. The higher grade superphosphates were well up to the standard of 20.5 per cent. of water soluble phosphoric acid as guaranteed, with the exception of one which contained slightly under 20 per cent. P_2O_5 . All other manures were up to registration, and were physically in good friable condition. One special sample of ground phosphate rock (ground by Cotterel process) did not prove what it was purported to be, so far as analytical figures show. It was claimed that this sample, on account of its fineness, might be used with good effect in place of superphosphate, but since this rock contained no water soluble P_2O_5 , it can in no wise compare with superphosphate. Its citric acid availability, however, compares very favourably with that of basic slag, for which it might be used as a substitute.

ANALYSIS OF PHOSPHATE ROCK.

Laboratory Number 1429.	Per cent.
Moisture	1.21
Water soluble phosphoric acid ...	nil
Citrate soluble phosphoric acid ...	2.95
Nitric acid soluble phosphoric acid ...	25.72
Citric acid soluble phosphoric acid ...	10.10
Total soluble phosphoric acid ...	28.67

Fineness—95.5% passes through a sieve of 100 meshes to the linear inch.

Analyst: A. J. Hoare.

Fungicides.—Several samples of basic copper carbonate were received during the year in connection with the dry pickling of wheat for smut, etc. Some of these on analysis did not come up to the American standard, requiring not less than 50 per cent. of copper being present. The subjoined tables show a few of these analyses:—

Lab. No. ...	385 Copper carbonate.	549 Bunti- cide.	1,371 Anti- bunt.	2,524 Copper carbonate.
Copper, Cu ...	50.43	28.40	47.20	51.40
Equal to basic carbonate of copper, $CuCO_3$ (OH) ₂ ...	87.73	49.40	82.10	89.42

Analyst: B. L. Southern.

No. 385 contained magnesium sulphate, small quantities of iron and chromium, was neutral to litmus, and did not contain any water soluble copper. A copper carbonate of good quality.

No. 549. Very low grade. The diluent consists mainly of calcium carbonate.

No. 1371. The diluent consists mainly of calcium carbonate.

No. 2524. Weighs 73lbs. per cubic foot; 10.9 per cent. retained on 200 mesh sieve. American standards: Weight not to exceed 32lbs. per cubic foot; not more than one per cent. to be retained on a 200 mesh sieve; and copper to be not less than 50 per cent.

Waters.—The number of waters received during the year was 191, a fair proportion of these being for stock and irrigation purposes. Unfortunately a large number of these were very salt, and therefore unfit for animals to drink. The appended table shows a few figures that are of interest:—

WATER ANALYSES.

(grams per 100 cc.)

Lab. No. Source ...	1,164 Well Mullewa.	1,642 Murray River, Pinjarra.	1,331 Well, Por- ongorup Range.	1,081 Spring, Fairy Creek.
$FeCO_3$...	0.0004	...	...	...
$CaCO_3$ ...	.0035	0.0023	0.0165	0.0060
$MgCO_3$ ...	...	...	.0103	.0101
Na_2CO_3 ...	...	...	...	.0210
$CaSO_4$ ...	...	.0040	...	...
$MgSO_4$ ...	.0038	...	.0059	...
K_2SO_4 ...	...	...	...	.0007
KNO_3 ...	trace	...	trace	trace
$CaCl_2$ ...	...	.0022	...	...
$MgCl_2$ ...	.0039	.0204	.0662	...
$NaCl$ ...	.0646	.0564	.3400	.0017
KCl ...	.0034	traces	.0012	.0015
Al_2O_3 ...	...	.0029	.0014	.0004
SiO_2 ...	.0041	.0002	.0010	.0007
	0.0837	0.0884	0.4425	0.0431
H_2S ...	nil	nil	.0003	trace
Reaction	Neutral	Neutral	Slightly acid	Neutral
PH ...	7.1	7.1	5.6	7.2

Analysts—H. E. Hill, J. Pericles, F. E. Chapman.

No. 1644, Baxters' Well, Mullewa.—A special examination for poisonous substances gave negative results. The water was said to have an effect on the kidneys.

No. 1642, Murray River, Pinjarra.—A hygienic analysis showed Albumenoid ammonia, 0.013 parts per hundred thousand; free ammonia, .011; nitrogen as nitrites, nil; nitrogen as nitrates, .029; oxygen absorbed in four hours, .145. This water was to be used for providing a supply to the town of Pinjarra. It was a good potable water.

No. 1331, Well at Karri-bank, 14 miles East of Mt. Barker.—A recently discovered supply among the foot-hills on the northern slope of the Porongorup Ranges. The water is said to be quite warm as it rises, and to have beneficial effects upon people who bathe in it. Spectroscopic examination proved the presence of traces of lithium, whilst traces also of bromides, phosphates, and organic matter were detected.

No. 1081, Spring $1\frac{1}{2}$ miles from Mugg's Lagoon, 20 miles from Wyndham.—The spring is in the bed of Fairy Creek, at the foot of a hill, and is surrounded by Pandanus plants. It is said to be "a cold spring, which never dries up, and has been held in high repute by the natives for generations past as a cure for swellings and painful parts, being taken internally as well as externally. Many whites in recent years testify to its healing properties in cases of rheumatism and external injuries."

Traces of phosphates and organic matter are present, and the spectroscope proves the presence of traces of lithium and barium.

A very unusual water is No. 3147, taken from a 50ft. well, in what appear to be bedded clays, at Bencubbin. Its analysis showed:—

	Grams. per 100 ccs.	Grains per gallon.
Silica, SiO_2	0.0092	6.44
Iron sulphate, $\text{Fe}_2(\text{SO}_4)_3$	trace	trace
Aluminium sulphate, $\text{Al}_2(\text{SO}_4)_3$ ... ..	.1154	80.78
Calcium sulphate, CaSO_4 ... ..	.0540	37.80
Magnesium sulphate, MgSO_4 ... ..	.1080	75.60
Magnesium chloride, MgCl_2 ... ..	.2056	143.92
Sodium nitrate, NaNO_3 ... ..	.0012	.84
Potassium chloride KCl} ... ..	.0407	28.49
Sodium chloride, NaCl	2.1999	1539.93
	2.7340	1913.80

Reaction, acid (PH, 4.4, equal to .0002% sulphuric acid).
Analyst, B. L. Southern.

The water contained a considerable amount of aluminium sulphate. It was a strongly astringent acid and saline water, entirely unsuited for stock or any other industrial purpose. The composition is unusual outside a mining field.

Sewage.—The number of sewage samples analysed for the past year was 387. Most of these were from the Perth Treatment Works and metropolitan areas, Fremantle, Claremont, etc., while others were odd installations. Some experiments were carried out on the filtrates passing through the settling pits at East Perth, the results of which corroborated the theory that a reducing or de-nitrifying action was taking place, the figures of last year showing a reduction of the nitrates to the extent of 43 per cent. This reducing action is somewhat of a complex problem and is still going on, but experiments, which are being conducted from time to time will no doubt help to solve this difficulty. At the present time an experiment is being conducted with a view of ascertaining the degree of purification at different depths, in the filter beds. No. 5 bed has been chosen for this experiment. A set of galvanised iron troughs, four in all, were built in at different depths, the lowest one being six inches from the bottom of the bed. A pipe from each trough, which served to drain off the filtrate, was carried straight along to the outside of the wall, projecting a few inches so as to allow filtrate to be drawn off when required. A chemical analysis made from time to time of these filtrates should yield some interesting and useful information respecting any variations in the chemical changes

going on at the different depths of the bed, and thus materially assist those who control the treatment, and in a measure help to throw further light upon the problem of denitrification.

WHEAT AND FLOUR INVESTIGATIONS.

The wheat milling operations and flour investigations were carried out during the year by Mr. R. G. Lapsley, B.Sc.Agr., A.A.C.I., who has supplied the following notes:—

The wheat samples milled totalled 67, of which 14 were from the Royal Agricultural Society, three from a private milling company, and 50 were milled for the Agricultural Department.

The flour samples examined totalled 32, of which 13 were samples of export flour sent in by the Agricultural Department, seven were samples of flour from a private milling company for grading purposes, and 12 were samples in connection with a commercial bakery investigation and the water absorption test.

The Royal Agricultural Society's Wheat Exhibits.—As in previous years this very important branch of the work, viz., the milling and investigating of the wheat samples submitted for competition in the Royal Agricultural Society's Show received much attention. The total number of individual entries for competition this year was 17 compared with 27 for the previous year. The general standard of excellence was, however, well maintained in all the classes. The judging was carried out as in previous years. The bushel weight of all samples was first taken, and after careful inspection by the judges, those which were considered eligible for prizes were milled in the experimental mill, and the prizes finally awarded according to points awarded for the different milling characteristics.

On submission to very careful inspection, three of the samples submitted were rejected as inferior before the milling test.

The judges appointed for the competition were:—Mr. G. L. Sutton, Director of Agriculture; Mr. E. M. Wilson, Miller of the Peerless Roller Flour Mill. Mr. R. G. Lapsley, B.Sc.Agr., Chemist and Miller, Agricultural Section, Chemical Branch.

The list of prize winners and the tabulated analytical results are given below.

Wheat Samples milled for Commercial Mills.—It has been customary in the past to mill and investigate samples of wheat for flour milling companies. During the year three samples of wheat varieties received attention from this source. These wheats were for blending purposes, and their milling quality and the baking quality of the resultant flours were determined.

Wheat Investigation for the Agricultural Department.—Of the 50 samples of wheat varieties entered for milling investigation, the varieties from the stud and pedigree bulk crops formed the chief part. Interesting comparative figures were obtained with varieties submitted from the Chapman and Merredin Experimental Farms where the same standard varieties were grown.

Three samples of red wheats were submitted for investigation of their respective milling qualities. These samples were Red Russian, Marquis, and Warden.

Thirty-one varieties of wheat were also submitted by the Agricultural Department for milling and baking quality tests. These were grown at the Chapman Experimental Farm.

Flour Investigations.—Thirteen samples of export flour were submitted by the Agricultural Department in connection with export grade standardisation. Seven samples of flour were submitted from a com-

mmercial flour mill for grading purposes, and the usual determinations were made.

Investigations to establish the relationship between the water absorption figure, as determined by the use of the model dough mixer in our laboratory, and the commercial bakery yield in pounds weight of bread from the same flour were completed in the latter half of the year. The results of these experiments showed that great accuracy can be and has been established between the commercial loaf yield and the yield when calculated from the dough mixer reading. The results were almost identical with those of the bakery.

S. C. PALMER. A.A.C.I.

GRAPH

SHOWING

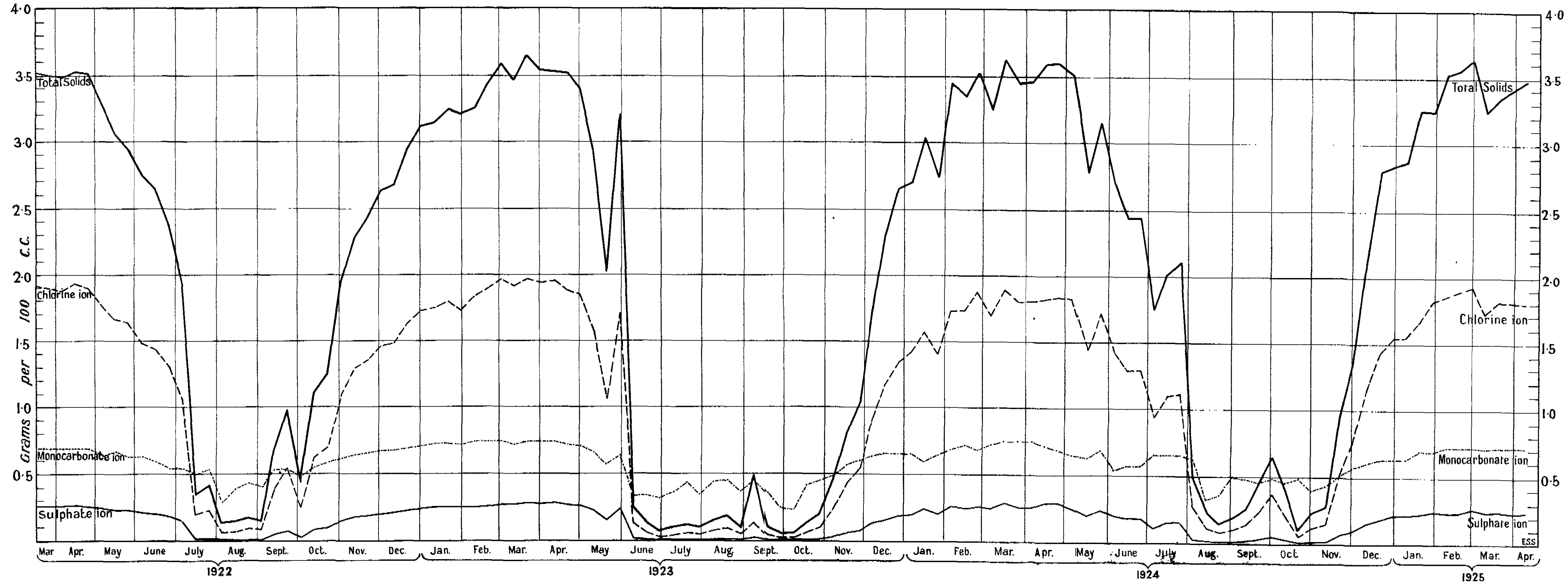
VARYING SALINITY OF SWAN RIVER

AT 10-DAY INTERVALS OVER A PERIOD OF THREE YEARS

17th March 1922—10th April 1925

Samples taken at Mends St Jetty, Perth Water.

N.B. Scale for Monocarbonate ion One hundred times that of other constituents.



MILLING TESTS OF WHEAT FOR THE ROYAL AGRICULTURAL SHOW, 1924.

Exhibitor.	Prize.	Variety.	Rainfall during growing period	Flour.	Bran.	Pollard.	Marks.	Wet Gluten.	Dry Gluten.	Marks.	Flour Strength quarts of water per 200lb. sack.	Marks.	Colour Marks.	Total Marks.	Bushel Weight.	Lbs. Weight of Bread per ton of Wheat.
CLASS 1—AUSTRALIAN WHITE WHEAT—ZONE 1.																
J. D. Hammond, Kellerberrin ...	1st	Florence	inches. 8.57	% 72.0	% 21.0	% 7.0	32	% 30.02	% 11.33	4	% 52.0	% 40.00	3½	79½	65½	2,387
H. W. Downer, Perenjori ...	2nd	Gluyas	10.04	72.3	21.3	6.4	33½	37.48	13.41	4½	44.8	31.00	4½	73½	64	2,267
V. S. Carter, Benjaberring ...	3rd	Gluyas	10.00	70.6	22.1	7.3	28.5	29.59	11.31	4	43.6	20.50	5	67	63	2,192
CLASS 2—AUSTRALIAN WHITE WHEAT—ZONE 2.																
J. F. Lewis, Konnongorring ...	1st	Florence	9.00	73.0	20.9	6.1	35½	32.55	12.39	4½	52.6	40.75	3½	84	66	2,431
R. Carter & Son, Three Springs ...	2nd	Niloc	15.00	72.3	20.9	6.8	33½	28.36	10.71	3½	52.8	41.00	4	82½	65	2,411
J. K. Hebiton, Three Springs ...	3rd	Firbank	14.00	71.9	20.7	7.4	31½	33.68	12.72	4½	49.2	36.50	5	77½	66	2,334
Fred Float, Dindiloa ...	...	Gresley	20.00	71.2	21.8	7.0	30	26.24	9.84	3½	47.6	34.50	4½	72½	65½	2,282
R. R. Ackland, Wongan Hills ...	...	Nabawa	9.00	69.6	23.0	7.4	26	17.96	7.55	3	47.4	34.25	5	68½	64	2,228
CLASS 3—AUSTRALIAN WHITE WHEAT—ZONE 3 (No entries).																
CLASS 4—AUSTRALIAN STRONG WHITE WHEAT—ZONE 1.																
J. D. Hammond, Kellerberrin ...	1st	Comeback	9.29	72.7	19.5	7.8	34½	40.75	15.52	5	56.4	45.5	4	89½	65½	2,490
Hughes Bros., Minnievale ...	2nd	Comeback	10.00	72.6	21.7	5.7	34½	38.62	14.99	4½	55.2	44.0	4	87½	66	2,464
T. H. Wilson, Wyalkatchem ...	3rd	Comeback	...	71.3	22.3	6.4	30½	34.15	12.60	4½	55.6	44.5	5	84	66	2,428
H. W. Downer, Perenjori ...	...	Comeback	10.04	71.6	22.2	6.2	31	36.20	12.69	4½	54.8	43.5	4½	83½	66	2,423
CLASS 5—AUSTRALIAN STRONG WHITE WHEAT—ZONE 2.																
J. K. Hebiton, Three Springs ...	1st and Champion	Carrabin	14.00	73.4	20.6	6.0	36½	40.69	13.94	4½	56.6	45.75	4½	91½	65½	2,517
J. K. Hebiton, Three Springs ...	2nd	Comeback	14.00	71.5	22.5	6.0	30½	34.95	13.03	4½	54.6	43.25	5	83½	66	2,417
CLASS 6—AUSTRALIAN STRONG WHEAT—ZONE 3 (No entries).																

DIVISION VIII.

REPORT OF THE CHIEF INSPECTOR OF EXPLOSIVES FOR THE YEAR 1924.

The Under Secretary for Mines.

I have the honour to submit, for the information of the Hon. the Minister for Mines, in compliance with Section 45 of "The Explosives Act, 1895," a report on the work of the Department during the year 1924.

The quantity of explosives imported into the State during the year under review will be found in Table I.

TABLE I.

Importation of Explosives into Western Australia during 1924.

	Quantity. lbs.
Gelignite	1,439,000
Gelatine Dynamite	282,500
Blasting Gelatine	91,250
Permitted Explosives	50,000
Blasting Powder	67,500
Pellet Powder	81,250
Fireworks ... ..	...
Fuse (coils)	365,400
Detonators (No.)	3,000,000

Table No. II. shows a comparison of the quantities of explosives imported during the past five years:—

TABLE II.

Comparison of Explosives imported into Western Australia during the past five years.

	1920.	1921.	1922.	1923.	1924.
	lbs.	lbs.	lbs.	lbs.	lbs.
Gelignite	2,035,300	375,325	520,000	997,000	1,439,000
Gelatine Dynamite	149,050	75,000	110,200	165,000	282,500
Blasting Gelatine	67,950	25,100	60,850	30,000	91,250
Permitted Explosives ... ..	...	...	65,000	2,500	50,000
Powder, Blasting	172,500	25,000	95,000	180,000	148,750
Powder, Sporting	10,675	...	700	...	...
Fireworks (Value)	£1,144	£1,185	£923	£449	£659
Fuse (Coils)	121,003	4,500	213,600	368,640	365,400
Detonators (No.) ... ..	...	...	...	1,150,000	3,000,000

This table shows a marked increase in the quantities of explosives of the nitro-compound classes imported during the year, when compared with the importations for the past three years.

The question of building magazines for the carriage of explosives in the fore-holds of ships, as mentioned in my last report, has been taken up with the Home Office authorities during the year, with the result that shipments are now carried in the after-holds, thus making the discharge into lighters more expeditious and safer, especially during the winter months.

Six shipments of explosives arrived in the State during the year, and were landed in a satisfactory condition with the exception of a consignment of 300 cases of blasting gelatine, which was found to have exuded nitro-glycerine from a number of the plugs.

This explosive was retained and placed under observation, and finally treated by removing the surplus nitro-glycerine by absorption with Keiselguhr. After treatment it was liberated for consumption, and no complaints were received from any of the users.

The above method of treating explosives from which the nitro-glycerine is freely exuding has been adopted on several occasions during the past few years, and has always proved satisfactory, and no trouble has been experienced while using the explosives so treated. Being able to treat explosives from which nitro-glycerine is exuding, satisfactorily, makes it possible to use them where otherwise they would have to be destroyed owing to the dangers of handling, etc., of free nitro-glycerine, and has resulted in a considerable saving of explosives, as on several occasions very large quantities were found from which the nitro-glycerine had exuded.

During the year the following licenses have been issued under the provisions of the Explosives Act, for the storage of explosives:—

Table III.

Licenses issued during 1924.

For magazines situated on Government explosives reserves	61
For magazines erected on private property	48
For magazines used by Government departments	16
For magazines used by group settlements	39
The total storage capacity of these magazines is 586 tons.	

Store licenses for the sale of explosives—

Mode A	91
Mode B	3
Licenses for the sale of fireworks only ..	276
Importation licenses	3

This table shows a slight increase in the number of magazines licensed for the storage of explosives.

I have again prepared a table showing the distribution and consumption of explosives and the relative percentage to the total consumption in the different classes of industry.

TABLE IV.

Distribution and Consumption of Explosives during 1924.

	lbs. *	Percentage of Total.
Gold Mining	830,000	48.9
Agricultural and land clearing ..	695,300	40.9
Government Departments, including Railways, Public Works and Water Supplies	49,100	2.9
Quarrying	62,300	3.6
Lead Mining	29,250	1.7
Coal Mining	19,700	1.2
Copper Mining	10,000	.6
Tin Mining	1,650	.1

* Figures for nitro compounds only.

TABLE V.

Distribution and Consumption of Explosives.

	1923.		1924.	
	lbs. *	Percentage of Total.	lbs. *	Percentage of Total.
Gold Mining	733,900	53.8	830,000	48.9
Agricultural and Land Clearing	487,950	35.7	695,300	40.9
Government Departments, including Railways, Public Works, and Water Supplies	41,750	3.1	49,100	2.9
Quarrying	41,200	3.0	62,300	3.6
Lead Mining	27,550	2.0	29,250	1.7
Coal Mining	25,990	1.9	19,700	1.2
Copper Mining	4,750	.3	10,000	.6
Tin Mining	950	.1	1,650	.1

* Figures for nitro compound only.

Table No. V. gives a comparison of the quantity of explosives used during the two years 1923 and 1924.

This table shows a general increase in the quantities used during 1924, and is a very fair barometer of the activity in the different classes of industry; but is not true in relation to coal mining, as most of the explosive used in this industry is gunpowder, and the figures quoted in these tables are for nitro-glycerine compounds only.

There have been no new reserves for explosives declared during the year, therefore the number remains the same as last year, *i.e.*, 51, with a total area of 3,056 acres.

Regular inspections, wherever possible, have been made of all licensed premises during the year, and the stocks examined. In order to do this the following places have been visited at least once during the year:—Perth and Fremantle (including all the metropolitan area), Northam, Westonia, Merredin, South-

ern Cross, Coolgardie, Kalgoorlie, Norseman, Menzies, Kookynie, Laverton, Leonora, Lawlers, Wiluna, Meekatharra, Nannine, Cue, Day Dawn, Magnet, Sandstone, Youanmi, Yalgoo, Mullewa, Geraldton, Northampton, Harvey, Bunbury, Busselton, Donnybrook, Greenbushes, Bridgetown, Albany, Denmark, Mount Barker, and a number of the Group Settlements in the South-West.

As a result of 215 inspections made it was only deemed necessary to take proceedings against one person for a breach of the Explosives Act, particulars of which are given in Table VI.

TABLE VI.

Date.	Place.	Offence.	Fine.
3-10-24	Fremantle ...	Storing Explosives in an unauthorised place.	Fine 10s., Costs 3s.

The following explosives were found not to comply with the provisions of the Explosives Act and considered unfit for consumption, and were accordingly destroyed.

TABLE VII.
Destruction of Explosives during 1924.

Date, 1924.	Place.	Kind and Quantity.	Remarks
March 4th	Fremantle	3,550lbs. Gelnite 950lbs. Viking Powder	Owing to exudation Absorption of moisture.
June 10th	Fremantle	50lbs. Gelnite 55lbs. Viking Powder	Owing to exudation. Absorption of moisture.
May 20th	Busselton	10lbs. Gelnite	do.
June 24th	Albany	60lbs. Viking Powder	do.
November 20th	Kalgoorlie	17,600 Detonators	Chemical deterioration
December 19th	Northam	7lbs. Gelnite	do.

The general supervision of shipments of explosives has been entrusted to this Department, and the discharge and loading of explosives have been done under the direct supervision of Mr. Maslin.

The following tests and analyses of explosives have been made during the year:—

Table VIII.

Heat tests	748
Burning tests of fuse	223
Complete analyses	49
Velocity of detonation	36
A.D.C. tests	19
Miscellaneous tests	42

Total 1,117

This table shows a marked increase in the number of tests made during the year when compared with those made during 1923, and is another indication that the work of the Department is increasing considerably.

No applications were received during the year to have placed on the authorised list of explosives any new explosive for importation into, or manufacture within the State.

A fair amount of work has been found necessary in connection with the strengthening of the fence surrounding the Woodman's Point Explosives Reserve, as it was found, on a thorough examination being made, that quite a number of the posts have been weakened by dry rot. The fence has been materially strengthened by bolting struts to all the weakened posts, and I am hopeful that no further trouble will be experienced for some years.

The reserve generally is well maintained and the buildings are in a satisfactory condition and well cared for, but the mounds surrounding the magazines are beginning to require attention owing to the timber facings being affected by dry rot and so letting the sand fall away, but this is receiving attention as the occasion arises.

Frequent applications are made to the Department for permission to carry explosives on petrol-driven vehicles, but only where special circumstances warrant it has permission been granted for the carriage of large quantities of explosives by motors in districts remote from railways and other means of transport, and permits which have been issued are for the cartage of explosives in trailers attached to motor cars with fastenings which can be easily released, in case of fire or accident, by means of a pin approved by the Inspector of Explosives.

According to an order approved of by the Secretary for State in England and dated 4th March, 1912, explosives are allowed to be conveyed in petrol-driven vehicles, provided the following conditions are observed:—

1. Explosives of Class VI., Division 1, and those of Class VI., Divisions 2 and 3, which are not capable of explosion *en masse*, such as primers, tubes and fuses for shell, may be carried in any mechanically-driven vehicle of modern design, provided all due precautions are taken to prevent accident.
2. Other explosives may be carried in petrol-driven vehicles, provided the following conditions are observed, viz.:—
 - (1) That at least two men accompany the vehicle.
 - (2) That the petrol tank be carried under the driver's seat or on the dash-board.
 - (3) That a quick-action cut-off be fitted to the petrol feed-pipe near the carburettor, but not so close as to be involved in a fire therein.
 - (4) That a chemical fire-extinguisher of the Tetra-chloride type be carried on the vehicle.
 - (5) That only electric lamps be carried.
 - (6) That the driver's seat be separated from the body of the vehicle by a fire-resisting screen carried down to within 12 inches of the ground, a clear space of at least six inches being provided between the screen and the body, and the whole of the exhaust pipe being carried in front of the screen.
 - (7) That the body of the vehicle be completely covered externally with a sheet of metal and lined internally with asbestos or with wood so treated as to be rendered unflammable.
 - (8) That the engine shall not be running during the loading or unloading of explosives.
 - (9) That the floor boards and side doors of the driver's seat, if of wood, be so treated as to be rendered unflammable.
 - (10) That there shall be no opening in the body of the vehicle except the door at the back, which shall fit closely.

The above method is also approved in some of the Eastern States, but if enforced in its entirety in this

State would mean a hardship on some of the small consumers of explosives in the remote parts of the State, as in many places the only means of transport is by motor vehicles, and it would certainly not pay to have a truck built in accordance with the specifications set out in the order of the Secretary for State for the carriage of the comparatively small quantities of explosives required.

I therefore propose to approve of the carriage of 1,000 lbs. of explosive on trailers affixed to motor trucks, with approved fastenings, to districts remote from railway stations and shipping ports.

The revenue received during the year from all sources amounted to £1,598, which is about £30 short of that received during 1923.

I have to acknowledge and thank the Commissioner of Police and his officers for the assistance they have rendered the Department during the year.

I should also like to express my appreciation of the willing and energetic help I have received from Mr. Maslin and the magazine staff at Woodman's Point.

T. N. KIRTON,
Chief Inspector of Explosives.

11th June, 1925.

WESTERN



AUSTRALIA.

DEPARTMENT OF MINES.

MINING STATISTICS,
1924.

MINING STATISTICS TO 31st DECEMBER, 1924.

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14. East Coolgardie Goldfield	42		
15. Coolgardie Goldfield	47		
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EXPLANATIONS OF SIGNS AND ABBREVIATIONS.

Gf. Goldfield.	M.C. Mineral Claim.
Mf. Mineral field.	M.R.C. Mineral Reward Claim
D. District.	M.A. Machinery Area.
G.M.L. Gold Mining Lease.	Mach. L. Machinery Lease.
M.L. Mineral Lease.	P.A. Prospecting Area.
Loc. Location.	T.A. Tailings Area.
L.C. Lode Claim.	T.L. Tailings Lease.
Q.C. Quartz Claim.	W.R. Water Right.
R.C. Reward Claim.	S.L. Special License.
	N.E.I. Not elsewhere included.

WESTERN AUSTRALIA.

SUMMARY OF MINERAL PRODUCTION.

GOLD AND OTHER MINERALS PRODUCED DURING 1924, AND THE ESTIMATED VALUE THEREOF, TOGETHER WITH A COMPARISON FOR PREVIOUS YEARS, AND THE TOTAL PRODUCTION TO DATE.

DESCRIPTION OF MINERAL.	1924.		1923.		1922.		1921.		Previously to 1921.		Total to date.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
1. Antimony (Exported) statute tons	...	£	...	£	...	£	...	£	88½	£	89	£
2. Arsenical Ore (Exported) do.	*	777	*	686	1,075	1,784	7	16	2,512	7,550	...	10,813
3. Asbestos (Reported) do.	74	2,206	115	4,032	181	7,600	235	13,581	253	10,483	858	37,902
4. Bismuth (Exported) do.	...	...	...	...	...	...	...	...	11	844	11	844
5. Coal (Reported) do.	421,864	363,255	420,714	368,949	438,443	381,555	468,817	407,117	5,071,680	2,674,257	6,821,518	4,195,133
6. Copper { Ore (Exported) do.	2,795	40,676	3,394	48,907	352	5,519	1,040	16,153	71,342	857,564	78,923	968,819
{ Ingot and Matte (Exported) do.	...	...	1,057	16,193	660	14,860	206	8,448	11,491	778,478	13,414	817,979
7. Gadolinite (Reported) do.	...	...	...	...	...	...	...	...	1	112	1	112
8. Gold ... (Exported and Minted) fine ounces	485,035	2,060,298	504,511	2,143,028	538,246	2,286,325	553,731	2,352,098	33,748,391	143,354,054	35,829,914	152,195,803
9. Graphite (Exported) statute tons	...	...	...	...	*	3	...	...	65	693	65	696
10. Gypsum (Reported) do.	4,237	5,278	...	...	63	16	665	622	...	...	4,965	5,916
11. Ironstone (Reported) do.	...	...	...	...	...	...	...	...	57,830	36,695	57,830	36,695
12. Lead (Ore and Concentrates) (Exported) do.	...	...	...	...	...	...	...	...	44,032	508,748	44,032	508,748
13. Lead and Silver Lead (Ore and Concentrates) (Exported) do.	4,854	83,095	3,172	43,416	...	...	...	...	8,230	151,221	16,256	277,732
14. Lead (Pig) (Exported) do.	...	...	20	609	2,796	69,528	2,156	48,863	18,080	509,956	23,052	628,956
15. Limestone (Reported) do.	...	...	...	...	...	...	...	...	93,706	18,290	93,706	18,290
16. Magnesite (Exported) do.	...	...	2	8	...	...	...	...	804	1,518	806	1,526
17. Manganese (Exported) do.	20	160	22	200	...	...	16	145	2	7	60	512
18. Mica (Exported) do.	...	...	...	...	2	60	...	...	*	1,297	...	1,357
19. Molybdenite (Exported) do.	...	...	...	...	51	505	...	...	26½	360	78	865
20. Pyritic Ore (Reported) do.	...	...	...	...	3,441	4,203	6,117	7,871	64,490	33,422	74,048	45,496
21. Silver (Exported) fine ounces	89,146	13,409	109,005	16,036	118,696	18,164	116,151	18,658	3,889,396	533,417	4,322,394	599,684
22. Tantalite (Exported) statute tons	...	...	5	688	...	...	...	...	*	18,092	...	18,780
23. Tin Ore (Exported) do.	87	12,008	131	15,095	110	10,930	67	6,485	15,257	1,477,556	15,652	1,522,074
24. Tungsten Ore { Scheelite ... (Exported) do.	...	...	...	...	...	...	...	...	21	2,507	21	2,507
{ Wolfram ... (Exported) do.	...	...	...	...	...	...	...	...	15	1,441	15	1,441
25. Zinc (Exported) do.	...	...	...	...	...	...	...	...	184	5,437	184	5,437
Unenumerated (Exported) ...	...	...	...	103	...	574	...	112	...	6,302	...	7,091
TOTAL VALUES ... ..	...	2,581,162	...	2,657,950	...	2,801,626	...	2,880,169	...	150,992,044	...	161,912,951

* Weight not stated.

The value of gold is calculated at the fixed price of £4.24773 per fine oz. Sales of gold by the Gold Producers' Association averaged £5.314 for the year 1921, £4.693 for the year 1922, £4.4244 for the year 1923, and £4.65107 for the year 1924. The amounts of £590,428, £239,487, £89,158, and £195,629 should, therefore, be added to those years respectively, to make up the actual value of such gold.

AUSTRALASIAN MINERAL PRODUCTION.

COMPARATIVE TABLE SHOWING THE OUTPUT OF ALL MINERAL PRODUCTS FROM THE SEVERAL STATES OF AUSTRALIA AND THE DOMINION OF NEW ZEALAND DURING 1924.

DESCRIPTION OF MINERAL.	Western Australia.		NEW SOUTH WALES.		QUEENSLAND.		VICTORIA.		TASMANIA.		SOUTH AUSTRALIA.		NEW ZEALAND.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
		£		£		£		£		£		£		£
Alunite Statute tons	...	...	1,008	4,032	...	...	...	...	...	...	...	...	...	...
Antimony (Metal and Ore)	...	...	...	...	...	...	276	14,522	...	...	...	...	...	...
Arsenical Ore ... do.	*	777	4,416	18,859	563	22,500	...	...	...	...	68	544	...	...
Asbestos do.	74	2,206	...	...	...	...	...	...	...	...	4	80	...	...
Bismuth (Metal and Ore)	...	...	15	3,135	½	110	...	...	...	...	...	...	...	...
Coal do.	421,864	363,255	11,618,216	9,589,547	1,123,117	985,542	645,805	610,671	75,988	66,555	...	...	2,083,207	2,083,207
Copper (Ingot and Matte)	...	...	1,129	71,658	5,630	380,025	...	...	...	6,698	457,386	405	26,046	...
Copper Ore do.	2,795	40,676	...	...	...	...	...	...	...	...	...	...	...	...
Gold Fine ounces	485,035	2,060,293	18,685	79,370	98,841	419,851	67,167	285,316	4,626	19,648	880	3,739	124,976	530,864
Gypsum Statute tons	4,237	5,278	...	...	...	...	13,268	11,818	...	...	65,690	57,479	...	...
Iron do.	...	...	74,075	518,525	...	...	...	...	...	...	...	...	630	4,725
Iron Oxide do.	...	...	4,863	5,361	...	...	...	...	...	...	...	...	...	...
Ironstone do.	...	...	...	...	...	...	...	...	...	...	580,308	667,354	...	...
Lead and Silver Lead	4,854	83,095	240,957	4,297,748	3,695	125,263	...	...	4,560	154,881	6	219	...	...
Limestone do.	...	...	114,756	43,034	96,899	39,222	...	...	146,140	146,140	109,298	38,254	...	...
Magnesite do.	...	...	12,496	12,772	149	149	76	228	...	...	129	323	...	...
Manganese Ore ... do.	20	160	4,387	13,281	...	...	...	...	...	...	316	1,128	...	...
Molybdenite do.	...	...	10	2,475	2	441	42	4,850	...	...	...	...	...	...
Osmiridium Ounces	...	...	...	...	...	...	...	...	365	10,617	...	...	...	...
Phosphate Rock ... Statute tons	...	...	...	...	...	...	532	532	...	...	84	117	...	...
Platinum Fine ounces	...	...	646	12,422	...	...	...	...	...	...	...	...	...	...
Precious Stones do.	...	...	...	...	...	24,640	...	...	...	...	...	4,000	...	...
Tungsten } Scheelite Statute tons	...	...	...	...	...	...	...	...	...	...	...	...	...	...
} Wolfram do.	...	...	9	170	...	...	...	...	54	2,785	...	...	3	126
Shale (Oil) do.	...	...	642	962	...	...	...	...	1,576	1,526	...	...	...	...
Silver Fine ounces	89,146	13,409	93,484	12,612	276,651	42,206	4,216	645	642,158	97,837	1,017	154	500,023	76,389
Tin (Ore and Ingot) ... Statute tons	87	12,008	1,041	259,485	1,196	175,509	38	6,056	...	275,014	...	...	...	...
Zinc (Spelter and Conc.) do.	...	...	353,650	1,296,571	127	4,283	...	...	2,749	90,485	...	...	...	...
Other do.	...	...	...	2,381,069	...	46,720	...	3,197	...	172,015	...	...	...	378,783
Total Value ...	...	£2,581,162	...	£18,623,088	...	£2,266,461	...	£937,835	...	£1,494,889	...	£953,238	...	£3,074,094

* Weight not stated.

PART I.—GOLD.

TABLE I.

MONTHLY PRODUCTION OF GOLD, IN FINE OUNCES, SHOWING THE QUANTITY REPORTED TO THE MINES DEPARTMENT DURING 1924.

GOLDFIELD.	DISTRICT.	JANUARY.		FEBRUARY.		MARCH.		APRIL.		MAY.		JUNE.		JULY.	
		District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.
		ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.
Kimberley ...	...	...	7-69	...	...	...	...	...	...	...	5-08	...	...	...	...
Pilbara ...	Marble Bar ...	7-30	80-83	...	...	73-86	76-83	47-91	61-48	76-27	100-52	76-97	123-16	280-91	283-73
Do.	Nullagine ...	73-53	...	...	...	2-97	...	13-57	...	24-25	...	46-19	2-82	2-82	9-06
West Pilbara ...	...	...	2-40	...	30	...	3-03	...	6-37	...	5-51	...	21-06	...	...
Ashburton ...	...	...	3-18	...	...	...	...	...	...	...	...	...	...	...	...
Gascoyne ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Peak Hill ...	...	...	59-94	...	54-93	...	115-34	...	39-34	...	78-46	...	67-44	...	1,052-64
East Murchison ...	Lawlers ...	108-52	231-29	...	...	137-06	...	149-64	...	250-86	...	236-50	212-73	...	...
Do.	Wiluna ...	...	162-26	...	252-81	165-87	318-12	273-64	712-72	...	421-88	...	244-00	...	237-27
Do.	Black Range ...	53-74	...	21-52	...	15-19	...	289-44	...	171-02	...	7-50	24-54	...	...
Murchison ...	Cue ...	42-21	40-63	...	...	124-61	...	62-96	...	150-09	...	41-38	111-90	...	...
Do.	Meekatharra...	1,377-86	1,466-79	1,284-62	1,452-20	1,918-02	2,336-55	1,559-42	2,312-98	1,144-73	1,919-86	1,413-39	1,639-94	1,292-17	1,725-84
Do.	Day Dawn ...	...	126-95	...	...	242-74	...	61-52	...	29-59	...	32-44	91-18	...	...
Do.	Mt. Magnet ...	46-72	...	...	...	51-18	...	629-08	...	595-45	...	152-73	230-59	...	...
Yalgoo ...	...	...	279-08	...	968-38	...	860-43	...	1,569-44	...	379-97	...	209-90	...	109-92
Mt. Margaret ...	Mt. Morgans...	505-13	413-97	...	...	279-30	...	625-50	...	325-23	...	544-65	776-04	...	...
Do.	Mt. Malcolm...	2,158-25	2,716-63	3,225-84	4,338-14	3,313-96	3,793-44	2,852-22	3,480-45	3,018-82	3,632-62	2,993-58	3,662-09	3,124-28	3,995-07
Do.	Mt. Margaret ...	53-25	698-33	...	...	200-18	...	2-73	...	288-57	...	123-86	94-75	...	...
North Coolgardie ...	Menzies ...	733-05	623-22	...	...	1,044-56	...	794-47	...	689-84	...	835-86	613-32	...	...
Do.	Ularring ...	8-52	835-01	20-42	643-64	63-34	1,107-90	15-33	874-40	43-48	970-08	13-18	849-04	35-52	648-84
Do.	Niagara ...	...	...	...	...	...	...	64-60	...	...	...	...	...	...	...
Do.	Yerilla ...	93-44	...	...	...	...	...	...	...	236-76	...	...	...	...	...
Broad Arrow ...	...	...	496-71	...	...	...	136-82	...	213-13	...	465-77	...	110-27	...	73-77
N.E. Coolgardie ...	Kanowna ...	406-37	126-72	...	...	174-80	...	129-52	...	283-50	...	320-49	470-78	...	...
Do.	Kurnalpi ...	17-11	203-23	76-51	...	16-27	191-07	15-38	144-90	20-56	304-06	...	320-49	...	470-78
East Coolgardie ...	East Coolgardie	29,066-60	29,066-60	30,580-48	30,708-85	30,145-51	30,189-21	29,875-51	29,956-19	30,680-59	30,701-52	30,480-86	30,604-85	30,554-00	30,615-39
Do.	Bulong ...	...	128-37	...	...	43-70	...	80-68	...	20-93	...	123-99	...	61-39	...
Coolgardie ...	Coolgardie ...	513-28	341-47	...	435-50	569-70	...	414-19	...	1,175-59	1,509-87	500-53	595-84	333-55	553-98
Do.	Kunanalling ...	176-46	94-03	...	...	201-91	771-61	703-91	1,118-10	334-28	...	95-31	595-84	220-43	...
Yilgarn ...	...	...	301-98	...	595-36	...	1,280-39	...	483-24	...	837-85	...	643-48	...	950-13
Dundas ...	...	...	72-00	...	166-31	...	241-00	...	196-88	...	204-55	...	746-43	...	400-00
Phillips River ...	...	...	...	...	14-57	...	14-40	...	70-73	...	11-23	...	...	...	22-09
State generally	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
TOTAL	Fine Ounces ...	...	36,664-32	...	39,834-22	...	41,436-14	...	41,240-35	...	41,548-83	...	39,837-99	...	41,148-51
	Sterling Value	£155,740	£169,205	£176,009	£175,178	£176,488	£169,221	£174,788							

TABLE I.—Monthly Production of Gold in Fine Ounces—continued.

GOLDFIELD.	DISTRICT.	AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		Total for 1924.	
		District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.
		ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.
Kimberley	...	...	...	...	...	...	...	...	...	...	...	...	...
Pilbara	Marble Bar	182·19	224·27	631·58	677·75	167·96	167·96	217·00	217·00	96·17	120·85	1,858·12	2,134·38
Do.	Nullagine	42·08		46·17			24·68		...	...	276·26
West Pilbara	...	...	1·89	...	3·53	...	4·32	...	...	...	18·98	...	76·45
Ashburton	...	...	...	...	...	...	...	...	...	...	...	...	3·18
Gascoyne	...	...	...	...	...	...	...	...	2·46	...	...	...	2·46
Peak Hill	...	...	154·19	...	75·20	...	79·04	...	...	...	336·61	...	2,113·13
East Murchison	Lawlers	306·78	1,044·33	218·00	481·63	227·43	425·83	221·33	221·33	153·84	374·76	2,453·98	4,806·94
Do.	Wiluna	29·80		262·86		163·50			188·30		...	...	1,083·97
Do.	Black Range	707·75	...	...	...	...	...	...	...	...	...	...	...
Murchison	Cue	940·07	...	30·34	...	9·27	...	271·12	...	88·10	...	1,912·68	...
Do.	Meekatharra	1,500·39	2,646·91	2,036·54	2,100·17	2,327·42	2,464·85	1,541·47	2,258·57	1,829·11	2,100·54	19,225·14	24,425·20
Do.	Day Dawn	57·84	...	11·00	...	1·02	...	68·79	...	37·87	...	775·94	...
Do.	Mt. Magnet	148·61	...	22·29	...	127·14	...	362·19	...	145·46	...	2,511·44	...
Yalgoo	...	...	542·41	...	53·49	...	53·98	...	330·33	...	253·90	...	5,611·23
Mt. Margaret	Mt. Morgans	528·76	4,279·94	468·90	3,680·58	500·00	3,800·43	305·80	3,536·37	279·15	2,789·07	5,552·43	43,704·83
Do.	Mt. Malcolm	3,263·00		3,109·99		3,194·02			3,141·56		...	2,443·83	35,839·35
Do.	Mt. Margaret	488·18	...	101·69	...	106·41	...	89·01	...	66·09	...	2,313·05	...
North Coolgardie	Menzies	647·92	...	629·77	...	621·64	...	557·78	...	443·31	...	8,252·74	...
Do.	Ularring	...	865·62	...	715·11	1·45	963·35	1·69	577·47	8·05	458·73	210·98	9,509·19
Do.	Niagara	39·99	...	85·34	...	...	...	...	...	7·37	...	197·30	...
Do.	Yerilla	177·71	...	...	...	340·26	...	...	...	...	...	848·17	...
Broad Arrow	...	...	92·41	...	218·77	...	114·10	...	632·92	...	105·94	...	2,660·61
N.E. Coolgardie	Kanowna	588·42	588·42	195·02	205·63	192·09	192·09	1,299·62	1,299·62	338·64	346·74	4,525·97	4,690·51
Do.	Kurnalpi	...		10·61		
East Coolgardie	East Coolgardie	27,126·92	27,182·69	28,502·51	28,528·18	25,639·59	25,655·89	22,192·20	22,221·22	20,635·82	20,668·04	335,480·59	336,098·63
Do.	Bulong	55·77	...	25·67	...	16·30	...	29·02	...	32·22	...	618·04	...
Coolgardie	Coolgardie	737·41	1,489·68	569·86	924·25	873·76	936·38	218·92	296·93	852·09	920·91	7,100·35	10,242·79
Do.	Kunanalling	752·27	...	354·39	...	62·62	...	78·01	...	68·82	...	3,142·44	145·44
Yilgarn	...	...	562·50	...	418·44	...	684·94	...	576·38	...	1,116·31	...	8,451·00
Dundas	...	...	229·80	...	238·14	...	137·96	...	546·88	...	249·19	...	3,429·14
Phillips River	...	...	...	...	8·98	...	...	...	...	...	3·44	...	...
State generally	...	...	...	...	...	...	...	...	...	...	...	...	...
TOTAL	Fine ounces ...	...	39,905·06	...	38,329·85	...	35,681·12	...	32,717·48	...	29,864·01	...	458,207·88
	Sterling value	£169,506		£162,815		£151,564		£138,975		£126,854		£1,946,343	

The total gold yield of the State is as shown at page 5, being the amount of gold exported and also that lodged at the Royal Mint, which total includes alluvial and other gold not reported to the Department.

