



REPORT
OF THE
DEPARTMENT OF MINES
FOR THE YEAR
WESTERN · 1914. · AUSTRALIA



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



H.C. HIGGINS

1915.
—
WESTERN AUSTRALIA.

REPORT

OF THE

DEPARTMENT OF MINES

FOR THE YEAR

1914.

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

[SECOND SESSION OF THE NINTH PARLIAMENT.]

PERTH:
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—
1915.



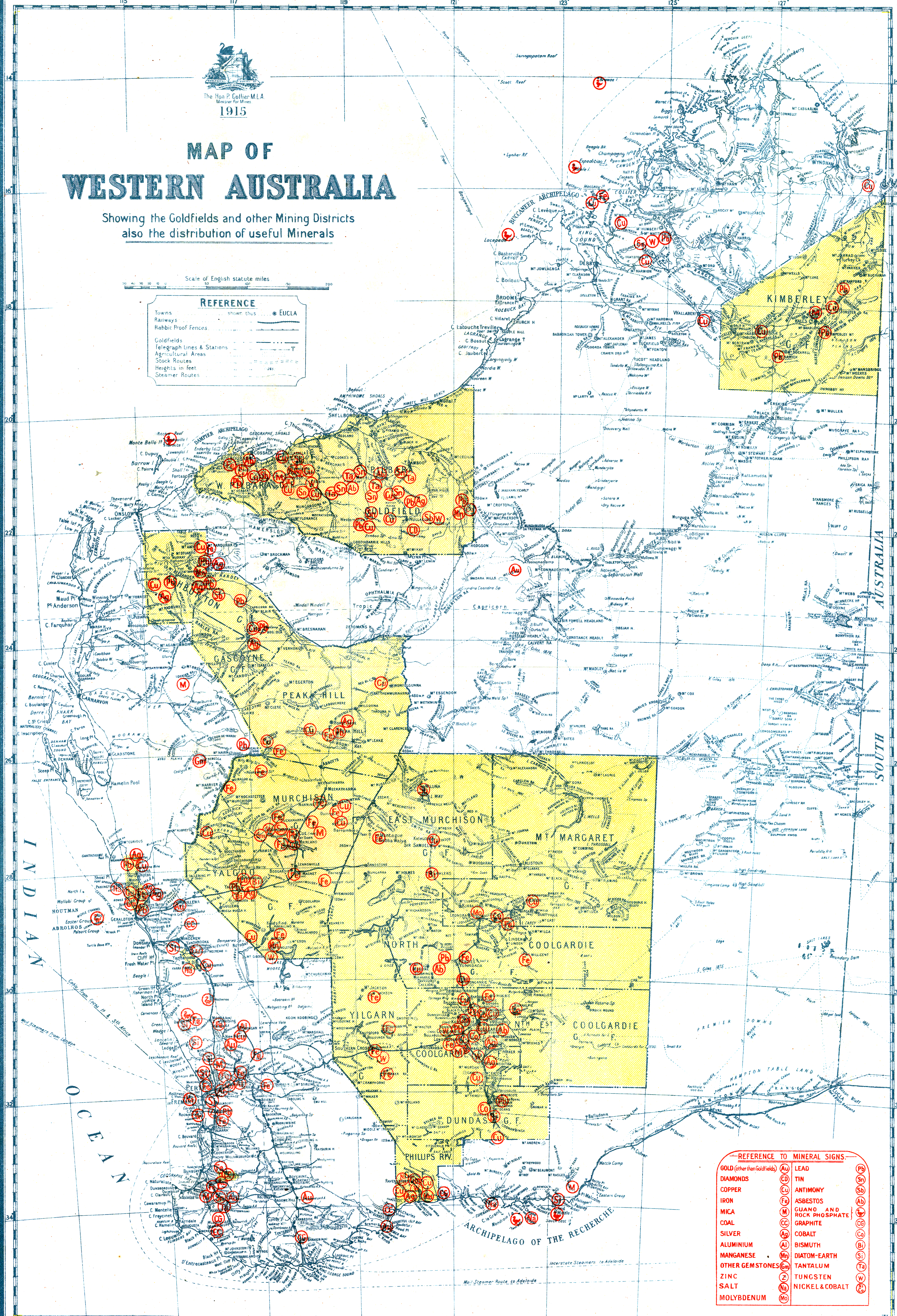
The Hon. P. Collier M.L.A.
Minister for Mines
1915