TABLE II.

TOTAL YEARLY PRODUCTION OF GOLD, IN FINE OUNCES, AS REPORTED TO THE MINES DEPARTMENT, TO 31ST DECEMBER, 1924.

GOLDFIELD.	DISTRICT.	1924.		1923.		1922.		1921.		1920.		1919.	
		District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.
Kimberley ...	...	...	12 77	...	30 55	...	5 01	...	49 35	...	...	...	150 72
Pilhara ...	Marble Bar	1,858 12	2,134 38	2,388 05	2,543 62	2,779 45	3,100 16	2,550 95	2,626 57	3,164 15	4,052 49	2,960 51	3,421 39
Do. ...	Nallagine	276 26		155 57		320 71		69 62		838 34		460 88	
West Pilhara ...	...	...	76 45	...	64 22	...	94 33	...	67 10	...	133 91	...	95 26
Ashburton ...	...	...	3 18	...	9 24	...	13 57	...	22 31	...	...	...	...
Gascoyne ...	...	...	2 46	...	...	...	1 52	...	7 46	...	...	...	...
Peak Hill ...	...	...	2,113 13	...	1,699 82	...	2,159 89	...	1,078 53	...	1,655 71	...	2,255 38
East Murchison ...	Lawlers	2,453 98	4,896 94	4,302 94	11,016 41	4,650 83	13,050 62	3,008 81	18,762 26	2,693 15	19,600 25	4,951 82	27,413 89
Do. ...	Wiluna	1,093 97		3,697 11		5,385 30		4,092 30		5,478 99		7,035 72	
Do. ...	Black Range	1,358 99	...	3,016 36	...	3,014 49	...	11,661 15	...	11,428 11	...	15,426 35	
Murchison ...	Cue	1,912 68	...	4,155 09	...	4,840 68	...	7,186 83	...	9,642 63	...	9,020 49	
Do. ...	Meekatharra	10,285 14	24,425 20	20,355 91	27,037 53	26,953 23	36,304 33	30,046 77	41,256 53	28,163 45	46,604 07	35,436 80	50,569 85
Do. ...	Day Dawn	775 94		850 79		1,114 58		726 80		4,871 54		2,383 58	
Do. ...	Mt. Magnet	2,511 44	...	1,675 74	...	3,395 84	...	3,296 13	...	4,126 45	...	3,728 98	
Yalgoo ...	...	...	5,611 23	...	7,713 45	...	18,132 49	...	3,579 20	...	2,965 43	...	4,788 38
Mt. Margaret ...	Mt. Morgans	5,552 43	48,704 83	5,556 38	26,876 42	7,768 38	27,649 19	7,612 89	20,803 51	5,560 87	77,335 84	5,302 34	88,151 93
Do. ...	Mt. Malcolm	35,899 35		20,301 14		16,811 82		8,364 49		42,800 83		49,506 74	
Do. ...	Mt. Margaret	2,813 05	...	1,018 90	...	3,068 99	...	4,826 13	...	28,974 14	...	33,342 85	
North Coolgardie ...	Menzies	3,252 74	...	11,278 60	...	11,650 21	...	8,034 25	...	11,468 50	...	20,859 22	
Do. ...	Ularring	219 98	9,509 19	219 18	12,212 93	1,401 44	13,624 14	1,605 06	10,640 08	57 53	12,024 18	931 86	23,019 41
Do. ...	Niagara	197 30		269 14		197 17		345 17		223 26		746 51	
Do. ...	Yerilla	848 17	...	446 01	...	375 32	...	655 60	...	274 69	...	482 02	
Broad Arrow ...	...	...	2,660 61	...	2,740 98	...	3,628 56	...	8,875 01	...	7,445 23	...	11,728 57
N.E. Coolgardie ...	Kanowna	4,525 97	4,690 51	4,592 90	4,714 51	3,882 13	4,545 10	3,378 29	4,147 98	1,248 14	1,738 80	5,250 96	5,472 08
Do. ...	Kurnalpi	164 54		121 61		662 97		769 69		490 66		221 12	
East Coolgardie ...	East Coolgardie...	335,480 59	336,098 63	369,859 84	370,669 86	375,757 25	376,388 69	378,344 62	378,429 92	401,417 01	401,495 91	396,995 28	397,054 89
Do. ...	Bulong	618 04		810 02		631 44		85 30		78 90		59 61	
Coolgardie ...	Coolgardie	7,100 35	10,242 79	9,929 81	13,076 81	9,662 68	16,170 54	4,629 54	9,547 74	3,482 79	5,986 43	4,222 21	5,814 30
Do. ...	Kunanalling	3,142 44		3,147 00		6,507 86		4,918 20		2,503 64		1,592 09	
Yilgarn ...	...	...	8,451 00	...	8,375 97	...	12,793 95	...	19,241 50	...	37,636 51	...	54,002 74
Dundas ...	...	...	3,429 14	...	6,357 85	...	8,043 99	...	5,465 77	...	6,541 18	...	12,529 61
Phillips River ...	...	...	145 44	...	374 58	...	688 75	...	865 75	...	1,422 76	...	1,700 12
*Donnybrook ...	...	...	...	...	...	...	...	...	...	...	...	...	...
State generally ...	...	...	...	...	157 74	...	144 45	...	99 85	...	20 67	...	46 41
TOTAL	Fine Ounces ...	...	458,207 88	...	495,872 49	...	536,539 28	...	525,556 42	...	626,659 37	...	688,214 94
	Sterling Value	\$1,946,343		\$2,105,498		\$2,279,074		\$2,232,422		\$2,661,880		\$2,923,351	

* Abolished 4th March, 1908.

TABLE II.—Total Yearly Production of Gold, in Fine Ounces, etc.—continued.

GOLDFIELD.	DISTRICT.	1918.		1917.		1916.		1915.		Previous to 1915.		Total to December 31st, 1924.	
		District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.
		ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.
Kimberley ...	...	...	15·08	...	82·25	...	161·91	...	144·34	...	17,466·04	...	18,118·03
Pilbara ...	Marble Bar ...	2,991·73	3,748·40	2,463·66	5,406·75	3,515·58	5,881·60	6,462·36	8,541·97	107,334·26	177,689·88	138,474·82	219,147·21
Do. ...	Nullagine ...	756·67		2,943·09		2,366·02		2,079·61		70,355·62		80,672·39	
West Pilbara ...	...	...	120·37	...	304·77	...	608·84	...	1,507·02	...	25,045·83	...	28,118·10
Ashburton ...	...	...	...	...	6·50	...	...	...	...	...	8,876·74	...	8,981·54
Gascoyne ...	...	...	...	...	...	...	14·48	...	80·85	...	581·21	...	687·98
Peak Hill ...	...	...	1,089·31	...	1,743·72	...	2,389·29	...	2,813·13	...	243,681·75	...	262,689·66
East Murchison ...	Lawlers ...	4,115·55	29,210·72	4,784·50	32,856·56	6,579·41	46,811·44	6,055·13	58,082·36	880,889·07	1,556,078·32	924,485·19	1,817,779·77
Do. ...	Wiluna ...	7,909·60		9,523·65		14,472·13		6,746·78		44,253·78		109,679·33	
Do. ...	Black Range ...	17,185·57	...	18,548·41	...	25,759·90	...	45,280·45	...	630,935·47	...	783,615·25	
Murchison ...	Cue ...	10,183·75	...	9,689·81	...	6,011·29	...	6,185·89	...	325,749·50	...	394,578·64	
Do. ...	Meekatharra ...	44,119·86	63,285·43	44,269·00	82,305·83	51,322·56	84,422·89	73,834·57	108,049·78	638,952·74	2,568,204·30	1,012,680·03	3,132,465·74
Do. ...	Day Dawn ...	4,176·83		23,746·93		18,134·71		19,168·14		1,236,912·67		1,312,682·51	
Do. ...	Mt. Magnet ...	4,804·99	...	4,600·09	...	8,954·33	...	8,861·18	...	366,589·39	...	412,544·56	
Yalgoo ...	...	...	4,397·89	...	5,812·74	...	8,194·69	...	8,841·88	...	89,539·90	...	159,577·28
Mt. Margaret ...	Mt. Morgans ...	5,294·03	85,346·97	6,314·21	101,874·54	8,439·99	100,612·34	7,463·52	106,563·01	476,459·06	2,426,245·44	541,324·10	3,105,164·02
Do. ...	Mt. Malcolm ...	46,368·64		59,488·04		57,541·13		63,995·64		1,326,287·41		1,727,305·23	
Do. ...	Mt. Margaret ...	33,684·30	...	36,072·29	...	34,631·22	...	35,103·85	...	623,498·97	...	836,534·69	
North Coolgardie ...	Menzies ...	30,345·06	...	30,725·13	...	36,756·35	...	49,096·24	...	809,558·95	...	1,028,025·25	
Do. ...	Ularring ...	4,791·82	36,829·91	1,090·35	34,795·55	2,989·66	45,146·57	2,474·10	59,513·22	275,676·86	1,766,345·71	291,448·64	2,023,660·89
Do. ...	Niagara ...	1,203·81		1,185·17		1,790·01		3,155·13		493,588·91		502,901·58	
Do. ...	Yerilla ...	459·22	...	1,794·90	...	3,610·55	...	4,787·75	...	187,520·99	...	201,285·42	
Broad Arrow ...	...	...	4,125·88	...	16,518·64	...	22,215·92	...	22,290·03	...	402,704·50	...	504,933·93
N.E. Coolgardie ...	Kanowna ...	3,439·60	3,700·25	5,912·39	5,933·17	6,392·00	6,678·02	10,077·23	10,860·98	658,935·81	686,595·37	707,635·42	739,076·77
Do. ...	Kurnalpi ...	260·65		20·78		286·02		783·75		27,659·56		31,441·35	
East Coolgardie ...	East Coolgardie ...	524,729·46	524,823·36	557,874·83	557,983·37	578,183·41	579,344·34	668,913·16	670,788·24	14,609,301·03	14,767,209·08	19,196,856·48	19,360,286·29
Do. ...	Bulong ...	93·90	...	108·54	...	1,160·93	...	1,875·08	...	157,908·05	...	163,429·81	
Coolgardie ...	Coolgardie ...	5,334·36	7,962·75	6,980·68	10,285·68	8,768·13	13,618·32	11,990·23	18,314·77	934,958·52	1,125,778·07	1,007,059·30	1,236,798·20
Do. ...	Kunanalling ...	2,628·39		3,305·00		4,850·19		6,324·54		190,819·55		229,788·90	
Yilgarn ...	...	...	70,765·88	...	78,244·77	...	87,993·68	...	91,123·57	...	578,849·17	...	1,047,478·74
Dundas ...	...	...	15,949·44	...	18,419·01	...	21,594·78	...	23,884·18	...	514,975·69	...	637,180·64
Phillips River ...	...	...	4,478·49	...	4,734·52	...	5,418·97	...	3,816·76	...	65,493·13	...	89,139·27
*Donnybrook ...	...	...	...	...	...	...	...	...	...	...	841·76	...	841·76
State generally ...	...	...	195·43	...	111·41	...	618·78	...	272·59	...	6,462·49	...	8,129·82
TOTAL	Fine Ounces ...	...	856,045·56	...	957,419·78	...	1,031,726·86	...	1,195,498·68	...	27,028,664·38	...	34,400,205·64
	Sterling Value ...	£3,636,250	£4,066,861	£4,382,497	£5,078,156	£114,810,468	£146,122,786						

* Abolished 4th March, 1908.

TABLE III.

GENERAL RETURN.

RETURN SHOWING, FOR THE RESPECTIVE GOLDFIELDS AND DISTRICTS, THE AREA IN SQUARE MILES, LEASES IN FORCE, PARTICULARS OF PLANT, MEN EMPLOYED AND DIGGERS, ALLUVIAL, DOLLIED, AND SPECIMEN GOLD AND ORE TREATED, WITH GOLD AND SILVER YIELD, IN FINE OUNCES, AS REPORTED TO THE MINES DEPARTMENT FOR THE YEAR 1924.

Goldfield.	District.	Date of Proclamation of Goldfield.				Area in Square Miles.		Leases in force, 31-12-1924.		Particulars of Plant.					Average Number of Men engaged in Gold Mining.			
		Proclamation gazetted.	To take effect from.	Latest Amendment of Boundaries gazetted.	To take effect from.	Goldfield.	District.	No.	Area in Acres.	Milling.		Cyaniding.			Men employed.		Diggers.	
										Stamps.	Other Mills.	Leaching Vats.	Agitating Vats.	Vacuum Filters and Presses.	Above Ground.	Under Ground.		
Kimberley ...	...	20-5-86	20-5-86	31-10-02	1-11-02	33,833	...	...	...	...	...	...	...	...	...	...	...	5
West Kimberley	...	19-3-20	1-3-20	...	...	98,600	...	...	...	...	...	...	...	...	...	...	...	12
Pilbara ...	{ Marble Bar ... Nullagine ... }	1-10-88	1-10-88	1-3-07	1-3-07	32,696	{ 25,809 6,887	17 3	167 30	50 28	2 2	10 19	...	...	15 13	41 5	...	24
West Pilbara ...	...	20-9-95	1-11-95	1-3-07	1-3-07	10,843	...	1	6	10	1	...	...	...	1	1	...	2
Ashburton ...	...	11-12-90	11-12-90	18-10-01	14-10-01	14,230	...	...	...	...	...	...	...	...	...	...	...	2
Gascoyne ...	...	25-6-97	15-4-97	...	...	5,313	...	4	24	...	...	...	...	...	...	...	...	2
Peak Hill ...	...	19-3-97	1-4-97	13-11-14	1-12-14	23,650	...	6	32	10	...	7	...	...	17	11	...	7
East Murchison	{ Lawlers ... Wiluna ... Black Range Cue ... }	28-6-95	28-6-95	2-2-20	2-2-20	26,058	{ 6,691 10,496 8,871 8,593	16 80 8	248 1,710 165	40 60 50	2 5 4	23 ...	...	...	35 34 33	16 27 37	...	...
Murchison ...	{ Meekatharra Day Dawn Mt. Magnet ... }	24-9-91	24-9-91	28-11-13	1-1-14	25,474	{ 12,250 896 3,735	28 9 11	449 79 92	70 10 25	9 1 2	8 14 11	...	...	81 24 37	117 7 39	...	23 2 3
Yalgoo ...	...	8-2-95	23-1-95	30-7-15	9-8-15	23,230	...	18	285	35	4	22	...	...	53	55	...	2
Mt. Margaret ...	{ Mt. Morgans Mt. Malcolm Mt. Margaret Menzies ... Ularring ... Niagara ... Yerilla ... }	12-3-97	1-4-97	2-2-20	2-2-20	59,918	{ 14,007 6,018 39,893 6,805 3,093	11 29 12 20 3	186 595 254 330 56	35 85 25 55 20	3 4 5 12 1	16 5 14 16 ...	4 ...	1 1 ...	39 160 43 64 8	26 182 7 62 3	...	...
North Coolgardie	...	28-6-95	28-6-95	7-9-17	17-9-17	13,746	{ 688 3,160	2 10	17 149	15 20	5 1	10 5	...	...	10 16	2	...	...
Broad Arrow ...	...	17-11-96	20-11-96	8-6-06	1-7-06	1,038	...	16	257	35	16	16	...	2	60	51	...	7
North-East Coolgardie ...	{ Kanowna Kurnalpi East Coolgardie Bulong ... Coolgardie Kunanalling ... }	20-3-96	15-4-96	27-3-08	1-4-08	20,604	{ 1,094 19,510 810 990 9,384 2,318	16 ... 123 2 33 12	256 ... 1,847 45 521 160	50 5 280 ...	3 1 226 6 3 14	...	...	...	31 4 28 153	40 4 9 183	...	2 ... 5 32
East Coolgardie	...	21-9-94	1-10-94	27-3-08	1-4-08	1,800	...	...	...	...	...	...	...	...	1,242	1,573	...	26
Coolgardie ...	...	6-4-94	6-4-94	1-3-07	1-3-07	11,702	...	33	521	68	3	36	...	...	30	30	...	1
Yilgarn ...	...	1-10-88	1-10-88	28-1-16	1-2-16	17,700	...	40	665	130	3	36	10	4	86	85	...	...
Dundas ...	...	31-8-93	31-8-93	1-3-07	1-3-07	11,430	...	13	147	17	...	9	1	...	47	64	...	13
Phillips River ...	...	21-9-00	14-9-00	28-1-16	1-2-16	5,078	...	6	88	35	2	1	...	...	6	5	...	1
State generally	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...
Total ...	...	...	...	...	...	436,943	...	560	9,009	1,343	339	426	161	73	2,411	2,711	...	174

TABLE III.—Return showing for the respective Goldfields and Districts, etc.—continued.

Goldfield.	District.	1924 GOLD AND SILVER YIELD—DISTRICTS.						1924 GOLD AND SILVER YIELD—GOLDFIELDS.					
		Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Total Gold.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Total Gold.	Silver.
		Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.
Kimberley ...	...	...	...	...	...	...	...	12·77	...	...	...	12·77	...
Pilbara ...	Marble Bar ...	67·72	92·40	1,597·35	1,698·00	1,858·12	...	} 111·17	} 112·63	} 1,754·35	} 1,910·58	} 2,134·38	} 28·67
Do. ...	Nullagine ...	43·45	20·23	157·00	212·58	276·26	...						
West Pilbara ...	...	...	...	...	...	...	...	35·81	...	21·00	40·64	76·45	...
Ashburton ...	...	...	...	...	...	...	...	3·18	...	...	...	3·18	...
Gascoyne ...	...	...	...	...	...	...	...	2·46	...	...	...	2·46	...
Peak Hill ...	...	...	...	...	...	...	...	65·86	19·24	1,361·00	2,028·03	2,113·13	...
East Murchison ...	Lawlers ...	...	...	2,930·00	2,453·98	2,453·98	...	} 8·13	} 9·68	} 6,097·00	} 4,879·13	} 4,896·94	} ...
Do. ...	Wiluna ...	...	...	1,579·00	1,083·97	1,083·97	...						
Do. ...	Black Range ...	8·13	9·68	1,588·00	1,341·18	1,358·99	...	} 418·04	} 999·01	} 39,032·99	} 23,008·15	} 24,425·20	} ...
Murchison ...	Cue ...	16·39	62·86	1,015·10	1,833·43	1,912·68	...						
Do. ...	Meekatharra ...	319·03	476·05	34,953·25	18,430·06	19,225·14	...	} 2·71	} 1·59	} 4,743·25	} 5,606·93	} 5,611·23	} 199·14
Do. ...	Day Dawn ...	80·56	58·38	1,242·02	637·00	775·94	...						
Do. ...	Mt. Magnet ...	2·06	401·72	1,822·62	2,107·66	2,511·44	...	} 37·30	} 49·73	} 94,361·63	} 43,617·80	} 43,704·83	} 3,527·79
Yalgoo ...	...	...	...	...	...	...	...
Mt. Margaret ...	Mt. Morgans ...	10·15	...	12,887·00	5,542·28	5,552·43	...	} 115·87	} 385·81	} 1,188·60	} 2,158·93	} 2,660·61	} 3·00
Do. ...	Mt. Malcolm ...	25·06	47·19	81,254·75	35,767·10	35,839·35	3,511·45						
Do. ...	Mt. Margaret ...	2·09	2·54	219·88	2,308·42	2,313·05	16·34	} 26·17	} 109·13	} 7,724·03	} 4,555·21	} 4,690·51	} ...
North Coolgardie...	Menzies ...	17·08	·97	13,794·23	8,234·69	8,252·74	...						
Do. ...	Ularring ...	...	1·45	252·51	209·53	210·98	...	} 298·45	} 430·11	} 8,901·28	} 9,514·23	} 10,242·79	} ...
Do. ...	Niagara ...	7·37	85·34	36·68	104·59	197·30	...						
Do. ...	Yerilla ...	·87	...	495·50	847·30	848·17	...	} ...	} 489·52	} 588,263·34	} 335,609·11	} 336,098·63	} 62,582·42
Broad Arrow ...	...	...	...	...	...	...	...
N.E. Coolgardie ...	Kanowna ...	7·46	98·19	7,679·03	4,420·32	4,525·97	...	} ...	} 7·64	} 12,719·23	} 8,443·36	} 8,451·00	} ...
Do. ...	Kurnalpi ...	18·71	10·94	45·00	134·89	164·54	...						
East Coolgardie ...	East Coolgardie ...	...	451·70	587,749·89	335,028·89	335,480·59	62,582·42	} 3·88	} 20·90	} 2,864·22	} 3,404·36	} 3,429·14	} ...
Do. ...	Bulong ...	...	37·82	513·45	580·22	618·04	...						
Coolgardie ...	Coolgardie ...	138·28	15·15	6,086·78	6,946·92	7,100·35	...	} 43	} ...	} 149·46	} 145·01	} 145·44	} ...
Do. ...	Kunanalling ...	160·17	414·96	2,814·50	2,567·31	3,142·44	...						
Yilgarn ...	...	...	...	...	...	...	...	} ...	} ...	} ...	} ...	} ...	} ...
Dundas ...	...	...	...	...	...	...	...
Phillips River ...	...	...	...	...	...	...	...	} ...	} ...	} ...	} ...	} ...	} ...
State generally ...	...	...	...	...	...	...	...
Total for 1924 ...	...	...	...	...	...	...	...	1,167·55	2,722·75	783,760·30	454,317·58	458,207·88	66,341·02

TABLE III.—Return showing for the respective Goldfields and Districts, etc.—continued.

Goldfield.	District.	TOTAL GOLD AND SILVER YIELD—DISTRICTS.						TOTAL GOLD AND SILVER YIELD—GOLDFIELDS.					
		Alluvial.	Dolled and Specimens.	Ore treated.	Gold therefrom.	Total Gold.	* Silver.	Alluvial.	Dolled and Specimens.	Ore treated.	Gold therefrom.	Total Gold.	* Silver.
		Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.
Kimberley ...	...	...	...	...	...	...	...	3,990.78	...	17,597.50	14,127.25	18,118.03	...
Pilbara ...	Marble Bar ...	12,358.01	3,696.22	81,858.53	122,420.59	138,474.82	613.91	} 19,122.27	4,176.05	122,751.77	195,848.89	219,147.21	642.58
Do. ...	Nullagine ...	6,764.26	479.83	40,893.24	73,428.30	80,672.39	28.67		5,734.22	275.00	19,302.71	22,108.88	28,118.10	1,331.07
West Pilbara ...	...	...	...	...	...	...	...	8,615.90	315.64	...	...	8,931.54	7,787.69
Ashburton ...	...	...	...	...	...	...	...	331.64	18.51	356.70	337.83	687.98	...
Gascoyne ...	...	...	...	...	...	...	...	2,289.75	4,186.06	522,189.76	256,213.85	262,689.66	2,287.63
Peak Hill ...	...	...	...	...	...	...	...	} 7,220.95	23,321.06	3,445,097.70	1,787,237.76	1,817,779.77	42,730.05
East Murchison ...	Lawlers ...	5,614.49	7,241.85	2,038,577.36	911,628.85	924,485.19	25,997.48						
Do. ...	Wiluna ...	97.37	197.27	213,648.50	109,384.69	109,679.33	232.00						
Do. ...	Black Range ...	1,509.09	15,881.94	1,192,871.84	766,224.22	783,615.25	16,500.57						
Murchison ...	Cue ...	1,220.59	5,764.12	476,215.38	387,593.93	394,578.64	508.68	} 16,757.75	43,359.77	4,467,955.54	3,072,348.22	3,132,465.74	175,922.20
Do. ...	Meekatharra ...	11,305.79	13,354.22	1,470,825.24	988,020.02	1,012,680.03	5,028.90						
Do. ...	Day Dawn ...	2,427.05	9,273.48	1,971,234.67	1,300,961.98	1,312,662.51	169,210.44						
Do. ...	Mt. Magnet ...	1,804.32	14,967.95	549,680.25	395,772.29	412,544.56	1,174.18						
Yalgoo ...	...	...	...	...	...	...	...	1,577.61	1,863.06	218,309.80	156,136.61	159,577.28	689.43
Mt. Margaret ...	Mt. Morgans ...	1,765.98	3,796.75	992,037.04	535,761.37	541,324.10	5,775.05	} 7,894.49	19,314.91	5,961,890.97	3,079,954.62	3,105,164.02	147,044.43
Do. ...	Mt. Malcolm ...	2,692.34	7,565.05	3,341,248.11	1,717,047.84	1,727,305.23	84,489.51						
Do. ...	Mt. Margaret ...	3,436.17	7,953.11	1,628,005.82	825,145.41	836,534.69	56,779.87						
North Coolgardie ...	Menzies ...	1,120.88	3,765.27	1,234,269.13	1,023,139.10	1,028,025.25	19,224.48	} 3,894.30	14,097.48	2,650,714.82	2,005,669.11	2,023,660.89	30,863.99
Do. ...	Ularring ...	22.17	1,152.06	298,568.88	290,274.41	291,448.64	5,973.05						
Do. ...	Niagara ...	1,504.04	1,607.78	899,266.52	499,789.76	502,901.58	5,603.42						
Do. ...	Yerilla ...	1,247.21	7,572.37	218,610.29	192,465.84	201,285.42	63.04						
Broad Arrow ...	...	...	...	...	...	...	...	19,452.69	15,355.32	854,553.25	470,125.92	504,933.93	2,184.96
N.E. Coolgardie ...	Kanowna ...	104,489.13	11,268.59	953,813.36	591,877.70	707,635.42	2,522.12	} 116,506.59	17,380.11	959,539.77	605,190.07	739,076.77	2,533.34
Do. ...	Kurnalpi ...	12,017.46	6,111.52	5,726.41	13,312.37	31,441.35	11.22						
East Coolgardie ...	East Coolgardie ...	27,609.22	33,992.22	30,362,432.58	19,135,255.04	19,196,856.48	2,018,055.48	} 54,334.83	49,101.57	30,517,688.55	19,256,849.89	19,360,286.29	2,018,068.40
Do. ...	Bulong ...	26,725.61	15,109.35	155,255.97	121,594.85	163,429.81	12.92						
Coolgardie ...	Coolgardie ...	9,245.25	11,230.87	1,566,580.36	986,583.18	1,007,059.30	891.44						
Do. ...	Kunanalling ...	891.96	6,454.84	282,281.49	222,392.10	229,738.90	48.67						
Yilgarn ...	...	...	...	...	...	...	...	91.65	1,482.99	2,270,776.52	1,045,904.10	1,047,478.74	32,288.71
Dundas ...	...	...	...	...	...	...	...	2,032.03	13,986.85	908,754.34	621,161.76	637,180.64	36,392.90
Phillips River ...	...	...	...	...	...	...	...	472.63	781.93	92,377.20	87,884.71	89,139.27	15,688.17
Donnybrook † ...	...	...	...	...	...	...	...	23.24	...	1,653.30	818.52	841.76	...
State generally ...	...	...	...	...	...	...	...	142.41	294.09	27.00	7,693.32	8,129.82	30,815.94
Total to 31st December, 1924 ...	...	...	...	...	...	...	...	280,022.94	226,996.11	54,880,399.05	33,892,586.59	34,400,205.64	2,548,211.60

* By-product in the treatment of auriferous ore except Ashburton and State generally. † Abolished 4th March, 1903.

TABLE IV.

PRODUCTION OF GOLD AND SILVER FROM ALL SOURCES, SHOWING IN FINE OUNCES THE OUTPUT AS REPORTED TO THE MINES DEPARTMENT DURING 1924, AND THE TOTAL PRODUCTION TO DATE.

Kimberley Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1924.					TOTAL PRODUCTION.					
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	
Half's Creek	Voided leases ...	...	...	...	...	...	...	...	...	423.00	477.76	...
Do.	Sundry claims ...	...	...	...	...	...	...	...	...	94.55	62.68	...
Mt. Dockerell	Voided leases ...	...	...	...	...	...	...	...	...	44.00	435.93	...
Ruby Well	Voided leases ...	...	...	...	...	...	...	...	...	12,633.50	9,435.13	...
Do.	Sundry claims ...	...	...	...	...	...	...	...	...	151.00	127.28	...
The Brockman	Voided leases ...	...	...	...	...	...	...	...	...	1,352.75	1,404.40	...
Do.	Sundry claims ...	...	...	...	...	...	...	...	...	2,462.00	1,820.33	...
The Mary	Voided leases ...	...	...	...	...	...	...	...	...	399.00	210.03	...
The Panton	Voided leases ...	...	...	...	...	...	...	...	...	34.70	138.70	...
Do.	Sundry claims ...	...	...	...	...	...	...	...	...	3.00	15.01	...
<i>From Goldfield generally—</i>													
Reported by Banks and Gold Dealers ...			12.77	...	...	...	...	...	3,990.78	...	...	...	...
Total ...			12.77	...	...	...	...	...	3,990.78	...	17,597.50	14,127.25	...

Pilbara Goldfield.

MARBLE BAR DISTRICT.

Bamboo Creek	795	...	Bulletin ...	...	10.10	16.48	...	...	...	114.10	230.43	...
Do.	843	...	Cave ...	...	11.50	27.37	...	...	...	11.50	27.37	...
Do.	819	...	Forrest Abbey ...	...	...	...	...	...	...	35.50	77.64	...
Do.	707	...	Kitchener ...	...	231.00	389.00	...	...	...	3,532.00	7,406.97	...
Do.	740	...	(Mount Prophecy)	...	...	...	...	...	1.11	1,040.50	1,898.07	...
Do.	740, 794	...	(Mt. Prophecy Leases)	...	144.00	174.80	...	...	...	1,463.50	2,272.98	...
Do.	794	...	(Perseverance)	...	...	...	...	...	...	290.50	584.21	...
Do.	817	...	Prince Charlie	...	63.00	154.87	...	...	...	116.25	398.86	...
Do.	...	...	Voided leases ...	...	...	...	...	...	508.66	15,203.00	23,257.69	...
Do.	...	...	Sundry claims ...	...	15.00	6.30	...	...	307.83	1,180.35	1,489.99	...

Boodalyerrie...	...	Voided leases ...	...	...	...	...	...	...	292-07	120-25	587-86	...
Do.	...	Sundry claims	...	...	...	...	...	...	7-16	...	...	...
Breen's Find	...	Voided leases ...	...	...	...	...	...	...	...	14-00	66-82	...
Elsie ...	...	Voided leases ...	...	...	...	...	...	...	...	178-00	352-06	...
Do.	...	Sundry claims	...	...	...	...	...	...	...	10-25	58-01	...
Lalla Rookh	786, R.C. 112	Haig ...	...	...	615-00	291-37	...	...	4-78	3,059-00	1,984-16	...
Do.	...	Voided leases	...	...	...	...	...	...	...	224-50	2,186-65	574-01
Do.	...	Sundry claims	...	...	...	...	...	...	...	6,992-00	6,881-04	...
Marble Bar	844	Anglo-French	...	...	100-50	79-50	...	...	...	100-50	79-50	...
Do.	841	Franklin	...	...	67-50	62-32	...	...	...	67-50	62-32	...
Do.	805	Homeward Bound East	...	...	75-50	70-40	...	...	...	624-50	752-44	...
Do.	694	Jo-Jo	...	...	30-00	40-25	...	...	33-97	2,576-00	2,883-10	...
Do.	845	Outward Bound	...	...	87-00	74-58	...	...	...	108-00	100-60	...
Do.	...	Voided leases	...	...	...	...	...	...	147-90	18,845-45	24,371-70	...
Do.	...	Sundry claims	...	...	19-50	24-14	...	38-68	149-23	5,071-14	5,647-78	...
North Pole	...	Voided leases	...	...	...	...	...	...	...	474-00	340-75	...
Do.	...	Sundry claims	...	...	...	...	...	...	...	50-50	69-56	...
North Shaw	(837)	Eclipse	...	...	8-00	8-32	...	...	...	8-00	8-32	...
Do.	820	McLeod's Reward	...	...	70-00	10-00	...	...	...	403-00	178-24	...
Do.	...	Voided leases	...	...	...	...	...	7-53	...	351-45	674-72	...
Do.	...	Sundry claims	...	...	...	...	...	...	567-06	...	...	...
Shark's	...	Sundry claims	...	...	...	...	...	145-08	19-37	24-50	93-14	...
Shaw River	...	Voided leases	...	...	...	...	...	...	...	101-00	49-63	...
Talga Talga	...	Voided leases	...	...	...	...	...	...	83-83	574-50	975-98	...
Do.	...	Sundry claims	...	...	...	...	...	50-26	68-99	204-65	520-25	...
Tambourah	...	Voided leases	...	...	...	...	...	...	73-90	1,438-50	1,739-44	...
Do.	...	Sundry claims	...	92-40	...	...	...	...	171-69	639-25	797-44	...
Warrawoona	...	Voided leases	...	...	...	...	...	...	16-99	10,072-80	18,136-84	...
Do.	...	Sundry claims	...	...	...	...	...	44-30	403-70	1,127-04	2,163-74	...
Western Shaw	...	Voided leases	...	...	...	...	...	...	...	1,222-50	957-80	...
Do.	...	Sundry claims	...	...	...	...	...	12-52	67-47	...	...	...
Wyman's Well	744	Euro	...	...	49-75	23-68	...	...	9-31	642-75	619-35	...
Do.	...	Voided leases	...	...	...	...	...	...	33-55	115-04	493-98	...
Do.	...	Sundry claims	...	...	...	...	...	93	39-41	355-86	592-18	...
Yandicoogina	...	Voided leases	...	...	...	...	...	...	140-76	2,733-20	5,824-23	...
Do.	...	Sundry claims	...	...	...	...	...	...	238-35	103-75	120-34	...
From District Generally :-													
Sundry Parcels treated at:													
State Battery, Bamboo Creek													
...	...	...	...	...	...	200-56	...	...	...	...	3,123-38	39-90
State Battery, Marble Bar													
...	...	...	...	...	...	44-06	...	...	...	...	78-12	...
Various Works													
...	...	...	...	...	...	...	...	...	...	237-95	1,204-91	...
Reported by Banks and Gold Dealers													
...	...	...	...	67-72	...	...	...	12,058-71	309-13	...	...	...
Total				67-72	92-40	1,597-35	1,698-00	...	12,358-01	3,696-22	81,858-53	122,420-59	613-91

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

PILBARA GOLDFIELD—continued.

NULLAGINE DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE	TOTAL FOR 1924.					TOTAL PRODUCTION.				
			Alluvial.	Dolled and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dolled and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
Eastern Creek	(215L)	Morning Star ... ..	...	...	...	...	...	...	32-00	...	30-13	...
Do.	219L	Shamrock ... ..	...	...	89-00	109-15	11-77	...	89-00	...	109-15	11-77
Do.	...	Voided leases ... ..	...	...	...	...	...	8-19	4,450-00	...	8,824-75	...
Do.	...	Sundry claims ... ..	...	...	68-00	103-43	16-90	...	383-50	...	643-65	16-90
Elsie	...	Voided leases ... ..	...	...	...	...	...	...	408-25	...	1,323-85	...
Do.	...	Sundry claims ... ..	...	...	...	...	...	...	24-00	...	27-48	...
McPhee's Creek	...	Voided leases ... ..	...	...	...	...	...	...	113-00	...	137-92	...
Middle Creek	...	Voided leases ... ..	...	...	...	...	...	...	6,211-90	...	8,433-68	...
Do.	...	Sundry claims ... ..	...	...	...	...	...	...	286-00	...	408-82	...
Mosquito Creek	...	Voided leases ... ..	...	...	...	...	...	1-07	21-42	7,259-80	12,464-00	...
Do.	...	Sundry claims ... ..	...	...	...	...	...	...	166-47	2,188-94	3,116-77	...
Nullagine	...	Voided leases ... ..	...	...	...	...	...	...	13-96	7,453-25	11,335-12	...
Do.	...	Sundry claims	7-53	20-23	...	...	...	156-85	206-73	3,984-75	9,336-03	...
20-Mile Sandy	...	Voided leases ... ..	...	...	...	...	...	...	3-20	5,093-70	7,786-99	...
Do.	...	Sundry claims ... ..	...	...	...	...	...	33-10	20-55	2,802-65	3,855-08	...
<i>From District generally:—</i>												
Sundry Parcels treated at:												
Doherty's Works ... ..			...	...	...	...	...	...	...	...	1,177-32	...
Fremantle Trading Co.'s Works ... ..			...	...	...	...	...	...	...	...	8-29	...
State Battery, 20-Mile Sandy ... ..			...	...	...	...	...	...	...	62-00	1,767-60	...
Various Works ... ..			...	...	...	...	...	...	...	50-50	2,641-67	...
Reported by Banks and Gold Dealers			35-92	...	...	...	...	6,573-24	35-54	...	...	...
Total			43-45	20-23	157-00	212-58	28-67	6,764-26	479-83	40,893-24	73,428-30	28-67

West Pilbara Goldfield.

Croydon	...	Voided leases ... ..	...	...	...	...	...	...	...	8-00	5-44	...
Hong Kong	...	Voided leases ... ..	...	...	...	...	...	...	...	331-00	442-45	...
Do.	...	Sundry claims ... ..	...	...	...	...	...	21-40	-02	9-00	3-15	...

Lower Nicol...	...	Voided leases ...	...	...	...	...	...	...	1-10	653-20	402-22	...
Do.	...	Sundry claims ...	...	...	...	...	...	10-44	2-71	10-00	11-51	...
Mallina	...	Voided leases ...	...	...	...	...	...	...	...	141-60	128-44	...
Nicol	...	Voided leases ...	...	...	...	...	...	...	...	30-00	11-47	...
Pilbara	...	Voided leases ...	...	...	...	...	...	...	48-12	267-00	413-59	...
Do.	...	Sundry claims ...	...	...	...	...	...	21-00	25-64	1-11	163-00	249-86
Roebourne	M.L. 174	Good Fortune	...	...	...	...	...	...	...	...	3-96	112-83
Do.	M.L. 183, M.L. 167	Carlow Castle:—Roebourne Copper Mines, Ltd.	...	...	...	...	...	...	...	...	21-12	...
Do.	...	Voided leases ...	...	...	...	...	...	...	...	113-36	573-91	237-91
Do.	...	Sundry claims ...	...	...	...	...	...	...	...	108-60	93-85	96-53
Station Peak	165	(Belladonna)	...	...	...	...	...	...	...	17-93	943-00	262-93
Do.	...	Voided leases ...	...	...	...	...	...	...	177-74	23-44	9,993-00	11,084-49
Do.	...	Sundry claims ...	...	...	...	...	...	...	...	...	37-50	48-19
Towranna	...	Voided leases ...	...	...	...	...	...	...	...	2-62	3,965-80	5,187-51
Do.	...	Sundry claims ...	...	...	...	...	...	...	...	...	22-00	12-35
Upper Nicol...	...	Sundry claims ...	...	...	...	...	...	...	...	...	6-50	2-57
Weerianna	...	Voided leases ...	...	...	...	...	...	...	...	2,436-15	3,079-81	...
Do.	...	Sundry claims ...	...	...	...	...	...	...	...	64-00	62-90	...
Whim Creek...	...	Voided leases ...	...	...	...	...	...	...	...	...	...	883-80
<i>From District generally:—</i>			...	...	...	...	...	...	...	...	...	...
Reported by Banks and Gold Dealers			...	...	...	...	...	...	...	5,523-53	92-82	7-16
Total			...	...	...	...	...	...	...	...	...	...
			35-81	...	21-00	40-64	5,734-22	275-00	19,302-71	22,108-88	1,331-07

Ashburton Goldfield.

Mt. Mortimer	...	Sundry claims ...	...	...	...	...	...	...	354-37	315-64	...	74-47
Uaroo	...	Voided leases ...	...	...	...	...	...	...	...	...	...	7,713-22
<i>From Goldfield generally:—</i>			...	...	...	...	...	...	...	...	...	...
Reported by Banks and Gold Dealers			...	...	...	...	...	...	...	...	...	...
Total			...	...	...	...	...	...	...	...	...	...
			3-18	...	...	...	...	...	...	...	...	...
			3-18	8,615-90	315-64	...	7,787-69

Gascoyne Goldfield.

Bangemall	...	Voided leases ...	...	...	...	...	...	...	6-22	350-70	313-82	...
Do.	...	Sundry claims ...	...	...	...	...	...	...	12-29	6-00	24-01	...
<i>From Goldfield generally:—</i>			...	...	...	...	...	...	...	...	...	...
Reported by Banks and Gold Dealers			...	...	...	...	...	...	...	...	...	...
Total			...	...	...	...	...	...	...	...	...	...
			2-46	...	...	...	...	...	...	...	...	...
			2-46	331-64	18-51	356-70	337-83

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued

Peak Hill Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1924.					TOTAL PRODUCTION.						
			Alluvial.	Dolled and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dolled and Specimens.	Ore treated.	Gold therefrom.	Silver.		
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.		
Egerton	(484P)	Full Hand	...	...	...	...	...	...	19.35	...	...	...	...
Do.	(352P)	Hibernian	60.86	10.65	...	...	...	60.86	10.65	4,410.00	1,659.78	...	...
Do.	...	Voided leases	...	...	...	...	...	...	.91	315.25	360.00	...	...
Do.	...	Sundry claims	5.00	...	...	...	...	235.35	23.51	1,093.75	506.79	...	...
Horseshoe	...	Voided leases	...	...	...	...	...	...	1,962.66	728.38	1,973.46	2.00	...
Do.	...	Sundry claims	...	8.59	...	...	...	15.70	648.12	16.05	45.14	...	...
Mt. Fraser	...	Voided leases	...	...	...	...	...	...	...	389.50	320.96	...	...
Do.	...	Sundry claims	...	...	...	...	...	...	...	136.50	110.26	...	...
Peak Hill	459P	Atlantic	...	...	129.75	36.56	...	...	...	463.50	669.90	...	...
Do.	(483P)	Atlantic North	...	...	...	...	...	...	...	257.00	39.32	...	...
Do.	448P	Evening Star	...	...	130.25	286.48	...	...	...	1,785.25	3,433.54	...	...
Do.	491P	Independent	...	...	62.00	84.52	...	...	...	62.00	84.52	...	...
Do.	5P, 306P	No. 1 North Leases	...	...	397.00	420.75	...	...	61.10	4,097.00	3,178.73	...	.04
Do.	492P	North Star	...	...	111.00	35.89	...	...	...	111.00	35.89	...	...
Do.	(1P), (2P), (4P), 5P, (6P), (8P), (9P), (13P), (15P), (16P), (26P), (27P), (28P), (29P), (35P), (36P), (43P), (53P), (54P), (63P), (146P), (152P), (190P), (213P), (222P), (239P), (248P), (252P), (262P), (274P), 306P, (313P)	(Peak Hill Goldfield, Ltd.)	191.46	462,057.01	223,273.59	2,285.59
Do.	...	Voided leases	...	...	...	...	...	...	543.06	21,455.62	7,346.34	...	...
Do.	...	Sundry claims	...	...	531.00	545.16	...	30.07	251.84	19,818.00	5,521.59	...	...
Ravelstone	...	Voided leases	...	...	...	...	...	...	101.64	4,219.85	3,117.68	...	...
Do.	...	Sundry claims	...	...	...	...	...	...	...	553.60	283.17	...	...
Wilgeena	...	Voided leases	...	...	...	...	...	...	23.54	128.50	146.79	...	...
Wilthorpe	...	Voided leases	...	...	...	...	...	...	...	47.00	20.93	...	...

From Goldfield generally:—

Sundry Parcels treated at:

Purcell's Works	...	...	...	449.43	...	...	...	1,515.45	...
State Battery, Egerton	...	...	...	...	...	...	...	284.87	...
State Battery, Ravelstone	...	...	...	169.24	...	...	3.05	15.00	1,955.18
Various Works	...	...	...	...	...	...	...	30.00	319.97
Reported by Banks and Gold Dealers	...	...	...	...	...	1,947.77	345.17	...	...		
Total	65.86	19.24	1,361.00	2,028.03	...	2,289.75	4,186.06	522,189.76	256,213.85	2,287.63

East Murchison Goldfield.

LAWLERS DISTRICT.

Bronzewing	...	Voided Leases	...	...	...	...	...	468.00	318.03	1.94
Cork Tree	...	Voided leases	...	...	...	...	29.90	3,767.00	3,292.87	...
Do.	...	Sundry claims	...	...	...	...	25.50	13.00	9.32	...
Kathleen Valley	382	(Yellow Aster)	...	...	...	...	...	37,605.00	27,051.42	...
Do.	382	(Yellow Aster)	...	...	...	...	...	1,714.00	949.04	...
Do.	382, 1197	Yellow Aster Leases	...	...	506.89	...	...	3,555.00	2,570.54	...
Do.	382	(Yellow Aster: Yellow Aster G.M. Co., N.L.)	...	...	...	...	...	10,359.75	5,425.26	...
Do.	...	Voided leases	...	...	...	...	141.57	23,291.50	11,350.24	...
Do.	...	Sundry claims	...	...	...	...	478.40	1,505.75	879.66	...
Lake Darlot	(1207), ([1515c])	New Discovery	...	...	...	...	...	220.00	84.11	...
Do.	...	Voided leases	...	...	...	...	4,448.42	65,165.30	48,656.33	...
Do.	...	Sundry claims	...	...	...	1.16	474.45	3,972.64	3,387.61	2.60
Lawlers	(22), (37), 58, 62, (70), (155), (156), (157), (158), (376), (377), (381), (385), (399), (426), (427), (459), (474), (500), (508), (509), (510), (511), (512), (552), (562), (563), (573), (811), (840),	(East Murchison United, Ltd.)	...	...	...	...	...	291,797.00	155,594.26	900.48
Do.	1171	(Great Eastern)	...	...	...	...	...	927.00	337.72	...
Do.	1171	Great Eastern	...	...	88.53	...	...	217.00	168.80	...
Do.	1171, (1186)	(Great Eastern Leases)	...	...	...	...	...	1,601.74	1,352.43	...
Do.	(22), (37), 58, 62, (70), (155), (156), (157), (158), (376), (377), (381), (385), (399), (426), (427), (459), (474), (500), (508), (509), (510), (511), (512), (552), (562), (563), (573), (811), (840)	(London and Western Australian Exploration Coy., Ltd.)	...	...	...	...	...	179,563.00	40,438.14	2,560.31

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

EAST MURCHISON GOLDFIELD—continued.

LAWLERS DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1924.					TOTAL PRODUCTION.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
Lawlers ...	(22), (37), 58, 62, (70), (155), (156), (157), (158), (376), (377), (385), (459), (508), (509), (562), (563), (811), (840), 918, (1053), (1106), (1109), (1110), (1123), (1160)	(Northern Mines Ltd.) ...	...	...	...	...	...	...	...	398,856·50	102,005·52	8,356·89
Do. ...	1212 ...	(Queen) ...	...	...	...	...	...	...	...	168·00	124·30	...
Do. ...	1212 ...	Queen: Daisy Queen G.M. Co., N.L.	...	...	70·00	35·84	...	...	...	4,158·00	2,353·20	...
Do. ...	58, 62, 918, 1178,	Waroonga G.M. Co., Ltd.	...	...	2,537·00	949·27	...	...	...	55,269·00	13,443·49	...
Do. ...	62 (562), (563),	(Waroonga South Leases)	...	...	...	...	...	...	...	42,150·00	14,329·48	...
Do. ...	58 ...	(Waroonga: London and Western Australian Exploration Co., Ltd.)	...	...	...	...	...	...	...	2,438·50	2,755·45	...
Do. ...	...	Voided leases ...	...	...	...	...	...	687·39	304,608·48	157,459·70	2,533·25	...
Do. ...	...	Sundry claims ...	...	...	76·00	45·27	...	14·81	255·08	11,445·48	7,005·98	268·34
New England	...	Voided leases ...	...	...	...	...	...	57·54	899·00	720·25	...	...
Do. ...	...	Sundry claims ...	...	...	...	...	...	4·32	554·50	465·23	...	...
Sir Samuel ...	1230 ...	Canberra ...	...	...	11·00	12·44	...	...	...	11·00	12·44	...
Do. ...	1225 ...	Combine ...	...	...	...	...	...	...	...	13·00	7·74	...
Do. ...	1228 ...	Vanguard ...	...	...	163·00	67·40	...	...	...	163·00	67·40	...
Do. ...	...	Voided leases ...	...	...	...	...	...	13·49	266,065·50	138,811·99	10,225·58	...
Do. ...	...	Sundry claims ...	...	...	73·00	46·03	...	21·37	4,316·00	2,968·61	...	...
Wiluna ...	542, [6j], 548, [7j], (550), ([8j]), (906), ([11j]), (930), ([13j]), (931), ([14j]), (932), ([15j]), (937), ([17j]), (938), ([18j]), (943), ([21j]), (944), ([22j]), (952), ([26j])	(Gwalia Consolidated, Ltd.) ...	...	...	...	...	...	...	...	210,230·32	74,536·14	69·03
Do. ...	870, [10j]	(Moonlight) ...	...	...	...	...	...	...	...	1,856·00	787·66	...
Do. ...	917, [12j]	(Squib) ...	...	...	...	...	...	...	...	276·50	67·00	...
Do. ...	...	Voided leases ...	...	...	...	...	...	537·27	104,086·75	62,811·02	124·00	...
Do. ...	...	Sundry claims ...	...	...	...	...	...	5·30	2,841·15	1,516·76	...	...

<i>From District generally —</i>												
Sundry Parcels treated at:												
Great Eastern Battery	...	...	...	545.85	...	...	...	...	5,437.58	151.37
Lawlers Public Battery (Retreatment Works)	...	...	...	81.30	...	...	...	...	1,439.37	...
Queen Works	...	...	...	...	...	...	...	...	1,275.11	39.36
State Battery, Lake Darlot	...	...	...	...	...	...	...	315.00	1,097.09	...
State Battery, Sir Samuel	...	...	...	75.16	...	...	...	23.50	1,611.14	...
State Battery, Wiluna	...	...	...	...	...	...	...	390.00	2,047.17	20.00
Western Machinery Co., Ltd.	...	...	...	...	...	...	...	80.00	37.25	...
Various Works	...	...	...	...	...	...	...	1,619.50	14,563.26	744.33
Reported by Banks and Gold Dealers	...	...	...	...	...	5,593.22	67.15	...	5.74	...
Total	2,930.00	2,453.98	5,614.49	7,241.85	2,038,577.26	911,628.85	25,997.48

WILUNA DISTRICT.

Collavilla	...	Voided leases	...	...	...	...	...	...	1,518.00	496.28	...
Do.	...	Sundry claims	...	...	...	...	...	...	30.00	21.47	...
Gum Creek	...	Voided leases	...	...	...	...	...	...	1,334.50	579.16	...
Mt. Keith	...	Voided leases	...	...	...	...	...	8.29	8,279.50	6,882.05	...
Do.	...	Sundry claims	...	...	...	...	...	78.26	1,595.25	976.93	...
New England	...	Voided leases	...	...	...	...	...	...	952.00	309.11	...
Do.	...	Sundry claims	...	...	...	...	...	...	115.00	100.62	...
Wiluna	91J, [940]	(Adelaide)	...	...	...	...	...	...	401.00	33.29	...
Do.	352J	Black Adder	...	...	88.75	103.00	...	...	88.75	103.00	...
Do.	231J	Brilliant	...	...	230.50	152.91	...	...	498.50	223.71	...
Do.	294J	Bulletin Consols	...	...	35.25	28.20	...	...	35.25	28.20	...
Do.	6J, [542], 7J, [548], (8J), ([550]), (11J), (13J), (14J), (15J), (17J), (18J), (21J), (22J), (24J), (25J), (28J), (39J), (161J), (163J)	Gwalia Consolidated, Ltd.	...	...	...	...	...	...	29,774.50	10,780.42	20.29
Do.	119J	(Happy Jack)	...	...	...	...	...	...	743.00	236.41	...
Do.	10J, [870]	(Moonlight)	...	...	...	...	...	...	5,181.00	1,078.40	...
Do.	10J, [870EM], 37J, 91J, 109J, (123J)	Moonlight leases	...	...	62.50	36.84	...	...	28,741.25	11,966.35	...
Do.	288J	Ullina	...	...	117.50	66.68	...	...	117.50	66.68	...
Do.	275J	W.A.	...	...	67.50	44.80	...	...	67.50	44.80	...
Do.	6J, [542], 7J, [548], (8J), (550), (11J), (13J), (14J), (15J), (17J), (21J), (161J), (163J), (193J), (194J), (256J), (257J)	Western Machinery Co., Ltd.	...	...	172.50	101.93	...	...	69,555.50	33,178.75	...

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

East Murchison Goldfield—continued.

WILUNA DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1924.					TOTAL PRODUCTION.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
Wiluna ...	12j, [917], (23j), ([946]), (28j), ([954]), (30j), ([959]), (33j), ([967]), (36j), ([975]), (43j), ([1018]), (76j), ([1090]), (113j), 119j, (124j), (137j), 266j	Wiluna Gold Mines, Ltd. (In liq.) ...	...	...	94·75	65·33	...	...	...	31,069·75	14,653·06	...
Do. ...	...	Voided leases ...	...	...	...	...	...	...	27·92	23,700·25	10,839·24	...
Do. ...	...	Sundry claims ...	...	...	709·75	484·28	...	87·59	79·88	9,648·50	4,522·14	... 33
<i>From District generally:—</i>												
Sundry Parcels treated at:												
State Battery, Mt. Keith ...			...	...	...	...	...	...	...	...	781·64	12·68
State Battery, Wiluna ...			...	...	...	...	...	...	...	202·00	11,482·98	198·70
Reported by Banks and Gold Dealers ...			...	...	...	...	...	9·78	2·92	...	...	...
Total ...			...	...	1,579·00	1,083·97	...	97·37	197·27	213,648·50	109,384·69	232·00

BLACK RANGE DISTRICT.

Barrambie ...	...	Voided leases ...	...	...	...	...	...	...	...	455·50	1,862·24	...
Do. ...	...	Sundry claims ...	...	...	...	...	...	...	77·14	127·05	140·50	...
Bellechambers ...	...	Sundry claims ...	...	...	...	...	...	...	...	45·00	36·62	...
Birrigrin ...	...	Voided leases ...	...	...	...	...	...	...	820·68	1,018·16	15,040·45	...
Do. ...	...	Sundry claims ...	...	...	...	...	...	...	34·52	744·50	678·89	...
Curran's Find ...	...	Voided leases ...	...	...	...	...	...	18·24	222·89	7,038·50	3,001·02	...
Do. ...	...	Sundry claims ...	...	2·18	518·00	141·51	...	...	29·38	1,188·50	430·37	...
Errolls ...	...	Voided leases ...	...	...	...	...	...	14·17	132·04	72·00	426·68	...
Do. ...	...	Sundry claims ...	...	...	...	...	...	6·53	399·11	228·00	327·90	...
Hancock's ...	(931B) ...	Comedy King ...	...	...	20·00	17·51	...	...	...	83·00	65·63	...

Do.	...	(888B), (890B), (892B), (896B) (918B)	(889B), (891B), (895B)	Empire Gold Prospecting Syn. icate, N.L.	...	...	...	...	...	...	...	787-00	181-14	...
Do.	...			Kohinoor North Extended	...	...	60-00	20-97	...	...	...	94-00	26-98	...
Do.	...			Voided leases	...	...	...	...	...	6,523-59	...	30,395-75	32,223-09	55-72
Do.	...			Sundry claims	...	...	...	...	4-21	119-02	...	2,649-50	1,340-96	...
Maninga Marley	...	203B	...	(Havilah) ...	...	...	...	...	...	...	...	1,507-50	2,315-74	...
Do.	...	203B	...	(Havilah)	...	...	...	...	...	...	...	638-00	716-05	...
Do.	...	203B, (249B), (287B), (289B), (350B), (504B)	(243B), (254B), (288B), (305B)	(Havilah G.M. Co., N.L.)	...	...	...	...	...	...	...	36,508-00	20,052-80	22-55
Do.	...	203B, (287B), (350B)	(243B), (289B)	(Havilah G.M. Co., N.L.)	...	...	...	...	...	...	...	6,026-00	5,029-69	...
Do.	...	203B, (249B), (287B), (289B), (305B)	(243B), (254B), (288B)	(Havilah leases)	...	...	...	...	...	...	...	2,240-00	2,432-48	...
Do.	...	203B and 345B	...	Havilah leases	...	...	161-00	104-78	...	...	...	161-00	232-32	...
Do.	...	203B, (289B)	(243B)	(Havilah leases : Tailings Treat- ment, Ltd.)	...	...	...	...	...	...	...	371-00	2,086-50	...
Do.	...			Voided leases	...	...	...	...	...	195-20	...	11,977-23	14,442-35	...
Do.	...			Sundry claims	...	...	...	...	...	158-16	...	853-50	669-68	...
Montagu	...			Voided leases	...	...	...	...	...	...	...	94-39	9,133-40	7,223-46
Do.	...			Sundry claims	...	...	...	...	...	...	...	45-67	794-50	471-76
Nungarra	...			Voided leases	...	...	...	...	...	25-94	952-34	9,000-75	4,813-99	...
Do.	...			Sundry claims	...	...	...	...	...	46-67	1,455-98	3,601-90	2,212-33	...
Sandstone	...	(887B)	...	Lucky Dip	...	...	...	...	...	...	...	14-00	7-91	...
Do.	...	893B	...	Nous Verrons	...	...	42-00	44-51	...	...	...	349-00	269-62	...
Do.	...	885B	...	(Oroya East)	...	...	...	...	...	...	17-77	508-15	860-92	...
Do.	...	885B	...	Oroya East : Black Range G.M. Co., N.L.	...	...	112-00	85-09	...	...	...	112-00	85-09	...
Do.	...			Voided leases	...	...	...	...	...	4-75	3,185-47	687,291-77	440,907-71	11,754-22
Do.	...			Sundry claims	...	7-50	385-00	236-88	...	33-72	1,277-93	5,170-65	3,027-04	...
Youanmi	...	(514B)	...	United	...	...	...	...	...	...	11-86	18,460-78	5,755-18	...
Do.	...	863B, 864B, (866B)	(865B)	Youanmi Gold Mines, Ltd.	...	...	...	...	...	...	...	56,125-75	38,674-05	1,658-83
Do.	...			Voided leases	...	...	...	...	...	36	115-06	283,584-75	132,271-11	2,949-72
Do.	...			Sundry claims	...	...	290-00	32-62	...	1-07	2-31	2,276-75	603-10	...
<i>From District generally :—</i>														
Sundry Parcels treated at :														
State Battery, Black Range														
State Battery, Youanmi														
Various Works														
Reported by Banks and Gold Dealers														
					8-13	9-68	1,588-00	1,341-18	...	1,509-09	15,881-94	1,192,871-84	766,224-22	16,500-57

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Murchison Goldfield.

CUE DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1924.					TOTAL PRODUCTION.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
Barrambie ...	...	Voided leases ...	...	...	...	...	...	...	22.49	16,903.92	14,338.72	125.60
Do. ...	...	Sundry claims ...	...	...	...	...	...	...	...	70.50	35.81	...
Cuddingwarra ...	1860 ...	Big Bell ...	...	...	...	11.82	...	...	...	64,448.36	10,965.90	85.29
Do. ...	...	Voided leases ...	...	...	...	...	...	10.59	124.53	35,855.75	43,796.59	15.42
Do. ...	...	Sundry claims ...	...	...	26.00	20.32	...	...	82.10	593.54	1,126.20	...
Cue ...	203, (1148) ...	(Cue Consolidated G.Ms., Ltd.)	...	...	...	...	...	...	...	23,427.50	18,382.10	...
Do. ...	203 ...	Cue No. 1 ...	...	...	...	...	...	...	...	7,781.75	12,961.68	20.40
Do. ...	2032 ...	Monte Carlo Bank ...	...	...	257.00	1,095.88	...	...	...	257.00	1,095.88	...
Do. ...	...	Voided leases ...	...	...	...	...	...	34.72	535.34	248,777.17	182,873.27	46.23
Do. ...	...	Sundry claims ...	16.39	57.00	348.35	226.90	...	38.45	604.80	18,019.29	10,923.28	...
Elya ...	...	Voided leases ...	...	...	...	...	...	...	8.78	971.00	1,778.94	...
Do. ...	...	Sundry claims ...	...	...	...	...	...	...	101.86	595.15	630.47	...
Errolls ...	...	Voided leases ...	...	...	...	...	...	...	20.25	14,098.50	8,902.24	...
Do. ...	...	Sundry claims ...	...	...	...	...	...	...	...	227.00	92.86	...
Mindoolah ...	...	Voided leases ...	...	...	...	...	...	3.07	...	7,935.50	4,773.33	42.97
Do. ...	...	Sundry claims ...	...	...	...	...	...	...	9.81	1,017.00	1,130.39	...
Reedy's Find ...	1977 ...	Emu ...	...	...	...	...	...	...	...	555.50	280.88	...
Do. ...	1981 ...	Emu North ...	...	...	115.00	22.15	...	...	...	529.00	282.46	...
Do. ...	2018 ...	Turn of the Tide ...	...	...	18.25	61.58	...	...	...	31.25	341.61	...
Do. ...	...	Voided leases ...	...	...	...	...	...	...	214.65	1,315.50	5,765.74	...
Do. ...	...	Sundry claims ...	...	...	53.50	27.21	...	169.59	87.00	451.30	395.09	...
Tuckabianna ...	...	Voided leases ...	...	...	...	...	...	...	162.70	3,020.00	4,302.51	...
Do. ...	...	Sundry claims ...	...	...	32.50	12.10	...	23.44	102.14	418.25	256.60	...
Tuckanarra ...	(1337) ...	Nemesis ...	...	...	...	...	...	...	966.35	2,371.00	6,220.01	...
Do. ...	...	Voided leases ...	...	...	...	...	...	14.65	2,095.42	15,621.40	14,486.26	172.77
Do. ...	...	Sundry claims ...	...	5.86	164.50	97.75	...	93.61	618.36	3,479.23	7,006.37	...

From District generally:—

Sundry Parcels treated at:														
Cue No. 1 Works ... ..	...	...	...	...	...	...	...	...	1,870-50	6,684-54	...
State Battery, Cue ... ..	...	...	...	...	143-55	...	...	...	...	1,846-96	...
State Battery, Tuukanarra ... ..	...	...	...	...	114-17	...	...	...	518-50	3,802-22	...
Triplicate Works ... ..	...	...	...	...	...	...	...	...	...	3,546-56	...
Various Works ... ..	...	...	...	...	...	...	...	...	5,055-02	18,568-66	...
Reported by Banks and Gold Dealers ... ..	...	...	...	...	...	...	...	832-47	7-54	...	...	
Total	16-39	62-86	1,015-10	1,833-43	...	1,220-59	5,764-12	476,215-38	387,593-93	508-68

MEEKATHARRA DISTRICT.

Abbott's ... ..	...	Voided leases ... ..	...	...	...	...	...	...	26-45	35,210-60	37,124-40	...	
Do. ... ..	...	Sundry claims ... ..	...	...	13-00	8-21	...	...	49	68-60	99-08	...	
Burnakura ... ..	...	Voided leases ... ..	...	...	...	...	...	...	3,239-43	38,480-95	30,579-03	26-90	
Do. ... ..	...	Sundry claims ... ..	...	...	...	...	...	12-51	81-11	144-50	118-98	...	
Chesterfield ... ..	...	Voided leases ... ..	...	...	...	...	...	...	29-02	409-15	6,756-26	7,445-01	80
Do. ... ..	...	Sundry claims ... ..	...	...	...	...	...	...	41-63	435-60	487-80	...	
Gabanintha ... ..	...	Voided leases ... ..	...	...	...	...	...	...	16-93	21,918-00	13,447-58	815-57	
Do. ... ..	...	Sundry claims ... ..	...	...	...	9-64	...	...	13-05	74-38	1,063-50	724-83	...
Garden Gully ... ..	...	Voided leases ... ..	...	...	...	...	...	...	26-36	74-91	29,854-06	21,435-37	1,102-59
Do. ... ..	...	Sundry claims ... ..	...	...	53-75	24-35	...	...	...	5-38	348-10	397-38	...
Gum Creek ... ..	...	Voided leases ... ..	...	...	...	...	...	...	25-27	88-12	3,639-08	3,359-56	...
Do. ... ..	...	Sundry claims ... ..	...	...	...	...	...	...	...	...	338-00	278-36	...
Holden's Find	1460N	Norma ... ..	...	...	...	...	...	...	...	...	213-75	167-26	...
Do.	1291N	Waterloo ... ..	...	...	...	...	9-40	...	...	...	14,256-00	4,949-09	...
Do. ... ..	...	Voided leases ... ..	...	...	...	...	...	...	...	...	18-00	987-62	...
Do. ... ..	...	Sundry claims ... ..	...	...	2-21	...	...	...	164-95	44-63	206-00	173-56	...
Jillawarra ... ..	...	Voided leases ... ..	...	...	...	...	...	...	...	1,134-68	1,499-55	2,801-53	...
Do. ... ..	...	Sundry claims ... ..	...	...	...	...	...	...	169-94	142-95	23-50	53-81	...
Meeka Pool ... ..	...	Voided leases ... ..	...	...	...	...	...	...	...	...	111-58	82-27	...
Do. ... ..	...	Sundry claims ... ..	...	...	...	...	...	...	2-84	211-72	184-83	...	
Meekatharra	597N	Commodore ... ..	...	...	165-50	120-86	...	...	...	...	165-50	120-86	...
Do.	597N	(Commodore) ... ..	...	...	...	...	...	...	...	...	498-00	1,268-71	...
Do.	597N, (915N)	(Commodore G.M. Co., N.L.)	...	...	...	...	...	...	...	...	40,527-00	16,121-38	3-32
Do.	(1041N), (1365N)	...	...	...	...	...	...	...	...	...	...	...	...
Do.	1501N	Empire ... ..	...	14-09	91-00	228-79	...	...	14-09	...	204-25	339-25	...
Do.	477N	(Fenian) ... ..	...	...	...	...	...	...	...	...	8,831-75	18,289-22	...
Do.	477N, 814N	Fenian leases ... ..	...	...	...	...	...	...	...	...	313,464-94	254,608-07	...
Do.	1331N	Gwalia ... ..	...	...	70-50	7-24	...	...	...	132-98	4,293-75	9,616-44	...
Do.	1326N	Gwalia Extended ... ..	...	...	39-00	90-52	...	...	...	...	39-00	90-52	...
Do.	1466N	Haveluck ... ..	...	...	87-00	175-54	...	...	...	...	488-50	761-54	...

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

MURCHISON GOLDFIELD—continued.

MEEKATHARRA DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1924.					TOTAL PRODUCTION.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
Meekatharra	555N	Ingliston ... ..	...	...	129.25	353.35	...	...	...	457.25	605.49	...
Do.	555N	(Ingliston) ... ..	...	...	...	...	...	...	...	1,202.49	2,332.27	...
Do.	475N	(Ingliston Consols Extended) ... ..	...	...	...	...	...	...	...	1,536.25	4,248.25	...
Do.	475N, 515N, 729N, 822N	Ingliston Consols Extended leases	...	...	33,302.00	15,676.25	...	...	...	361,228.22	194,261.12	...
Do.	(1461N)	Ingliston Extended	...	...	...	...	...	...	...	134.50	171.01	...
Do.	555N, (1239N)	Ingliston leases	...	...	...	...	...	...	...	21,324.85	19,947.12	...
Do.	1489N	Ingliston G.M. Co., N.L.	...	...	...	...	...	...	...	65.00	179.89	...
Do.	533N	Marmont ... ..	...	...	158.75	214.08	...	...	...	54,997.60	39,620.91	...
Do.	580N	(Marmont Extended)	...	...	...	...	...	...	...	43.00	38.03	...
Do.	580N, (888N)	Marmont Extended leases	...	...	...	...	...	...	...	152.00	129.61	...
Do.	597N (915N), (1041N), (1365N)	(New Commodore G.M. Co., N.L.)	...	...	...	...	...	...	...	127.10	76.78	...
Do.	...	Voided leases	...	...	...	...	...	...	3.88	465.44	284,341.70	142,210.90
Do.	...	Sundry claims	2.84	...	627.75	457.50	...	187.56	184.34	7,531.20	3,738.09	2,451.42
Mistletoe	1502N	Munarra ... ..	...	363.69	33.75	125.04	...	...	943.87	33.75	125.04	...
Do.	...	Voided leases	...	...	...	...	...	...	...	...	...	...
Do.	...	Sundry claims	9.87	...	...	...	...	102.96	63.65	...	...	...
Mt. Maitland	...	Sundry claims	...	...	16.50	53.20	...	...	...	16.50	53.20	...
Munara Gully	...	Voided leases	...	...	...	...	...	...	...	13,167.75	6,489.65	...
Do.	...	Sundry claims	...	...	...	...	...	...	11.62	90.50	66.31	...
Nannine	166N	Nannine ... ..	...	...	48.00	131.98	...	...	218.15	262.00	762.50	...
Do.	(16N), (25N), 166N	(Nannine leases)	...	...	...	...	...	...	8.71	23,649.60	24,385.66	127.60
Do.	...	Voided leases	...	...	...	...	...	34.02	372.54	68,097.02	43,048.73	39.85
Do.	...	Sundry claims	24.83	...	40.00	32.14	...	46.12	414.92	2,482.45	1,991.28	...
Quinn's	...	Voided leases	...	...	...	...	...	7.30	1,186.50	18,931.16	8,886.79	90.70
Do.	...	Sundry claims	4.16	69.84	...	176.56	...	10.78	1,172.91	1,671.50	1,458.18	...
Ruby Well	...	Voided leases	...	...	...	...	...	...	...	7,443.00	3,988.36	...
Do.	...	Sundry claims	232.78	28.43	...	...	...	574.79	389.32	261.00	341.66	...
Stake Well	...	Voided leases	...	...	...	...	...	...	200.12	21,362.00	9,566.18	...
Do.	...	Sundry claims	...	...	26.00	11.75	...	...	31.79	286.50	301.26	...
Star of the East	...	Voided leases	...	...	...	...	...	...	...	27,244.00	20,305.40	...
Do.	...	Sundry claims	...	...	...	...	...	...	...	127.62	94.97	...

Yaloginda ...	...	Voided leases ...	...	...	...	...	...	1,591.82	25,776.02	13,256.35	8.68
Do. ...	...	Sundry claims	...	2.93	...	51.50	28.43	536.58	2,029.67	1,711.26	...
<i>From District generally:—</i>												
Sundry Parcels treated at:												
		Ruby Well Battery	...	...	...	...	...	...	...	699.32	...
		State Battery, Meekatharra	...	...	...	...	472.84	...	14.00	11,546.00	19.00
		State Battery, Quinns	...	...	...	...	...	...	...	618.79	...
		Tumbulgum Sand Syndicate's Works	...	...	...	...	...	...	...	174.90	...
		Various Works	...	...	...	...	...	...	172.75	4,475.42	342.17
		Reported by Banks and Gold Dealers	...	39.41	...	...	...	9,879.31	13.79	...	...
		Total	...	319.03	476.05	34,953.25	18,430.06	11,305.79	13,354.22	1,470,825.24	988,020.02	5,028.90

DAY DAWN DISTRICT.

Day Dawn ...	569D ...	Fingall South ...	...	...	103.50	71.42	...	...	274.50	205.38	...	
Do. ...	557D ...	Great Fingall, No. 2	...	...	116.50	71.18	...	...	382.50	298.27	...	
Do. ...	1D, (2D), (86D), (87D), (99D), (119D), (129D), (158D), (159D), 170D, (185D), (191D), (209D), 210D, (211D), (212D), (213D), (224D), (225D), (249D), (424D), (453D), (455D), (467D)	(Great Fingall Consolidated, Ltd.)	...	18.19	276.10	99.31	...	...	18.19	1,865,708.45	1,185,412.46	169,210.20
Do. ...	1D, (2D), (86D), (87D), (99D), (119D), (129D), (158D), (159D), 170D, (185D), (191D), (209D), 210D, (211D), (212D), (213D), (224D), (225D), (249D), (424D), (453D), (455D), (467D)	London, Australian, and General Exploration Co., Ltd.	...	...	32.00	10.24	...	...	...	32.00	10.24	...
Do. ...	570D ...	Star	...	34.34	...	...	...	34.34	...	...	...
Do. ...	...	Voided leases	...	...	...	...	...	126.30	511.03	45,558.63	30,974.34	...
Do. ...	...	Sundry claims	...	4.87	49.19	442.92	272.86	24.74	299.32	3,647.50	2,509.49	...
Jasper Hill ...	(553D) ...	Neptune	...	...	230.00	95.47	...	...	...	730.00	235.91	...
Do. ...	...	Voided leases	...	...	...	...	...	4.90	1,210.23	15,350.75	9,133.56	...
Do. ...	...	Sundry claims	...	...	...	...	...	...	401.27	358.50	468.44	...
Lake Austin (Island) ...	(568D) ...	Boomerang	...	...	...	...	...	...	23.37	5.50	36.40	...
Do. ...	536D ...	Eureka	...	...	...	...	...	...	1,271.01	57.25	892.61	...
Do. ...	(556D) ...	Eureka North	...	11.40	...	41.00	16.52	11.40	...	174.25	54.89	...	
Do. ...	...	Voided leases	...	...	...	...	...	590.52	1,568.02	29,774.37	45,386.70	...
Do. ...	...	Sundry claims	...	...	...	...	...	24.39	567.57	863.64	510.85	...
Mainland	Voided leases	41	2,706.26	7,272.13	23,129.51	...
Do. ...	...	Sundry claims	...	...	...	...	...	3.24	677.12	103.95	164.86	...
<i>From District generally:—</i>													
Sundry Parcels treated at:													
		Various Works	...	...	...	...	...	...	16.61	940.75	1,537.30	...
		Reported by Banks and Gold Dealers	...	29.95	...	...	...	1,606.81	3.48	...	...	...
		Total	...	80.56	58.88	1,242.02	637.00	2,427.05	9,273.48	1,971,234.67	1,300,961.98	169,210.44	

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

MURCHISON GOLDFIELD—continued.

MOUNT MAGNET DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1924.					TOTAL PRODUCTION.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
Lennonville ...	964M ...	(Empress) ...	...	...	...	...	...	...	...	1,649-00	7,361-81	...
Do. ...	964M ...	Empress ...	...	...	...	123-28	...	...	...	75-00	375-47	...
Do. ...	964M, (1078M), (1116M), (1117M), (1197M) ...	(Empress leases) ...	...	...	...	...	...	...	...	4,813-00	3,171-33	...
Do. ...	(1197M) ...	Galtee Moore ...	...	...	33-00	16-01	...	...	...	1,307-50	565-79	...
Do. ...	...	Voided leases ...	...	...	...	...	...	...	3,196-79	133,623-73	112,674-33	458-82
Do. ...	...	Sundry claims ...	...	...	115-25	37-78	...	13-51	98-01	2,361-67	2,264-20	...
Mt. Magnet ...	1156M ...	Leap Year ...	...	...	96-00	79-42	...	...	...	1,423-75	1,112-25	...
Do. ...	(1013M) ...	Mars ...	...	...	...	...	...	...	...	8,078-15	2,040-25	...
Do. ...	1200M ...	Morning Star ...	...	...	...	...	...	...	...	200-75	127-39	...
Do. ...	1183M ...	Mount Zion ...	...	...	...	...	...	...	...	5,048-45	1,384-59	...
Do. ...	1201M ...	Neptune ...	...	...	96-50	193-68	...	...	...	215-75	343-56	...
Do. ...	1075M ...	New Havelock ...	...	...	176-00	43-43	...	...	15-77	2,097-00	915-63	...
Do. ...	1209M ...	Royal Consols ...	...	...	...	...	...	...	...	66-50	15-24	...
Do. ...	(1193M) ...	Tame Cat ...	...	...	...	...	...	...	...	107-50	304-98	...
Do. ...	...	Voided leases ...	...	...	...	...	...	27-83	8,409-19	354,842-76	205,063-68	714-36
Do. ...	...	Sundry claims ...	...	23-24	1,220-75	841-92	...	1-82	1,214-64	22,536-47	13,518-34	...
Mt. Magnet East	...	Voided leases ...	...	...	...	...	...	63-29	764-53	5,522-28	2,811-75	...
Do. ...	...	Sundry claims ...	...	...	...	...	...	...	37-22	214-50	144-10	...
Moyagee ...	(1213M) ...	Evelyn ...	...	...	20-00	20-17	...	...	...	20-00	20-17	...
Do. ...	(1099M) ...	Moyagee ...	...	...	60	6-24	...	...	...	2,497-60	4,253-47	...
Do. ...	...	Voided leases ...	...	...	...	...	...	...	5-08	2,053-15	2,416-74	...
Do. ...	...	Sundry claims ...	...	...	14-00	22-48	...	...	111-10	658-23	735-45	...
Paynesville ...	1196M ...	Elsie ...	...	289-65	15	83-82	...	...	648-54	25	101-95	...
Do. ...	(1210M) ...	L.P.S. ...	...	...	18-52	29-83	...	...	25-99	19-27	42-90	...
Do. ...	...	Voided leases ...	...	...	...	...	...	...	152-90	19-75	26-62	...
Do. ...	...	Sundry claims ...	...	88-83	31-85	65-43	...	...	287-84	59-67	727-62	...
Youanmi ...	...	Sundry claims ...	...	...	...	...	...	...	...	33-00	44-58	...

From District generally :-

Sundry Parcels treated at :

Fremantle Trading Co., Ltd., Works	...	...	...	...	...	...	...	...	143.80	...
Long Reef Cyanide Works	...	...	...	97.00	...	...	...	...	166.30	...
Morning Star Battery	...	...	...	...	...	...	...	...	874.80	...
State Battery, Boogardie	...	...	...	447.17	...	...	92.51	16,194.48	...	...
Various Works	...	...	...	...	...	...	43.06	15,828.72	...	1.00
Reported by Banks and Gold Dealers	...	2.06	...	...	...	1,697.87	.35	...	...	...
Total	...	2.06	401.72	1,822.62	2,107.66	1,804.32	14,987.95	549,680.25	395,772.29	1,174.18

Yalgoo Goldfield.

Adavale	...	Sundry claims	...	...	...	...	...	10.00	12.56	...
Bilberatha	...	Voided leases	...	...	...	...	...	554.00	200.07	...
Do.	...	Sundry claims	...	...	...	...	2.90	...	...	...
Carlaminda	...	Voided leases	...	...	...	...	...	947.32	524.72	3.30
Do.	...	Sundry claims	...	...	...	...	...	114.00	71.96	...
Field's Find	907	Brown's Reward	...	...	...	...	...	1,073.25	1,301.42	...
Do.	902	Field's Find Extended	...	...	...	...	10.38	8.00	23.74	...
Do.	968	Hayes Gold Mine	...	6.00	7.90	...	5.08	38.00	30.85	...
Do.	...	Voided leases	...	...	...	...	204.26	36,169.05	26,802.83	...
Do.	...	Sundry claims	...	97.75	61.49	5.77	163.59	545.75	519.15	...
Goodingnow	(919)	Blue Bell...	...	...	...	...	...	251.50	279.10	...
Do.	878	Carnation	...	135.50	136.75	...	...	2,904.50	4,699.55	...
Do.	606	(Lake View)	...	...	...	...	...	163.00	185.46	...
Do.	606	Lake View : Payne's Find, Develop- ment Co., N.L.	...	380.00	355.93	...	15.58	9,910.00	9,996.90	...
Do.	(849)	Princess Mary	...	...	...	...	...	397.50	384.15	...
Do.	849	Princess Mary	...	38.00	36.01	...	...	38.00	36.01	...
Do.	973	Sweet William	...	225.00	491.56	...	...	225.00	491.56	...
Do.	...	Voided leases	...	...	...	146.70	257.15	14,293.06	17,305.34	...
Do.	...	Sundry claims	...	214.50	141.27	148.00	80.76	3,248.00	1,815.61	...
Gullewa	(972)	Joyce Jenkins	...	...	...	...	...	...	18.00	9.16
Do.	...	Voided leases	...	...	...	...	...	23,056.50	15,128.82	...
Do.	...	Sundry claims	...	...	...	...	14.76	690.00	565.54	...
Kirkaluoka	...	Sundry claims	...	...	...	...	...	8.80	4.01	...
Messenger's Patch	952	Golden Monaroh	...	.44	...	...	...	.44	4.50	.81
Do.	880	(Gnow's Nest)	...	...	...	...	...	10,938.00	9,827.20	158.06
Do.	880, 897	Gnow's Nest G.Ms., Ltd.	...	3,102.00	4,001.81	199.14	...	6,175.00	6,709.40	363.97
Do.	...	Voided leases	...	...	...	...	321.36	587.26	382.29	...
Do.	...	Sundry claims	...	...	...	463.12	315.11	438.55	280.85	...
Mt. Farmer	...	Voided leases	...	...	...	...	...	64.00	40.19	...
Do.	...	Sundry claims	...	...	...	...	...	5.00	6.22	...

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

YALGOO GOLDFIELD—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1924.					TOTAL PRODUCTION.				
			Alluvial.	Dolled and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dolled and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
Mt. Gibson	Voided leases ...	...	...	...	...	...	...	6.44	434.50	803.57	...
Do.	Sundry claims ...	...	...	...	...	...	...	...	76.00	40.84	...
Ninghan	Voided leases ...	...	...	...	...	...	...	...	10.00	1.41	...
Do.	Sundry claims ...	...	...	...	...	...	...	...	5.00	17.89	...
Noongal ...	953	Revival ...	...	...	170.00	164.04	...	...	...	647.00	383.56	...
Do.	Voided leases ...	...	...	...	...	...	...	15.86	3,086.95	1,847.66	...
Do.	Sundry claims ...	...	...	86.00	39.07	...	11.55	64.97	417.75	266.27	...
Nyounda	Voided leases ...	...	...	...	...	...	...	217.63	416.00	183.91	...
Do.	Sundry claims ...	...	...	...	...	...	...	4.28	18.00	21.67	...
Pinyalling	Voided leases ...	...	...	...	...	...	...	1.36	2,281.60	902.03	...
Do.	Sundry claims ...	...	...	...	...	...	...	2.59	160.50	132.57	...
Rothsay	Voided leases ...	...	...	...	...	...	...	...	9,230.50	3,517.44	...
Do.	Sundry claims ...	...	...	77.50	42.53	...	...	...	269.50	166.15	...
Wadgingarra	Voided leases ...	...	...	...	...	...	...	...	541.61	600.91	...
Do.	Sundry claims ...	...	...	...	...	...	...	...	71.50	38.21	...
Warda Warra ...	(970)	Warda Central ...	...	...	...	...	...	...	...	15.50	14.88	...
Do.	Sundry claims ...	...	...	...	...	...	...	...	10.10	25.54	...
Warriedar ...	961	Highland Chief ...	...	...	18.50	10.79	...	...	...	177.75	80.48	...
Do.	Voided leases ...	...	...	...	...	...	...	...	11,899.75	4,219.12	7.30
Do.	Sundry claims ...	...	...	186.50	53.71	...	...	2.84	1,463.35	607.13	...
Yalgoo	Voided leases ...	...	...	...	...	...	...	3.23	6,314.50	9,965.18	...
Do.	Sundry claims ...	...	1.15	6.00	4.78	...	...	19.89	856.50	518.75	...
Yuin ...	712, (735)	(Bullrush Gold Estates, N.L.) ...	...	...	...	...	...	...	...	23,690.00	7,302.83	130.13
Do. ...	(712)	Royal Standard: Bullrush Gold Es- tates, N.L.	...	...	...	...	...	...	...	10,977.00	4,928.21	...
Do.	Voided leases ...	...	...	...	...	...	...	127.12	31,381.50	14,957.04	...
Do.	Sundry claims ...	...	...	...	...	...	...	4.70	279.50	59.20	...

<i>From Goldfields generally :-</i>												
Sundry Parcels treated at:												
	Field's Find Extended Treatment Works	...	...	...	...	...	...	...	...	152.40	...
	Goodingnow (Payne's Find)	...	...	...	...	...	...	...	...	...	...
	State Battery	...	...	...	59.29	...	...	...	38.50	1,915.72	...
	State Battery, Warriedar	...	...	...	...	...	...	...	...	3,187.19	...
	Yuanmi G.M.'s Ltd., Works (Warriedar options)	...	...	...	...	...	...	...	...	310.93	26.67
	Various Works	...	...	...	...	...	...	...	664.00	1,332.45	...
	Reported by Banks and Gold Dealers	...	2.71	...	...	...	...	9.42	793.05	...	...
	Total	...	2.71	1.59	4,743.25	5,606.93	199.14	1,577.61	1,863.06	218,309.80	156,136.61	689.43

Mount Margaret Goldfield.
MOUNT MORGANS DISTRICT.

Australia United	...	Voided leases	...	...	...	...	...	1,911.63	15,913.69	23,305.76	1.76
Do.	...	Sundry claims	...	...	...	...	...	580.98	799.25	2,072.62	...
Eucalyptus	...	Sundry claims	...	...	...	...	...	...	11.00	5.40	...
Federation Well	...	Voided leases	...	...	...	...	...	...	1,248.50	1,782.71	...
Do.	...	Sundry claims	...	...	...	...	...	...	108.07	64.68	...
Korong	...	Voided leases	...	...	...	...	17.95	72.23	2,722.00	3,473.45	...
Do.	...	Sundry claims	...	...	...	...	...	34.97	279.28	232.89	...
Linden	(344F), (998E)	Bindah	...	...	30.00	1,401.84	...	...	24,232.00	10,332.58	...
Do.	(340F), (871E)	Democrat	...	...	...	...	...	...	736.50	1,357.69	...
Do.	346F, [1024R]	Great Carbine	...	...	...	...	...	...	136.50	41.07	...
Do.	388F	New Bindah	...	...	...	219.40	...	...	...	219.40	...
Do.	341E, [903R], 343F, [985E]	Torquay leases	...	...	230.00	58.10	...	...	5,108.87	3,076.55	.68
Do.	...	Voided leases	...	...	...	...	...	...	1,156.25	1,029.58	...
Do.	...	Sundry claims	...	...	11.00	9.47	...	...	1,056.75	728.35	...
Mt. Margaret	...	Voided leases	...	...	...	...	...	...	6,412.89	4,290.53	12.55
Do.	...	Sundry claims	...	...	...	...	...	...	366.10	289.21	...
Mt. Morgans	6F	(Lily of the Valley South : Westralia Mt. Morgans G.M.'s Ltd.)	...	...	...	...	...	...	1,587.50	808.18	...
Do.	6F	(Lily of the Valley South : Westralia Mt. Morgans Syndicate Ltd.)	...	...	...	...	...	...	3,002.00	1,022.90	...
Do.	5F, (10F), (19F), (22F), (32F), (73F)	(Westralia-Mt. Morgans G.M. Co. Ltd.)	...	...	...	...	...	...	575,148.00	294,758.28	5,552.63
Mt. Morgans	7F, (20F), (21F)	(Westralia-Mt. Morgans G.M. Co. Ltd.)	...	...	...	...	...	...	18,261.00	8,127.69	...
Do.	5F, 6F, 7F, (10F), (19F), (20F), (22F), (32F), 301F	Westralia-Mt. Morgans Mines Ltd.	...	...	12,480.00	3,603.75	...	...	160,783.82	43,241.14	...
Do.	...	Voided leases	76.56	34,334.25	20,938.55	77.86
Do.	...	Sundry claims	10.00	10.75	22.66	1,392.29	1,704.22	...

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

MT. MARGARET GOLDFIELD—continued.

MT. MORGANS DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1924.					TOTAL PRODUCTION.							
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.			
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.			
Murrin Murrin	...	Voided leases ...	...	...	...	...	...	...	...	...	...	...	...	...
Do.	...	Sundry claims ...	...	...	...	...	...	...	...	...	...	...	...	...
Redcastle	...	Voided leases ...	...	...	...	...	...	...	...	...	...	...	...	...
Do.	...	Sundry claims ...	...	...	...	...	...	...	...	...	...	...	...	...
Yundamindera	(357F) ...	Big Stone ...	...	...	126·00	...	...	...	...	...	...	...	...	...
Do.	(369F) ...	Mahalah ...	...	...	...	...	...	...	...	...	...	...	...	...
Do.	...	Voided leases ...	...	...	...	...	...	...	...	...	...	...	...	...
Do.	...	Sundry claims ...	...	...	...	...	...	...	...	2·35	...	...	...	...
From District generally:—															
Sundry Parcels treated at:															
Battlesville Battery			126·00
Hainault Sulphide Plant, Kalgoorlie			127·21
Mt. Morven Cyanide Works		
State Battery (Linden)			10·00
Westralia-Mt. Morgans Works		
Various Works			788·50
Reported by Banks and Gold Dealers		
Total			10·15	1,709·52	32·47
			10·15	...	12,887·00	1,765·98	3,796·75	992,037·04	5,775·05

MOUNT MALCOLM DISTRICT.