MAP OF WESTERN AUSTRALIA

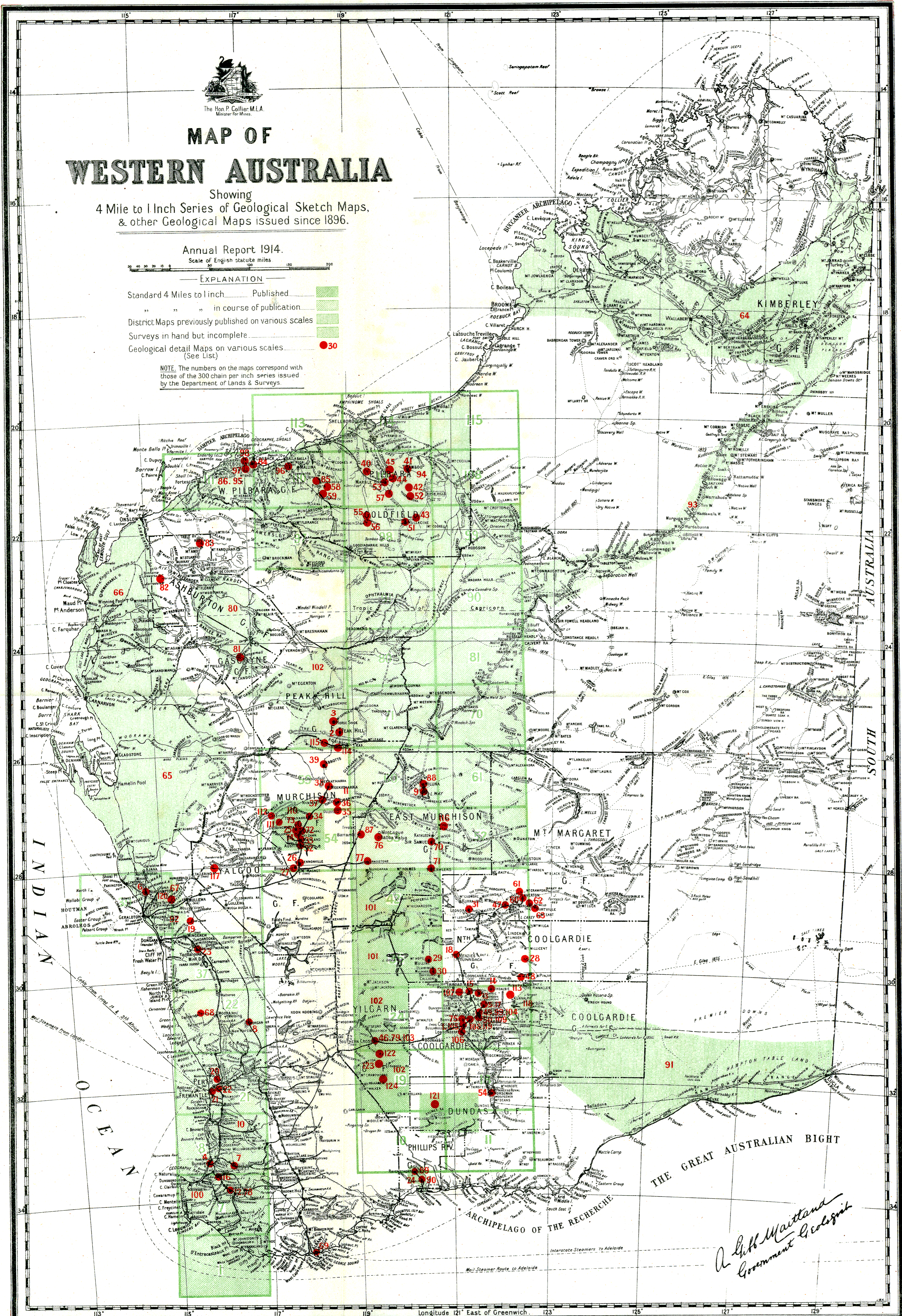
Showing the Goldfields and other Mining Districts
also the distribution of useful Minerals