Cardinia	1532c	Contact	...	...	3·86	...	...	...	...	11·99	23·37	2·50	...	...	...
Do.	...	Voided leases	...	...	...	...	...	...	...	...	1,568·29	1,628·24	...	...	...
Do.	...	Sundry claims	...	...	...	...	...	...	...	...	22·37	23·00	...	...	...
Diorite King...	(1546c)	Unexpected	...	...	11·04	...	...	2·00	...	...	26·08	117·50	...	...	...
Do.	...	Voided leases	...	...	...	...	...	...	...	...	819·15	34,541·53	...	...	...
Do.	...	Sundry claims	...	...	7·66	17·60	9·00	11·06	...	9·06	148·62	2,664·80	...	...	24·05
Dodger's Well	...	Voided leases	...	...	...	...	...	...	...	...	57·90	1,299·30	...	...	...
Do.	...	Sundry claims	...	...	...	...	...	...	...	...	3·37	798·75	...	...	...
Lake Darlot...	(1515c), ([1207EM])	New Discovery	...	...	...	...	9·00	9·84	...	...	...	223·00	...	...	...
Do.	(1515c), ([1207EM]),	(New Discovery leases)	...	...	...	...	...	...	...	...	...	825·11	...	...	...
Do.	(1516c), ([1210EM])	Sundry claims	...	...	...	...	...	...	...	...	5·52	579·20	...	...	...
Leonora	198c	(Eastern)	...	...	...	...	...	...	...	...	...	302·00	...	...	...
Do.	(1530c)	Leonora Gold Blocks	...	...	...	...	...	...	...	...	5·15	452·50	...	...	...
Do.	1548c	Ping Pong	...	...	...	...	66·75	34·70	...	...	...	92·75	...	...	...

Do.	190c, 198c, 207c, 352c, 353c, 380c, 446c, 447c, (450c), (476c), 489c, 490c, 504c, (523c), 741c, 742c, 807c, 809c, (811c), (812c), (813c), (814c), 980c, (981c), 1082c, (1225c), (1226c), (1227c), (1228c), (1229c), (1230c), (1231c), (1232c), 1259c, (1291c), (1292c), 1341, 1342, (1343c), (1344c), (1345c), (1346c), (1347c)	Sons of Gwalia, Ltd.			80,500-00	35,371-40	3,511-45			2,776,494-67	1,320,967-36	82,765-52
Do.	198c, 1082c	(Sons of Gwalia South G.M. Co., N.L.)								631-00	903-61	
Do.	198c, 1082c, (1257c), (1258c), 1259c, (1284c), (1285c), (1300c), (1301c)	(Sons of Gwalia South G.Ms., Ltd.)								98,239-00	51,593-99	8-66
Leonora	158c, 1082c, 1259c	(Sons of Gwalia South G.Ms., Ltd.)								9,909-00	3,169-89	
Do.	263c	(Trump)								562-50	2,393-40	
Do.	263c	Trump: Gwalia Central G.Ms., Ltd.								1,541-00	3,220-24	
Do.	263c, (774c), (793c)	(Trump leases)								21,794-45	16,002-07	
Do.		Voided leases							1,847-42	138,291-75	65,756-85	10-71
Do.		Sundry claims	6-66		88-50	90-58		23-76	319-42	10,507-05	9,238-92	
Mt. Malcolm		Voided leases								47-07	62,301-78	47,425-54
Do.		Sundry claims						5-75	26-50	3,060-90	2,116-50	
Mertondale		Voided leases								88,663-00	60,840-00	1,497-58
Do.		Sundry claims						1-45	63-04	1,092-46	1,538-97	
Mt. Clifford	1544c	Bannockburn			32-00	13-08				107-50	278-66	
Do.	1329c	Victory No. 1			525-00	217-84				2,339-46	7,635-51	
Do.		Voided leases							1,364-45	3,274-00	7,060-57	
Do.		Sundry claims	6-06	3-52	17-00	11-63		19-27	271-55	1,037-50	1,625-25	
Pig Well	1547c	Starlight								10-00	1-80	
Do.		Voided leases								13,575-32	14,673-13	63-68
Do.		Sundry claims							34-61	2,738-40	1,160-33	
Randwick		Voided leases							239-49	8,065-15	8,671-57	
Do.		Sundry claims						66-57	159-37	1,282-14	944-20	
Webster's Find		Voided leases						30-30		21,760-00	13,970-17	
Do.		Sundry claims						36-37	15-73	1,397-80	939-58	
Wilson's Creek		Voided leases								333-50	168-27	
Do.		Sundry claims							4-24	5-00	19-04	
Wilson's Patch		Voided leases							99-38	27,395-10	12,638-18	1-05
Do.		Sundry claims	4-68	11-17				4-68	12-67	814-00	1,086-36	

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued

MT. MARGARET GOLDFIELD—continued.

MOUNT MALCOLM DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1924.					TOTAL PRODUCTION.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
<i>From District generally:—</i>												
		Sundry Parcels treated at:										
		Fremantle Trading Co., Ltd., Works ...	...	...	...	...	...	...	...	...	1.42	...
		State Battery, Leonora ...	...	...	7.50	4.97	...	...	...	103.00	11,259.41	98.14
		Various Works ...	...	...	...	...	...	...	...	371.50	7,149.72	20.12
		Reported by Banks and Gold Dealers ...	...	...	...	...	...	2,483.14	131.00	...	...	...
		Total ...	25.06	47.19	81,254.75	35,767.10	3,511.45	2,692.34	7,565.05	3,341,248.11	1,717,047.84	84,489.51

MOUNT MARGARET DISTRICT.

Burtville ...	(2095r) ...	Bell ...	...	...	...	...	...	...	...	12.00	12.15	...
Do. ...	2138r ...	Nil Desperandum ...	...	...	66.62	211.75	...	...	...	262.62	1,277.11	...
Do. ...	...	Voided leases ...	...	...	...	...	...	2.29	413.80	66,789.18	103,923.04	275.27
Do. ...	...	Sundry claims ...	...	...	30.00	16.17	...	...	122.10	3,261.90	2,942.79	...
Duketon ...	...	Voided leases ...	...	...	...	...	...	3.54	3,213.21	31,485.42	22,318.21	...
Do. ...	...	Sundry claims ...	...	...	...	3.26	...	...	65.43	238.50	370.38	...
Eagle's Nest ...	...	Voided leases ...	...	...	...	...	...	...	145.34	331.00	1,215.78	...
Do. ...	...	Sundry claims ...	...	2.54	8.00	7.55	...	4.00	335.08	147.50	133.96	...
Erlistoun ...	2113r ...	Baneygo North ...	...	...	...	...	...	...	...	587.00	182.55	...
Do. ...	...	Voided leases ...	...	...	...	...	...	...	11.66	27,012.07	18,461.35	...
Do. ...	...	Sundry claims ...	...	...	68.00	124.43	...	1,179.43	116.81	2,189.24	1,964.86	...
Euro ...	...	Voided leases ...	...	...	...	...	...	...	65.14	91,556.25	37,582.89	...
Do. ...	...	Sundry claims ...	...	...	...	26.01	...	...	46.52	259.50	370.57	...
Laverton ...	2083r ...	Beria Main Reef ...	...	...	...	...	...	...	...	1,159.50	171.68	...
Do. ...	715r, 806r, (1206r), (1207r), (1483r), (1523r), (1524r), (1525r), (1542r), (1544r), (1548r)	(Kalgoorlie & Boulder Firewood Co., Ltd.)	...	...	...	...	...	...	...	71,802.00	25,003.11	3,364.01
Do. ...	715r, 806r, (1206r), (1207r), (1483r), (1523r), (1524r), (1525r), (1542r), (1544r), (1548r)	(Lancefield G.M. Co., Ltd.)	...	...	...	...	...	...	...	102,179.78	39,402.81	...

Do.	715t, 806t, (1206t), (1207t), (1483t), (1523t), (1524t), (1525t), (1542t), (1544t), (1548t)	(Lancefield G.M. Co., Ltd.)	...	...	...	...	...	...	...	153,829-00	58,842-47	5,824-39
Do.	715t, 806t, (1206t), (1207t), (1483t), (1523t), (1524t), (1525t), (1542t), (1544t), (1548t)	(Lancefield G.M. Co., Ltd.)	...	...	...	...	...	...	...	260,749-00	103,535-54	21,612-29
Do.	715t, 806t, (1206t), (1523t), (1524t), (1525t), (1542t), (2050t), (2051t)	Lancefield Gold Mines, Ltd.	...	...	3-26	1,610-64	70	...	...	352,729-78	129,132-36	21,013-58
Do.	...	Voided leases	...	...	...	...	...	17-66	2,024-11	456,060-24	260,674-99	4,674-69
Do.	...	Sundry claims	...	...	44-00	33-56	...	204-58	1,393-91	5,017-84	4,723-39	...
Mt. Barnicoat	...	Voided leases	...	...	...	...	...	...	...	652-00	359-12	...
Do.	...	Sundry claims	...	...	...	...	...	...	...	23-00	23-37	...
Quartz Hill	...	Voided leases	...	...	...	...	...	...	...	10-00	3-86	...
Red Hill	...	Sundry claims	...	...	...	...	...	...	...	27-00	13-76	...
<i>From District generally:—</i>													
Sundry Parcels treated at:													
		Brown Hill Consols Works, Kalgoorlie	...	...	...	...	...	...	...	...	13-70	...
		Mulga Queen Works	...	...	...	...	...	...	...	6-00	181-20	...
		State Battery, Laverton	...	...	...	275-05	15-64	...	...	77-50	2,704-97	15-64
		Various Works	...	...	...	...	...	...	...	151-00	9,603-44	...
		Reported by Banks and Gold Dealers	...	2-09	...	...	...	2,024-67	...	...	...	...
		Total	...	2-09	2-54	219-88	2,308-42	16-84	3,436-17	7,953-11	1,628,605-82	825,145-41	56,779-87

North Coolgardie Goldfield.

MENZIES DISTRICT.

Comet Vale	5217z	(Gladstone)	...	...	...	...	...	...	...	10,879-50	8,678-16	95-29
Do.	5217z (5333z), (5380z), 5476z	Gladstone leases	...	...	...	792-52	...	...	...	64,875-00	50,329-09	1,410-36
Do.	5410z	Lake View	...	...	164-25	28-12	...	...	10-04	910-00	253-37	...
Do.	...	Voided leases	...	...	...	...	...	...	409-70	147,111-07	119,022-33	3,839-28
Do.	...	Sundry claims	...	...	169-54	73-65	...	...	34-99	896-94	615-24	...
Goongarrie	...	Voided leases	...	...	...	...	...	94	1,027-51	27,198-29	17,428-84	...
Do.	...	Sundry claims	...	...	77-50	52-19	...	33-72	589-57	1,277-77	1,420-12	...
Menzies	5489z	Crusoe	...	...	34-00	52-70	...	...	...	34-00	52-70	...
Do.	5423z	Lady Shenton	...	...	33-00	21-04	...	...	...	5,289-58	4,207-03	...
Do.	4931z, 4934z, 4935z, 4936z, 5074z, 5075z, 5260z, 5261z, 5315z	Menzies Consolidated G.Ms., Ltd.	...	...	12,405-46	5,980-65	...	...	...	513,443-46	268,981-57	78-67

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

NORTH COOLGARDIE GOLDFIELD—continued.

MENZIES DISTRICT—continued.

MINING CENTRE	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1924.					TOTAL PRODUCTION.					
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	
Menzies ...	5484z ...	Warrior ...	...	...	279.00	95.60	...	...	...	636.00	328.35	...
Do. ...	...	Voided leases ...	...	...	...	...	...	45.42	1,049.04	373,305.96	423,936.52	11,263.06
Do. ...	...	Sundry claims ...	17.08	.97	581.48	483.99	...	28.36	362.30	19,915.14	14,374.12	776.49
Mt. Ida ...	(5467z) ...	Forrest Belle ...	...	...	...	...	...	...	...	1,318.00	984.49	...
Do. ...	5480z, 5481z ...	Unexpected leases ...	...	...	50.00	64.36	...	...	...	550.00	248.93	...
Do. ...	5481z ...	(Unexpected South) ...	...	...	...	...	...	...	...	36.00	29.45	...
Do. ...	...	Voided leases ...	...	...	...	...	...	...	77.07	56,564.37	67,244.74	106.63
Do. ...	...	Sundry claims ...	...	...	...	...	...	43.79	9.57	5,394.00	3,088.35	...
<i>From District generally:—</i>													
<i>Sundry Parcels treated at:</i>													
Balkis Battery ...			...	...	...	...	...	...	...	65.75	4,648.28	...
Boddington's Cyanide Works ...			...	...	...	...	...	...	...	...	1,069.35	...
Crusoe Wedderburn Cyanide Works ...			...	...	...	...	...	...	...	...	1,497.89	...
Fremantle Trading Co., Ltd., Works ...			...	...	...	...	...	...	...	...	212.98	...
Gidney's Cyanide Works ...			...	...	...	...	...	...	...	...	906.97	585.27
Lady Harriet Battery ...			...	...	...	309.40	...	...	...	279.50	4,177.75	30.00
Menzies Mining & Exploration Corp., Ltd., Works ...			...	...	...	...	...	...	...	639.50	732.04	...
Mt. Ida State Battery ...			...	...	...	280.47	...	...	...	1,842.25	5,028.57	...
Various Works ...			...	...	...	...	...	...	...	1,087.05	23,641.87	1,039.43
Reported by Banks and Gold Dealers ...			...	...	...	...	...	968.65	195.48	...	...	...
Total ...			17.08	.97	13,794.23	8,234.69	...	1,120.88	3,765.27	1,234,269.13	1,023,139.10	19,224.48	

ULARRING DISTRICT.

Davyhurst ...	...	Voided leases ...	...	...	...	...	...	2.93	138.99	155,644.73	123,063.43	5,403.14
Do. ...	...	Sundry claims ...	...	...	27.00	25.13	...	...	30.12	5,999.15	3,219.41	...
Diemel's Find ...	...	Sundry claims ...	...	...	...	...	...	...	7.37	102.50	119.13	...
Mulline ...	(995v) ...	Lady Gladys ...	...	...	192.25	81.42	...	...	...	192.25	81.42	...
Do. ...	763v ...	Young Australian ...	...	...	...	...	...	...	...	601.25	733.86	...
Do. ...	763v ...	(Young Australian) ...	...	...	...	...	...	...	...	1,295.00	3,609.26	...
Do. ...	763v, (938v), (939v) ...	(Young Australian leases) ...	...	...	...	...	...	...	...	2,672.25	5,763.88	...

Do.	...	Voided leases	...	...	...	...	...	...	...	274-09	93,469-97	88,656-31	530-75
Do.	...	Sundry claims	...	...	1-45	15-28	42-30	...	...	43-27	7,122-60	5,060-95	69
Mulwarrie	...	Voided leases	...	...	...	...	...	...	...	56-84	18,440-68	25,625-54	38-47
Do.	...	Sundry claims	...	...	...	...	...	...	...	21-45	2,099-07	1,888-49	...
Ularring	...	Voided leases	...	...	...	...	...	...	...	563-34	9,429-60	13,647-97	...
Do.	...	Sundry claims	...	...	...	...	...	...	...	...	143-00	113-15	...
<i>From District generally:—</i>													
Sundry Parcels treated at:													
		Hannan's Central Battery, Kalgoorlie	...	...	...	...	...	...	...	...	18-40	4-66	...
		State Battery, Mulline	...	...	...	...	1-60	...	...	...	538-50	13,211-28	...
		State Battery, Mulwarrie	...	...	...	17-98	58-99	...	...	...	613-18	4,821-30	...
		Various Works	...	...	...	...	...	...	...	15-82	186-75	654-37	...
		Reported by Banks and Gold Dealers	...	...	...	...	...	...	19-24	-77	...	...	...
		Total	...	...	1-45	252-51	209-53	...	22-17	1,152-06	298,568-88	290,274-41	5,973-05

NIAGARA DISTRICT.

Desdemona	...	Voided leases	...	...	...	...	...	...	...	5-73	9,585-25	7,471-39	12-04
Do.	...	Sundry claims	...	...	...	...	...	...	...	8-99	1,331-70	634-19	...
Kookynie	780g	Cosmo	...	...	36-68	104-59	...	...	...	...	44-62	148-88	...
Do.	(757g)	(Cosmopolitan No. 2: Cosmopolitan Proprietary Ltd.)	...	...	...	...	...	...	...	...	710-00	909-66	...
Do.	(757g)	Cosmopolitan No. 2: Western Machinery, Ltd.	...	...	...	...	...	...	...	...	3,561-00	4,044-72	...
Do.	769g	(Two D's)	...	...	...	...	...	...	...	...	100-00	14-01	...
Do.	769g, (770g), (771g)	Two D's leases	...	...	...	...	...	...	...	...	950-00	590-26	...
Do.	...	Voided leases	...	...	...	...	...	...	...	264-29	730,009-94	383,610-65	5,375-97
Do.	...	Sundry claims	...	...	...	...	...	30-59	93-85	4,922-85	4,426-32	...	...
Niagara	...	Voided leases	...	...	...	...	...	...	104-54	84,472-50	51,887-97	...	...
Do.	...	Sundry claims	...	7-37	...	...	...	20-64	70-23	9,874-29	6,069-68	...	...
Tampa	...	Voided leases	...	...	...	...	...	...	28-60	49,271-87	22,173-80	174-24	...
Do.	...	Sundry claims	...	...	85-34	...	...	17-61	244-17	3,212-00	1,894-48	...	...
<i>From District generally:—</i>													
Sundry Parcels treated at:													
		Grafter Battery	...	...	...	...	...	...	...	...	98-00	448-91	...
		Hainault Sulphide Plant, Kalgoorlie	...	...	...	...	...	...	...	...	...	9-03	...
		Lubra Queen G.M. Co., N.L. Works	...	...	...	...	...	...	...	...	...	153-47	...
		State Battery, Niagara	...	...	...	...	...	...	...	...	671-50	8,945-91	...
		Various Works	...	...	...	...	...	...	...	...	451-00	6,356-43	41-17
		Reported by Banks and Gold Dealers	...	...	...	...	...	1,435-20	787-38	...	...	...	...
		Total	...	7-37	85-34	36-68	104-59	...	1,504-04	1,607-78	899,266-52	499,789-76	5,603-42

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

NORTH COOLGARDIE GOLDFIELD—continued.

YERILLA DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1924.					TOTAL PRODUCTION.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
Edjudina	1062R	Martin	...	...	34.50	23.64	...	...	...	99.50	77.98	...
Do.	1011R	Neta	...	...	...	...	...	...	...	156.75	102.56	...
Do.	(1010R), 1011R	(Neta leases)	...	...	...	...	...	...	...	407.00	340.01	...
Do.	...	Voided leases	...	...	...	...	...	...	18.44	32,203.20	41,731.77	37.79
Do.	...	Sundry claims	...	...	108.00	82.24	...	...	21.26	3,683.33	3,079.40	...
Eucalyptus	...	Voided leases	...	...	...	...	...	...	2,864.77	1,351.35	3,020.68	...
Do.	...	Sundry claims	...	...	...	...	...	...	367.50	362.50	381.82	...
Linden	(998R), ([344F])	Bindah	...	...	...	...	...	...	...	1,462.50	531.95	...
Do.	(871R), ([340F])	Democrat	...	...	...	...	...	...	9.01	2,245.25	5,026.30	...
Do.	1024R, [346F]	Great Carbine	...	...	...	...	...	...	...	67.75	20.30	...
Do.	903R, [341F], 985R, [343F]	Torquay leases	...	...	...	...	...	...	...	325.68	107.45	...
Do.	903R, [341F], (904R), (992R), 985R, [343F]	(Westralia United Goldfields, Ltd.)	...	...	...	...	...	...	...	1,995.00	1,452.42	...
Do.	...	Voided leases	...	...	...	...	...	...	7.53	544.15	13,471.85	16,540.49
Do.	...	Sundry claims	...	...	...	...	...	...	77.81	35.11	6,493.25	4,798.42
Mt. Celia	...	Voided leases	...	...	...	...	...	...	...	14.00	5.39	...
Mt. Howe	...	Sundry claims	...	...	...	...	...	...	...	5.00	11.13	...
Mt. Remarkable	...	Voided leases	...	...	...	...	...	...	17.74	528.72	415.09	...
Do.	...	Sundry claims	...	...	...	...	...	...	...	4.00	1.32	...
Pingin	...	Voided leases	...	...	...	...	...	...	46.99	14,637.80	10,306.68	...
Do.	...	Sundry claims	...	...	...	...	...	...	99.36	3,422.35	2,297.51	...
Yarri	1055R	Redbrook G.M.	...	...	185.00	84.44	...	...	...	792.25	497.36	...
Do.	(1069R)	Yilgange	...	...	24.00	15.57	...	...	...	24.00	15.57	...
Do.	...	Voided leases	...	...	...	...	...	...	6.30	87.08	36,938.75	19,197.16
Do.	...	Sundry claims	...	...	109.00	40.09	...	...	.87	5.31	6,238.10	3,236.74
Yerilla	...	Voided leases	...	...	...	...	...	...	3,089.51	15,619.21	12,313.06	13.93
Do.	...	Sundry claims	...	...	...	...	...	...	19.30	2,401.00	1,338.07	...
Yilgange	...	Voided leases	...	...	...	...	...	...	...	218.75	295.45	...
Do.	...	Sundry claims	...	...	15.00	19.36	...	...	121.67	29.83	40.50	65.53

Yundamindra	...	Voided leases	...	...	...	...	...	...	80.47	69,067.85	46,004.87	5.82
Do.	...	Sundry claims	...	...	...	...	...	...	85.22	3,151.25	2,740.75	...
From District generally:—												
Sundry Parcels treated at:												
Battlesville Battery												
Fremantle Trading Co., Ltd. Works												
Neta Battery												
State Battery, Linden												
State Battery, Yarra												
State Battery, Yerilla												
Various Works												
Reported by Banks and Gold Dealers												
Total			...	...	...	...	...	...	1,011.56	154.74	...	...
				-87	495.50	847.30	...	1,247.21	7,572.37	218,610.29	192,465.84	68.04

Broad Arrow Goldfield.

Bardoc	1833w	...	Zoroastrian	...	...	...	...	...	...	23.25	22.45	106.77	...
Do.	...	...	Voided leases	...	...	...	...	...	...	1,863.68	73,236.55	51,823.64	203.60
Do.	...	...	Sundry claims	...	13.48	43.43	63.95	...	53.82	572.75	3,389.63	2,953.40	...
Black Flag	...	...	Voided leases	...	...	...	...	...	27.81	373.99	40,332.13	24,451.48	...
Do.	...	...	Sundry claims	6.80	...	...	...	...	710.99	180.49	2,181.08	2,063.02	...
Broad Arrow	(1921w)	...	Chalcedony	...	...	74.00	85.70	...	...	...	74.00	85.70	...
Do.	1771w	...	North Duke	...	...	26.00	104.30	...	...	1,533.79	153.30	592.36	...
Do.	1799w	...	Oversight	...	109.70	18.00	306.99	3.00	...	1,324.01	930.65	2,576.48	3.00
Do.	(1905w)	...	Oversight South	...	...	5.10	8.25	...	...	...	24.50	44.49	...
Do.	1735w	...	Tara	...	...	14.75	36.73	...	...	3,174.28	586.25	1,659.76	...
Do.	...	...	Voided leases	...	...	...	...	...	54.85	2,340.68	117,837.21	97,859.50	15.85
Do.	...	...	Sundry claims	10.20	16.95	16.00	90.29	...	987.53	1,273.11	9,311.45	7,036.58	...
Canegrass	(1895w)	...	Digger's Luck	...	...	...	...	...	...	...	89.10	133.13	...
Do.	...	...	Sundry claims	...	85.10	14.00	44.23	...	...	201.58	14.00	44.23	...
Carnage	...	...	Voided leases	...	...	...	...	...	...	...	138.00	251.97	...
Do.	...	...	Sundry claims	...	...	...	...	...	...	...	73.50	38.38	...
Paddington	...	...	Voided leases	...	...	...	...	...	5,557.72	257.75	175,109.58	82,198.30	18.96
Do.	...	...	Sundry claims	...	...	22.32	18.76	...	1,714.16	2.13	10,413.68	6,677.18	...
Siberia	1399w, (1424w), (1429w), (1442w), (1655w)	...	Associated Northern Blocks (W.A.), Ltd.	...	...	...	...	...	...	...	247,585.84	91,053.70	1,664.70
Do.	1371w	...	Gimblet South	...	...	...	...	...	...	...	72,401.22	12,191.04	...
Do.	1399w	...	(Gimblet South Extended)	...	...	...	...	...	...	...	525.00	835.44	...
Do.	1399w, (1424w), (1429w), (1442w)	...	(Gimblet South Extended leases)	...	...	...	...	...	...	...	215.00	39.98	...
Do.	1889w	...	Hazel Gold Mine	...	...	...	...	...	...	...	29.00	2.29	...
Do.	1917w	...	Hazelmere	...	...	227.50	52.38	...	...	...	227.50	52.38	...
Do.	1289w	...	Lady Evelyn	...	...	12.00	414.91	...	...	...	902.00	1,577.19	...
Do.	1289w, (1308w)	...	(Lady Evelyn leases)	...	...	...	...	...	25.26	...	5,376.25	5,267.70	...
Do.	(1916w)	...	Ora Banda	...	...	...	...	...	...	...	39.00	55.53	...
Do.	1906w	...	Orinda	...	...	249.00	185.65	...	...	...	1,363.50	1,162.53	...

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

NORTH-EAST COOLGARDIE GOLDFIELD—continued.

KURNALPI DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1924.					TOTAL PRODUCTION.				
			Alluvial.	Dolled and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dolled and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
<i>From District generally:—</i>												
Sundry Parcels treated at:												
Success Battery ... ..			...	...	...	61·04	...	...	...	...	143·55	...
Various Works ... ..			...	...	...	...	...	...	...	56·50	193·15	...
Reported by Banks and Gold Dealers ... ..			...	...	...	...	...	...	...	...	...	...
Total			18·71	10·94	45·00	134·89	...	11,375·71	19·62	5,726·41	13,312·37	11·22

East Coolgardie Goldfield.
EAST COOLGARDIE DISTRICT.

Binduli ... ..	...	Voided leases ... ..	...	...	...	...	...	...	...	334·10	224·30	...
Do. ... ..	...	Sundry claims ... ..	...	...	42·75	18·25	...	...	...	498·40	500·13	...
Boorara ... ..	...	Voided leases ... ..	...	...	...	...	...	...	381·56	306,642·45	171,638·36	408·36
Do. ... ..	...	Sundry claims ... ..	...	...	208·70	298·54	...	49	53·46	823·86	848·79	...
Boulder	392E	(Acrobat: Paringa Consolidated Mines, Ltd.)	...	...	...	...	...	...	...	10·25	37·15	...
Do.	392E	Acrobat: Paringa Mines (1909), Ltd.	...	...	368·35	135·27	...	...	...	17,035·57	7,856·69	...
Do.	38E, 71E, 72E, (101E)	Associated G.Ms. of W.A., Ltd.	...	...	61,816·87	22,649·33	792·00	...	8·49	2,143,847·15	1,132,255·52	34,501·05
Do.	49E, (4211E)	Associated Northern Blocks (W.A.), Ltd.	...	...	4,418·16	3,126·01	...	...	538·31	421,361·32	508,715·45	4,844·50
Do.	(682E), 902E, 923E, 936E, (1064E), 1124E, 1196E, 4075E	(Boulder Deep Levels, Ltd.)	...	...	...	...	...	...	...	3,043·00	1,778·10	26·71
Do.	902E, 923E, 936E, 1124E, 1196E, 4075E	(Boulder Deep Levels (1907), Ltd.)	...	...	...	...	...	...	...	787·50	210·30	...
Do.	66E	Boulder Perseverance, Ltd.	...	...	45,932·45	45,130·26	9,822·12	...	...	45,932·45	45,130·26	9,822·12
Do.	281E	(Brookman Bros.: Boulder G.M. Co., Ltd.)	...	...	...	...	...	...	...	8,655·00	8,417·00	...
Do.	24E, (888E), (949E)	Central and West Boulder G.Ms. Ltd.	...	...	...	...	...	...	...	70,362·55	36,243·11	...
Do.	352E	(Chaffers G.M. Co., Ltd.)	...	...	...	...	...	...	...	4,256·00	1,299·03	161·50
Do.	352E, 873E, 4334E	(Chaffers G.M. Co., Ltd.)	...	...	...	...	...	...	...	111,111·00	44,796·77	...
Do.	352E, 873E, 4334E	(Chaffers Gold Mining Coy. (1913), Ltd.)	...	...	...	...	...	...	...	13,350·00	3,334·91	129·57
Do.	1621E	(Croesus Proprietary G.M. Co.)	...	...	...	...	...	...	...	79·00	45·87	...
Do.	5347E	Croesus South	...	...	385·54	74·43	...	...	...	568·25	225·61	...
Do.	35E	Eureka	...	13·18	552·71	324·71	...	...	107·98	6,157·05	5,561·06	...

Do.	351E, 1001E, 1002E, 1085E, 1113E, 1219E, 1326E, 1397E	Golden Horseshoe Estates Co., Ltd.	...	...	110,760-00	57,310-51	32,983-34	...	...	4,669,322-00	2,886,160-44	665,921-07
Do.	750E	(Golden Links Consolidated G.Ms., Ltd.)	...	...	...	...	...	...	...	10,729-00	6,096-80	...
Do.	2325E, 2326E	(Golden Links Consolidated G.Ms., Ltd.)	...	...	...	...	...	...	...	1,525-00	733-48	...
Do.	750E, 1621E	(Golden Links, Ltd.)	...	...	...	...	...	...	...	87,115-02	43,504-60	19-06
Do.	873E	(Great Boulder Main Reefs, Ltd.)	...	...	...	...	...	...	...	143,292-39	119,541-14	761-98
Do.	66E	(Great Boulder Perseverance G.M. Co., Ltd.)	...	...	...	...	...	...	...	3,306,942-88	1,841,159-00	203,821-43
Do.	16E, 51E, 61E, 102E, 280E, 1109E, 4366E	Great Boulder Proprietary G.Ms., Ltd.	...	...	108,061-20	61,379-10	8,738-00	...	...	3,691,427-96	3,188,887-46	361,630-10
Do.	902E, 1124E	(Great Boulder South G.M. Co., Ltd.)	...	...	...	...	...	...	...	437-00	122-11	...
Do.	3643E	(Hainault G.M., Ltd.)	...	...	...	...	...	...	...	517,345-70	184,570-02	113-30
Do.	6E	(Hannan's Block 45, Ltd.)	...	...	...	...	...	...	...	2,343-55	3,226-69	...
Do.	131E, 245E, 269E, 743E, (794E), 969E	(Hannan's Central G.Ms., Ltd.)	...	...	...	...	...	...	...	6,098-00	3,360-33	...
Do.	739E	(Hannan's Croesus G.M. Co., Ltd.)	...	...	...	...	...	...	...	4,256-75	4,416-90	...
Do.	1004E	(Hannan's North Croesus G.M. Co., Ltd.)	...	...	...	...	...	...	...	50-00	13-21	...
Do.	15E, 60E, 902E, 923E, 986E, 1116E, 1124E, 1196E, 4075E	(Hannan's Star, Consolidated, Ltd.)	...	...	...	...	...	...	...	360-00	175-59	...
Do.	15E, 60E, 1116E	(Hannan's Star G.M. Co., Ltd.)	...	...	...	...	...	...	...	85,652-75	40,438-85	2,142-59
Do.	15E, 60E, 1116E	(Hannan's Star, Ltd.)	...	...	...	...	...	...	...	13,470-50	4,716-66	191-22
Do.	4317E, (4318E), (4442E)	(Idaho leases)	...	...	...	...	...	...	4,847-57	128,727-26	63,546-75	...
Do.	4317E	Idaho	...	341-97	101-96	148-33	6-20	...	559-27	187-12	349-33	6-20
Do.	946E, (4370E), (4531E)	(Ironsidies North leases)	...	...	...	...	...	...	...	71,677-81	128,290-00	...
Do.	946E	Ironsidies North	...	...	...	64-88	...	...	...	4-95	338-83	...
Do.	946E	(Ironsidies North G.M. Co., N.L.)	...	...	...	...	...	...	...	1,348-00	807-48	...
Do.	31E, 1357E, 1413E, 1507E, 4399E, 4445E, 4476E	(Ivanhoe Gold Corporation, Ltd.)	...	...	53,281-00	25,606-97	4,812-50	...	...	4,296,179-00	2,571,681-86	447,123-80
Do.	1507E, (2899E), (3712E), (3713E)	(Ivanhoe Junction G.M. Co., N.L.)	...	...	...	...	...	...	...	1,764-00	121-43	...
Do.	6E, 131E, 245E, 269E, (301E), 739E, 743E, (794E), 969E	(Kalgoorlie Amalgamated, Ltd.)	...	...	...	...	...	...	...	32,589-00	8,859-95	...
Do.	6E, 131E, 245E, 269E, (301E), 739E, 743E, (794E), 969E	(Kalgoorlie Amalgamated (New), Ltd.)	...	...	...	...	...	...	...	27,145-00	6,265-27	...
Do.	6E, 131E, 245E, 269E, (301E), 739E, 743E, (794E), 969E	(Kalgoorlie Amalgamated (1909), Ltd.)	...	...	...	...	...	...	...	7,940-50	1,568-40	...
Do.	1004E	(Kalgoorlie Golden Eagle)	...	...	...	...	...	...	...	4,891-50	1,289-65	...
Do.	1004E	(Kalgoorlie Golden Eagle: Golden Links, Ltd.)	...	...	...	...	...	...	...	193-00	31-63	...
Do.	22E, 34E	(Kalgoorlie Gold Mines, Ltd.)	...	...	...	...	...	...	...	1,683,548-41	1,072,090-59	188-24

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

EAST COOLGARDIE GOLDFIELD—continued.

EAST COOLGARDIE DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1924.					TOTAL PRODUCTION.				
			Alluvial.	Dolled and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial	Dolled and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
Boulder	73E, (74E)	(Kalgoorlie Mint and Iron King Gold Estates, Ltd.)	...	...	...	...	...	...	3,020.00	1,762.00	...
Do.	73E, (74E)	(Kalgoorlie Mint and Iron King G.Ms., Ltd.)	...	...	...	...	...	...	3,647.00	7,454.80	...
Do.	15E, 25E, 31E, 32E, 60E, 352E, 873E, 902E, 933E, 986E, 1116E, 1124E, 1196E, 1413E, 1507E, 2325E, 2326E, 4075E, 4334E, 4399E, 4445E, 4476E, 4493E	Lake View & Star, Ltd.	25,459.60	14,395.17	4,410.54	25,459.60	14,395.17	4,410.54
Do.	15E, 25E, 32E, 60E, 352E, 873E, 902E, 933E, 986E, 1116E, 1124E, 1196E, 2325E, 4075E, 4334E, (4432E), (4433E), (4434E), 4493E	(Lake View & Star, Ltd.)	44,144.09	24,888.31	1,017.72	1,764,864.70	630,551.50	56,537.86
Do.	25E, 32E, 2325E, 2326E	(Lake View Consols, Ltd.)	...	...	...	...	...	...	1,179,303.55	1,016,875.27	38,491.89
Do.	5159E	Lake View South	...	...	466.58	291.67	...	...	803.39	439.78	...
Do.	5345E	Enterprise	...	...	775.29	330.00	...	...	775.29	330.00	...
Do.	(5154E)	Lucknow West	...	...	...	...	...	...	25.47	3.19	...
Do.	5346E	Main Ore Channel	...	...	38.52	5.34	...	...	73.45	9.93	...
Do.	(33E), 35E, (975E)	(New North Boulder G.Ms., Ltd.)	...	...	...	...	...	...	23,438.78	14,750.03	...
Do.	(33E), 35E, (975E)	(North Boulder G.M. Co., Ltd.)	...	...	...	...	...	...	33,549.15	47,532.52	...
Do.	(33E), 35E, (975E)	(North Boulder G.Ms., Ltd.)	...	...	...	...	...	...	4,542.50	4,256.55	...
Do.	281E, 287E, 444E	(North Kalgurli Co., Ltd.)	...	...	...	...	...	43.99	104,116.49	60,229.47	7,202.47
Do.	281E, 287E, 444E	North Kalgurli (1912), Ltd.	...	...	1,457.81	1,310.18	...	...	35,250.78	18,204.85	...
Do.	5232E	Old Bank of England	...	...	105.45	64.64	...	...	1,031.41	949.83	...
Do.	73E, 410E, 448E, 532E, 578E, 698E, 944E, (1395E), (3031E), (4180E)	(Oroya Brownhill Co., Ltd.)	...	...	...	...	...	...	1,075,862.55	1,163,881.77	61,682.30

Do.	6E, 22E, 34E, 73E, 131E, 245E, 269E, (301E), 410E, 448E, 532E, 578E, 698E, 739E, 743E, 750E, (794E), 944E, 969E, 1004E, (1395E), 1621E, 3031E, (4180E)	Oroya Links, Ltd.	...	...	29,550·31	18,018·87	...	...	...	936,562·56	397,428·29	28,532·96
Do.	392E	(Paringa Mines (1909), Ltd.)	...	...	...	...	...	...	...	26,890·74	12,599·54	...
Do.	1208E, 3612E, 3643E	South Kalgurli Consolidated, Ltd.	...	...	70,315·00	37,097·88	...	...	...	953,301·00	367,777·24	15,071·52
Do.	1208E, 3612E	(South Kalgurli G.Ms., Ltd.)	...	...	...	...	...	...	...	826,909·00	347,222·75	17,609·67
Do.	4537E	Union Jack	...	...	123·94	121·12	...	...	...	6,426·02	3,059·11	...
Do.	...	Voided leases	...	...	...	...	...	109·90	5,780·86	241,635·84	158,006·32	...
Do.	...	Sundry claims	...	...	73·79	21·10	...	24·58	...	2,363·72	1,400·52	...
Feysville	Block 48	Hampton Gold Mining Areas, Ltd.	...	...	...	...	...	...	...	17·10	66·95	...
Do.	...	P.P.L. 23—McKay & Reid	...	...	120·70	120·73	...	...	...	120·70	120·73	...
Do.	...	P.P.L. 53—McKenzie and Party	...	...	9·06	13·20	...	...	...	17·24	31·63	...
Do.	...	P.P.L. 63, 84, 86—Golden Hope G.Ms., N.L.	...	...	6,005·00	3,174·03	...	...	...	8,933·30	4,708·75	69·60
Do.	...	P.P.L. 175—Jubilee Central	...	...	...	...	...	...	...	29·00	7·70	...
Do.	...	P.P.L. 207—Lancashire Lass	...	...	...	...	...	...	...	18·30	29·17	...
Do.	...	P.P.L. 264—Marion	...	...	...	...	...	...	...	16·29	25·52	...
Do.	...	P.P.L. 98—Red Indian	...	...	...	...	...	...	...	15·75	85·35	...
Do.	...	P.P.L. 37—Ring Neck	...	...	...	...	...	15·36	...	4·40	58·25	...
Do.	...	P.P.L. 306—Westralia	...	...	...	...	...	...	...	39·95	17·98	...
Do.	...	P.P.L. 1—White Hope Synd., Ltd.	...	...	5,645·50	1,990·54	...	...	...	15,063·03	6,231·09	...
Do.	...	Sundry claims	...	...	...	...	...	...	...	20·53	22·06	...
Do.	Block 48	(Hampton Plains Estate, Ltd.)	...	...	...	...	...	4,565·62	21·59	20,615·28	2,502·56	...
Do.	Block 50	P.P.L. 17—McFarlane	...	...	10·00	5·06	...	...	...	10·00	5·06	...
Do.	Block 50	(Hampton Plains Estate (1906), Ltd.)	...	...	...	...	...	...	...	85·00	108·82	...
Do.	Block 45	P.P.L. 252—Mt. Martin	...	...	984·00	1,246·12	...	...	...	9,563·00	4,675·67	...
Do.	Block 45	Hampton Properties, Ltd.	...	...	...	...	...	...	52·75	69·75	80·52	...
Do.	Block 50	(Hampton Properties, Ltd.)	...	...	...	...	...	...	7·26	6,348·00	3,956·22	...
Do.	Block 50	Hampton Properties, Ltd.	...	...	...	...	...	106·23	...	689·36	591·14	...
Do.	Block 50	P.P.L. 138—Eva May Hampton	...	...	...	...	...	...	...	22·00	9·70	...
Do.	Block 50	P.P.L. 9 and 274—Hampton Celebration, W.A., Ltd.	...	...	3,944·00	1,333·29	...	...	...	22,111·00	9,156·99	...
Do.	Block 50	P.P.L. 222—Hampton Jubilee...	...	...	53·14	33·50	...	...	...	308·37	234·52	...
Do.	Block 50	P.P.L. 183 and 184—Melvina leases	...	...	...	...	...	...	...	170·00	44·00	...
Do.	Block 50	P.P.L. 23—Mutooroo Copper Corp., N.L.	...	...	23·00	26·75	...	...	...	1,155·39	2,081·36	...
Do.	Block 50	P.P.L. 10—Pernatty Central Copper Mining Co., N.L.	...	...	10·00	18·90	...	...	...	135·11	61·46	...
Do.	Block 50	P.P.L. 129—Triumph	...	...	...	...	...	...	...	20·56	42·82	...
Do.	Block 50	P.P.L. 293—Union Jack	...	...	...	...	...	...	...	41·35	11·84	...
Do.	...	Voided leases	...	...	...	...	...	110·74	...	561·30	394·24	...
Do.	...	Sundry claims	...	...	16·39	32·72	...	12·13	...	395·99	297·22	...
Kalgoorlie	5348E	Big Genuine	...	...	69·00	56·05	...	...	...	140·00	127·25	...
Do.	5279E	Cassidy Hill	...	...	53·00	98·47	...	...	...	284·00	471·29	...
Do.	5251E	Central	...	...	3,760·00	970·98	...	...	...	18,656·00	6,687·33	...
Do.	5359E	Central North	...	...	560·00	195·20	...	...	...	560·00	195·20	...
Do.	5350E and 5351E	Great Boulder Proprietary G.Ms., Ltd.	...	...	1,798·87	1,280·52	...	...	...	1,798·87	1,280·52	...

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued
EAST COOLGARDIE GOLDFIELD—continued.
EAST COOLGARDIE DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1924.					TOTAL PRODUCTION.					
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	
Boulder	4546E, 4547E, 4548E, (4551E)	Hannan's Reward, Ltd.	...	...	94.00	52.76	...	...	5.72	33,378.00	9,005.69	...
Do.	5379E	Hick's Gold Mine	...	...	21.37	23.94	...	...	...	21.37	23.94	...
Do.	5358E	Invincible	...	...	15.71	9.52	...	...	...	24.71	16.09	...
Do.	5375E	Lucell	...	...	148.60	234.04	...	...	...	148.60	234.04	...
Do.	4632E	North End	...	...	53.51	10.24	...	...	...	160.66	36.78	...
Do.	5333E	Paymaster	...	...	234.52	84.26	...	...	...	393.80	161.01	...
Do.	5368E	Rose of Diorite	...	1.73	553.00	431.17	...	1.73	...	723.00	569.50	...	
Do.	5193E	Surprise North	...	...	485.00	856.70	...	...	...	609.93	885.87	...
Do.	5376E	Yorkshire Rose	...	...	345.35	1,451.70	...	...	...	845.35	1,451.70	...
Do.	...	Voided leases	...	...	...	...	...	...	242.48	9,478.81	915,986.07	367,713.28
Do.	...	Sundry claims	...	8.21	2,454.32	1,812.18	...	...	207.69	433.76	42,867.11	17,168.67
Wombola	(5369E)	Caledonian	...	...	30.00	109.77	...	...	...	30.00	109.77	...
Do.	(4600E)	Daisy	...	...	69.50	119.18	...	...	...	423.05	1,902.01	...
Do.	4766E	Great Hope	...	86.61	933.00	1,983.33	...	86.61	...	2,077.38	8,248.95	...	
Do.	4770E	Great Hope North	...	...	590.00	563.17	...	...	...	2,331.24	3,001.42	...
Do.	...	Voided leases	...	...	...	...	...	...	1,867.91	6,030.04	7,202.45	...
Do.	...	Sundry claims	...	...	264.66	465.16	...	...	4.15	1,235.40	1,774.38	...
<i>From District generally:—</i>													
Sundry claims			49.48	209.66	10,907.93	431.95	5,341.32	1,856.19	...
Sundry Parcels treated at:													
Adeline Works			...	...	...	...	...	42.64	35.12	127.90	20,900.12	...
Associated Northern Works			...	...	...	...	...	...	...	...	287.41	...
Bonnie Lass leases			...	...	...	...	...	...	...	55.00	1,297.73	...
Brown Hill Consols Works			...	...	...	...	...	...	...	780.38	45,161.54	...
Dunstan and Cumming's Works			...	...	...	...	...	...	...	...	9,244.56	1,644.00
Fremantle Trading Co., Ltd., Works			...	...	...	215.74	...	...	...	...	12,860.37	8,028.22
Great Boulder Perseverance Battery			...	...	...	...	...	...	...	...	7.18	...
Hainault Sulphide Plant			...	...	...	1,284.01	...	...	...	...	35.66	5,186.55
Hannans Central Lakeside Works (A.W.A. Slimes Plant)			...	...	...	...	...	...	...	58.06	4,788.43	...
Hannans Central Works			...	...	...	...	4.35	...	...	172.80	65,241.89	67.17
Hannans Reward Battery			...	...	...	...	311.90	...	...	...	412.15	...
Kalgurli G.Ms., Ltd.			...	...	...	...	...	...	...	7.44	658.04	...
Lone Hand Works			...	...	...	...	1,269.60	...	14.43	469.00	5,609.85	...
North Kalgurli Battery			...	...	...	...	...	...	...	...	810.22	...
Oroya Links Battery			...	...	3.75	33.44	...	...	...	32.34	453.58	...
Various Works			...	...	...	...	...	341.72	15.15	38,756.72	75,908.77	1,968.67
Reported by Banks and Gold Dealers			...	...	2.39	36.14	...	11,122.18	9,013.32	2.39	40.71	...
Total			...	451.70	587,749.89	335,028.89	62,582.42	27,609.22	33,992.22	30,362,432.58	19,135,255.04	2,018,055.48	

BULONG DISTRICT.

Balagundi ...	...	Voided leases ...	...	...	...	...	...	2,408.98	1,110.68	1,473.73	12.92
Do. ...	...	Sundry claims ...	...	...	...	...	...	120.34	269.76	222.19	...
Bulong ...	1191y	Sweet Nell ...	...	48.00	62.13	...	...	...	122.84	331.63	...
Do. ...	(1259y)	Sunrise ...	...	12.77	39.87	...	...	...	29.95	106.52	...
Do. ...	...	Voided leases ...	...	...	...	...	107.54	8,433.70	99,606.01	82,419.97	...
Do. ...	...	Sundry claims ...	...	37.82	6.14	32.19	1,648.60	1,109.85	6,916.05	14,887.85	...
Hogan's Find ...	...	Voided leases ...	...	...	...	...	...	908.82	309.50	276.51	...
Majestic ...	Block 41	Hampton Gold Mining Areas, Ltd. :- P.P.L. 275—Long Looked For	...	113.54	123.76	...	19.45	...	235.34	218.57	...	
Do. ...	do.	(Hampton Properties, Ltd.)	...	...	...	...	...	...	41.00	22.66	...
Do. ...	...	Voided leases ...	...	...	...	...	...	...	1,007.70	333.30	...
Do. ...	...	Sundry claims ...	...	...	...	...	42.88	43.20	77.90	30.04	...
Mt. Monger ...	...	Voided leases ...	...	...	...	...	...	1,862.57	1,128.35	979.59	...
Do. ...	...	Sundry claims ...	...	...	...	...	215.60	...	369.80	302.47	...
Randall's ...	...	Voided leases ...	...	...	...	...	...	60.04	31,820.04	10,645.98	...
Do. ...	...	Sundry claims ...	...	...	...	...	20.45	...	1,893.55	486.04	...
Sudden Jerk ...	...	Voided leases ...	...	...	...	...	...	63.91	14.25	53.67	...
Do. ...	...	Sundry claims ...	...	...	...	...	...	...	.15	10.23	...
Taurus ...	...	Voided leases ...	...	...	...	...	2.06	3.70	1,688.90	868.75	...
Do. ...	...	Sundry claims ...	...	...	...	...	112.69	...	276.00	411.01	...
Trans Find ...	1198y	Transville ...	...	333.00	322.27	...	...	...	654.92	707.13	...
Do. ...	...	Voided leases ...	...	...	...	...	...	...	4.50	31.63	...
Woodline ...	...	Voided leases ...	...	...	...	...	...	...	792.75	610.57	...
Do. ...	...	Sundry claims ...	...	...	...	...	...	...	39.33	61.57	...
		From District generally :-	...	...	...	...	...	...	...	...	...
		Sundry claims	...	...	...	...	5.64	41.85	744.55	254.99	...
		Sundry Parcels treated at:	...	...	...	...	...	...	...	...	...
		Various Works	...	...	...	...	...	...	6,102.15	5,848.25	...
		Reported by Banks and Gold Dealers	...	...	...	...	24,550.70	52.39	...	...	...
		Total	...	37.82	513.45	580.22	...	26,725.61	15,109.35	155,255.97	121,594.85	12.92

Coolgardie Goldfield.

COOLGARDIE DISTRICT.

Bonnievale ...	4600	Melva Maie ...	...	75.00	146.30	...	...	...	491.00	1,325.27	...
Do. ...	...	Voided leases ...	...	...	...	...	...	25.00	350,852.84	188,088.12	...
Do. ...	...	Sundry claims ...	...	12.16	82.00	253.41	...	92.08	2,127.18	2,259.82	...
Bulla Bulling ...	(5179)	Emerald Hill ...	...	...	...	...	...	...	25.00	6.77	...
Do. ...	(5166)	Surprise ...	...	...	...	...	...	...	113.93	293.33	...
Do. ...	(5173)	Surprise Deeps ...	...	...	...	...	...	...	25.50	21.94	...
Do. ...	...	Voided leases ...	...	...	...	...	...	...	612.38	346.15	...
Do. ...	...	Sundry claims ...	...	24.00	21.53	...	...	12.82	375.56	263.64	...

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.
COOLGARDIE GOLDFIELD—continued.
COOLGARDIE DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1924.					TOTAL PRODUCTION.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
Burbanks	5188	Burbanks Oversight G.M. Co., N.L.	...	...	265.00	97.81	...	...	...	435.00	253.54	...
Do.	...	Voided leases	...	...	...	...	13.36	342.96	407,762.11	301,320.55	521.06	...
Do.	...	Sundry claims	...	...	177.00	192.94	43.37	141.95	4,894.25	4,008.17	...	...
Cave Rocks	...	Voided leases	...	...	...	...	...	...	132.00	28.04	...	...
Coolgardie	(5127)	Bayley's Reward	...	...	20.00	2.78	...	...	160.50	68.30	...	...
Do.	4559	Cockshot	...	...	14.50	3.77	...	182.77	371.43	1,458.76	...	...
Do.	(5137)	Coolgardie Redemption No. 1 South	...	...	...	...	...	...	47.00	5.19	...	...
Do.	5199	Derry Ormonde	...	...	58.00	4.27	...	...	58.00	4.27	...	...
Do.	4555	(Dreadnought)	...	...	...	...	...	...	867.85	870.10	...	...
Do.	4555, 4561, (4563), (5065)	Dreadnought leases	...	...	...	...	...	...	962.18	1,028.24	...	...
Do.	(5147), (5148)	Garden Gully leases	...	...	...	...	...	...	102.00	10.69	...	...
Do.	4567	Griffith's Gold Mine	...	...	...	...	...	1.70	17,792.50	2,043.31	...	...
Do.	Block 59	Hampton Gold Mining Areas, Ltd.	...	...	...	...	...	...	9.00	1.57	...	...
Do.	...	P.P.L. 119—Golden Eagle	...	...	71.00	181.55	...	...	240.84	449.50	...	...
Do.	5197	Great Empress of Coolgardie	...	...	38.00	16.52	...	...	38.00	16.52	...	...
Do.	Block 49	Hampton Plains Estates, Ltd.	...	...	...	...	...	10.94	150.00	157.31	...	...
Do.	Block 53	(Hampton Plains Estates, Ltd.)	...	...	...	...	...	358.42	67.00	112.49	...	...
Do.	Block 49	P.P.L. 384—A. W. Pane	...	...	25.75	9.09	...	...	25.75	9.09	...	...
Do.	Block 59	(Hampton Plains Estates, Ltd.)	...	...	...	...	...	4.12	8,008.25	7,194.52	...	...
Do.	(4556)	Lady Carmen	...	...	23.00	2.21	...	...	74.83	1,077.99	506.90	...
Do.	...	Voided leases	...	...	...	...	1,299.02	4,237.04	539,885.78	316,497.14	96	...
Do.	...	Sundry claims	26.26	2.99	837.25	491.15	131.99	2,081.62	37,946.81	15,177.83	...	...
Eundynie	...	Voided leases	...	...	...	...	...	...	29,812.50	14,966.76	1.75	...
Do.	...	Sundry claims	...	...	...	...	...	...	117.00	31.11	...	...
Gibraltar	4586	Carlton	...	...	206.00	86.39	...	...	15.28	1,058.00	750.17	...
Do.	4604	Limerick	...	...	95.75	35.31	...	...	...	192.75	72.80	...
Do.	4580	(Lloyd George)	...	...	...	...	...	...	...	341.75	289.27	...
Do.	4580, 4726, 4727	Lloyd George G.M. Co., N.L.	...	...	2,161.00	2,596.12	...	...	...	26,718.00	12,201.62	...
Do.	5200	Perseverance Gold Mine	...	...	37.00	42.61	...	...	...	37.00	42.61	...
Do.	...	Voided leases	...	...	...	...	...	...	...	970.75	609.91	...
Do.	...	Sundry claims	...	...	...	...	...	48.55	636.45	438.62	...	...
Gnarlbine	...	Voided leases	...	...	...	...	...	10.94	1,899.75	1,049.90	...	...
Do.	...	Sundry claims	...	...	...	...	...	1.31	189.75	99.26	...	...
Higginsville	...	Voided leases	...	...	...	...	...	287.26	32,578.00	14,938.44	134.79	...
Do.	...	Sundry claims	...	...	...	...	...	16.52	772.90	515.40	...	...
Do.	...	...	...	...	...	...	...	...	...	...	...	...
Londonderry	...	Voided leases	...	...	...	...	...	46.25	27,102.85	18,537.59	...	...
Do.	...	Sundry claims	...	...	10.50	28.03	...	6.00	1,797.47	1,607.01	...	...

Mungari	...	...	Voided leases	...	...	...	...	...	17.71	735.00	331.78	...
Do.	...	...	Sundry claims	...	...	...	...	...	107.82	346.51	204.90	...
Paris	...	...	Voided leases	...	...	...	...	...	4.30	...	...	...
Red Hill	...	...	Voided leases	...	...	...	...	...	1,541.48	40,797.40	31,070.65	...
Do.	...	...	Sundry claims	...	...	...	...	...	34.62	160.42	287.90	...
Ryan's Find	...	...	Voided leases	...	...	...	...	...	...	54.16	151.69	...
Do.	...	...	Sundry claims	...	...	...	...	...	44	87.69	226.64	...
St. Ives	4905	...	Brennan's Idough	...	...	596.75	341.62	...	12.18	1,590.00	1,216.05	...
Do.	5195	...	Clifton	...	...	205.90	60.67	...	...	205.90	60.67	...
Do.	4669	...	Coo-ee	...	...	70.50	373.09	...	...	304.00	774.66	...
Do.	4732	...	Ives Lake View Reward Junction	...	...	468.75	156.77	...	...	1,099.50	480.74	...
Do.	4720	4721, 4722	Ives Reward Gold Mines, N.L.	...	...	...	...	...	...	46.25	21.99	...
Do.	5164	...	Just-in-Time	...	13.31	16.75	5.97	...	45.10	16.75	5.97	...	
Do.	(5196)	...	Koombana	...	...	5.00	9.02	...	...	5.00	9.02	...
Do.	4720	4721, 4722	(Lake View Reward leases)	...	...	...	...	...	...	883.25	544.64	...
Do.	(5159)	...	New Victory lease	...	...	...	...	...	...	82.75	42.21	...
Do.	...	...	Voided leases	...	...	...	...	...	2.75	757.50	595.95	...
Do.	...	...	Sundry claims	...	49.05	153.75	33.72	...	49.05	809.67	270.30	...
Widgiemooltha	4028	...	Flinders	23.35	71.90	591.60	2,811.32	...
Do.	(5000)	...	Great Reward	114.24	155.90	430.17	565.25	...
Do.	(5192)	...	Great Reward South	15.00	14.08	66.75	121.23	...
Do.	Voided leases	9.42	795.21	8,871.83	3,915.88	17
Do.	Sundry claims	219.39	256.44	...	9.21	101.06	4,241.10	2,521.49	...
<i>From District generally :-</i>													
Sundry Parcels treated at:													
Burbanks Main Lode Works													
Fremantle Trading Co., Ltd., Works													
Highgate Battery													
Imperial Battery													
Lady Robinson Cyanide Works													
State Battery: Coolgardie													
State Battery, St. Ives													
Various Works													
Reported by Banks and Gold Dealers													
Total				138.28	15.15	6,086.78	6,946.92	...	9,245.25	11,230.87	1,566,580.36	986,583.18	891.44

KUNANALLING DISTRICT.

Balgarrie	...	...	Voided leases	...	...	...	...	10.94	75.48	5,142.25	4,825.96	1.38
Do.	...	...	Sundry claims	...	...	...	...	...	18.57	1,112.25	417.03	...
Carbine	33s	...	(Carbine)	...	...	...	...	...	10.85	2,401.00	1,164.53	...
Do.	33s, 710s, 711s, 807s, 863s, (890s)	...	Carbine leases	...	...	1,590.00	1,109.73	...	677.13	44,086.86	35,361.70	...
Do.	...	...	Voided leases	...	...	...	...	...	...	3,347.00	3,233.60	...
Do.	...	...	Sundry claims	...	...	...	...	...	...	73.00	55.69	...

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

KUNANALLING DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1924.					TOTAL PRODUCTION.				
			Alluvial.	Dolled and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dolled and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
Carnage ...	...	Voided leases ...	...	...	...	...	...	176·04	659·31	2,402·00	2,170·67	...
Do. ...	...	Sundry claims ...	...	...	...	...	...	...	...	61·00	27·50	...
Cashman's (Siberia) ...	716s, [1289w] ...	Lady Evelyn ...	...	...	...	...	...	...	...	241·75	479·81	...
Do. ...	...	Voided leases ...	...	...	...	...	...	67·51	793·44	7,187·90	6,395·33	...
Do. ...	...	Sundry claims ...	...	...	...	...	...	...	6·16	116·00	67·61	...
Chadwin ...	...	Voided leases ...	...	...	...	...	...	...	...	1,111·75	2,062·12	...
Do. ...	...	Sundry claims ...	...	...	...	...	...	...	8·87	507·00	449·22	...
Dunnsville ...	...	Voided leases ...	...	...	...	...	...	...	181·12	17,407·10	7,982·23	...
Do. ...	...	Sundry claims ...	...	...	...	...	...	43	121·27	297·19	301·14	...
Jourdie Hills ...	...	Voided leases ...	...	...	...	...	...	...	18·00	28,009·74	19,401·09	28·45
Do. ...	...	Sundry claims ...	...	...	...	...	...	...	27·85	760·50	422·33	...
Kandana ...	...	Voided leases ...	...	...	...	...	...	...	...	465·00	68·12	...
Kintore ...	...	Voided leases ...	...	...	...	...	...	6·66	143·66	44,174·14	31,882·70	...
Do. ...	...	Sundry claims ...	...	...	...	...	...	100·30	78	1,241·70	1,163·14	...
Siberia ...	...	Voided leases ...	...	...	...	...	...	1·07	1,557·81	8,216·85	10,530·14	...
Do. ...	...	Sundry claims ...	...	...	...	...	...	30·91	...	223·00	349·86	...
25 Mile ...	696s ...	Blue Bell ...	...	...	...	...	...	...	...	27·00	9·15	...
Do. ...	296s ...	(Blue Bell) ...	...	...	...	...	...	...	8·05	697·00	429·47	...
Do. ...	696s, (727s) ...	(Blue Bell leases) ...	...	...	...	...	...	...	...	1,693·00	1,647·99	...
25 Mile ...	892s ...	Brittania ...	...	60·77	...	...	...	...	871·06	11·00	143·53	...
Do. ...	(894s) ...	Caledonia ...	...	...	34·50	36·23	...	...	...	86·50	144·57	...
Do. ...	897s ...	Nick of Time ...	...	68·35	83·75	138·17	...	...	68·35	83·75	138·17	...
Do. ...	896s ...	Premier ...	...	2·65	311·50	336·34	...	...	2·65	311·50	336·34	...
Do. ...	845s ...	Sadie ...	...	...	39·00	80·98	...	...	...	2,084·00	1,982·42	...
Do. ...	645s ...	Star of Fremantle ...	...	...	...	45·04	...	32·67	...	5,301·00	3,874·62	...
Do. ...	895s ...	Sydney Mint ...	...	7·34	...	78	...	...	7·34	...	78	...
Do. ...	847s ...	Turn of the Tide ...	...	...	407·00	193·09	...	...	2·72	4,559·98	4,979·90	...
Do. ...	...	Voided leases ...	...	...	...	...	...	...	685·98	89,672·24	70,371·87	18·84
Do. ...	...	Sundry claims ...	...	160·17	275·85	348·75	405·69	...	173·39	507·29	4,946·31	...
From District generally:—												
Sundry Parcels treated at:												
Blue Bell Battery ...			...	...	...	221·26	...	3·77	...	72·00	2,184·51	...
Stanley Works ...			...	...	...	...	...	14·86	...	402·60	384·93	...
Various Works ...			...	...	...	...	...	9·22	...	1,276·66	2,006·02	...
Reported by Banks and Gold Dealers			...	...	...	...	...	264·19	1·10	...	...	...
Total ...			160·17	414·96	2,814·50	2,567·31	...	891·96	6,454·84	282,231·49	222,392·10	48·67

Yilgarn Goldfield.

Blackbourne	...	...	Voided leases	...	...	...	...	...	...	...	1,282.50	341.37	...
Bullfinch	914, 915, 916, 926, 928, (942), (960)	...	(Bullfinch leases)	...	...	...	...	...	...	...	1,027.52	10,958.88	...
Do.	914, 915, 916, 926, 928, (930), (942), (960)	...	(Bullfinch Proprietary (W.A.) Ltd.)	...	...	...	...	...	...	...	477,968.42	166,223.11	27,833.41
Do.	914, 915, 916, 926, 928, (930), (942), (960)	...	Bullfinch Proprietary (1919), Ltd.	...	...	499.68	389.90	...	...	...	556.65	457.00	...
Do.	(3249)	...	Joke	...	...	...	...	...	...	...	41.00	16.03	...
Do.	(3256)	...	Millennium	...	...	...	...	...	...	...	103.00	78.03	...
Do.	...	...	Voided leases	...	...	...	...	...	3.57	...	522.15	640.21	...
Do.	...	...	Sundry claims	...	...	17.00	11.40	...	...	...	260.05	200.67	...
Corinthian	...	...	Voided leases	...	...	...	...	...	...	...	134,508.00	29,324.83	...
Do.	...	...	Sundry claims	...	...	...	...	...	...	...	104.50	77.35	...
Ennuin	...	...	Voided leases	...	...	...	...	...	...	...	134.56	361.34	...
Do.	...	...	Sundry claims	...	...	...	...	...	...	...	117.00	72.12	...
Forrestonia	(2909)	...	Great Southern	...	...	...	...	...	...	...	915.00	214.16	...
Do.	...	...	Voided leases	...	...	...	...	...	...	...	270.00	83.99	...
Do.	...	...	Sundry claims	...	...	...	...	...	...	...	327.00	114.95	...
Golden Valley	3276	...	O.K.	...	...	27.75	19.36	...	...	...	27.75	19.36	...
Do.	2994	...	Radio	...	...	572.30	1,838.92	...	...	...	3,013.80	9,448.63	7.43
Do.	3248	...	Radio Deeps	...	...	165.00	243.54	...	...	...	165.00	243.54	...
Do.	3272	...	Radio North	...	...	43.00	90.23	...	...	...	43.00	90.23	...
Do.	...	...	Voided leases	...	...	...	...	...	18.05	...	7,935.24	8,289.07	2.00
Do.	...	...	Sundry claims	...	...	41.00	78.75	...	2.75	...	2,272.22	2,107.83	...
Greenmount	(3245)	...	Jessie Graham	...	...	...	...	...	...	...	50.00	5.62	...
Do.	550	...	Sunbeam	...	...	...	...	...	...	...	200.00	173.13	...
Do.	550	...	(Sunbeam)	...	...	...	...	...	14.00	...	4,472.00	1,427.25	...
Do.	550, (565)	...	Sunbeam leases	...	...	...	...	...	...	...	3,191.00	816.42	...
Do.	3264	...	Transvaal	...	...	...	30.18	...	...	...	...	30.18	...
Do.	...	...	Voided leases	...	...	...	...	...	31.99	21.62	115,887.50	28,843.86	944.50
Do.	...	...	Sundry claims	...	...	30.00	20.47	...	...	4.12	875.00	334.48	...
Hope's Hill	2544	...	Colleen Bawn	...	...	6.00	44.05	...	...	15.26	395.20	1,798.20	...
Do.	...	...	Voided leases	...	...	...	...	...	...	56.97	129,884.85	33,899.78	1.00
Do.	...	...	Sundry claims	...	...	...	...	...	...	25.38	1,622.50	506.06	...
Kennyville	(911), (3170), (3171)	...	(Edna May Battler G.M. Co., N.L.)	...	...	...	...	...	...	...	5,850.00	1,397.64	...
Do.	(3267)	...	Eveline G.M.	...	...	55.00	19.17	...	...	...	205.00	56.70	...
Do.	(911)	...	(Trafalgar)	...	...	...	...	...	...	...	1,984.00	1,499.02	...
Do.	(911)	...	Trafalgar: Edna May Battler G.M. Co., N.L.	...	...	...	77.02	...	...	...	...	77.02	...
Do.	...	...	Voided leases	...	...	...	...	...	...	18.76	24,013.13	12,089.09	59
Do.	...	...	Sundry claims	...	...	42.00	28.80	...	...	5.06	1,715.00	733.71	...
Koolyanobbing	...	...	Voided leases	...	...	...	...	...	...	...	308.00	116.74	...
Do.	...	...	Sundry claims	...	...	...	...	...	...	...	55.00	11.24	...

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

YILGARN GOLDFIELD—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1924.					TOTAL PRODUCTION.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
Marvel Loch	3069	(Banker) ...	...	...	...	...	...	1,043.00	926.75	...
Do.	3069	Banker: Golden Butterfly G.M. Co., N.L.	...	...	475.00	472.46	...	475.00	472.46	...
Do.	923	Bohemian ...	...	...	137.00	84.30	...	19.66	4,877.00	4,670.03
Do.	3217, 3222	Firelight leases ...	...	...	...	...	...	1,185.00	328.53	...
Do.	3069, (3152), (3157), (3213)	(Golden Butterfly G.M. Co., N.L.) ...	...	...	...	...	...	4,911.00	3,148.65	...
Do.	719	(Great Victoria) ...	...	...	...	...	...	1,356.00	281.53	...
Do.	719, 944, 945, 1227, 1228, 1606	Great Victoria G.Ms. N.L. ...	...	...	7,513.00	1,784.22	...	7,513.00	1,784.22	...
Do.	719, 944, 945, 1227, 1228, 1606	(Great Victoria leases) ...	...	...	...	...	...	132,664.26	17,869.89	...
Do.	852	May Queen ...	...	...	203.00	351.91	...	4.07	1,073.50	4,734.99
Do.	3273	Salvation ...	...	...	447.00	747.46	...	84.73	243,494.00	85,666.81
Do.	...	Voided leases ...	...	...	...	...	...	7.72	10,672.74	5,544.13
Do.	...	Sundry claims ...	...	5.71	246.00	117.40	...	...	...	...
Mt. Jackson	...	Voided leases ...	...	...	...	...	...	114.88	37,186.03	27,676.47
Do.	...	Sundry claims ...	...	1.93	77.50	51.73	...	4.42	1,689.25	1,131.60	
Mt. Rankin	...	Voided leases ...	...	...	...	...	...	3.84	496.00	122.17
Do.	...	Sundry claims ...	...	...	...	...	...	...	170.00	54.38
Parker's Range	2801	Scots Greys ...	...	...	195.00	73.50	...	...	1,296.00	480.09
Do.	724	(Spring Hill) ...	...	...	...	...	...	...	3,232.00	607.21
Do.	724, (760)	(Spring Hill leases) ...	...	...	...	...	...	...	8,910.00	2,215.59
Do.	724, 2633, (2793)	Spring Hill G.M. Co., N.L. ...	...	...	772.00	429.19	...	...	4,339.00	1,808.22
Do.	2951	White Horseshoe ...	...	...	633.00	510.00	...	...	3,573.50	3,045.51
Do.	...	Voided leases ...	...	...	...	...	...	105.14	13,686.25	10,013.04
Do.	...	Sundry claims ...	...	...	22.00	9.75	...	...	2,108.75	1,429.60
Southern Cross	(3228), (3232)	Fraser's Central (1921) leases ...	...	...	31.50	128.47	...	...	900.50	398.04
Do.	(3268)	Liberty ...	...	...	20.00	3.46	...	...	20.00	3.46
Do.	...	Voided leases ...	...	...	...	...	...	2.13	211.22	433,160.20
Do.	...	Sundry claims ...	...	...	42.00	35.55	...	5.50	595.45	4,154.48
Weston's	(3257)	Edna May Deep Levels G.M. Co., N.L.	...	...	...	10.00	...	...	80.97	558.31
Do.	3269	Myrtle Central ...	...	...	220.00	207.82	...	...	220.00	245.91
Do.	3270	Recovery ...	...	...	54.00	26.68	...	...	54.00	26.68
Do.	3226	Royal Flush ...	...	...	102.00	76.84	...	...	599.00	449.14
Do.	...	Voided leases ...	...	...	...	...	...	4.06	421,444.02	298,110.30
Do.	...	Sundry claims ...	...	...	...	...	...	52.91	1,285.75	1,280.81

From Goldfields generally :-

Sundry Parcels treated at :

Glide Away Battery	...	...	...	37.43	...	...	...	237.60	...
Great Victoria Cyanide Works	...	...	...	...	...	...	...	5,847.54	...
Howlett's Battery	...	...	...	153.51	...	...	...	1,059.34	...
Never Never Works	...	...	...	...	...	...	...	1,629.53	...
Smith's Cyanide Works	...	...	...	...	...	...	...	26.16	...
Spring Hill Works	...	...	...	...	...	...	...	854.27	...
Sunbeam Battery	...	...	30.50	239.89	...	...	38.50	7,242.60	...
Violet Works	...	...	...	...	...	...	...	998.34	...
Various Works	...	...	...	...	...	...	118.28	26,087.03	36.54
Reported by Banks and Gold Dealers	...	...	...	...	...	22.05	3.53	...	...
Total	7.64	12,719.23	8,443.36	1,482.99	2,270,776.52	1,045,904.10	32,288.71

Dundas Goldfield.

Buldanian	...	...	Voided leases	...	...	...	...	3.02	846.05	708.99	...
Do.	...	...	Sundry claims	...	...	...	...	36.53	341.27	519.77	...
Dundas	...	...	Voided leases	...	...	...	...	...	4,543.23	2,208.48	...
Do.	...	...	Sundry claims	...	...	...	...	385.37	182.50	143.88	...
Killaloe	...	...	Voided leases	...	...	...	...	...	20.65	6.88	...
Norseman	903, 1138, 1253	...	Great Boulder Proprietary G.Ms. N.L.	...	...	1,483.96	2,013.82	...	6,158.86	10,222.21	...
Do.	1306	...	Gloaming	...	...	67.25	146.64	90.62	178.75	318.68	...
Do.	1209	...	Hoffman's Gold Mine	...	3.60	106.00	32.97	3.60	1,640.90	967.66	...	
Do.	1288	...	Mararoa No. 3	...	...	...	...	...	376.75	690.17	...
Do.	1290	...	Mararoa No. 2	...	...	...	...	...	186.50	189.75	...
Do.	1291	...	Mararoa No. 1	...	...	418.96	417.62	...	766.96	985.79	...
Do.	1261	...	Mararoa South Extended	...	...	...	...	...	377.00	70.32	...
Do.	1289	...	New Valkyrie	...	...	17.75	11.68	...	89.00	47.73	...
Do.	903	...	(O.K.)	...	...	...	...	21.23	1,147.25	1,293.01	...
Do.	903, 1138, 1253	...	(O.K. leases)	...	...	...	...	...	2,364.00	3,455.06	...
Do.	1307	...	Recoup North	...	...	111.75	83.80	...	132.25	120.52	...
Do.	1281	...	Red White and Blue Extended No. 2	...	...	100.00	11.56	...	2,756.75	986.28	...
Do.	(1287)	...	Supreme	...	...	137.55	105.39	...	337.05	297.14	...
Do.	990	...	Viking No. 1	...	...	222.50	364.37	...	477.50	972.63	...
Do.	990	...	(Viking No. 1)	...	...	...	...	...	1,274.00	3,095.95	...
Do.	990, (1060)	...	(Viking No. 1 leases)	...	...	...	...	...	775.50	1,176.13	16.89
Do.	(1016), 990, (1060), (1117), (1181), (1194), (1235)	...	(Viking No. 1 leases)	...	...	...	...	...	48,452.00	44,457.70	242.83
Do.	Voided leases	...	3.88	4.23	10,300.49	805,665.88	507,660.90	34,600.73
Do.	Sundry claims	...	17.30	198.50	216.51	1,001.51	3,073.86	20,972.21	12,176.21	59
Peninsular	Voided leases	17.61	7,807.14	4,833.88	...
From Goldfields generally :-												
Sundry Parcels treated at :												
Rawling's and Bullen's Works	...	...	...	...	...	...	...	...	57.39	4,266.10	...
State Battery, Norseman	...	...	...	...	...	...	...	...	401.25	12,726.04	885.41
Various Works	...	...	...	...	...	...	...	54.52	425.75	6,562.86	646.46
Reported by Banks and Gold Dealers	...	...	...	...	...	...	...	1,026.29	...	1.04	...
Total	3.88	20.90	2,864.22	3,404.36	...	2,032.03	13,986.85	908,754.34	621,161.76	36,392.90

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Phillips River Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1924.					TOTAL PRODUCTION.				
			Alluvial.	Dollied and Specimens.	Ore treated	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
Kundip	147, 179	Fair Play leases	...	...	...	...	...	...	4,860.72	8,678.54	12.63
Do.	184	Gem	...	...	...	...	...	4,159.15	3,324.86	...	
Do.	151	(Gem Consolidated)	...	...	...	...	...	777.50	616.30	...	
Do.	151, 156	Gem Consolidated leases	...	...	...	...	...	6,315.76	5,690.35	8.00	
Do.	M.L. 52, M.L. 94	Harbour View Gold and Copper Co., Ltd	...	...	...	...	...	1,602.89	1,836.05	360.11	
Do.	M.L. 52, M.L. 94	(Harbour View leases)	...	...	...	...	379.86	3,619.25	1,560.86	61.41	
Do.	M.L. 52, M.L. 94	(Harbour View leases)	...	...	...	...	...	3,403.50	2,227.62	1.88	
Do.	98	Hillsborough	...	...	71.46	96.06	...	3,295.51	6,018.84	118.03	
Do.	M.L. 370	North Harbour View	...	...	...	...	...	35.27	22.16	...	
Do.	M.L. 52, M.L. 94	(Ravensthorpe G.M. Syndicate N.L.)	...	...	...	...	...	1,124.00	433.94	164.98	
Do.	...	Voided leases	...	...	...	...	113.28	176.31	37,704.03	25,448.75	3,070.20
Do.	...	Sundry claims	...	...	...	...	79.05	71.58	956.88	596.33	15.45
Mt. Desmond	M.L. (203)	(British Flag)	...	...	...	...	...	...	...	7.76	...
Do.	M.L. (203)	British Flag: Phillips River Gold and Copper Co., Ltd.	...	...	...	...	...	...	...	4.08	...
Do.	M.L. (208)	(Desmond)	...	...	...	...	...	...	...	.77	...
Do.	M.L. (208)	Desmond	...	...	...	...	...	...	...	155.38	...
Do.	M.L. (208)	(Desmond: Phillips River Gold and Copper Co., Ltd.)	...	...	...	...	...	...	...	219.59	14.55
Do.	M.L. (95)	Elverdton	...	...	...	...	...	...	...	519.69	...
Do.	M.L.-(95)	(Elverdton: Phillips River Gold and Copper Co., Ltd.)	...	...	...	...	...	...	...	2,569.38	6,537.35
Do.	M.L. (95)	(Elverdton: Phillips River Option Syndicate, N.L.)	...	...	...	...	...	...	...	9.63	...
Do.	M.L. (168)	(Elverdton South: Phillips River Gold and Copper Co., Ltd.)	...	...	...	...	...	...	...	.94	...
Do.	M.L. (109)	(Mt. Desmond)	...	...	...	...	...	1.40	...	36.97	...
Do.	M.L. (109)	(Mt. Desmond: Phillips River Gold and Copper Co., Ltd.)	...	...	...	...	...	...	...	228.19	180.06
Do.	M.L. (199)	(P.L.P.)	...	...	...	...	...	...	...	13.69	7.41
Do.	M.L. (199)	(P.L.P.: Phillips River Gold and Copper Co., Ltd.)	...	...	...	...	...	...	...	3.14	...
Do.	...	Voided leases	...	...	...	...	...	...	9.00	136.25	152.22
Do.	...	Sundry claims	...	...	...	...	...	...	...	32.81	51.01
Mt. Purchas	...	Voided leases	...	...	...	...	...	4.38	346.05	293.13	...
Do.	...	Sundry claims	...	...	...	...	...	...	4.75	4.68	...
Ravensthorpe	M.L. 16	(Marion Martin)	...	...	...	...	...	...	...	20.09	...
Do.	M.L. 16	Marion Martin	...	...	...	...	...	...	...	240.70	...
Do.	M.L. 16	(Marion Martin: Phillips River Gold and Copper Co., Ltd.)	...	...	...	...	...	...	...	275.33	205.97
Do.	M.L. 15	(Mt. Cattlin)	...	...	...	...	...	...	49	200.00	85.50
Do.	M.L. 15	Mt. Cattlin	...	...	...	...	...	...	...	789.34	...

Do.	M.L. 15	(Mt. Cattlin: Mt. Cattlin Copper Mining Co., Ltd.)	...	...	...	...	...	...	...	...	1,496.92	52.92
Do.	M.L. 15	(Mt. Cattlin: Phillips River Gold and Copper Co., Ltd.)	...	...	...	...	...	...	...	...	387.33	...
Do.	M.L. 15	(Mt. Cattlin: Phillips River Gold and Copper Co., Ltd.)	...	...	...	...	...	...	...	...	3,077.08	3,814.45
Do.		Voided leases	...	...	...	...	...	...	141.31	21,716.76	18,765.65	310.73
Do.		Sundry claims	...	...	78.00	48.95	...	157.82	6.60	2,246.18	1,411.90	20.65
West River		Voided leases	...	...	...	...	...	...	...	...	10.34	31.06
Do.		Sundry claims	...	...	...	...	...	...	...	...	3.29	3.44
<i>From Goldfield generally:—</i>												
Sundry parcels treated at:												
		Gem Battery	...	...	...	...	...	...	...	...	138.89	...
		Phillips River Smelter	...	...	...	...	...	...	...	...	385.96	493.66
		Two Boys' Works	...	...	...	...	...	...	...	...	100.95	...
		Various Works	...	...	...	...	...	...	...	...	4.76	...
		Reported by Banks and Gold Dealers	...	...	43	...	...	122.48	...	...	...	...
		Total	...	...	43	...	...	472.63	781.93	92,377.20	87,894.71	15,688.17

Donnybrook Goldfield.

Donnybrook		Voided leases	...	...	...	...	...	23.24	...	1,613.30	816.23	...
Do.		Sundry claims	...	...	...	...	...	...	...	40.00	2.29	...
		Total	...	...	...	...	...	23.24	...	1,653.30	818.52	...

State generally.

Narra Tarra	Loc. 833	Narra Tarra: Fremantle Trading Co., Ltd.	...	...	...	...	...	...	...	...	91.51	20,718.76
Coombana Crk.		Voided leases	...	...	...	...	...	...	53.66	...	...	...
<i>From State generally:—</i>												
Sundry parcels treated at:												
		Fremantle Trading Co., Ltd., Works	...	...	...	...	...	...	...	...	3,128.19	9,615.41
		Hainault Sulphide Plant, Kalgoorlie	...	...	...	...	...	...	...	...	21.28	...
		State Smelter, Ravensthorpe	...	...	...	...	...	...	...	...	41.20	...
		Various Works	...	...	...	...	...	...	...	27.00	4,411.14	481.77
		Sundry specimens	...	...	...	...	...	4.24	56.56	...	...	...
		Reported by Banks and Gold Dealers	...	...	...	...	...	138.17	183.87	...	...	...
		Total	...	...	...	...	...	142.41	294.09	27.00	7,693.32	30,815.94

TABLE V.

TOTAL OUTPUT OF GOLD BULLION ENTERED FOR EXPORT, AND RECEIVED AT THE PERTH BRANCH OF THE ROYAL MINT, FROM 1ST JANUARY, 1886, TO 31ST DECEMBER, 1924, SHOWING, IN FINE OUNCES, THE QUANTITY OBTAINED EACH YEAR FROM THE RESPECTIVE GOLDFIELDS, AND THE TOTAL ANNUAL VALUE.

Year.	KIMBERLEY.			PILBARA.			WEST PILBARA.			ASHBURTON.		
	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.
	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.
1886	270.17	...	270.17	...	...	...	...	...	...	...	...	...
1887	4,359.37	...	4,359.37	...	...	...	...	...	...	...	...	...
1888	3,124.82	...	3,124.82	...	...	...	...	...	...	...	...	...
1889	2,204.28	...	2,204.28	9,992.63	...	9,992.63	...	...	...	...	...	...
1890	4,002.42	...	4,002.42	14,363.01	...	14,363.01	...	...	...	...	...	...
1891	2,415.07	...	2,415.07	10,623.32	...	10,623.32	...	...	...	750.31	...	750.31
1892	974.08	...	974.08	11,533.84	...	11,533.84	...	...	...	.63	...	.63
1893	1,450.77	...	1,450.77	10,465.43	...	10,465.43	...	...	...	418.43	...	418.43
1894	526.59	...	526.59	14,541.20	...	14,541.20	...	...	...	255.20	...	255.20
1895	784.27	...	784.27	17,464.65	...	17,464.65	...	...	...	483.76	...	483.76
1896	797.85	...	797.85	10,565.27	...	10,565.27	...	...	...	598.64	...	598.64
1897	495.67	...	495.67	10,695.67	...	10,695.67	...	...	...	928.75	...	928.75
1898	257.54	...	257.54	10,433.27	...	10,433.27	1,814.48	...	1,814.48	402.46	...	402.46
1899	728.52	275.94	1,004.46	17,888.69	473.96	18,362.65	1,749.39	...	1,749.39	214.26	252.10	466.36
1900	29.16	576.14	605.30	8,629.83	6,703.99	15,333.82	522.76	122.85	645.61	44.82	424.27	469.09
1901	...	601.26	601.26	36.68	10,223.75	10,260.43	78.38	357.46	435.84	7.70	50.24	57.94
1902	1.48	378.02	379.50	...	9,199.50	9,199.50	...	2,822.20	2,822.20	...	...	...
1903	...	433.71	433.71	2.26	12,049.52	12,051.78	...	5,493.23	5,493.23	...	114.67	114.67
1904	...	31.51	31.51	...	6,931.27	6,931.27	...	4,320.82	4,320.82	...	125.96	125.96
1905	...	545.95	545.95	48.33	13,353.49	13,401.82	...	1,164.92	1,164.92	...	42.05	42.05
1906	...	647.77	647.77	...	4,956.14	4,956.14	...	755.35	755.35	...	138.84	138.84
1907	...	362.06	362.06	...	4,130.48	4,130.48	...	332.30	332.30	...	41.85	41.85
1908	...	338.00	338.00	...	8,172.26	8,172.26	...	1,076.63	1,076.63	...	45.87	45.87
1909	...	168.95	168.95	...	5,529.19	5,529.19	...	1,396.22	1,396.22	...	228.16	228.16
1910	...	487.25	487.25	...	5,894.32	5,894.32	63.66	1,337.66	1,451.32	...	173.06	173.06
1911	...	148.53	148.53	...	4,874.00	4,874.00	58.00	819.35	877.35	...	270.68	270.68
1912	...	294.55	294.55	...	6,274.04	6,274.04	...	747.34	747.34	...	38.73	38.73
1913	...	266.41	266.41	...	4,207.37	4,207.37	...	1,237.85	1,237.85	...	39.26	39.26
1914	...	196.46	196.46	...	5,544.64	5,544.64	...	1,262.73	1,262.73	...	46.14	46.14
1915	...	220.94	220.94	...	7,411.06	7,411.06	64	1,239.04	1,240.58	...	16.63	16.63
1916	...	249.58	249.58	...	6,700.93	6,700.93	...	560.79	560.79	...	31.16	31.16
1917	...	108.90	108.90	...	4,673.40	4,673.40	63.80	559.95	623.75	...	21.21	21.21
1918	...	116.34	116.34	2.35	2,951.31	2,954.16	...	267.43	267.43	...	6.29	6.29
1919	...	239.74	239.74	...	3,819.66	3,819.66	...	23.90	23.90	...	3.30	3.30
1920	...	131.53	131.53	9.42	5,285.85	5,305.27	...	114.21	114.20	...	2.96	2.96
1921	...	49.35	49.35	...	1,404.86	1,404.86	...	160.51	160.51	...	22.31	22.31
1922	...	5.01	5.01	...	3,732.13	3,732.13	...	95.88	95.88	...	13.57	13.57
1923	...	30.55	30.55	...	2,814.68	2,814.68	...	59.89	59.89	...	9.24	9.24
1924	...	12.77	12.77	6.58	2,209.05	2,215.63	...	70.49	70.49	...	3.18	3.18
Total	22,422.06	6,917.22	29,339.28	147,392.43	149,561.35	296,833.78	4,351.11	26,449.99	39,891.10	4,104.96	2,161.73	6,266.69

Year.	GASCOYNE.			PEAK HILL.			EAST MURCHISON.			MURCHISON.		
	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.
	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.
1886
1887
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1897
1898	4,571.38	...	4,571.38	8,457.34	...	8,457.34	74,154.67	...	74,154.67
1899	12,288.93	...	12,288.93	35,393.10	...	35,393.10	38,794.22	...	38,794.22
1900	297.96	76.63	374.59	14,064.24	14,558.64	28,622.88	33,826.08	3,361.95	37,188.03	61,586.00	22,074.71	83,660.80
1901	6.59	77.02	83.61	9,523.14	16,119.79	25,642.93	25,545.54	28,671.55	52,217.09	59,815.70	43,423.77	97,239.47
1902	...	16.82	23.41	231.85	19,352.44	19,584.29	29,780.63	40,557.07	70,337.70	92,149.56	38,908.10	131,145.66
1903	...	107.29	107.29	85.93	28,044.55	28,130.48	25,450.63	53,583.10	79,033.73	141,731.91	40,928.08	182,657.99
1904	...	30.76	30.76	203.60	29,395.32	29,598.92	21,878.06	65,334.05	87,212.11	154,012.88	54,348.53	208,361.41
1905	...	10.95	10.95	...	17,475.33	17,475.33	21,296.85	64,550.36	85,847.21	165,232.67	52,683.16	217,915.83
1906	...	21.34	21.34	125.01	13,371.75	13,496.76	1,361.68	89,249.93	90,611.61	131,656.36	92,742.05	224,398.41
1907	...	78.73	78.73	...	2,038.62	2,038.62	140.68	93,163.89	95,309.57	79,172.69	109,936.80	189,109.49
1908	...	8.44	8.44	...	5,918.75	5,918.75	2,391.66	117,735.69	120,627.35	54,811.74	115,497.50	170,309.24
1909	...	31.82	31.82	...	9,864.36	9,864.36	10,701.24	137,023.14	147,729.38	45,483.05	111,540.54	157,023.59
1910	...	7.37	7.37	...	7,322.29	7,322.29	11,599.83	136,637.67	148,237.50	24,682.47	107,167.27	131,849.74
1911	...	26.31	26.31	...	3,057.25	3,057.25	1,557.78	137,190.44	138,748.22	19,568.85	111,414.23	130,983.08
1912	...	7.87	7.87	...	134.23	134.23	...	96,442.87	96,454.64	13,919.70	109,444.91	123,364.61
1913	...	6.55	6.55	...	196.11	196.11	...	90,397.82	90,397.82	6,377.17	105,245.32	111,622.49
1914	...	4.11	4.11	...	258.10	258.10	195.78	80,122.11	80,317.89	5,749.47	115,694.96	121,444.43
1915	...	65.55	65.55	56	85.66	85.66	354.75	65,609.61	65,964.36	6,443.82	111,822.67	118,266.49
1916	...	60.53	60.53	...	446.00	446.00	268.57	52,926.34	53,194.91	8,669.79	96,610.36	105,280.15
1917	155.01	155.01	902.67	30,284.85	31,187.52	6,694.02	77,369.19	84,063.21
1918	7,942.96	7,942.96	1,082.93	94,142.67	95,225.60
1919	768.08	768.08	214.23	75,478.06	75,692.29
1920	...	3.19	3.19	...	57.83	57.83	...	766.30	766.30	...	64,425.15	64,425.15
1921	...	7.46	7.46	...	18.78	18.78	...	98.82	98.82	885.05	56,388.49	57,173.54
1922	...	1.52	1.52	...	1.23	1.23	...	21.54	21.54	677.71	50,411.3	51,089.01
1923	5.12	5.12	...	556.07	614.95	1,171.02	283.39	40,724.62
1924	...	2.46	2.46	2.98	454.04	454.04	371.22	2,466.06	2,837.28	485.08	30,220.87	30,705.95
Total	304.55	652.72	957.27	41,102.62	170,001.12	211,103.74	230,563.56	1,492,076.57	1,632,640.13	1,446,174.66	1,951,093.83	3,397,288.49

a Prior to 1st May, 1898, included with Pilbara.

b Prior to March, 1892, included with Ashburton.

c From 1st August, 1897.

TABLE V.—continued.

Total Output of Gold Bullion entered for Export, and Received at the Perth Branch of the Royal Mint, etc.—continued.

Year.	d YALGOO.			e MT. MARGARET.			f NORTH COOLGARDIE.			g BROAD ARROW.		
	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.
	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.
1886
1887
1888
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1896
1897	1,819-81	...	1,819-81	7,770-22	...	7,770-22	15,351-71	...	15,351-71	3,720-87	...	3,720-87
1898	3,360-44	...	3,360-44	38,706-19	...	38,706-19	60,997-57	...	60,997-57	22,035-17	...	22,035-17
1899	5,059-83	4,643-00	9,732-83	58,004-19	15,128-98	73,193-17	54,489-26	40,059-43	94,548-69	32,224-04	7,607-18	39,831-22
1900	462-55	7,918-53	8,381-08	65,993-33	60,607-45	126,605-83	15,060-11	79,340-01	95,000-12	29,955-07	12,860-80	42,815-87
1901	6-80	8,330-42	8,337-22	65,352-46	114,840-17	180,192-63	6,020-82	122,806-58	129,427-40	9,313-50	17,066-09	26,379-59
1902	483-32	4,396-91	4,880-23	61,846-01	124,306-49	186,152-50	4,064-18	156,856-06	160,920-24	2,128-49	13,665-52	15,794-01
1903	47-08	1,430-39	1,477-67	65,410-09	125,437-19	190,853-28	1,348-74	167,153-90	168,502-64	5,201-12	18,245-41	23,446-53
1904	...	2,796-23	2,796-23	63,180-89	119,889-97	183,070-82	1,614-64	139,518-37	141,133-01	318-83	20,660-78	20,979-61
1905	76-75	4,549-25	4,625-00	34,949-75	153,203-05	188,152-80	1,193-71	145,615-47	146,809-18	603-66	15,300-58	15,904-24
1906	...	4,883-17	4,883-17	21,869-88	137,022-23	158,892-11	1,140-45	107,890-76	109,031-21	1,245-75	16,841-70	18,087-45
1907	...	3,199-60	3,199-60	23,989-43	154,059-92	178,049-35	13,240-87	72,701-05	85,941-92	4,292-84	13,610-81	17,903-15
1908	...	456-43	456-43	19,324-02	147,879-90	167,203-92	6,701-28	76,700-77	83,402-05	3,613-64	7,946-35	11,559-99
1909	...	626-80	626-80	24,123-15	135,914-94	160,038-09	6,389-19	66,631-79	73,020-98	6,711-37	4,863-50	11,574-87
1910	...	725-79	725-79	28,507-31	131,976-01	160,483-32	1,889-24	60,886-71	62,775-95	...	321-40	321-40
1911	...	294-80	294-80	21,302-54	131,280-97	152,583-51	209-17	60,270-42	60,479-59	176-57	280-54	457-11
1912	...	1,169-18	1,169-18	4,835-73	101,353-79	106,189-52	53-68	49,946-08	49,999-78	...	4-33	4-33
1913	...	2,837-97	2,837-97	157-14	89,403-71	89,565-85	...	60,855-69	60,855-69	...	8,947-58	8,947-58
1914	...	1,403-35	1,403-35	184-66	103,550-71	103,735-37	...	73,943-49	73,943-49	...	3,074-74	3,074-74
1915	...	4,218-34	4,218-34	68-20	107,934-53	108,002-73	638-99	56,372-00	57,010-99	...	14,447-56	14,447-56
1916	...	4,336-27	4,336-27	642-48	111,277-58	111,920-06	...	39,714-46	39,714-46	...	6,815-74	6,815-74
1917	...	1,108-11	1,108-11	...	111,357-98	111,357-98	...	28,306-84	28,306-84	...	9,185-65	9,185-65
1918	...	878-62	878-62	...	95,186-67	95,186-67	...	30,273-00	30,273-00	...	2,493-63	2,493-63
1919	...	648-81	648-81	...	95,129-83	95,129-83	...	21,535-19	21,535-19	...	2,782-50	2,782-50
1920	...	243-26	243-26	...	82,976-60	82,976-60	...	11,221-31	11,221-31	...	5,642-42	5,642-42
1921	...	188-04	188-04	...	27,703-53	27,703-53	380-43	9,785-52	10,165-95	...	168-81	168-81
1922	...	11,669-19	11,669-19	215-69	30,878-39	31,094-08	180-55	11,236-64	11,417-19	...	331-78	331-78
1923	...	5,657-27	5,657-27	352-97	33,162-16	33,515-13	212-97	9,455-91	9,668-88	...	331-78	331-78
1924	...	5,924-03	5,924-03	330-17	40,750-48	41,080-65	202-60	9,145-96	9,348-56	...	1,616-40	1,616-40
Total	11,466-75	84,533-36	96,000-11	607,187-55	2,582,218-19	3,189,405-74	261,461-25	1,708,222-91	1,969,684-16	121,540-42	204,776-80	326,317-23

Year.	f NORTH-EAST COOLGARDIE.			g EAST COOLGARDIE.			h COOLGARDIE.			i YILGARN.		
	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.
1886
1887
1888
1889
1890
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1893
1894
1895
1896	3,679-63	...	3,679-63	76,297-42	...	76,297-42	1,662-61	...	1,662-61
1897	29,437-40	...	29,437-40	268,411-95	...	268,411-95	2,036-99	...	2,036-99
1898	112,039-58	36,233-90	148,273-48	402,847-31	...	402,847-31	...	...	...	11,480-61	...	11,480-61
1899	57,674-82	14,940-55	72,615-37	796,696-63	29,567-58	826,264-21	101,589-22	24,700-89	126,290-11	6,919-11	8,114-60	15,033-71
1900	10,400-57	36,233-90	46,634-47	800,328-29	125,105-24	925,433-53	60,988-33	46,167-62	107,155-95	688-47	25,628-83	26,317-30
1901	6,798-56	39,024-18	45,822-74	693,042-56	238,840-93	931,883-49	9,584-31	70,720-21	80,304-56	49-15	26,677-85	26,727-00
1902	549-07	46,316-67	46,865-74	460,462-26	546,964-68	1,007,423-94	2,872-61	80,887-85	83,760-46	3-31	22,232-80	22,236-11
1903	4,308-99	36,145-75	40,454-74	570,447-27	580,790-97	1,151,238-24	7,318-63	69,681-38	77,000-01	...	22,761-00	22,761-00
1904	55-09	33,262-10	33,317-19	555,016-48	584,579-88	1,139,598-36	1,100-07	61,073-11	62,173-18	28-87	29,965-37	29,994-24
1905	2,187-11	40,220-19	42,407-30	479,254-37	613,103-20	1,092,357-57	177-80	62,066-34	62,244-14	...	25,291-11	25,291-11
1906	1,590-31	30,943-82	32,534-13	454,645-84	612,546-81	1,067,192-65	103-78	60,474-81	60,578-59	...	25,570-77	25,570-77
1907	3,132-83	25,399-75	28,532-58	323,550-05	643,139-11	966,689-16	1,050-88	61,670-65	62,721-53	...	23,311-41	23,311-41
1908	925-44	23,902-44	24,827-88	267,748-62	657,936-89	923,683-51	871-76	40,982-65	41,854-41	...	20,866-10	20,866-10
1909	1,774-45	24,566-87	26,341-32	306,462-21	620,612-07	927,074-23	350-91	36,311-70	36,662-61	204-41	20,958-23	21,162-64
1910	...	19,082-01	19,082-01	179,032-94	653,211-05	832,273-99	...	38,264-02	38,264-02	...	24,049-13	24,049-13
1911	...	18,528-97	18,528-97	123,160-54	686,386-80	809,547-34	...	33,840-93	33,840-93	...	14,688-17	14,688-17
1912	194-22	14,475-38	14,669-60	71,429-00	717,356-45	788,783-45	...	42,327-65	42,327-65	...	27,439-38	27,439-38
1913	...	11,210-69	11,210-69	70,078-57	723,593-22	793,671-79	...	35,593-00	35,593-00	9,638-59	63,679-58	73,368-17
1914	...	5,210-22	5,210-22	40,393-05	677,609-26	718,002-31	...	21,957-78	21,957-78	3,738-03	81,713-56	85,511-59
1915	...	8,773-97	8,773-97	5,493-67	709,061-79	714,555-46	...	17,590-21	17,590-21	...	90,705-75	90,705-75
1916	...	1,996-06	1,996-06	6,194-14	635,425-68	641,619-82	...	12,381-82	12,381-82	...	84,800-82	84,800-82
1917	...	769-16	769-16	4,523-28	602,459-51	607,982-79	...	6,500-66	6,500-66	...	74,399-36	74,399-36
1918	...	145-91	145-91	10,216-56	560,438-18	570,654-74	...	6,727-82	6,727-82	745-57	67,956-84	68,702-41
1919	...	116-83	116-83	6,415-89	459,912-83	466,328-72	...	3,918-19	3,918-19	...	60,140-27	60,140-27
1920	...	350-26	350-26	2,186-57	402,861-25	405,047-82	...	4,031-16	4,031-16	2,230-09	35,930-17	38,160-26
1921	...	43-63	43-63	3,095-25	423,936-85	427,032-10	...	214-67	214-67	262-39	22,031-97	22,294-36
1922	...	...	...	2,631-78	415,979-06	418,610-84	...	518-97	518-97	1,437-76	13,267-24	14,705-00
1923	...	564-05	564-05	4,015-37	404,110-59	408,125-96	39-96	1,071-95	1,161-91	211-47	7,305-74	7,517-21
1924	...	1,322-28	1,322-28	1,071-69	375,211-10	376,282-79	126-97	6,721-06	6,848-03	75-22	8,644-23	8,719-45
Total	284,809-81	483,545-64	668,355-45	6,790,209-56	13,704,740-98	20,494,950-54	661,348-84	846,397-10	1,507,745-94	215,462-18	928,130-28	1,143,612-46

d Prior to 1st April, 1897, included with Murchison.
g From 1st September, 1897.

e From 1st August, 1897.
h Declared 5th April, 1894, to which date included with Coolgardie.
i Prior to 1st May, 1896, included with Coolgardie.
g From 1st September, 1897.

TABLE V.—continued.

Total Output of Gold Bullion entered for Export, and Received at the Perth Branch of the Royal Mint, etc.—continued.

Year.	DUNDAS.			PHILLIPS RIVER.			DONNYBROOK.			STATE GENERALLY.		
	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.
	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.
1886	...	...	...	...	...	...	...	...	...	...	...	...
1887	...	...	...	...	...	...	...	...	...	...	...	...
1888	...	...	...	...	...	...	...	...	...	...	...	...
1889	...	...	...	...	...	...	...	...	...	...	...	...
1890	...	...	...	...	...	...	...	...	...	...	...	...
1891	...	...	...	...	...	...	...	...	...	...	...	...
1892	...	...	...	...	...	...	...	...	...	...	...	...
1893	132·37	...	132·37	...	...	...	...	...	...	...	...	...
1894	204·31	...	204·31	...	...	...	...	...	...	...	...	...
1895	216·40	...	216·40	...	...	...	...	...	...	...	...	...
1896	3,891·77	...	3,891·77	...	...	...	...	...	...	...	...	...
1897	17,275·36	...	17,275·36	...	...	...	...	...	...	...	...	...
1898	28,655·52	...	28,655·52	...	...	...	...	...	...	...	...	...
1899	39,930·65	423·71	40,404·36	...	...	...	277·27	175·49	452·76	...	809·07	809·07
1900	8,144·72	28,254·19	36,398·91	...	...	...	...	237·56	237·56	5,644·83	1,450·08	7,094·91
1901	5,411·46	29,752·16	35,163·62	...	...	...	...	4·20	4·20	215·91	1,511·63	1,727·54
1902	4,401·31	26,714·16	31,115·47	2,946·53	4,422·56	7,369·09	4·94	57·64	62·58	7·77	2,115·52	2,123·29
1903	1,311·53	33,905·88	35,217·41	2,136·09	5,441·68	7,577·77	...	82·64	82·64	53·44	2,339·44	2,392·88
1904	1,834·03	31,347·06	33,181·09	936·76	2,047·59	2,984·35	...	...	...	86	1,344·25	1,345·11
1905	1,324·48	27,411·31	28,735·79	2,060·46	1,458·44	3,518·90	...	...	...	70·41	1,515·58	1,585·99
1906	1,111·18	20,198·62	21,309·80	945·65	1,439·03	2,384·68	...	...	...	284·38	763·15	1,047·53
1907	...	22,830·71	22,830·71	4,043·86	1,514·90	5,558·76	...	...	...	799·48	285·47	1,084·95
1908	...	41,203·39	41,203·39	969·00	3,631·02	4,600·02	...	...	...	15·91	1,953·56	1,969·47
1909	...	35,894·72	35,894·72	4,025·81	3,605·75	7,631·56	...	...	...	46·78	455·34	502·12
1910	...	43,260·55	43,260·55	3,271·89	5,031·60	8,303·49	...	...	...	48·67	222·89	271·56
1911	...	48,361·14	48,361·14	1,374·96	4,241·05	5,616·01	...	...	...	209·03	129·01	338·04
1912	...	38,373·40	38,373·40	...	3,292·05	3,292·05	...	...	...	687·32	142·72	830·04
1913	...	27,090·46	27,090·46	...	3,515·02	3,515·02	...	...	...	385·58	230·17	615·75
1914	...	27,803·51	27,803·51	...	395·67	395·67	...	...	...	280·34	237·86	568·20
1915	...	24,148·61	24,148·61	2,011·73	283·06	2,274·79	...	...	...	188·32	318·59	506·91
1916	...	21,956·42	21,956·42	4,119·93	131·13	4,301·06	...	...	...	8,188·93	357·85	8,546·78
1917	...	19,346·27	19,346·27	2,995·76	196·24	3,192·00	...	...	...	356·72	216·30	573·02
1918	...	16,215·83	16,215·83	4,463·52	400·11	4,863·63	...	...	...	1·89	568·96	564·85
1919	...	13,631·96	13,631·96	...	349·49	349·49	...	...	...	...	88·12	88·12
1920	...	7,156·82	7,156·82	2,733·42	34·62	34·62	...	...	...	...	129·31	129·31
1921	...	4,961·45	4,961·45	...	329·14	302·56	...	...	...	...	68·11	68·11
1922	...	3,799·37	3,799·37	...	317·13	317·13	...	...	...	...	67·33	127·25
1923	...	534·52	534·52	...	258·90	258·90	...	...	...	148·40	69·39	217·79
1924	1·38	2,126·14	2,127·52	...	67·72	67·72	...	...	...	18·80	47·21	66·01
Total	113,896·47	596,702·36	710,598·83	39,035·37	42,433·90	81,409·27	282·21	557·53	839·74	17,713·69	17,980·91	35,694·60

‡ Prior to 1893 included with Yilgarn.

§ Prior to 1902, included in State generally.

¶ Abolished 4th March, 1908.

Year.	GRAND TOTAL.			
	Export.	Mint.	Total.	Value.
	fine ozs.	fine ozs.	fine ozs.	£ s. d.
1886	270·17	...	270·17	1,147 12 2½
1887	4,359·37	...	4,359·37	13,517 8 6½
1888	3,124·82	...	3,124·82	13,273 7 10½
1889	13,859·52	...	13,859·52	58,371 9 11½
1890	20,402·42	...	20,402·42	86,663 19 5
1891	27,116·14	...	27,116·14	115,182 0 10½
1892	53,271·65	...	53,271·65	226,283 11 8
1893	99,202·50	...	99,202·50	421,385 8 8½
1894	185,298·73	...	185,298·73	787,098 19 6
1895	207,110·20	...	207,110·20	879,748 4 2½
1896	251,618·69	...	251,618·69	1,068,308 5 2
1897	603,846·44	...	603,846·44	2,564,976 12 9½
1898	939,489·49	...	939,489·49	3,990,697 18 10
1899	1,283,360·25	187,244·41	1,470,604·66	6,246,731 10 7½
1900	894,387·27	519,923·59	1,414,310·86	6,607,610 13 4½
1901	923,686·96	779,729·56	1,703,416·52	7,235,653 9 1
1902	707,039·75	1,163,997·60	1,871,037·35	7,947,661 9 7½
1903	833,685·78	1,231,115·62	2,064,801·40	8,770,718 17 0½
1904	810,616·04	1,172,614·03	1,983,230·07	8,424,225 17 3½
1905	655,089·88	1,300,326·00	1,955,315·88	8,305,653 18 5½
1906	562,250·59	1,232,396·01	1,794,646·60	7,622,749 8 7
1907	431,803·14	1,265,750·45	1,697,553·59	7,210,749 6 2½
1908	356,353·96	1,291,557·17	1,647,911·13	6,999,381 10 10½
1909	386,370·58	1,208,898·83	1,595,269·41	6,776,273 14 7½
1910	233,970·34	1,236,661·68	1,470,632·02	6,246,847 15 0
1911	160,422·28	1,210,445·24	1,370,867·52	5,823,075 1 9½
1912	83,577·12	1,199,080·87	1,282,657·99	5,448,384 16 5½
1913	86,255·13	1,227,788·15	1,314,043·28	5,581,701 1 2½
1914	51,454·65	1,181,522·17	1,232,976·82	5,237,352 12 6½
1915	17,340·47	1,192,771·23	1,210,111·70	5,140,227 15 5½
1916	26,742·17	1,034,655·87	1,061,398·04	4,508,532 5 11
1917	9,022·49	961,294·87	970,317·16	4,121,645 6 2½
1918	15,844·12	860,867·03	876,711·15	3,723,182 14 9
1919	6,445·89	727,619·90	734,065·79	3,118,113 5 6½
1920	5,361·13	612,581·00	617,942·13	2,624,426 11 0
1921	7,170·74	546,559·92	553,730·66	2,352,098 6 8½
1922	5,320·16	532,926·12	538,246·28	2,286,324 17 5
1923	5,933·82	498,577·59	504,511·41	2,143,028 5 0½
1924	2,585·20	482,449·78	485,034·98	2,060,297 12 8½
TOTAL	10,970,760·05	24,859,154·49	35,829,914·54	152,195,802 18 3

TABLE VI.

COMPARATIVE RETURN OF GOLD BULLION ENTERED FOR EXPORT AND RECEIVED AT THE PERTH BRANCH OF THE ROYAL MINT, DURING THE YEARS 1922, 1923, AND 1924, SHOWING IN FINE OUNCES THE QUANTITY RECORDED EACH MONTH, AND ITS VALUE.

MONTHS AND QUARTERS.	1922.				1923.				1924.			
	EXPORT.	MINT.	TOTAL.	VALUE.	EXPORT.	MINT.	TOTAL.	VALUE.	EXPORT.	MINT.	TOTAL.	VALUE.
	fine ozs.	fine ozs.	fine ozs.	£ s. d.	fine ozs.	fine ozs.	fine ozs.	£ s. d.	fine ozs.	fine ozs.	fine ozs.	£ s. d.
JANUARY	329·92	37,851·30	38,181·22	162,183 10 3½	766·44	41,149·71	41,916·15	178,048 9 9	198·08	37,260·27	37,458·35	159,112 19 1½
FEBRUARY	926·19	41,194·66	42,120·85	178,917 19 11½	245·08	38,871·62	39,116·70	166,157 3 7½	285·15	42,849·78	43,134·93	183,225 10 8½
MARCH	180·55	42,662·44	42,842·99	181,985 9 1	331·55	35,689·00	36,020·55	153,005 11 5	111·14	36,188·99	36,300·13	154,193 3 0½
<i>1st January to 31st March</i> ...	1,436·66	121,708·40	123,145·06	523,086 19 3½	1,343·07	115,710·33	117,053·40	497,211 4 9½	594·37	116,299·04	116,893·41	496,531 12 10½
APRIL	1,237·24	45,157·08	46,394·32	197,070 10 10½	216·21	41,437·08	41,653·29	176,931 18 7	...	45,087·57	45,087·57	191,519 16 5½
MAY	271·67	39,454·59	39,726·26	168,746 8 6½	1,099·25	34,769·94	35,869·19	152,362 12 8½	423·18	39,914·29	40,337·47	171,342 13 7½
JUNE	136·91	49,158·13	49,295·04	209,392 0 4½	161·24	44,502·99	44,664·23	189,721 11 9½	87·10	47,083·23	47,170·33	200,366 16 6½
<i>1st January to 30th June</i> ...	3,082·48	255,478·20	258,560·68	1,098,295 19 1½	2,819·77	236,420·34	239,240·11	1,016,227 7 10	1,104·65	248,384·13	249,488·78	1,059,760 19 6½
JULY	366·04	42,774·63	43,140·67	183,249 18 4½	1,061·58	40,283·93	41,345·51	175,624 11 3½	170·50	35,788·99	35,959·49	152,746 4 1
AUGUST	1,051·61	48,638·71	49,690·32	211,071 1 3	651·49	47,807·11	48,458·60	205,839 0 11½	...	41,581·96	41,581·96	176,628 18 9½
SEPTEMBER ... ..	...	46,398·21	46,398·21	197,087 1 5	...	46,272·38	46,272·38	196,552 11 6½	384·86	38,305·91	38,690·77	164,347 18 10½
<i>1st January to 30th September</i> ...	4,500·13	393,289·75	397,789·88	1,689,704 0 2	4,532·84	370,783·76	375,316·60	1,594,243 11 7½	1,660·01	364,060·99	365,721·00	1,553,484 1 3½
OCTOBER	216·07	49,092·82	49,308·89	209,450 17 0	767·13	49,956·62	50,723·75	215,460 15 10½	371·23	41,036·20	41,407·43	175,887 11 7½
NOVEMBER	153·10	46,401·35	46,554·45	197,750 14 8	222·89	32,481·05	32,703·94	138,917 10 1½	167·50	33,151·29	33,318·79	141,529 4 5½
DECEMBER	450·86	44,142·20	44,593·06	189,419 5 7	410·96	45,356·16	45,767·12	194,406 7 4½	386·46	44,201·30	44,587·76	189,396 15 3½
Total	5,320·16	532,926·12	538,246·28	2,286,324 17 5	5,933·82	498,577·59	504,511·41	2,143,028 5 0½	2,585·20	482,449·78	485,034·98	2,060,297 12 8½

TABLE VII.

MONTHLY RETURN OF GOLD, CONTAINED IN BULLION, FURNACE PRODUCTS, AND ORE, ENTERED FOR EXPORT DURING 1924.

MONTH.	UNITED KINGDOM.			VICTORIA.			NEW SOUTH WALES.			SOUTH AUSTRALIA.			TOTALS.			Minted Gold Exported*
	Bullion.	Furnace Products.	Ore.	Bullion.	Furnace Products.	Ore.	Bullion.	Furnace Products.	Ore.	Bullion.	Furnace Products.	Ore.	Bullion.	Furnace Products.	Ore.	
1924.	Fine ozs.	Estimated fine ozs.	Estimated fine ozs.	Fine ozs.	Estimated fine ozs.	Estimated fine ozs.	Fine ozs.	Estimated fine ozs.	Estimated fine ozs.	Fine ozs.	Estimated fine ozs.	Estimated fine ozs.	Fine ozs.	Estimated fine ozs.	Estimated fine ozs.	Fine ozs.
January	198·08	...	...	...	...	...	198·08	...	...
February	151·00	...	134·15	...	...	...	...	...	134·15	151·00	...
March	111·14	...	...	...	...	...	111·14	...	...
April	40,950·58
May	178·90	...	...	244·28	...	...	...	...	...	423·18	...	31,559·73
June	87·10	...	...	...	...	...	87·10	...	17,910·04
July	114·41	...	56·09	...	...	...	...	...	56·09	114·41	54,000·00
August
September	384·86	...	...	...	...	...	384·86	...	...
October	150·90	...	220·33	...	...	...	...	...	220·33	150·90	...
November	167·50	...	...	...	...	...	167·50	...	70·85
December	28·96	...	357·50	...	...	...	...	...	357·50	28·96	...
TOTALS	178·90	445·27	...	1,961·03	...	...	...	...	...	2,139·93	445·27	144,491·20

*When considering the total production of gold for this State, these amounts must be disregarded, having been already recorded in the total receipts of gold at the Mint.

TABLE VIII.

RETURN OF GOLD BULLION RECEIVED AT THE PERTH BRANCH OF THE ROYAL MINT FROM MAY, 1899, TO THE 31ST DECEMBER, 1924, SHOWING IN GROSS OUNCES THE QUANTITY OBTAINED FROM THE RESPECTIVE GOLDFIELDS AND OTHER COUNTRIES, AND THE ACTUAL VALUE THEREOF.

Year.	Kimberley.	Pilbara.	West Pilbara.	Ashburton.	Gascoyne.	Peak Hill.	East Murchison.	Murchison.	Yalgoo.
	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.
Previous to 1901	952·47	8,023·68	137·33	756·06	171·75	34,293·08	35,807·81	73,215·76	14,041·57
1901 ...	663·37	11,279·93	394·38	55·42	18·56	21,351·67	44,746·88	43,024·65	9,191·01
1902 ...	439·93	10,766·03	3,284·37	...	124·86	32,637·17	62,357·98	47,628·18	5,116·94
1903 ...	511·75	14,217·53	6,481·53	135·30	36·29	34,684·27	77,089·29	64,127·18	1,687·99
1904 ...	37·69	8,293·68	5,170·06	150·73	13·10	20,909·99	77,237·31	63,037·71	3,345·82
1905 ...	656·34	16,053·42	1,400·46	50·54	25·65	16,075·36	107,295·17	111,493·34	5,469·06
1906 ...	785·23	6,007·79	915·63	168·30	95·43	2,471·21	115,363·22	133,264·79	5,919·37
1907 ...	431·72	4,924·97	396·22	49·89	10·06	7,057·22	140,382·15	137,713·43	3,815·06
1908 ...	400·19	9,676·11	1,292·97	54·32	37·68	11,679·58	162,243·76	132,066·00	2,625·14
1909 ...	203·59	6,662·82	1,682·49	274·93	8·89	8,823·58	164,652·43	129,139·74	755·31
1910 ...	586·44	7,094·46	1,670·20	208·31	31·67	3,679·72	165,123·37	134,098·94	873·58
1911 ...	183·78	6,033·33	1,014·60	334·38	9·78	165·36	119,267·86	135,342·96	363·85
1912 ...	361·11	7,674·55	912·60	47·77	8·09	237·96	110,585·25	128,679·43	1,410·49
1913 ...	319·55	5,048·77	1,491·66	47·37	...	564·67	96,270·04	139,021·56	3,410·52
1914 ...	238·83	6,750·56	1,538·31	56·09	5·00	104·45	79,785·02	135,990·48	1,705·85
1915 ...	270·76	9,084·62	1,540·93	20·50	81·05	550·77	65,111·82	118,861·14	5,208·56
1916 ...	306·92	8,265·75	692·68	38·34	74·07	190·21	37,169·30	95,071·24	5,320·33
1917 ...	133·03	5,770·70	683·84	25·85	...	...	9,660·88	115,360·36	1,366·18
1918 ...	144·31	3,643·49	339·36	7·87	...	...	949·78	93,501·94	1,090·10
1919 ...	293·46	4,813·34	29·62	4·10	...	71·92	958·91	79,921·84	806·04
1920 ...	164·07	6,589·24	137·59	3·79	4·03	22·62	121·47	70,428·05	307·48
1921 ...	62·45	1,772·78	201·52	28·42	9·39	1·58	97·40	63,808·17	235·89
1922 ...	6·36	4,694·01	123·65	17·41	1·89	6·40	789·30	51,649·85	14,819·53
1923 ...	37·92	3,506·31	74·18	1·31	...	564·84	3,066·04	37,634·94	7,059·53
1924 ...	16·21	2,760·69	86·49	4·00	3·02	2,128·28	5,707·71	28,211·09	7,449·97
Total ...	8,207·48	179,348·86	31,692·72	2,541·00	770·26	198,271·91	1,681,840·15	2,862,292·77	103,395·17

Year.	Mt. Margaret.	North Coolgardie.	Broad Arrow.	North-East Coolgardie.	East Coolgardie.	Coolgardie.	Yilgarn.	Dundas.	*Phillips River.
	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.
Previous to 1901	84,659·99	133,467·52	22,879·60	57,204·02	172,896·93	79,218·50	37,719·21	32,056·83	...
1901 ...	126,703·91	135,493·31	18,829·13	43,055·63	263,514·75	78,026·07	29,433·84	32,825·75	...
1902 ...	144,663·12	182,543·06	15,903·42	53,901·58	636,536·52	94,134·17	25,873·68	31,088·91	5,146·80
1903 ...	148,006·49	197,229·08	21,528·20	42,649·25	685,289·82	82,218·79	26,856·28	40,006·39	6,420·79
1904 ...	143,453·51	166,939·82	24,721·53	39,799·55	699,475·35	73,076·66	35,854·87	37,508·11	2,450·03
1905 ...	184,178·87	175,057·14	18,394·17	48,352·22	737,065·14	74,615·36	30,404·65	32,953·56	1,753·32
1906 ...	166,097·63	130,784·60	20,415·43	37,509·91	742,525·99	73,307·24	30,996·76	24,484·65	1,744·38
1907 ...	183,693·29	86,685·09	16,228·85	30,285·39	766,846·83	73,532·99	27,795·35	27,222·21	1,806·30
1908 ...	175,092·47	90,815·08	9,408·64	28,300·91	779,009·10	48,524·18	22,835·58	48,785·54	4,299·19
1909 ...	163,781·55	80,293·29	5,860·66	29,603·84	747,856·04	43,756·68	25,255·30	43,254·22	4,345·04
1910 ...	158,847·24	73,283·66	386·84	22,967·23	786,209·41	46,054·82	28,945·68	52,068·70	6,056·08
1911 ...	162,319·77	74,536·34	346·78	22,917·38	848,725·06	41,861·54	18,190·20	59,831·49	5,242·16
1912 ...	124,123·10	61,018·13	5·32	17,705·86	872,900·05	51,732·78	33,429·29	52,222·76	4,026·32
1913 ...	107,391·67	73,160·41	10,814·52	13,452·90	867,887·30	42,738·63	76,581·73	47,535·02	4,221·40
1914 ...	125,937·60	89,904·49	3,727·56	6,318·12	824,280·77	26,696·51	99,410·57	47,487·27	480·65
1915 ...	132,819·64	69,318·34	17,810·16	10,808·78	872,466·66	21,593·44	111,539·75	42,283·16	324·48
1916 ...	136,731·10	48,799·86	8,415·40	2,441·68	780,354·90	15,238·33	104,136·12	36,653·26	221·89
1917 ...	136,343·74	34,650·24	11,300·38	936·97	737,833·22	7,968·62	91,168·91	34,685·39	238·50
1918 ...	118,132·80	37,572·67	3,087·67	179·83	695,564·50	8,338·10	84,297·45	29,049·05	494·27
1919 ...	117,763·53	26,692·84	3,455·12	144·34	569,681·41	4,866·10	74,493·69	20,346·85	434·47
1920 ...	103,788·16	14,038·70	6,997·95	440·84	507,113·25	5,035·18	45,007·22	9,865·14	43·29
1921 ...	35,134·85	12,492·59	206·82	54·75	543,397·61	273·77	27,844·76	6,259·31	413·29
1922 ...	39,572·87	14,263·42	...	...	527,784·28	664·06	16,847·62	4,800·69	403·98
1923 ...	41,206·42	11,757·92	423·44	703·32	502,783·94	1,334·06	9,085·08	674·62	325·25
1924 ...	51,477·10	11,534·54	2,047·14	1,670·74	473,587·19	8,486·18	10,904·41	2,708·25	85·41
Total ...	8,111,720·42	2,082,332·14	243,194·71	511,405·04	16,844,926·02	1,003,292·76	1,124,908·00	797,255·13	50,977·29

Year.	†Donnybrook.	State generally.	TOTAL.				GRAND TOTAL.						
			Western Australia.		Other Countries.		Quantity.		Actual Value.				
			Quantity.	Actual Value.	Quantity.	Actual Value.	Quantity.	Actual Value.	Quantity.	Actual Value.			
	Ozs.	Ozs.	£	s.	d.	Ozs.	£	s.	d.	Ozs.	£	s.	d.
Previous to 1901	461·72	2,525·32	790,489·15	2,858,759	5 8	120·95	381 13 10	790,610·10	2,859,140	19 6	...	...	...
1901 ...	4·64	1,667·79	850,280·69	3,033,311	0 4	92·25	297 5 8	860,372·94	3,033,608	6 0	...	...	...
1902 ...	67·08	2,461·98	1,354,615·78	4,791,303	18 1	16·27	38 10 2	1,354,632·05	4,791,342	8 3	...	...	...
1903 ...	97·52	3,350·32	1,452,624·11	5,139,852	11 9	294·78	703 14 10	1,452,918·89	5,140,556	6 7	...	...	...
1904	1,608·47	1,403,083·89	4,955,870	9 0	263·05	614 11 9	1,403,346·94	4,956,485	0 9	...	...	...
1905	1,821·99	1,563,115·76	5,475,841	2 10	523·80	1,491 0 7	1,563,641·56	5,477,332	3 5	...	...	...
1906	925·10	1,403,782·66	5,330,245	12 1	413·86	974 16 0	1,494,196·52	5,331,220	8 1	...	...	...
1907	340·39	1,509,217·41	5,416,812	0 7	640·51	1,663 4 3	1,509,857·92	5,418,475	4 10	...	...	...
1908	2,080·42	1,529,226·86	5,386,858	15 8	1,313·84	3,885 2 3	1,530,540·70	5,390,743	17 11	...	...	...
1909	548·71	1,456,759·11	5,143,035	17 1	882·56	1,109 6 7	1,457,641·67	5,144,145	3 8	...	...	...
1910	268·26	1,488,454·61	5,163,100	17 11	2,251·71	1,670 11 7	1,490,706·32	5,164,771	9 6	...	...	...
1911	159·90	1,496,846·52	5,143,795	10 5	452·22	915 19 4	1,497,298·74	5,144,711	9 9	...	...	...
1912	174·26	1,471,253·12	5,106,466	9 1	641·47	1,527 8 0	1,471,894·59	5,107,993	17 1	...	...	...
1913	277·70	1,490,235·42	5,204,738	18 3	697·50	1,247 12 7	1,490,932·92	5,205,986	10 10	...	...	...
1914	350·48	1,450,768·61	5,016,905	19 0	915·24	1,726 5 1	1,451,683·85	5,018,632	4 1	...	...	...
1915	392·28	1,480,026·72	5,060,196	7 6	1,260·07	2,610 8 11	1,481,286·79	5,062,806	16 5	...	...	...
1916	437·33	1,280,558·71	4,405,278	13 10	1,059·26	2,060 6 9	1,281,617·97	4,407,339	0 7	...	...	...
1917	264·27	1,188,391·08	4,074,112	6 7	1,016·70	1,905 17 7	1,189,407·78	4,076,018	4 2	...	...	...
1918	705·32	1,077,698·51	3,855,942	4 5	1,468·02	2,476 6 11	1,079,166·53	3,858,418	11 4	...	...	...
1919	109·08	904,286·66	3,089,243	3 1	1,358·71	2,811 16 1	905,645·37	3,091,854	19 2	...	...	...
1920	161·46	770,269·53	2,595,167	17 9	1,375·73	1,531 13 5	771,645·26	2,596,699	16 2	...	...	...
1921	86·45	692,381·80	2,322,697	14 1	1,563·59	2,206 15 8	693,945·39	2,324,904	9 9	...	...	...
1922	85·44	676,330·76	2,264,069	17 11	3,319·49	2,130 17 2	679,650·25	2,260,200	15 1	...	...	...
1923	86·62	620,325·74	2,118,348	19 7	1,110·52	2,752 9 4	621,636·26	2,121,101	8 11	...	...	...
1924	58·91	608,927·33	2,049,636	8 9	1,113·53	1,814 18 4	609,933·86	2,051,451	7 1	...	...	...
Total ...	630·96	20,948·25	30,109,950·54	104,801,592	1 8	24,260·63	40,348 17 8	30,134,211·17	104,841,940	18 11	...	...	...

* Prior to 1902 included in State generally.

† Abolished 4th March, 1908.

PART II.—MINERALS OTHER THAN GOLD.

TABLE IX.—GENERAL RETURN OF ORE AND MINERALS, OTHER THAN GOLD, SHOWING THE QUANTITY PRODUCED AND THE VALUE THEREOF AS REPORTED TO THE MINES DEPARTMENT FROM THE RESPECTIVE GOLDFIELDS AND MINERAL FIELDS, DURING 1924, AND PREVIOUS YEARS.

Period.	BLACK TIN.											
	Pilbara Goldfield—Marble Bar District.				Greenbushes Mineral Field.				Total.			
	Quantity.			Value.	Quantity.			Value.	Quantity.			Value.
	Lode.	Stream.	Total.		Lode.	Stream.	Total.		Lode.	Stream.	Total.	
Previous to 1901	£ 35,205	...	...	...	£ 117,294	...	...	...	£ 2,324.09
1901	21,148	...	...	...	18,852	...	...	...	794.32
1902	15,103	...	...	...	24,680	...	...	...	619.56
1903	21,528	...	...	...	34,362	...	...	...	817.05
1904	24,355	...	...	...	34,462	...	...	...	854.50
1905	38,880	...	...	...	52,960	...	...	...	1,079.26
1906	78,449	...	...	...	79,195	...	...	...	1,432.16
1907	85,603	...	...	...	73,045	...	...	...	1,479.16
1908	30,636	...	...	...	41,046	...	...	...	934.46
1909	22,431	...	...	...	34,786	...	...	...	*628.08
1910	12,899	...	...	...	31,771	...	...	...	412.40
1911	16,064	...	...	...	44,638	...	...	...	504.60
1912	14,993	...	...	...	50,166	...	...	...	528.68
1913	16,506	...	...	...	50,954	...	...	...	*557.72
1914	8,168	...	...	...	21,145	...	...	...	314.27
1915	7,633	...	...	...	21,431	...	...	...	313.38
1916	15,939	...	...	...	27,319	...	...	...	418.47
1917	9,264	...	...	...	29,928	...	...	...	15.23
1918	20,984	...	...	...	57,653	...	...	...	339.08
1919	8,871	...	...	...	34,959	...	...	...	257.65
1920	7,616	...	...	...	31,249	...	...	...	221.84
1921	1,460	...	...	...	52.87	...	...	...	60.37
1922	2,446	...	...	...	1,393	...	...	...	41.06
1923	2,960	...	...	...	3,024	...	...	...	52.42
1924	4,048	...	...	...	7,469	...	...	...	80.79
Total	372.62	5,311.97	5,684.59	515,189	347.61	10,479.77	10,827.38	925,762	720.23	15,796.61	16,516.84	1,441,326

* Includes tons 1.52, the produce of Cue District. † Includes £118, value of tons 1.52, the produce of Cue District, ‡ Includes tons 3.20, the produce of Cue District and tons .15 of Coolgardie District. § Includes £242, value of tons 3.20 the produce of Cue District, and £15, value of .15 tons of Coolgardie District.

Period.	TANTALITE.											
	Pilbara Goldfield—Marble Bar District.				Greenbushes Mineral Field.				Total.			
	Quantity.			Value.	Quantity.			Value.	Quantity.			Value.
	Lode.	Stream.	Total.		Lode.	Stream.	Total.		Lode.	Stream.	Total.	
Previous to 1901	£	£	£ ...
1901
1902
1903
1904
1905	8,925	...	...	...	1,590	...	...	...	10,515
1906	2,644	...	...	...	...	...	...	...	2,644
1907
1908
1909	113	...	...	...	214	...	...	...	327
1910
1911
1912
1913
1914
1915
1916
1917	1,782	...	...	...	...	...	...	...	1,782
1918
1919
1920
1921
1922
1923
1924
Total	2.25	98.30	98.55	13,464	...	3.19	3.19	1,804	2.25	99.49	101.74	15,268

Period.	PYRITIC ORE.		COPPER ORE.													
	Mt. Margaret G.F.	West Kimberley Goldfield	Pilbara Goldfield.				West Pilbara Gf.				Ashburton Gf.		Peak Hill Gf.		E. Murchison Gf.	
			Marble Bar D.		Nullagine D.		...		...		...		...		Lawlers D.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Previous to 1901	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1901	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1902	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1903	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1904	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1905	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1906	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1907	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1908	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1909	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1910	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1911	9,988.92	3,529	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1912	7,625.80	2,543	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1913	10,216.18	3,658	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1914	9,758.83	3,485	38.50	426	...	...	...	...	...	...	...	...	...	...	...	...
1915	6,557.62	2,368	67.55	1,247	...	...	...	...	...	...	...	...	...	...	...	...
1916	4,409.22	2,263	3.47	36	...	...	...	...	...	...	...	...	...	...	...	...
1917	3,575.46	1,762	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1918	2,251.81	1,629	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1919	4,135.93	4,919	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1920	6,019.98	7,276	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1921	6,116.66	7,871	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1922	3,441.15	4,203	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1923	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1924	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	74,047.56	45,496	109.52	1,709	32.87	386	14.00	480	82,700.45	748,082	351.07	6,408	1,015.11	32,212	238.56	4,364

|| Represents the value of the sulphur only, the copper contents not having been treated yet.

TABLE IX.—Minerals other than Gold, etc.—continued.

Period.	COPPER ORE—continued.															
	Murchison Gf.				Yalgoo Gf.		Northampton Mf.		Yandanooka Mf.		Mt. Margaret Goldfield.					
	Meekatharra D.		Day Dawn D.		Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Mt. Morgans District.		Mt. Margaret District.	
	Quantity.	Value.	Quantity.	Value.									Quantity.	Value.	Quantity.	Value.
Previous to 1901	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£		
1901	5.15	91	...	...	98.00	1,715	38.00	407	4,812.00	35,056	...	...
1902	10.50	76	...	...	38.50	277	...	...	7,660.00	40,738	...	...
1903	1,954.00	6,852	...	...
1904	18,965.00	45,557	...	...
1905	600.00	900	...	...
1906	...	133.50	2,816	...	...	13.91	91	...	...	...	60.00	674	...	...
1907	10.00	130	...	...	...	4,361.05	21,934	...	...
1908	81.71	274	...	...	...	...	...	5,141.52	58,888	2.85	26		
1909	...	608.00	2,823	...	...	9.50	97	...	...	133.55	4,404.10	20,221	...	...
1910		
1911		
1912	4.80	54	...	...	...	...	...	...	...	...	...
1913		
1914	...	15.19	248	3.40	27	...	...	...	...	...	...	...	...	...
1915	...	33.70	492	...	...	4.99	95	...	...	...	...	...	...	...
1916		
1917	...	82.92	2,164	...	...	...	...	...	...	...	...	...	...	...
1918	...	78.34	1,794	...	...	...	...	998.66	13,435	...	...	...	...	...
1919	...	16.81	377	...	...	...	...	9,826.29	59,143	...	...	...	...	...
1920	10,672.00	34,955	...	...	...	...	...
1921		
1922		
1923		
1924		
Total	968.46	10,714	55.56	522	38.40	413	21,433.45	109,525	171.55	1,889	47,857.67	230,820	2.85	26		

Period.	COPPER ORE—continued.											GYPSUM.	
	North Coolgardie Goldfield.		East Coolgardie Goldfield.		Phillips River Goldfield.		State generally.		Total.		State generally.		
	Menzies District.		E. Coolgardie D.		Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	
	Quantity.	Value.	Quantity.	Value.									
Previous to 1901	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	
1901	34.00	725	...	...	16,165.15	134,881	...	...
1902	1,089.14	12,918	...	...	9,960.14	69,900	...	...
1903	308.25	1,238	...	...	2,262.25	8,090	...	...
1904	1,561.33	10,984	...	...	20,526.33	56,541	...	...
1905	3,468.89	24,280	...	...	3,968.89	25,180	...	...
1906	...	4.70	33	...	2,329.04	15,592	...	...	2,389.04	16,266	...	...
1907	...	1.42	18	...	2,865.00	25,270	13.50	193	7,411.66	50,387	...	...
1908	50.67	330	10,414.57	57,273	3.08	40	18,978.42	180,387	...	...
1909	2,015.71	9,233	...	...	8,294.30	51,434	...	...
1910	7,380.70	29,815	...	...	15,084.95	95,344	...	...
1911	25,871.65	96,745	...	...	34,351.45	161,606	...	...
1912	13,563.68	40,862	...	...	22,075.80	116,318	...	...
1913	1,318.38	15,815	...	...	13,607.20	120,168	...	...
1914	806.95	9,737	...	...	13,428.68	86,615	...	...
1915	4,841.15	37,524	2.03	16	12,775.12	81,241	...	...
1916	3,681.03	24,093	...	...	4,498.56	40,998	...	...
1917	5,428.08	48,618	...	...	6,097.38	74,376	...	...
1918	5,255.57	66,868	...	...	6,488.65	93,711	...	...
1919	2,901.66	42,978	...	...	4,982.91	77,527	...	...
1920	215.02	4,998	...	...	1,277.00	21,580	...	...
1921	217.27	4,125	...	...	1,962.16	37,945	...	...
1922	95.34	1,207	...	...	1,150.34	20,162	664.50	622
1923	31.84	217	...	...	1,194.50	16,133	63.00	16
1924	26.01	541	...	...	9,873.30	63,184	...	...
Total	6.12	51	50.67	330	95,693.95	587,695	18.61	249	250,758.87	1,735,875	4,964.50	5,916	

Period.	IRONSTONE.								LEAD ORE.					
	W. Pilbara Gf.		E. Coolgardie Gf.		State generally.		Total.		Northampton Mf.		West Pilbara Gf.		Total.	
	E. Coolgardie D.		Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Quantity.	Value.												
Previous to 1901	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£
1901	100.00	300	...	...	25,103.00	18,197	25,203.00	18,497	350.75	1,445	...	...	350.75	1,445
1902	450.00	247	20,119.00	12,999	20,569.00	13,246	...	...	...	...	...	...
1903	4,800.00	2,040	4,800.00	2,040	...	...	...	...	...	...
1904	220.00	88	220.00	88	...	...	...	...	...	...
1905	1,441.50	577	1,441.50	577	...	...	...	...	...	...
1906	3,212.60	1,285	3,212.60	1,285	...	...	...	...	...	...
1907	1,279.87	512	1,279.87	512	...	...	...	...	...	...
1908	1,093.53	438	1,093.53	438	10.00	128	...	...	10.00	128
1909	57.00	461	...	...	57.00	461
1910
1911	185.10	1,777	...	...	185.10	1,777
1912	8,194.76	17,663	...	...	8,194.76	17,663
1913	11,098.50	24,412	...	...	11,098.50	24,412
1914	26,589.53	50,474	...	...	26,589.53	50,474
1915	15,334.62	38,351	...	...	15,334.62	38,351
1916	15,678.30	29,396	...	...	15,678.30	29,396
1917	34,578.34	110,872	44.00	770	34,622.34	111,642
1918	46,801.97	148,925	62.57	759	46,864.54	144,684
1919	47,079.68	176,380	...	...	47,079.68	176,380
1920	7,385.70	29,341	...	...	7,385.70	29,341
1921	27,716.40	122,483	...	...	27,716.40	122,483
1922	10,300.43	25,649	...	...	10,300.43	25,649
1923	29,600.00	72,338	...	...	29,600.00	72,338
1924	21,634.50	59,194	...	...	21,634.50	59,194
Total	100.00	300	450.00	247	57,280.00	36,148	57,830.00	36,69	339,378.48	1,055,958	106.57	1,529	339,485.05	1,057,487

† Iron ore from Koolan Island, Yampi Sound.

TABLE IX.—Minerals other than Gold, etc.—continued.

Period.	SILVER LEAD ORE.				TUNGSTEN ORES.											
	Ashburton Gf.		State generally.		North Coolgardie Gf.		Broad Arrow Goldfield.		SCHEELITE.				Total.			
									Coolgardie Gf.		Dundas Goldfield.					
	Quantity.		Value.		Quantity.		Value.		Quantity.		Value.		Quantity.		Value.	
tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	
Previous to 1901	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1901	21.05	152	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1902	35.85	277	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1903	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1904	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1905	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1906	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1907	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1908	727.25	6,914	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1909	440.00	3,520	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1910	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1911	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1912	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1913	125.50	1,757	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1914	715.10	9,807	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1915	298.96	4,429	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1916	67.83	554	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1917	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1918	237.48	3,461	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1919	214.76	3,116	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1920	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1921	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1922	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1923	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1924	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	2,883.78	33,987	265.89	1,295	407.31	942	3.35	175	85.71	155	.41	10	496.78	1,282		

Period.	COAL.		FIRECLAY.		GADOLINITE.		ASBESTOS.									
	Collie Mf.		Collie Mf.		Pilbara Gf.		Pilbara Gf.				West Pilbara Goldfield.		Total.			
							Marble Bar D.		Nullagine D.							
	Quantity.		Value.		Quantity.		Value.		Quantity.		Value.		Quantity.		Value.	
tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	
Previous to 1901	176,254.10	82,547	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1901	117,885.80	68,561	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1902	140,883.90	86,188	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1903	133,426.62	69,128	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1904	138,560.04	67,174	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1905	127,364.06	55,312	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1906	149,755.27	57,998	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1907	142,372.54	55,158	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1908	175,247.92	75,694	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1909	214,301.98	90,965	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1910	202,166.06	113,699	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1911	249,899.15	111,154	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1912	295,078.91	135,857	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1913	313,817.96	153,614	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1914	319,210.32	148,684	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1915	286,666.35	137,859	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1916	301,525.97	147,823	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1917	326,550.07	191,822	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1918	337,039.24	204,319	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1919	401,713.18	270,355	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1920	462,020.78	350,346	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1921	468,816.65	407,117	677.80	646	...	...	...	...	...	...	...	...	...	...	...	...
1922	438,442.78	381,555	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1923	420,713.98	368,949	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1924	421,863.86	363,255	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	6,821,517.49	4,195,133	677.80	646	1.00	112	112.93	5,414	744.01	32,471	.85	17	857.79	37,902		

Period.	LIMESTONE.								DIAMONDS.		MAGNESITE.		AN. IMONY.		MANGANESE.	
	Murchison Gf.		Yilgarn Goldfield.		State generally.		Total.		Pilbara Gf.		East Coolgardie Goldfield.		West Pilbara Goldfield.		Peak Hill Goldfield.	
									Nullagine District.		Bulong District.					
	Quantity.		Value.		Quantity.		Value.		Quantity.		Value.		Quantity.		Value.	
tons.	£	tons.	£	tons.	£	tons.	£	carats.	£	tons.	£	tons.	£	tons.	£	
Previous to 1901
1901	269.85	273	33,250.00	6,159	33,519.85	6,432	...	...	...	...	...	...	...	...
1902	1,642.00	919	16,568.00	3,429	18,210.00	4,348	...	...	...	...	...	...	...	...
1903	535.00	340	4,545.35	1,000	5,080.35	1,340	...	...	...	...	...	...	...	...
1904	102.00	75	1,177.50	103	1,279.50	178	...	...	...	...	...	...	...	...
1905	13,397.20	1,699	13,397.20	1,699	...	...	...	...	...	...	...	...
1906	9,144.60	1,220	9,144.60	1,220	...	...	...	...	...	...	...	...
1907	298.00	772	...	...	9,472.28	1,691	9,472.28	1,691	...	...	...	...	...	...	...	...
1908	3,303.95	610	3,601.95	1,382	...	...	...	...	...	...	...	...
1909
1910
1911
1912
1913
1914
1915
1916
1917
1918
1919
1920
1921
1922
1923
1924
Total	298.00	772	2,548.85	1,607	90,858.88	15,911	92,75.73	18,290	24	824.75	1,053	20.78	491	76.74	4.6	

* Produced within the West Kimberley Goldfield. † Tons 22.00, value £30, the produce of West Kimberley, and tons 20.00, value £85, the produce of Cue. ‡ The produce of Cue District. § Weight unknown. ** The produce of Yalgoo Goldfield.

NOTE.—As the collection of Statistics of Minerals other than Gold commenced during 1899, the total production from the different localities can only be approximately estimated by the Customs Records, the latest available returns of which are to be found in Table XXVIII, pages 74-79.

TABLE X.

QUANTITY AND VALUE OF BLACK TIN REPORTED TO THE MINES DEPARTMENT DURING 1924,
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1924.				TOTALS TO DATE.			
			Quantity.			Value.	Quantity.			Value.
			Lode.	Stream.	Total.		Lode.	Stream.	Total.	
			tons.	tons.	tons.	£	tons.	tons.	tons.	£
PILBARA GOLDFIELD.										
MARBLE BAR DISTRICT.										
Coogong	...	Sundry claims	...	9-00	9-00	1,231	...	1,715-27	1,715-27	152,906
Mills Find	...	Sundry claims	...	...	...	...	...	85	85	69
Moolyella	...	Voided leases	...	...	...	...	...	330-53	330-53	21,340
Do.	...	Sundry claims	...	19-00	19-00	2,724	...	2,853-21	2,853-21	271,754
Old Shaw	...	Voided leases	...	...	...	...	...	675	675	424
Do.	...	Sundry claims	...	...	...	...	...	214-04	214-04	14,525
Tabba Tabba	...	Sundry claims	...	...	...	93	...	116-57	116-57	13,098
Wedgna	M.Ls. 86, 87, 95	H.M. and Anchorite leases	...	...	...	...	...	5-00	5-00	5,500
Do.	M.L. 84	(Mount Cassiterite)	...	...	...	...	133-52	13-85	147-37	14,184
Do.	M.Ls. 84, (93), (148)	Mount Cassiterite leases	...	...	...	...	195-50	1-60	197-10	16,913
Do.	...	Voided leases	...	...	...	...	...	37-82	6-10	43-92
Do.	...	Sundry claims	...	...	...	...	...	5-78	48-20	53-98
		Totals	...	28-55	28-55	4,048	372-62	5,311-97	5,684-59	515,189
MURCHISON GOLDFIELD.										
CUE DISTRICT.										
Poons	...	Sundry claims	...	...	...	...	...	1-52	1-52	118
Cuddingwarra	...	Sundry claims	...	...	...	...	...	3-20	3-20	242
		Totals	...	...	...	...	...	4-72	4-72	360
COOLGARDIE GOLDFIELD.										
COOLGARDIE DISTRICT.										
Bulla Bulling	...	Sundry claims	...	...	...	...	...	-15	-15	15
		Totals	...	...	...	...	...	-15	-15	15
GREENBUSHES MINERAL FIELD.										
Greenbushes	(511)	Champion	...	2-75	2-75	330	1-60	215-42	217-02	24,045
Do.	515	Kapanga	...	...	...	48	33-42	96	34-38	4,314
Do.	505, (519), 614	Scotia leases	...	10-35	10-35	1,424	...	70-52	70-52	7,531
Do.	580	Southern Cross	...	...	...	...	7-95	...	7-95	1,086
Do.	Locs. 289, 290	Clarth and others	...	...	...	...	...	318-04	318-04	28,959
Do.	Loc. 290	McKay & Struthers	...	...	...	...	...	5-39	5-39	762
Do.	...	Voided leases	...	...	...	...	233-54	3,255-78	3,489-32	343,118
Do.	...	Sundry claims	...	30-14	30-14	5,667	71-10	6,613-66	6,684-76	515,947
		Totals	...	52-24	52-56	7,469	347-61	10,479-77	10,827-38	925,762

TABLE XI.

QUANTITY AND VALUE OF TANTALITE REPORTED TO THE MINES DEPARTMENT DURING 1924, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1924.				TOTAL TO DATE.			
			Quantity.			Value.	Quantity.			Value.
			Lode.	Stream.	Total.		Lode.	Stream.	Total.	
			tons.	tons.	tons.	£	tons.	tons.	tons.	£
PILBARA GOLDFIELD.										
MARBLE BAR DISTRICT.										
Wedgna	86, 87, 95	H.M. and Anchorite leases	...	...	...	...	2-25	44-89	47-05	7,340
Do.	...	Sundry claims	...	...	...	...	...	51-50	51-50	6,124
		Totals	...	...	...	...	2-25	96-39	98-55	13,464
GREENBUSHES MINERAL FIELD.										
Greenbushes	(369)	Enterprise	...	...	...	...	...	3-19	3-19	1,304
		Totals	...	...	...	...	...	3-19	3-19	1,304

TABLE XII.

QUANTITY AND VALUE OF PYRITIC ORE REPORTED TO THE MINES DEPARTMENT DURING 1924, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1924.		TOTAL TO DATE.	
			Quantity.	†Value.	Quantity.	†Value.
			tons.	£	tons.	£
MT. MARGARET GOLDFIELD.						
MT. MORGANS DISTRICT.						
Eulamanna ...	M.Ls. 4F, 5F, (11F), (12F)	West Australian Copper Co., Ltd. ...	...	...	61,687·98	33,818
Murrin Murrin...	M.L. 18F	Nangeroo: Nangaroo Mines, Ltd. ...	...	...	12,350·58	6,673
		Totals ...	...	...	74,047·56	45,496

† Represents the value of the sulphur only, the copper contents not having been treated.

TABLE XIII.

QUANTITY AND VALUE OF COPPER ORE REPORTED TO THE MINES DEPARTMENT DURING 1924, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1924.			TOTAL TO DATE.		
			Quantity.		Value.	Quantity.		Value.
			Ore.	Metallic Copper.		Ore.	Metallic Copper.	
			tons.	tons.	£	tons.	tons.	£
WEST KIMBERLEY GOLDFIELD.								
Berylton ...	M.L. (1), [221H]	Voided leases ...	...	...	...	13·19	2·76	200
Yampi Sound ...	...	Yampi Sound Copper Mine	...	...	...	92·86	22·80	1,473
		Sundry claims ...	...	...	...	3·47	·36	36
		Totals ...	...	...	...	109·52	25·92	1,709
PILBARA GOLDFIELD.								
MARBLE BAR DISTRICT.								
Marble Bar ...	...	Voided Leases ...	...	...	...	11·00	1·64	90
Do. ...	...	Sundry claims ...	...	...	...	4·75	·48	25
North Pole ...	...	Voided leases ...	...	...	...	9·35	1·39	81
North Shaw ...	...	Voided leases ...	...	...	...	7·77	1·90	190
		Totals ...	...	...	...	32·87	5·41	386
NULLAGINE DISTRICT.								
Lionel ...	...	Sundry claims ...	...	...	...	9·00	4·75	360
McPhee's Creek	M.L. (14L)	Tambina	...	...	...	5·00	2·22	120
		Totals ...	...	...	...	14·00	6·97	480
WEST PILBARA GOLDFIELD.								
Croydon ...	...	Voided leases ...	...	...	...	604·00	108·65	7,333
Egina ...	...	Voided leases ...	...	...	...	542·00	104·15	6,643
Roebourne ...	M.L. 183	(Carlow Castle: Roebourne Copper Mine, Ltd.)	...	...	...	69·00	7·80	780
Do. ...	M.L. 174	Good Fortune	...	...	...	56·77	8·58	904
Do. ...	M.Ls. 174, (175)	(Good Fortune leases)	...	...	...	63·40	9·58	1,011
Do. ...	M.L. 184	Good Luck	...	...	...	521	1·01	111
Do. ...	M.L. 187	(Quod Est.)	...	...	...	22·43	3·49	256
Do. ...	M.Ls. 167, 183	Roebourne Copper Mines, Ltd.	...	...	...	122·45	18·50	1,855
Do. ...	M.Ls. 144, (192), (193)	Yannery and Whundo Copper Mining Co., Ltd.	...	...	...	404·50	37·14	8,116
Do. ...	M.L. 144	Yannery Hill Copper Mine	...	...	...	469·25	113·81	9,961
Do. ...	...	Voided leases ...	...	...	...	2,729·28	515·83	44,459
Do. ...	...	Sundry claims ...	...	...	...	77·41	13·61	800
Whim Creek ...	M.L. 34	(Balla Balla Copper Mines, Ltd.)	...	...	...	2,009·00	166·33	12,036
Do. ...	M.L. 34	Mons. Cupri: Whim Well Copper Mines, Ltd.	...	...	...	282·50	33·75	2,979
Do. ...	Loc. 71	Pilbarra Copper Fields, Ltd.	79·00	16·50	1,012	2,650·50	574·31	46,096
Do. ...	Loc. 71	(Whim Well Copper Mines, Ltd.)	...	...	...	72,562·75	9,343·89	604,492
Do. ...	...	Voided leases ...	...	...	...	30·00	5·50	250
		Totals ...	79·00	16·50	1·012	82,700·45	11,115·93	748,082

TABLE XIII.—Quantity and Value of COPPER ORE, etc.—continued.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1924.			TOTALS TO DATE.		
			Quantity.		Value.	Quantity.		Value.
			Ore.	Metallic Copper.		Ore.	Metallic Copper.	
			tons.	tons.	£	tons.	tons.	£
ASHBURTON GOLDFIELD.								
Ashburton ...	...	Sundry claims ...	...	...	...	6.82	79	94
Bed Hill ...	...	Voided leases ...	...	...	...	175.50	33.85	2,126
Uaroo ...	...	Voided leases ...	...	...	...	169.25	62.49	4,188
		Totals ...				351.07	97.13	6,408
PEAK HILL GOLDFIELD.								
Peak Hill ...	M.L. (35P) ...	Burra Copper Mines, Ltd. ...	...	...	...	25.84	8.85	943
Do. ...	M.Ls. 37P, 38P	Sonia leases ...	...	...	...	135.04	47.28	4,307
Do. ...	M.L. 9P	Sons of Gwalla ...	...	...	...	453.49	169.89	15,680
Do. ...	M.Ls. (29P), (30P) (31P)	(Two Sisters leases) ...	...	...	...	64.04	30.99	1,466
Do. ...	M.L. (31P) ...	Two Sisters North... ..	...	...	...	115.76	31.40	3,594
Do. ...	...	Voided leases ...	...	...	...	153.91	43.02	3,885
Do. ...	...	Sundry claims ...	...	...	...	62.03	21.96	1,887
		Totals ...				1,015.11	353.31	32,312
EAST MURCHISON GOLDFIELD.								
LAWLERS DISTRICT.								
Kathleen Valley ...	M.L. (12) ...	Shepherd ...	...	...	...	6.77	1.32	69
Lawlers ...	M.L. (29) ...	Bungarra ...	...	...	...	157.44	23.85	2,837
Do. ...	...	Sundry claims ...	...	...	...	74.35	13.25	1,458
		Totals ...				238.56	38.42	4,364
MURCHISON GOLDFIELD.								
MEEKATHARRA DISTRICT.								
Gabanintha ...	...	Voided leases ...	...	...	...	920.56	119.84	9,381
Do. ...	...	Sundry claims ...	...	...	...	34.42	9.23	1,072
Holden's Find... ..	...	Sundry claims ...	...	...	...	6.72	1.11	111
Yaloginda ...	...	Sundry claims ...	...	...	...	6.76	1.41	150
		Totals ...				968.46	131.59	10,714
DAY DAWN DISTRICT.								
Day Dawn ...	...	Voided leases ...	...	...	...	26.95	5.17	305
Do. ...	...	Sundry claims ...	...	...	...	28.61	2.93	217
		Totals ...				55.56	8.10	522
YALGOO GOLDFIELD.								
Mount Gibson ...	...	Sundry claims ...	...	...	...	4.99	1.10	95
Twin Peaks ...	...	Sundry claims ...	...	...	...	19.50	3.49	227
Wadgingarra ...	M.L. (6) ...	Olive Queen ...	...	...	...	13.91	.98	91
		Totals ...				38.40	5.57	413
NORTHAMPTON MINERAL FIELD.								
Geraldine ...	M.Ls. (10), (11)	Geraldine leases ...	...	...	...	136.50	36.05	1,992
Narra Tarra ...	Loc. 833 ...	Narra Tarra : Fremantle Trading Co., Ltd.	10,672.00	554.19	34.955	21,296.95	1,846.15	107,533
		Totals ...	10,672.00	554.19	34.955	21,433.45	1,882.20	109,525
YANDANOOKA MINERAL FIELD.								
Arrino ...	...	Sundry claims ...	...	...	...	126.05	18.48	1,386
Yandanooka ...	Freshold Gd. ...	Muggawa Copper Mines ...	...	...	...	7.50	1.20	96
Do. ...	...	Voided leases ...	...	...	...	38.00	7.95	407
		Totals ...				171.55	27.63	1,889
MOUNT MARGARET GOLDFIELD.								
MOUNT MORGANS DISTRICT.								
Eulaminna ...	[10c, 11c], 4F, 5F (12c, 37c)	(Mt. Malcolm Copper Mine leases) ...	...	...	...	13,516.00	1,001.98	70,754
Do. ...	[10c, 11c], 4F, 5F	(Mt. Malcolm Copper Mine leases) ...	...	...	...	3,839.00	418.00	17,065
Do. ...	[10c, 11c], 4F, 5F (12c, 37c)	(Murrin Copper Mines, Ltd.) ...	...	...	...	19,165.00	798.50	45,817
Do. ...	4F, 5F (11P) (12P)	West Australian Copper Co., Ltd. ...	...	...	...	9,794.05	1,976.08	80,199
Mt. Margaret ...	G.M.L. (66P) ...	Mt. Morven ...	...	...	...	11.53	2.40	163
Murrin Murrin... ..	13P ...	Nangeroo : Nangeroo Mines, Ltd. ...	...	...	...	6.80	3.00	160
Do. ...	...	Voided leases ...	...	...	...	1,525.29	248.04	16,662
		Totals ...				47,857.87	4,448.00	230,820

TABLE XIII.—Quantity and Value of COPPER ORE, etc.—continued.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1924.			TOTALS TO DATE.		
			Quantity.		Value.	Quantity.		Value.
			Ore.	Metallic Copper.		Ore.	Metallic Copper.	
			tons.	tons.	£	tons.	tons.	£
MOUNT MARGARET GOLDFIELD—continued.								
MOUNT MARGARET DISTRICT.								
Burtville	M.L. (16r)	Dreadnought	...	...	...	2·85	·29	26
		Totals	...	...	...	2·85	·29	26
NORTH COOLGARDIE GOLDFIELD.								
MENEIES DISTRICT.								
Goongarrie	M.L. (18z)	Providence Copper Mining Syndicate, Ltd.	...	...	...	4·70	·42	33
Do.	...	Sundry claims	...	...	...	1·42	·40	18
		Totals	...	...	...	6·12	·82	51
EAST COOLGARDIE GOLDFIELD.								
EAST COOLGARDIE DISTRICT.								
Boorara	M.L. (100e)	Premier Copper Mine	...	...	...	50·67	6·22	330
		Totals	...	...	...	50·67	6·22	330
PHILLIPS RIVER GOLDFIELD.								
Kundip	G.M.Ls. 147, 179	Fair Play leases	...	...	...	130·09	131·30	11,975
Do.	G.M.L. 184	Gem	...	...	...	90·98	22·58	2,404
Do.	G.M.Ls. 151, 156	Gem Consolidated leases	...	...	...	48·00	76·75	8,327
Do.	M.Ls. 52, 94	Harbour View Gold and Copper Co., Ltd.	...	...	...	1,209·93	90·14	8,236
Do.	M.Ls. 52, 94	(Harbour View leases)	...	...	...	604·36	76·80	4,524
Do.	M.Ls. 52, 94	(Harbour View leases)	...	...	...	508·27	64·66	3,642
Do.	G.M.L. 98	Hillsborough	...	...	...	692·84	57·65	4,746
Do.	M.L. 370	North Harbour View	...	...	...	15·72	24·99	124
Do.	M.Ls. 52, 94	(Ravensthorpe G.M. Syndicate, N.L.)	...	...	...	132·56	24·36	1,332
Do.	...	Voided leases	...	...	...	3,430·67	319·32	22,398
Do.	...	Sundry claims	...	...	...	111·12	17·40	1,372
Mt. Desmond	M.L. (208)	British Flag: Phillips River Gold & Copper Co., Ltd.	...	...	...	19·90	3·64	250
Do.	M.L. (208)	Desmond	...	...	...	1,392·85	164·82	16,993
Do.	M.L. (208)	(Desmond: Phillips River Gold & Copper Co., Ltd.)	...	...	...	1,234·05	215·74	14,956
Do.	M.L. (95)	Elverdton	...	...	...	7,418·57	675·84	67,229
Do.	M.L. (95)	(Elverdton)	...	...	...	180·00	5·70	570
Do.	M.L. (95)	(Elverdton: Phillips River Gold & Copper Co., Ltd.)	...	...	...	30,574·23	2,186·64	124,252
Do.	M.L. (95)	(Elverdton: Phillips River Option Syndicate, N.L.)	...	...	...	2,946·02	401·43	22,657
Do.	M.L. (109)	(Mt. Desmond)	...	...	...	188·87	30·77	1,640
Do.	M.L. (109)	(Mt. Desmond: Phillips River Gold & Copper Co., Ltd.)	...	...	...	1,762·22	216·76	18,128
Do.	M.L. (199)	(P.L.P.)	...	...	...	208·66	33·69	2,277
Do.	M.L. (199)	(P.L.P.: Phillips River Gold & Copper Co., Ltd.)	...	...	...	17·56	1·88	121
Do.	...	Voided leases	...	...	...	1,049·38	170·56	9,981
Do.	...	Sundry claims	...	...	...	140·25	25·17	1,901
Ravensthorpe	M.L. 16	Marion Martin	...	...	...	2,270·63	256·94	26,496
Do.	M.L. 16	(Marion Martin)	...	...	...	865·69	130·61	6,650
Do.	M.L. 16	(Marion Martin: Phillips River Gold and Copper Co., Ltd.)	...	...	...	2,856·36	375·44	23,506
Do.	M.L. 15	Mount Cattlin	...	...	...	2,178·01	142·64	15,296
Do.	M.L. 15	(Mount Cattlin)	...	...	...	281·56	31·35	1,716
Do.	M.L. 15	(Mount Cattlin: Mount Cattlin Copper Mining Co., Ltd.)	...	...	...	6,608·76	393·59	28,841
Do.	M.L. 15	(Mount Cattlin: Phillips River Gold & Copper Co., Ltd.)	...	...	...	1,263·76	80·26	7,646
Do.	M.L. 15	(Mount Cattlin: Phillips River Gold and Copper Co., Ltd.)	...	...	...	14,432·25	714·90	40,313
Do.	...	Voided leases	...	...	...	7,880·86	986·55	63,429
Do.	...	Sundry claims	...	...	...	1,157·36	133·24	11,482
West River	...	Voided leases	...	...	...	44·04	7·41	414
Do.	...	Sundry claims	...	...	...	150·69	25·84	2,061
		From Goldfield generally	...	...	...	1,637·88	128·64	9,760
		Totals	3·69	·66	44	95,693·95	8,362·00	537,695
STATE GENERALLY.								
...	...	Voided leases	...	...	...	5·11	1·54	56
...	...	Sundry claims	...	...	...	18·50	2·27	193
		Totals	...	...	...	18·61	3·81	249

TABLE XIV.

QUANTITY AND VALUE OF IRONSTONE REPORTED TO THE MINES DEPARTMENT DURING 1924, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1924.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons.	£
WEST PILBARA GOLDFIELD.						
Whim Creek ...	(17), (18), (21)	Whim Well Copper Mines ...	...	...	100·00	300
		Totals ...	...	...	100·00	300
EAST COOLGARDIE GOLDFIELD.						
EAST COOLGARDIE DISTRICT.						
Boulder ...	(1490E)	Mt. Ferrum ...	...	...	450·00	247
		Totals ...	...	...	450·00	247
STATE GENERALLY.						
		Avon ...	...	...	22,223·00	16,241
		Clackline ...	...	...	18,253·50	8,789
		Coates' Paddock ...	...	...	4,712·00	3,277
		Greenbushes ...	...	...	7,481·00	4,629
		Koolan Island—Yampi Sound	...	...	10·50	12
		Werribee ...	...	...	4,600·00	3,200
		Totals ...	...	...	57,280·00	36,148

TABLE XV.

QUANTITY AND VALUE OF LEAD ORE REPORTED TO THE MINES DEPARTMENT DURING 1924, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1924.			TOTALS TO DATE.		
			Lead Ore.	Metal therefrom.	Value.	Lead Ore.	Metal therefrom.	Value.
			tons.	tons.	£	tons.	tons.	£
NORTHAMPTON MINERAL FIELD.								
Geraldine ...	Loc. 1 ...	Geraldine Mine ...	...	...	...	774·59	257·13	5,139
Do. ...	M.Ls. 143, 150, 154, 158, 20PP	Surprise leases ...	26,492·00	2,378·51	80,153	69,198·53	10,871·52	318,565
Do. ...	M.L. 158	(Surprise South) ...	...	...	...	14·00	5·41	170
Do. ...	M.L. 153	Three Sisters ...	...	...	...	6·25	3·94	112
Do. ...	M.L. 23PP	Wheal Ina ...	118·00	24·84	462	188·00	45·46	847
Do. ...	Loc. 7	Thring & Green ...	...	...	...	318·44	154·46	2,546
Do. ...	...	Voided leases ...	...	...	...	145·49	87·61	1,357
Do. ...	...	Sundry claims ...	...	...	...	327·04	175·65	3,408
Narra Tarra ...	Loc. 833	Narra Tarra: Fremantle Trading Co., Ltd.	824·00	43·04	1,604	113,006·85	11,532·51	332,611
Do. ...	Locs. 118, 119	Lauder & Raven (Tributers) ...	...	...	...	106·21	60·02	1,345
Do. ...	...	Sundry claims ...	...	...	...	238·16	34·18	442
Northampton ...	Loc. 1472	Baddera: Fremantle Trading Co., Ltd.	...	...	...	129,264·56	13,888·33	317,631
Do. ...	Loc. 436	Fortune Exploration Co., N.L. ...	...	...	...	123·38	51·17	1,316
Do. ...	Loc. 1146	Wheal Ellen: Fremantle Trading Co., Ltd.	9,316·00	580·43	19,000	22,033·28	1,818·71	52,456
Do. ...	Loc. 436	(Wheal of Fortune Extended Syndicate)	...	...	...	125·82	43·13	793
Do. ...	...	Voided leases ...	...	...	...	3,266·76	723·13	14,329
Do. ...	...	Sundry claims ...	...	...	...	222·12	132·14	2,679
Victoria ...	...	Voided leases ...	...	...	...	19·00	12·54	212
		Totals ...	36,750·00	3,026·82	101,219	339,378·48	39,897·04	1,055,958
WEST PILBARA GOLDFIELD.								
Roebourne ...	...	Sundry claims ...	...	...	...	2·57	1·36	39
Whim Creek ...	M.L. (172)	Cumstock ...	...	...	...	104·00	46·00	1,490
		Totals ...	...	...	...	106·57	47·36	1,529

TABLE XVI.

QUANTITY AND VALUE OF SILVER-LEAD ORE REPORTED TO THE MINES DEPARTMENT DURING 1924, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1924.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons.	£
ASHBURTON GOLDFIELD.						
Ashburton ...	M.L. (3) ...	Rainbow ...	...	...	56.90	429
Do. ...	...	Sundry claims ...	...	...	2.88	40
Uaroo ...	M.Ls. (48), (49), (84) ...	Uaroo Silver Lead Mines, Ltd. ...	...	...	2,824.05	83,518
		Totals ...	...	...	2,883.78	83,987

TABLE XVII.

QUANTITY AND VALUE OF COAL REPORTED TO THE MINES DEPARTMENT DURING 1924, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1924.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons.	£
COLLIE MINERAL FIELD.						
Collie ...	197, etc. ...	Amalgamated Collieries of W.A., Ltd., (Cardiff Mine) ...	45,936.95	36,953	316,296.73	261,949
Do. ...	244, etc. ...	Amalgamated Collieries of W.A., Ltd. (Co-operative Mine) ...	112,459.95	97,794	506,496.35	435,027
Do. ...	85, etc. ...	Amalgamated Collieries of W.A., Ltd. (Proprietary Mine) ...	118,493.97	101,784	549,148.70	472,386
Do. ...	250, etc. ...	Amalgamated Collieries of W.A., Ltd. (Westralia Mine) ...	97,454.04	86,013	213,756.27	190,812
Do. ...	151, etc. ...	(Amalgamated Collieries of W.A., Ltd. (Scottish leases) ...	...	...	380.00	251
Do. ...	197, etc. ...	(Cardiff Coal Mining Co., Ltd.) ...	...	...	976,824.78	471,417
Do. ...	151, etc. ...	(Collie Boulder Coal Co., Ltd.) ...	...	...	71,512.70	26,139
Do. ...	244, etc. ...	(Collie Co-operative Collieries, Ltd.) ...	...	...	970,044.30	511,862
Do. ...	88 (part of) ...	(Collie Proprietary Coalfields of W.A., Ltd.) ...	...	...	477,781.55	242,918
Do. ...	85, etc. ...	(Collie Proprietary Coalfields of W.A., Ltd.) ...	...	...	580,392.15	289,246
Do. ...	260, etc. ...	Premier Coal Mining Co., Ltd. ...	47,518.95	40,711	374,580.96	268,134
Do. ...	151, etc. ...	(Scottish Collieries, Ltd.) ...	...	...	2,314.51	1,210
Do. ...	151, etc. ...	(Scottish Co-operative Collieries, Co. Ltd.) ...	...	...	430,796.95	171,303
Do. ...	85, etc. ...	(The Proprietary Coal Mines of W.A., Ltd.) ...	...	...	698,045.34	413,755
Do. ...	88 (part of) ...	(The Proprietary Coal Mines of W.A., Ltd.) ...	...	...	109.00	54
Do. ...	250 ...	(Westralia Coal Mining Co., Ltd.) ...	...	...	507,384.11	307,913
Do. ...	250 ...	(Westralia Black Diamond Collieries, Ltd.) ...	...	...	125,083.24	117,827
Do. ...	...	Voided leases ...	...	...	25,569.85	12,930
		Totals ...	421,863.86	363,255	6,821,517.49	4,195,133

TABLE XVIII.

QUANTITY AND VALUE OF FIRECLAY REPORTED TO THE MINES DEPARTMENT DURING 1924, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1924.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons.	£
COLLIE MINERAL FIELD.						
Collie ...	87 ...	Amalgamated Collieries of W.A., Ltd. (Proprietary lease) ...	...	...	677.80	646
		Total ...	...	...	677.80	646

TABLE XIX.

QUANTITY AND VALUE OF LIMESTONE REPORTED TO THE MINES DEPARTMENT DURING 1924, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1924.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons.	£
MURCHISON GOLDFIELD.						
CUE DISTRICT.						
Cuddingwarra ...	M.L. (3) ...	Linella ...	...	...	298-00	772
		Totals ...	...	...	298-00	772
YILGARN GOLDFIELD.						
Southern Cross ...	...	Voided leases ...	...	...	2,548-85	1,807
		Totals ...	...	...	2,548-85	1,807
STATE GENERALLY.						
Fremantle ...	...	...	...	...	90,858-88	15,911
		Totals ...	...	...	90,858-88	15,911

TABLE XX.

QUANTITY AND VALUE OF ASBESTOS REPORTED TO THE MINES DEPARTMENT DURING 1924, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1924.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons.	£
PILBARA GOLDFIELD.						
MARBLE BAR DISTRICT.						
Cooglegong ...	M.Ls. 274, 275 ...	Chrysotile No. 1 leases ...	...	...	70-10	3,660
Soanesville ...	...	Voided leases ...	...	...	42-83	1,754
		Totals ...	...	...	112-93	5,414
NULLAGINE DISTRICT.						
Idonel ...	M.L. (34L) ...	Archern ...	...	...	3-00	90
Do. ...	M.Ls. 32L, 33L ...	Bullswool No. 2, and Junction leases ...	...	...	6-15	330
Do. ...	...	Voided leases ...	...	...	561-78	28,575
Do. ...	...	Sundry claims ...	73-58	2,206	173-08	5,476
		Totals ...	73-58	2,206	744-01	32,471
WEST PILBARA GOLDFIELD.						
Roebourne ...	...	Sundry claims ...	...	...	-85	17
		Totals ...	...	...	-85	17

TABLE XXI.

QUANTITY AND VALUE OF GADOLINITE REPORTED TO THE MINES DEPARTMENT DURING 1924, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1924.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons.	£
PILBARA GOLDFIELD.						
MARBLE BAR DISTRICT.						
Cooglegong ...	(M.L. 254) ...	Iverna ...	...	...	1-00	112
		Totals ...	...	...	1-00	112

TABLE XXII.

QUANTITY AND VALUE OF TUNGSTEN ORES REPORTED TO THE MINES DEPARTMENT DURING 1924, AND TOTALS TO DATE.

SCHEELITE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1924.			TOTALS TO DATE.		
			Ore.	Contents Tungstic Trioxide.	Value.	Ore.	Contents Tungstic Trioxide.	Value.
			tons.	units.	£	tons.	units.	£
NORTH COOLGARDIE GOLDFIELD.								
MENZIES DISTRICT.								
Comet Vale ...	G.M.L. 5410z...	Lake View ...	...	...	...	380.84	338.39	818
Do. ...	...	Sundry claims ...	...	...	...	26.47	47.88	124
		Totals ...	...	...	...	407.31	385.77	942
BROAD ARROW GOLDFIELD.								
Ora Banda ...	...	Sundry claims ...	...	...	...	3.35	66.50	175
		Totals ...	...	...	...	3.35	66.50	175
COOLGARDIE GOLDFIELD.								
COOLGARDIE DISTRICT.								
Higginsville ...	...	Sundry claims ...	...	...	...	85.71	59.07	155
		Totals ...	...	...	...	85.71	59.07	155
DUNDAS GOLDFIELD.								
Norseman ...	...	Sundry claims ...	...	...	...	.41	3.98	10
		Totals ...	...	...	...	.41	3.98	10

WOLFRAM.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1924.			TOTALS TO DATE.		
			Ore.	Metallic contents.	Value.	Ore.	Metallic contents.	Value.
			tons.	tons.	£	tons.	tons.	£
MURCHISON GOLDFIELD.								
CUE DISTRICT.								
Callie Spring ...	M.L. (11) ...	Socialist ...	...	...	...	194.00	6.11	877
Do. ...	...	Sundry claims ...	...	...	...	44.64	2.30	271
		Totals ...	...	...	...	238.64	8.41	1,148
YALGOO GOLDFIELD.								
Yalgoo ...	M.L. (36) ...	Yandanoo King North ...	...	...	...	.25	.12	27
		Totals ...	...	...	...	.25	.12	27
STATE GENERALLY.								
Darby ...	(146H) ...	Taylor's Wolfram Reward ...	...	...	...	27.00	2.00	120
		Totals ...	...	...	...	27.00	2.00	120

TABLE XXIII.

QUANTITY AND VALUE OF MAGNESITE REPORTED TO THE MINES DEPARTMENT DURING 1924, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE	1924.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity	Value.
			tons.	£	tons.	£
EAST COOLGARDIE GOLDFIELD.						
BULONG DISTRICT.						
Bulong	Sundry claims ...	...	...	824.75	1,053
		Totals ...	...	...	824.75	1,053

TABLE XXIV.

QUANTITY AND VALUE OF ANTIMONY REPORTED TO THE MINES DEPARTMENT DURING 1924, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1924.			TOTALS TO DATE.		
			Ore.	Metallic contents.	Value.	Ore.	Metallic contents.	Value.
			tons.	tons.	£	tons.	tons.	£
WEST PILBARA GOLDFIELD.								
Balla Balla ...	M.L. (185) ...	Star ...	...	...	...	20.78	11.58	491
Totals ...			...	...	...	20.78	11.58	491

TABLE XXV.

QUANTITY AND VALUE OF GYPSUM REPORTED TO THE MINES DEPARTMENT DURING 1924, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1924.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons.	£
STATE GENERALLY.						
Baandee	Sundry Claims ...	357.00	357	357.00	357
Bakh	Sundry claims ...	487.00	561	487.00	561
Blues Hill	Sundry claims ...	641.00	322	641.00	322
Coria ...	M.L. 280H ...	White Cross ...	1,234.00	1,679	1,961.50	2,317
Woolundra	Sundry claims ...	1,518.00	2,359	1,518.00	2,859
Totals ...			4,237.00	5,278	4,964.50	5,916

TABLE XXVI.

QUANTITY AND VALUE OF DIAMONDS REPORTED TO THE MINES DEPARTMENT DURING 1924, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1924.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			carats.	£	carats.	£
PILBARA GOLDFIELD.						
NULLAGINE DISTRICT.						
Nullagine ...	M.R.C. (6L) ...	Morgans, A. E. ...	...	...	...	24
Totals ...			...	...	...	24

XXVII.

QUANTITY AND VALUE OF MANGANESE REPORTED TO THE MINES DEPARTMENT DURING 1924, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1924.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons.	£
PEAK HILL GOLDFIELD.						
Merseshoe Do.	Voided leases ...	...	...	18.11	142
		Sundry claims ...	58.63	294	58.63	294
Totals ...			58.63	294	76.74	436

TABLE

RETURN OF ORE AND MINERALS OTHER THAN GOLD

YEAR.	COPPER.												
	COPPER ORE.										COPPER INGOT, MATTE, ETC.		Total Value of Copper Exported.
	West Pilbara Gf.		Northampton Mf.		Phillips River Gf.		State generally.		Total.		State generally.		
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	
tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£		
1850
1
2
3	2†	7	...	...	...	...	...	7	...	...	7
4
5	2	26	...	...	...	...	2	26	...	...	26
6	57	1,018	...	...	...	...	57	1,018	...	...	1,018
7	80	1,920	...	...	...	...	80	1,920	...	...	1,920
8	433	9,531	...	...	...	...	433	9,531	...	...	9,531
9	941	14,122	...	...	...	...	941	14,122	...	...	14,122
1860	517	8,021	...	...	...	...	517	8,021	...	...	8,021
1	409	6,339	...	...	...	...	409	6,339	...	...	6,339
2	783	12,536	...	...	...	...	783	12,536	...	...	12,536
3	763	12,208	...	...	...	...	763	12,208	...	...	12,208
4	1,076	17,216	...	...	...	...	1,076	17,216	...	...	17,216
5	886	13,290	...	...	...	...	886	13,290	...	...	13,290
6	557	8,362	...	...	...	...	557	8,362	...	...	8,362
7	337	5,055	...	...	...	...	337	5,055	...	...	5,055
8	83	1,245	...	...	...	...	83	1,245	...	...	1,245
9	155	2,325	...	...	...	...	155	2,325	...	...	2,325
1870	6	90	...	...	...	...	6	90	...	...	90
1
2
3	56	848	...	...	...	...	56	848	...	...	848
4	67	998	...	...	...	...	67	998	...	...	998
5	205	3,071	...	...	...	...	205	3,071	...	...	3,071
6	279	4,185	...	...	...	...	279	4,185	...	...	4,185
7	54	803	...	...	...	...	54	803	...	...	803
8	9	135	...	...	...	...	9	135	...	...	135
9
1880	8	120	...	...	...	...	8	120	...	...	120
1
2	2	23	...	...	...	...	2	23	...	...	23
3	5	75	...	...	...	...	5	75	...	...	75
4	118	1,770	...	...	...	...	118	1,770	...	...	1,770
5	120	1,793	...	...	...	...	120	1,793	...	...	1,793
6	249	3,735	...	...	...	...	249	3,735	...	...	3,735
7	23	345	...	...	...	...	23	345	...	...	345
8	88	1,488	...	...	...	...	88	1,488	...	...	1,488
9	112	1,904	...	...	...	...	112	1,904	...	...	1,904
1890	8	136	...	...	...	...	8	136	...	...	136
1 ...	263	4,462	...	...	...	...	...	...	263	4,462	...	...	4,462
2 ...	†412	6,319	155	2,377	...	...	...	...	567	8,696	...	...	8,696
3 ...	50	606	...	...	...	...	...	...	50	606	...	...	606
4
5 ...	802	12,832	24	120	...	...	...	...	826	12,952	...	...	12,952
6 ...	6	100	...	...	...	...	...	...	6	100	...	...	100
7 ...	65	731	21	302	...	...	...	...	86	1,033	...	...	1,033
8 ...	281	3,334	75	932	...	...	...	...	356	4,266	...	...	4,266
9 ...	1,404	31,979	587	9,473	...	...	...	...	1,991	41,452	...	...	41,452
1900 ...	544	10,696	...	...	105	2,411	197	3,355	846	16,462	249	17,475	33,937
1 ...	1,058	26,464	1	10	1,205	22,107	397	6,322	2,661	54,903	880	55,866	110,769
2 ...	68	1,698	20	330	162	2,469	33	489	283	4,986	175	7,918	12,904
3 ...	4	180	25	460	302	3,538	15	349	346	4,527	1,075	33,288	37,815
4 ...	50	500	...	...	11	154	310	3,378	371	4,032	102	3,827	7,859
5	80	2,808	713	8,576	793	11,384	794	53,867	65,251
6 ...	112	323	...	...	...	...	...	...	224	2,930	336	6,162	36,529
7	3,727	61,493	3,727	61,493	203,376
8	2,503	29,272	2,503	29,272	57,091
9	6,959	59,541	6,959	59,541	104,641
1910	6,309	27,271	6,309	27,271	95,928
1	9,825	33,709	9,825	33,709	78,118
2	9,536	58,688	9,536	58,688	59,824
3	4,339	136,472	4,339	136,472	142,363
4	3,913	33,654	3,913	33,654	38,174
5	737	13,768	737	13,768	91,169
6	650	14,971	650	14,971	64,833
7	966	20,878	966	20,878	85,738
8	1,643	24,877	1,643	24,877	68,146
9	455	9,740	455	9,740	10,105
1920	1,511	22,467	1,511	22,467	25,165
1921	1,040	16,153	1,040	16,153	24,601
1922	352	5,519	352	5,519	20,379
1923	3,394	48,907	3,394	48,907	65,100
1924	2,795	40,676	2,795	40,676	40,876
Total	78,923	968,819	13,414	817,979	1,786,798

†See Woodward's Mining Handbook, Perth: By Authority, 1895; page 123.

†† Weight not stated.

XXVIII.

ENTERED FOR EXPORT FROM 1850 TO 1924, INCLUSIVE.

TIN.											YEAR.
BLACK TIN (Dressed Tin ore).							TIN INGOT.		Total Value of Tin Exported.		
Pilbara Gf.		Greenbushes Mf.		*†State generally.		Total.		Greenbushes Mf.			
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.		
tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	£	
...	1850
...	1
...	2
...	3
...	4
...	5
...	6
...	7
...	8
...	9
...	1860
...	1
...	2
...	3
...	4
...	5
...	6
...	7
...	8
...	9
...	1870
...	1
...	2
...	3
...	4
...	5
...	6
...	7
...	8
...	9
...	1880
...	1
...	2
...	3
...	4
...	5
...	6
...	7
...	8
...	9
...	...	5	300	...	...	5	300	...	...	300	1890
...	...	68	5,400	...	...	68	5,400	...	...	5,400	1
...	...	204	10,200	...	...	204	10,200	...	...	10,200	2
...	...	265	13,843	...	...	265	13,843	...	...	13,843	3
57	3,470	171	7,664	...	...	228	11,134	...	...	11,134	4
19	949	371	14,325	...	...	390	15,274	...	...	15,274	5
...	...	277	9,703	...	...	277	9,703	...	...	9,703	6
...	...	137	4,338	...	...	137	4,338	...	...	4,338	7
...	...	96	3,275	...	...	96	3,275	...	...	3,275	8
...	...	68	2,760	...	...	68	2,760	...	...	2,760	9
...	...	278	21,138	...	...	308	23,163	...	...	23,163	1890
...	...	102	8,032	...	...	470	38,178	142	18,872	57,050	1
...	...	68	4,895	...	...	507	39,495	97	12,607	52,102	2
...	...	31	2,870	...	...	279	22,568	141	16,830	39,398	3
...	...	25	1,868	...	...	292	22,856	235	29,277	52,133	4
...	...	24	1,389	379	20,797	467	27,118	129	16,155	43,273	5
...	...	119	8,177	666	51,748	973	76,778	†	1	76,779	6
...	...	444	46,254	624	64,005	1,397	138,634	45	8,746	147,380	7
...	1,424	151,414	1,424	151,414	78	14,725	166,139	8
...	1,093	83,294	1,093	83,594	†	1	83,595	9
...	698	62,989	698	62,989	...	...	62,989	1910
...	500	45,129	500	45,129	...	...	45,129	1
...	495	55,220	495	55,220	...	...	55,220	2
...	651	79,738	651	79,738	...	...	79,738	3
...	484	72,142	484	72,142	...	...	72,142	4
...	363	35,649	363	35,649	...	...	35,649	5
...	429	41,391	429	41,391	...	...	41,391	6
...	463	49,101	463	49,101	...	...	49,101	7
...	383	45,288	383	45,288	...	...	45,288	8
...	415	76,952	415	76,952	...	...	76,952	9
...	318	47,269	318	47,269	...	...	47,269	1920
...	243	49,449	243	49,449	...	...	49,449	1921
...	67	6,485	67	6,485	...	...	6,485	1922
...	110	10,930	110	10,930	...	...	10,930	1923
...	131	15,095	131	15,095	...	...	15,095	1924
...	87	12,008	87	12,008	...	...	12,008	Total
...	14,785	1,404,860	867	117,214	1,522,074	

*†Weight not stated.

*†Probably the produce of Pilbara Goldfield and Greenbushes Mineral Field.

TABLE XXVIII.—Return of Ore and Minerals other than Gold

YEAR.	SILVER.		‡ LEAD.		‡ LEAD AND SILVER-LEAD.		PIG LEAD.		ZINC INGOTS AND CONCENTRATES.	
	State generally.		Northampton Mf.		State generally.		State generally.		State generally.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	ozs.	£	tons.	£	tons.	£	tons.	£	tons.	£
1850	...	...	5	55	...	...	...	...	...	...
1	...	...	...	...	...	...	...	...	...	...
2	...	...	...	...	...	...	...	...	...	...
3	...	...	†	4	...	...	55	1,200	...	...
4	...	...	...	...	...	...	122	2,440	...	...
5	...	...	25	250	...	...	134	2,675	...	...
6	...	...	...	...	...	...	60	1,200	...	...
7	...	...	...	...	...	...	120	2,410	...	...
8	...	...	...	...	...	...	61	1,220	...	...
9	...	...	13	135	...	...	25	495	...	...
1860	...	...	98	985	...	...	...	...	...	...
1	...	...	79	790	...	...	...	...	...	...
2	...	...	9	90	...	...	...	...	...	...
3	...	...	230	2,300	...	...	...	...	...	...
4	...	...	80	800	...	...	...	...	...	...
5	...	...	703	8,436	...	...	...	...	...	...
6	...	...	273	3,282	...	...	...	...	...	...
7	...	...	902	10,824	...	...	†3	50	...	...
8	...	...	1,100	13,206	...	...	...	...	...	...
9	...	...	699	8,394	...	...	...	...	...	...
1870	...	...	1,209	14,514	...	...	...	...	...	...
1	...	...	420	5,040	...	...	...	...	...	...
2	...	...	364	4,368	...	...	...	...	...	...
3	...	...	965	11,586	...	...	...	...	...	...
4	...	...	2,144	25,725	...	...	...	...	...	...
5	...	...	2,289	27,468	...	...	4	89	...	...
6	...	...	2,192	26,298	...	...	†7	155	...	...
7	...	...	3,956	47,466	...	...	†1	15	...	...
8	...	...	3,618	43,410	...	...	...	...	...	...
9	...	...	2,775	33,300	...	...	...	...	...	...
1880	...	...	1,921	15,368	...	...	†5	89	...	...
1	...	...	1,401	11,204	...	...	†1	20	...	...
2	...	...	1,794	14,348	...	...	...	...	...	...
3	...	...	1,038	7,266	...	...	...	...	...	...
4	...	...	696	4,872	...	...	...	...	...	...
5	...	...	465	3,255	...	...	...	...	...	...
6	...	...	611	4,277	...	...	...	...	...	...
7	...	...	471	4,710	...	...	†6	120	...	...
8	...	...	532	5,320	...	...	†2	40	...	...
9	...	...	250	2,500	...	...	...	...	...	...
1890	...	...	214	2,135	...	...	...	...	...	...
1	...	...	25	250	...	...	...	...	...	...
2	...	...	30	150	...	...	...	...	...	...
3	...	...	...	...	...	...	...	...	...	...
4	...	...	...	...	...	...	...	...	...	...
5	...	...	...	...	...	...	...	...	...	...
6	...	...	...	...	...	...	...	...	...	...
7	...	...	†	4	...	...	†1	11	...	...
8	...	...	5	33	...	...	...	...	...	...
9	...	...	16	96	...	...	77	1,077	...	...
1900	28,749	3,594	27	242	...	...	...	...	...	...
1	60,869	7,609	...	...	...	...	...	...	...	...
2	83,293	9,190	...	...	...	...	...	...	...	...
3	168,113	19,153	...	...	...	...	...	...	...	...
4	399,190	45,912	...	...	...	...	...	...	...	...
5	359,744	44,278	...	...	...	...	...	...	...	...
6	282,145	37,612	...	...	...	...	...	...	...	...
7	189,265	25,382	...	...	211	1,866	...	...	73	3,390
8	168,455	18,877	...	...	518	5,006	...	...	11	98
9	176,843	18,778	...	...	211	1,199	...	...	19	244
1910	176,139	18,777	248	1,433	...	...	...	...	12	147
1	169,043	18,333	1,549	15,002	...	...	...	...	12	189
2	165,371	19,725	1,868	22,270	...	...	...	...	14	217
3	188,020	23,420	3,169	59,002	...	...	...	...	...	...
4	193,057	23,227	3,554	46,285	...	...	...	...	22	379
5	222,159	24,295	...	...	2,883	39,032	13	302	7	143
6	173,012	22,258	...	...	428	12,033	3,523	74,930	14	630
7	222,075	38,339	...	...	22	593	4,661	139,940	...	...
8	109,830	22,711	...	...	282	3,045	5,489	163,880	...	...
9	223,332	55,342	...	...	248	3,704	1,780	48,462	...	...
1920	130,692	36,605	...	...	3,427	84,743	1,930	69,136	...	...
1921	116,151	18,658	...	...	...	...	2,156	48,863	...	...
1922	118,696	18,164	...	...	...	...	2,796	69,528	...	...
1923	109,005	16,036	...	...	3,172	43,416	20	609	...	...
1924	89,146	13,409	...	...	4,854	83,095	...	...	...	...
Total	4,322,394	599,684	44,032	508,748	16,256	277,732	23,052	628,956	184	5,437

*† Weight not stated.

† Estimated.

‡ Ore and Concentrates.

TABLE XXVIII.—Return of Ore and Minerals other than Gold

YEAR.	NON-METALLIC MINERALS—continued.						MINERALS NOT ELSEWHERE INCLUDED.		Total Value of Minerals other than Gold exported to Date.	YEAR.
	ASBESTOS.		COAL.		MICA.		Quantity.	Value.		
	State generally.		Collie	River	Mf.	State generally.				
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.		
1850	£ 55	1850
1	1
2	2
3	1,211	3
4	2,440	4
5	2,951	5
6	2,218	6
7	4,330	7
8	10,751	8
9	14,752	9
1860	9,006	1860
1	7,129	1
2	12,626	2
3	14,508	3
4	18,016	4
5	21,726	5
6	11,644	6
7	15,929	7
8	14,451	8
9	10,719	9
1870	14,604	1870
1	5,040	1
2	4,368	2
3	12,434	3
4	26,723	4
5	30,628	5
6	30,638	6
7	48,284	7
8	43,545	8
9	33,300	9
1880	15,577	1880
1	11,224	1
2	14,371	2
3	7,341	3
4	6,642	4
5	5,048	5
6	8,012	6
7	5,175	7
8	6,848	8
9	4,704	9
Carried forward	508,968	

entered for EXPORT from 1850 to 1924, inclusive—continued.

YEAR.	NON-METALLIC MINERALS—continued.						MINERALS NOT ELSEWHERE INCLUDED.		Total Value of Minerals other than Gold exported to Date.	YEAR.	
	ASBESTOS.		COAL.		MICA.						
	State generally.		Collie River Mf.		State generally.						
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.			
	tons.	£	tons	£	tons.	£	tons	£			
Brought forward	508,968		
1890	7,871	1890	
1	14,912	1	
2	25	...	...	22,714	2	
3	4	...	...	11,744	3	
4	15,274	4	
5	3	...	...	22,658	5	
6	4,438	6	
7	209	...	...	4,532	7	
8	1	1	...	...	...	...	7,060	8	
9	798	772	...	50	...	...	66,611	9	
1900	355	350	...	3	5	85	95,261	1900	
1	971	969	...	...	...	4	171,453	1	
2	12	12	...	...	2	41	61,551	2	
3	110	127	...	...	22	230	109,468	3	
4	11	7	...	...	7	81	97,132	4	
5	108	87	...	...	62	127	192,251	5	
6	86	65	...	...	10	1,035	222,621	6	
7	26	28	...	...	96	1,447	402,906	7	
8	13	11	...	...	42	2,750	176,827	8	
9	353	183	...	...	263	735	282,650	9	
1910	85,647	93,781	...	...	...	...	...	1910	
1	3	2	...	...	...	100	200,106	1	
2	48,876	38,400	...	...	14	407	197,439	2	
3	40,063	29,344	...	...	...	8	212,509	3	
4	6	6	...	...	...	17	336,155	4	
5	42,602	30,721	...	...	5	635	182,996	5	
6	54,228	39,125	...	...	9	115	218,495	6	
7	54,416	38,244	...	...	...	...	...	7	
8	1,667	1,513	...	...	...	...	...	8	
9	26,167	19,288	...	...	...	...	...	9	
1920	2,447	1,857	...	...	...	...	...	1920	
1	37,590	28,387	...	...	...	...	...	1	
2	31,951	29,359	...	...	...	...	...	2	
3	23,238	24,424	...	...	...	...	...	3	
4	69,708	76,924	...	...	...	...	...	4	
5	78,788	104,665	...	...	...	...	...	5	
6	116,993	188,686	...	...	...	...	...	6	
7	71,164	115,835	...	...	...	...	...	7	
8	5,313	7,969	...	...	...	...	...	8	
9	43,729	73,256	...	...	...	...	...	9	
1921	36	752	...	...	...	...	...	1921	
1922	31	2,525	...	...	...	...	...	1922	
1923	141	6,205	...	...	...	...	...	1923	
1924	143	5,746	...	...	...	...	...	1924	
Total	71	3,830	...	...	...	...	...	Total	
	22	1,586	...	...	...	...	...
Total	21,922	885,328	1,013,575	...	1,357	...	11,209	6,413,255	Total

* Bunker Coal. † Weight not stated. ‡ 4 cwt. § Cobalt ore. ¶ Antimony ore. †† Bismuth. ††† Molybdenite, †††† 7 cwt.

†† Includes—
 Antimony ore, 25 tons = £680
 N.E.I., 71 tons ... = 817
 Total ... £1,447

††† Includes—
 Iron ore, 9 tons ... = £7
 Ores, N.E.I., 5 tons ... = 400
 Total ... £407

†††† Includes—
 Bismuth, 1 ton ... = £37
 Fireclay, 12 tons ... = 75
 Manganese, 3 cwt. ... = 3
 Total ... £115

††††† Includes—
 Antimony, 12 tons ... = £258
 Bismuth, 9cwt. ... = 24
 Molybdenite, 14 tons ... = 158
 Total ... £440

†††††† Includes—
 Other Concentrates, 29 tons = £108
 N.E.I., 234 tons ... = 627
 Total ... £735

††††††† Includes—
 Manganese, 2 tons ... = £4
 N.E.I. ... = 4
 Total ... £8

†††††††† Includes—
 Antimony, 27 tons ... = £580
 Bismuth, 4 cwt. ... = 133
 Total ... £713

††††††††† Includes—
 Bismuth, 1 cwt. ... = £15
 Corundum, 1 ton ... = 1
 Molybdenite, 7 tons ... = 100
 Total ... £116

†††††††††† Includes—
 Antimony, 2½ tons ... £45
 Clay, 6 cwt. ... 6
 Gadolinite, 1 ton ... 150
 Iron Concentrates, 1 ton ... 17
 Molybdenite, 10 cwt. ... 5
 Total ... £223

††††††††††† Includes—
 Barytes, 2 cwt. ... £18
 Corundum, ¼cwt. ... 2
 Felspar, 1 ton ... 47
 Jarosite, 12cwt. ... 5
 Manganese, 16 tons ... 145
 Pottery clay, 3½ tons ... 40
 Total ... £257

†††††††††††† Includes—
 Barytes, 19 tons ... £73
 Felspar, 60 tons ... 485
 Gypsum, 2 tons ... 4
 Molybdenite, 51 tons ... 505
 Pottery clay, 1 ton ... 16
 Total ... £1,083

††††††††††††† Includes—
 Clay, 84 tons ... £94
 Iron Ore, 2 tons ... 9
 Manganese, 22 tons ... 200
 Total ... £303

†††††††††††††† Includes—
 Manganese.

PART III.—ALL MINES.

TABLE XXIX.

MILLING AND CYANIDING PLANTS ERECTED IN THE RESPECTIVE GOLDFIELDS, DISTRICTS, AND MINERAL FIELDS ON THE 31ST DECEMBER, 1924, AND THE TOTAL VALUE OF MINING MACHINERY.

Mining Centre and Lease or Area.	Name of Mine, Company, or Works.	MILLING.							CYANIDING.			Value of All Mining Machinery
		Batteries. Number of Heads of Stampers.	Other Mills.						Leaching Vats.	Agitating Vats.	Vacuum Filters and Presses.	
			Prospecting Mills.	Ball Mills.	Griffin Mills.	Huntington Mills.	Puddlers.	Other Crushers.					Flint Mills.	Grinding Pans.
PILBARA GOLDFIELD.												
MARBLE BAR DISTRICT.												
<i>Bamboo Creek.</i> G.M.L. 795	Bulletin	10	...	...	...	...	...	...	...	...	...	...
	State Battery, Bamboo Creek	5	...	...	...	...	...	...	5	...	...	...
<i>Lalla Rookh.</i> R.O. 112.	Lalla Rookh	10	...	...	...	...	...	...	5	...	...	...
<i>Marble Bar.</i> M.A. 87. G.M.L. 694.	Ironclad	10	...	...	...	...	...	...	...	...	...	...
	Jo Jo	5	...	...	1	...	...	...	1	...	...	...
	State Battery, Marble Bar	5	...	...	...	...	...	...	...	...	...	...
<i>North Shaw.</i> G.M.L. 820.	McLeod's Reward	5	...	...	...	...	...	...	...	...	...	...
	Total	50	...	...	1	...	...	...	1	10	...	£17,838
NULLAGINE DISTRICT.												
<i>Eastern Creek.</i> G.M.L. 219L. M.A. 11L.	Shamrock	3	...	...	...	...	...	...	...	3	...	...
	Doherty's Reward	10	...	...	...	...	...	...	...	4	...	...
<i>Middle Creek.</i> G.M.L. 218L.	Barton	10	...	...	...	...	...	...	1	6	...	...
<i>20-Mile Sandy.</i> A	State Battery, 20-Mile Sandy	5	...	...	...	...	...	...	1	6	...	...
	Total	28	...	...	...	...	...	...	2	19	...	£2,992
WEST PILBARA GOLDFIELD.												
<i>Pilbara.</i> L.C. 10 Station Peak. M.A. 14	Black Prince ... ..	...	1	...	...	...	...	...	...	...	...	...
	Pilgrim's Rest	10	...	...	...	...	...	...	...	...	...	...
	Total	10	1	...	...	...	...	...	...	...	...	£2,231
PEAK HILL GOLDFIELD.												
<i>Mt. Egerton.</i> A	State Battery, Mt. Egerton	5	...	...	...	...	...	...	...	...	...	...
<i>Peak Hill.</i> T.A. 6P A	Wind Power Cyanide Works ... ..	...	...	...	...	...	...	...	...	4	...	...
	State Battery, Peak Hill	5	...	...	...	...	...	...	...	3	...	...
	Total	10	...	...	...	...	...	...	...	7	...	£2,978
EAST MURCHISON GOLDFIELD.												
LAWLERS DISTRICT.												
<i>Kathleen Valley.</i> G.M.L. 382	Yellow Aster	5	...	...	...	...	...	...	...	4	...	...
<i>Lawlers.</i> 1212 1171	Daisy Queen G.M. Co., N.L.	10	...	...	...	...	...	...	...	5	...	...
	Great Eastern	5	...	...	...	...	...	...	1	6	...	...
	Sands Retreatment Works ... ..	...	...	...	...	...	...	...	...	4	...	...
	Try It	5	...	...	...	...	...	...	...	...	...	...
	Waroonga G.M. Co., Ltd.	10	...	...	...	...	...	...	1	4	...	...
<i>Sir Samuel.</i> A	State Battery, Sir Samuel	5	...	...	...	...	...	...	...	...	...	...
	Total	40	...	...	...	...	...	...	2	23	...	£19,647
WILUNA DISTRICT.												
<i>Mt. Keith.</i> A	State Battery, Mt. Keith	5	...	...	...	...	...	...	...	...	...	...
<i>Wiluna.</i> A	State Battery, Wiluna	10	...	...	...	...	...	1	...	3	1	...
6J etc.	Wiluna Gold Mines, Ltd.	45	...	...	...	...	...	...	4	...	...	...
	Total	60	...	...	...	...	...	1	4	3	1	£20,853
BLACK RANGE DISTRICT.												
<i>Curran's Find.</i> Temp. Res. 299H	Red White and Blue	5	...	...	...	...	...	...	...	...	...	...
<i>Manninga.</i> Marley. 203B	Havilah G.M.	10	...	...	...	...	...	...	...	...	...	...
<i>Sandstone.</i> A	State Battery, Sandstone	10	...	...	...	...	...	...	...	6	...	...
<i>Yuanmi.</i> 863B etc. A	Yuanmi Gold Mines, Ltd.	20	...	1	...	...	...	1	2	...	...	...
	State Battery, Yuanmi	5	...	...	...	...	...	...	...	2	...	...
	Total	50	...	1	...	...	...	1	2	8	...	£78,950

TABLE XXIX.—Milling and Cyaniding Plants erected in the respective Goldfields, Districts, etc.—continued.

Mining Centre and Lease or Area.	Name of Mine, Company, or Works.	MILLING.							CYANIDING.			Value of all Mining Machinery	
		Batteries.	Other Mills.						Leaching Vats.	Agitating Vats.	Vacuum Filters and Presses.		
			Number of Heads of Stampers.	Prospecting Mills.	Ball Mills.	Griffin Mills.	Huntington Mills.	Puddlers.					Other Crushers.	Flint Mills.	Grinding Pans.
MURCHISON GOLDFIELD.													
CUE DISTRICT.													
<i>Cuddingwarra.</i> 1860 Cue. 203 A	Big Bell	10						1		12	2		
<i>Reedy's Find.</i> 1877	Cue No. 1	20							1	5			
<i>Tuckénarra</i> A	State Battery, Cue	5											
	Emu	5								4			
	State Battery, Tuckénarra... ..	10											
	Total	50						1	1	19	2		£20,304
MBEKATHARRA DISTRICT.													
<i>Holden's Find.</i> 1891N	Waterloo	5											
<i>Meekatharra.</i> 477N 555N 475N 585	Fenian	15							4				
	Ingliston	10											
	Ingliston Consols Extended	15								3			
	Marmont	10											
	State Battery, Meekatharra	5								5			
<i>Nannine.</i> 166N	Nannine	10								2	3		
	Total	70							9	8			£46,500
DAY DAWN DISTRICT.													
<i>Day Dawn.</i> 1D, etc. <i>Jasper Hill.</i> 555D	Great Fingall									14	4		
	Neptune	10								1			
	Total	10							1	14	4		£3,250
MT. MAGNET DISTRICT.													
<i>Lennonville.</i> 964M	Empress	5								1	3		
<i>Mt. Magnet.</i> 1156M 1075M	Leap Year	5								1			
	New Havelock	5									3		
	State Battery, Boogardie	5									5		
<i>P.A. 954M</i>	T. W. Austin	5											
	Total	25							2	11			£6,288
YALGOO GOLDFIELD.													
<i>Goodingnow.</i> A	State Battery, Payne's Find	5								6			
<i>Noongul.</i> 963	Revival	5								2			
<i>Ngawana.</i> 880	Brilliant G.M. Co., N.L.	10						1		2	8		
<i>Warrledar.</i> (708)	Mug's Luck	10											
<i>Yalgoo.</i> P.A. 616	State Battery, Warrledar	5									6		
	Moxon		1										
	Total	35	1					1		2	22		£24,561
MT. MARGARET GOLDFIELD.													
MT. MORGANS DISTRICT.													
<i>Linden.</i> 844F	Bindah	5								3			
<i>A</i> 841F	State Battery, Linden	10								6			
<i>Mt. Morgans.</i> 5F	Torquay	5								4	2		
<i>Yundamindera.</i> 357F	Westralia Mt. Morgans Mines, N.L.	10							3		2	1	
	Big Stone	5								3			
	Total	35							3	16	4	1	£8,828
MT. MALCOLM DISTRICT.													
<i>Lake Darlot.</i> A	State Battery, Lake Darlot	10											
<i>M.A. 100</i> 2080	Gwalla Central Gold Mines, Ltd.	5											
<i>15300</i> 1900, etc.	Trump : Gwalla Central Gold Mines, Ltd.	5											
<i>A</i>	Leonora Gold Blocks	10											
<i>Mt. Clifford.</i> 18200 Pig Well. 15470	Sons of Gwalla, Ltd.	30							4			1	
	State Battery, Leonora	10									5		
	Victory No. 1	5											
	Starlight	10											
	Total	85							4	5		1	£226,792

TABLE XXIX.—Milling and Cyaniding Plants erected in the respective Goldfields, Districts, etc.—continued.

Mining Centre and Lease or Area.	Name of Mine, Company, or Works.	MILLING.								CYANIDING.			Value of all Mining Machinery.
		Batteries.	Other Mills.							Leaching Vats.	Agitating Vats.	Vacuum Filters and Presses.	
			Number of Heads of Stampers.	Prospecting Mills.	Ball Mills.	Griffin Mills.	Huntington Mills.	Puddlers.	Other Crushers.					Flint Mills.	Grinding Pans.
MT. MARGARET DISTRICT.													
<i>Erlistoun.</i> 2118T	Baneygo North	5	...	...	...	...	...	...	1	...	...	...	...
<i>Laverton.</i> 1807T	Mary Mac Gold Mine Co., N.L.	10	...	...	...	...	...	...	4	3	1	...	...
715T	Lancefield Treatment Syndicate	10	...	...	...	...	...	...	...	5	...	...	...
▲	State Battery, Laverton	10	...	...	...	...	...	...	...	...	...	...	...
	Total	25	...	...	...	...	...	...	5	14	1	...	£4,373
NORTH COOLGARDIE GOLDFIELD.													
MENZIES DISTRICT.													
<i>Comet Vale.</i> 5217Z	Gladsome	10	...	...	...	...	...	...	2	...	...	...	...
<i>Menzies</i> M.A. 65Z	Lady Harriet	5	...	...	...	...	...	...	...	4	...	...	...
4931Z, etc. (3100Z)	Menzies Consolidated Gold Mines, Ltd.	20	...	...	...	...	...	...	9	14	4	1	...
	Menzies Mining and Exploration Corporation, Ltd.	10	...	...	...	...	...	...	...	...	...	...	...
<i>Mt. Ida.</i> ▲	State Battery	5	...	...	...	...	...	...	...	...	...	...	...
5481Z	Unexpected South	5	...	...	...	...	...	...	1	...	...	...	...
	Total	55	...	...	...	...	...	...	12	16	4	1	£15,779
ULARRING DISTRICT.													
<i>Mulline.</i> ▲	State Battery, Mulline	10	...	...	...	...	...	...	...	...	...	...	...
M.A. 11U	Young Australian	10	...	...	...	...	...	...	1	...	...	...	...
	Total	20	...	...	...	...	...	...	1	...	...	...	£2,427
NIAGARA DISTRICT.													
<i>Kookynie.</i> 769G	Two D's	...	...	1	...	...	...	...	3	8	...	...	...
<i>Niagara.</i> ▲	State Battery, Niagara	10	...	...	...	...	...	...	...	...	...	...	...
<i>Tampa.</i> M.A. 62G	Grafter	5	...	...	...	...	...	...	1	2	...	...	...
	Total	15	...	1	...	...	...	...	4	10	...	...	£2,772
YERILLA DISTRICT.													
<i>Edjudina.</i> 1011R	Neta	10	...	...	...	...	...	...	1	...	...	...	...
<i>Yarri.</i> ▲	State Battery, Yarri	10	...	...	...	...	...	...	...	5	...	...	...
	Total	20	...	...	...	...	...	...	1	5	...	...	£4,680
BROAD ARROW GOLDFIELD.													
<i>Bardoc.</i> 1833W	Zoroastrian	5	...	...	...	...	...	...	...	...	...	...	...
<i>Siberia.</i> 1899W, etc.	Associated Northern Blocks (W.A.) Ltd.	10	...	1	...	2	3	...	10	7	...	2	...
1871W	Gimblet South	10	...	...	...	...	...	...	...	...	...	...	...
1289W	Lady Evelyn	5	...	...	...	...	...	...	...	4	...	...	...
(1736W)	Pole	5	...	...	...	...	...	...	...	...	...	...	...
▲	State Battery, Ora Banda	5	...	...	...	...	...	...	...	5	...	...	...
▲	State Battery, Siberia	5	...	...	...	...	...	...	...	...	...	...	...
	Total	35	...	1	...	2	3	...	10	16	...	2	£63,413
NORTH-EAST COOLGARDIE GOLDFIELD.													
KANOWNA DISTRICT.													
<i>Gordon.</i> 1385X	Pride of the Morning	...	...	...	1	...	...	...	...	...	...	...	...
<i>Kanowna.</i> 1839X	Golden Valley	5	...	...	...	...	...	...	...	...	...	...	...
1299X	Kanowna Consols	10	...	...	...	...	...	...	1	...	...	...	...
M.A. 19X	Martin's Battery	15	...	...	...	...	...	...	1	...	...	...	...
12X, etc.	North White Feather G.Ms., Ltd.	20	...	...	...	...	...	...	...	...	...	...	...
	Total	50	...	...	1	...	...	...	2	...	...	...	£7,800
KURNALPI DISTRICT.													
<i>Kurnalpi.</i> M.A. 5K	Success Battery	5	...	...	...	...	...	...	...	2	...	...	...
<i>Mulgabbie.</i> M.A. 4K	Simmons' Battery	...	1	...	...	...	...	...	...	...	...	...	...
	Total	5	1	...	...	...	...	...	...	2	...	...	£200

TABLE XXIX.—Milling and Cyaniding Plants erected in the respective Goldfields, Districts, etc.—continued.

Mining Centre and Lease or Area.	Name of Mine, Company, or Works.	MILLING.								CYANIDING.			Value of all Mining Machinery.	
		Batteries.	Other Mills.							Leaching Vats.	Agitating Vats.	Vacuum Filters and Presses.		
			Number of Heads of Stampers.	Prospecting Mills.	Ball Mills.	Griffin Mills.	Huntington Mills.	Puddlers.	Other Crushers.					Flint Mills.	Grinding Pans.
EAST COOLGARDIE GOLDFIELD.														
EAST COOLGARDIE DISTRICT.														
Boulder. 33E, etc. 66E	Associated Gold Mines of W.A., Ltd. ...	...	...	7	...	...	1	...	20	...	6	7	...	
351E	Boulder Perseverance, Ltd. ...	...	8	...	...	...	1	2	17	...	24	13	...	
M.A. 71E	Golden Horseshoe Estates Co., Ltd. ...	100	1	...	...	3	6	15	24	20	22	20	...	
16E, etc. 940E	Great Boulder No 1, Ltd. ...	10	...	...	...	...	...	...	2	...	...	...	...
15E, etc. 281E	Great Boulder Proprietary G.Ms., Ltd. ...	...	1	6	6	...	2	0	...	20	...	23	7	
410E, etc. 1208E, etc.	Ironsides North ...	10	...	...	...	...	...	...	1	...	...	...	...
Hampton Plains. Block 48, P.F.L. 86	Lake View and Star, Ltd. ...	10	...	3	...	2	...	2	4	32	28	2	...	
Block 50, F.P.L. 9	North Kalgurli (1912), Ltd. ...	20	...	...	...	...	2	...	1	4	...	...	...
Block 45, F.P.L. 252	Oroya Links, Ltd. ...	50	...	11	...	1	...	3	17	7	7	1	...	
Block 48, F.P.L. 1	South Kalgurli Consolidated, Ltd. ...	...	...	4	...	...	...	...	...	...	5	7	...	
Kalgurli. 5251E 3643E	Golden Hope G.Ms. Co., No Liability ...	10	...	...	...	...	...	...	...	2	2	1	...	
M.A. 7E 4540E	Hampton Celebration, W.A., Ltd. ...	10	...	...	...	...	1	1	1	...	3	2	...	
5367E L.C. 353E	Mount Martin ...	10	...	...	...	...	...	...	...	6	2	1	...	
Wombola. 4766E 4770E	White Hope: Hopeful Syndicate, Ltd. ...	10	...	...	...	...	...	...	2	6	2	...	...
	Central ...	...	...	...	1	...	...	...	...	3	...	...	...
	Hainault Sulphide Plant ...	...	1	...	...	...	...	...	...	7	...	...	...
	Hannans Central ...	20	...	...	...	1	...	...	...	8	4	2	...	
	Hannans Reward ...	5	...	...	...	...	...	...	1	11	...	...	...
	Hidden Secret ...	5	...	1	...	...	...	...	...	7	...	...	...
	Lone Hand ...	...	...	...	1	...	...	...	1	...	...	...	...
	Great Hope ...	...	...	...	1	1	...	...	1	...	...	...	...
	Great Hope, North ...	10	...	...	...	...	...	...	...	6	...	...	...
	Total ...	280	1	42	6	3	8	22	23	121	110	128	63	£633,388
COOLGARDIE GOLDFIELD.														
COOLGARDIE DISTRICT.														
Burbanks. M.A. 77 (2160)	Burbanks Main Lode ...	...	...	...	...	...	1	...	...	...	...	...	...	...
Coolgardie. 4567	Lady Robinson ...	10	...	...	...	...	...	...	...	...	...	...	...	...
M.A. 11	Griffiths Gold Mine ...	10	...	...	...	...	...	...	...	6	...	...	...	...
Gibraltar. 4560 4503	New Bayley's Mine, Ltd. ...	10	...	...	...	...	...	...	...	6	4	...	...	...
St. Ives. 4720	State Battery, Coolgardie ...	10	...	...	...	...	...	...	...	6	...	...	...	...
Widgiemooltha. M.A. 68 M.A. 280H	Lloyd George G.M. Co., N.L. ...	10	...	...	...	...	...	...	2	18	...	...	...	...
	Reform ...	5	...	...	...	...	...	...	...	...	...	...	...	...
	Ives Reward Gold Mines, N.L. ...	10	...	...	...	...	...	...	3	...	...	...	...	...
	State Battery, St. Ives ...	5	...	...	...	...	...	...	...	5	...	...	...	...
	Highgate ...	3	...	...	...	...	...	...	...	...	...	...	...	...
	Imperial ...	5	...	...	...	...	...	...	...	...	...	...	...	...
	Total ...	68	...	...	...	...	1	...	5	36	4	...	...	£44,151
KUNANALLING DISTRICT.														
Carbine 33E 25-Mile.	Carbine ...	10	...	...	...	...	...	...	2	...	...	...	...	...
690E 890E	Blue Bell ...	5	...	...	...	...	...	...	...	7	...	...	...	...
645E 897E	Premier ...	5	...	...	...	...	...	...	...	2	...	...	...	...
	Star of Fremantle ...	10	...	...	...	...	...	...	...	1	...	...	...	...
	Nick of Time ...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Total ...	30	...	...	...	...	...	...	3	9	...	...	...	£7,750
YILGARN GOLDFIELD.														
Bullfinch. 914, etc. Forrestonia. 2909	Bullfinch Proprietary (1919), Ltd. ...	20	...	...	...	...	...	...	2	2	4	3	...	...
Golden Valley. 3248 2994	Great Southern ...	5	...	...	...	...	...	...	...	...	...	...	...	...
Greenmount. 550 M.A. 25	Manxman Battery ...	5	...	...	...	...	...	...	1	3	...	...	...	...
Kennyville. (911) (570)	Radio ...	5	...	...	...	...	...	...	...	3	...	...	...	...
Marvel Loch. 3217 3069 719	Sunbeam Battery ...	5	...	...	...	...	...	...	1	6	...	...	...	...
M.A. 23 852	Transvaal ...	10	...	...	...	...	...	...	...	...	...	...	...	...
Mt. Jackson. (1935)	Edna May Battler G.M. Co., N.L. ...	10	...	...	...	...	...	...	2	5	...	...	...	...
Parker's Range. 2801 721	Great Leviathan ...	5	...	...	...	...	...	...	...	...	...	...	...	...
Southern Cross. (3232)	Firelight ...	...	...	...	1	...	...	...	...	5	...	...	...	...
Westonia. 3269 3270	Banker: Golden Butterfly G.M. Co., N.L. ...	10	...	...	...	...	...	...	...	...	6	1	...	...
	Great Victoria Gold Mines, N.L. ...	10	...	...	...	...	...	1	2	4	...	...	...	...
	Howlett's Battery ...	5	...	...	...	...	...	...	...	...	...	...	...	...
	May Queen ...	5	...	...	...	...	...	...	...	...	...	...	...	...
	Butcher Bird No. 1 ...	5	...	...	...	...	...	...	...	...	...	...	...	...
	Scots Greys ...	5	...	...	...	...	...	...	...	...	...	...	...	...
	Spring Hill G.M. Co., N.L. ...	10	...	...	...	...	...	...	1	4	...	...	...	...
	Fraser's Central ...	...	...	...	1	...	...	...	...	...	...	...	...	...
	Myrtle Central ...	10	...	...	...	...	...	...	...	6	...	...	...	...
	Recovery ...	5	...	...	...	...	...	...	...	...	...	...	...	...
	Total ...	130	...	...	2	...	...	...	3	9	36	10	4	£55,821

TABLE XXIX.—Milling and Cyaniding Plants erected in the respective Goldfields, Districts, etc.—continued.

GOLDFIELD.	DISTRICT.	MILLING.									CYANIDING.			Total Value of all Mining Machinery.
		Batteries.	Other Mills.								Leaching Vats.	Agitating Vats.	Vacuum Filters and Presses.	
		Number of Heads of Stampers.	Prospecting Mills.	Ball Mills.	Griffin Mills.	Huntington Mills.	Puddlers.	Other Crushers.	Flint Mills.	Grinding Pans.				
GOLD MINING.														
KIMBERLEY	Marble Bar	50				1					1	10		17,888
PILBARA	Nullagine	28									2	19		2,992
WEST PILBARA		10	1											2,281
ASHBURTON														
GASCOYNE														
PEAK HILL		10										7		2,878
EAST MURCHISON	Lawlers	40								2	23			19,647
	Wiluna	60							1	4		3	1	20,353
	Black Range	50	1						1	2	8			78,950
MURCHISON	Cue	50							1	1	19	2		20,804
	Meekatharra	70								0	8			46,500
	Day Dawn	10								1	14	4		3,250
YALGOO	Mt. Magnet	25								2	11			6,288
		35	1						1	2	22			24,561
		35								3	16	4	1	8,823
MT. MARGARET	Mt. Malcolm	85								4	5		1	266,792
	Mt. Margaret	25									14	1		4,378
	Menzies	55									12	4	1	15,779
NORTH COOLGARDIE	Ularring	20								1	1			2,427
	Niagara	15		1						4	10			2,772
	Yerfla	20								1	5			4,890
BROAD ARROW		35		1		2	3			10	16		2	63,418
N.E. COOLGARDIE	Kanowna	50				1				2	2			7,800
	Kurnalpi	5	1								2			200
EAST COOLGARDIE	East Coolgardie	280	1	42	6	3	8	22	23	121	110	128	63	638,888
	Bulong													
	Coolgardie	68						1		5	36	4		44,151
COOLGARDIE	Kunanalling	80								9	9			7,750
YILGARN		180				2			3	38	10	4		55,821
DUNDAS		17								9	1			9,838
PHILLIPS RIVER		35								1				5,795
STATE GENERALLY				1				1						80,100
	Total, Gold Mining Machinery	1,843	4	46	6	9	11	25	36	202	426	161	78	1,409,399
LEAD MINING.														
NORTHAMPTON, M.F.								7						53,470
	Total, Lead Mining Machinery							7						53,470
TIN MINING.														
PILBARA	Marble Bar					1		1	4					25,150
GREENBUSHES TINFIELD							1							15,440
	Total, Tin Mining Machinery					1	1	5						40,590
COPPER MINING.														
WEST PILBARA								5	2	1				60,000
PHILLIPS RIVER								10	2	2		3	1	81,250
	Total, Copper Mining Machinery			5				15	4	3		3	1	141,250
COAL MINING.														
COLLIE COALFIELD														117,671
	Total, Coal Mining Machinery													117,671
ASBESTOS MINING.														
PILBARA	Nullagine													2,750
	Total, Asbestos Mining Machinery													2,750
	Total Machinery other than Gold Mining			5		1	1	28	4	3		8	1	855,731
	Total, all Mining Machinery	1,843	4	51	6	10	12	53	40	205	426	164	74	1,765,130

APPENDIX.

ROYAL MINT, PERTH BRANCH.

Subject to the Regulations, any person may deposit gold at the Mint in his own name. Those who cannot attend personally for the purpose may send the gold by an agent, under Police escort, or by Post.

Arrangements can be made for the insurance of gold sent by post. Particulars upon application to the Mint.

A circular can be obtained from the Deputy Master of the Mint giving all necessary information for intending depositors, Coining Regulations, etc., etc.

Forms for use in connection with gold sent to the Mint by post can be obtained at the Mint.

Charges for Assaying, Refining, and Coinage.

Gross Weight of Deposit in ounces.	Mint Charge.	Gross Weight of Deposit in ounces.	Mint Charge.	Gross Weight of Deposit in ounces.	Mint Charge.
Up to and including—	£ s. d.	Up to and including—	£ s. d.	Up to and including—	£ s. d.
24	0 5 0	400	4 3 4	1,300	10 4 2
30	0 6 3	410	4 5 5	1,400	10 16 8
40	0 8 4	420	4 7 6	1,500	11 9 2
50	0 10 5	430	4 9 7	1,600	12 1 8
60	0 12 6	440	4 11 8	1,700	12 14 2
70	0 14 7	450	4 13 9	1,800	13 6 8
80	0 16 8	460	4 15 10	1,900	13 19 2
90	0 18 9	470	4 17 11	2,000	14 11 8
100	1 0 10	480	5 0 0	2,100	15 4 2
110	1 2 11	490	5 2 1	2,200	15 16 8
120	1 5 0	500	5 4 2	2,300	16 9 2
130	1 7 1	520	5 6 8	2,400	17 1 8
140	1 9 2	540	5 9 2	2,500	17 14 2
150	1 11 3	560	5 11 8	2,600	18 6 8
160	1 13 4	580	5 14 2	2,700	18 19 2
170	1 15 5	600	5 16 8	2,800	19 11 8
180	1 17 6	620	5 19 2	2,900	20 4 2
190	1 19 7	640	6 1 8	3,000	20 16 8
200	2 1 8	660	6 4 2	3,100	21 9 2
210	2 3 9	680	6 6 8	3,200	22 1 8
220	2 5 10	700	6 9 2	3,300	22 14 2
230	2 7 11	720	6 11 8	3,400	23 6 8
240	2 10 0	740	6 14 2	3,500	23 19 2
250	2 12 1	760	6 16 8	3,600	24 11 8
260	2 14 2	780	6 19 2	3,700	25 4 2
270	2 16 3	800	7 1 8	3,800	25 16 8
280	2 18 4	820	7 4 2	3,900	26 9 2
290	3 0 5	840	7 6 8	4,000	27 1 8
300	3 2 6	860	7 9 2	4,100	27 14 2
310	3 4 7	880	7 11 8	4,200	28 6 8
320	3 6 8	900	7 14 2	4,300	28 19 2
330	3 8 9	920	7 16 8	4,400	29 11 8
340	3 10 10	940	7 19 2	4,500	30 4 2
350	3 12 11	960	8 1 8	4,600	30 16 8
360	3 15 0	980	8 4 2	4,700	31 9 2
370	3 17 1	1,000	8 6 8	4,800	32 1 8
380	3 19 2	1,100	8 19 2	4,900	32 14 2
390	4 1 3	1,200	9 11 8	5,000	33 6 8

For every additional 100ozs. the charge is increased by 12s. 6d.

NOTE.—Additional charges are collected when base metals in a deposit exceed 2 per cent. of its weight.

The following table illustrates the operation of these charges in case of gold of the value of £3 17s. 10½d. an ounce:—

Weight of Deposit.	Rate of Charge per ounce.	Amount of Charge.	Net Value of Deposit.
ozs.	d.	£ s. d.	£ s. d.
50	2.5	0 10 5	194 3 4
100	2.5	1 0 10	388 6 8
600	2.3	5 16 8	2,330 8 4
1,000	2.0	8 6 8	3,885 8 4
5,000	1.6	33 6 8	19,435 8 4
10,000	1.55	64 11 8	38,872 18 4

NOTE.—A proportion of silver in deposits of gold is paid for by the Mint as follows:—

In deposits under 1,000ozs. gross: all silver in excess of 8 per cent. of the weight of the deposit after melting.
 " from 1,000 " to 5,000 " " 6 " " " " " " "
 " " 5,000 " " 10,000 " " 5 " " " " " " "
 " " 10,000 " upwards " " 4 " " " " " " "

The rate at which payment for silver is made is liable to fluctuation.

RATES FOR CARRIAGE OF GOLD ON GOVERNMENT RAILWAYS.

	Distance not over—									
	10 miles	25 miles.	50 miles.	100 miles.	150 miles.	200 miles.	250 miles.	300 miles.	400 miles.	500 miles.
Bullion or unmanufactured Gold, per 100ozs.	s. d. 3 9	s. d. 4 6	s. d. 5 3	s. d. 6 9	s. d. 8 3	s. d. 9 9	s. d. 11 3	s. d. 12 9	s. d. 15 0	s. d. 17 3

1s. 6d. per 100ozs. for every additional 100 miles, or part thereof.

Consignments of Gold Bullion in lots exceeding in the aggregate 30,000 ozs. despatched on any one day will be allowed a reduction of 33½ per cent. with a minimum charge as for 30,000 ozs. Consignors may combine to make up the required quantity, but each consignment must be charged for separately.

To find the value per ounce of gold sent from a mine to the Mint.—Divide the standard gold by the weight before melting, and multiply the result by £3 17s. 10½d. For instance, supposing the Mint return to show:—

Weight before melting	..	..	..	..	..	..	Ozs. 47.41
Standard gold	..	..	..	..	..	..	38.19

The calculation would be as follows:—

4741)3819.0(.805	.805 × £3 17s. 10½d. =
3792.8	.805 × £3.894
	.805
<u>26200</u>	19470
23705	<u>311520</u>
<u>2495</u>	£3.134(670)
	20
	<u>s. 2.680</u>
	12
	<u>d. 8.160 = £3 2s. 8d., value per ounce of gold as produced, at the mine.</u>