Scale of English statute miles

REFERENCE	
Towns	shown thus ● EUCLA
Railways	—
Rabbit Proof Fences	—
Goldfields	—
Telegraph Lines & Stations	—
Agricultural Areas	—
Stock Routes	—
Heights in feet	—
Steamer Routes	—



REFERENCE TO MINERAL SIGNS			
GOLD (other than Goldfields)	AU	LEAD	PB
DIAMONDS	CD	TIN	SN
COPPER	CU	ANTIMONY	SB
IRON	FE	ASBESTOS	AB
MICA	M	QUARTZ AND ROCK PHOSPHATE	Q
COAL	CC	GRAPHITE	CG
SILVER	AG	COBALT	CO
ALUMINIUM	AL	BISMUTH	BI
MANGANESE	MN	DIATOM-EARTH	DI
OTHER GEMSTONES	GM	TANTALUM	TB
ZINC	Z	TUNGSTEN	W
SALT	Na	NICKEL & COBALT	NC
MOLYBDENUM	MO		



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1. Coolgardie	1897	VII.	3	II.	
2. Peak Hill	"	II.	48	II.	
3. Horseshoe	"	III.			
4. Bunbury	"	IV.			
5. Kanowna	"	VI.	47	I.	
6. Northampton	1897	I.	9		
7. Collie Coal Field	1898	I.			
8. Wongan Hills	"	IV.			
9. Lake Way	"	VI.			
12. Greenbushes	1899	I.			
13. Mulgarric	"	II.			
14. Lindsay's and Hayes' New Find	"	III.			
15. Bardoc	"	IV.			
16. Donnybrook	"	V.			
17. North Lead, Kanowna	"	VI.			
18. Menzies	"	VII.	22	VII.	
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23. Arrino	"	I. and II.			
25. Auriferous Reefs, Cue and Day Dawn	"	7	I.		
26. Lennoxville	"	8	I.	59	IX.
27. Mt. Magnet and Boogardie	"	8	II.	59	IX.
28. Edjudina and Yarrri	"	11	I.		
29. Mulline	"	12	I.		
30. Mulwarrie and Davyhurst	"	12	II.		
31. Leonora	"	13	I.		
32. The Island	"	14	II.		
33. The Mainland	"	14	III.		
34. Tuckanarra	"	14	IV.		
35. Quinas	"	14	V.		
36. Gabanintha and Star of the East	"	14	VI.		
37. Nannine	"	14	VII.		
38. Mookatharra	"	14	VIII.		
39. Abbots	"	14	IX.		
40. Lalla Rookh	"	15	II.	40	II.
41. Bamboo	"	15	IV.	40	IV.
42. Yandicoogina	"	15	V.	40	V.
43. Mosquito Creek	"	15	VI.	40	VI.
44. Moolyella	"	15	VII.	40	VII.
45. Talga Talga	"	15	III.	40	III.
46. Southern Cross	"	17	I.		
47. Mt. Morgans	"	18	I.		
48. Mulgabbie	"	18	II.		
49. Kalgoorlie	"				
50. Boulder Belt	Separately				
51. Nullagine	Separately				
52. Warrawoona		20	I.	40	VIII.
53. Marble Bar		20	III.	40	X.
54. Norseman		20	VII.	40	XIV.
55. Tambourah		21	VI.		
56. Western Shaw		23	I.	40	XV.]
57. Just in Time		23	II.	40	XVI.]
58. Wodgina		23	IV.	40	XVII.]
59. Stannum		23	V.	40	XVIII.]
60. Laverton		24	VI.	40	XIX.]
61. Laneefield		24	I.		
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*A. G. H. Maitland
Government Geologist*

ANNUAL REPORT OF THE DEPARTMENT OF MINES, WESTERN AUSTRALIA, 1914.

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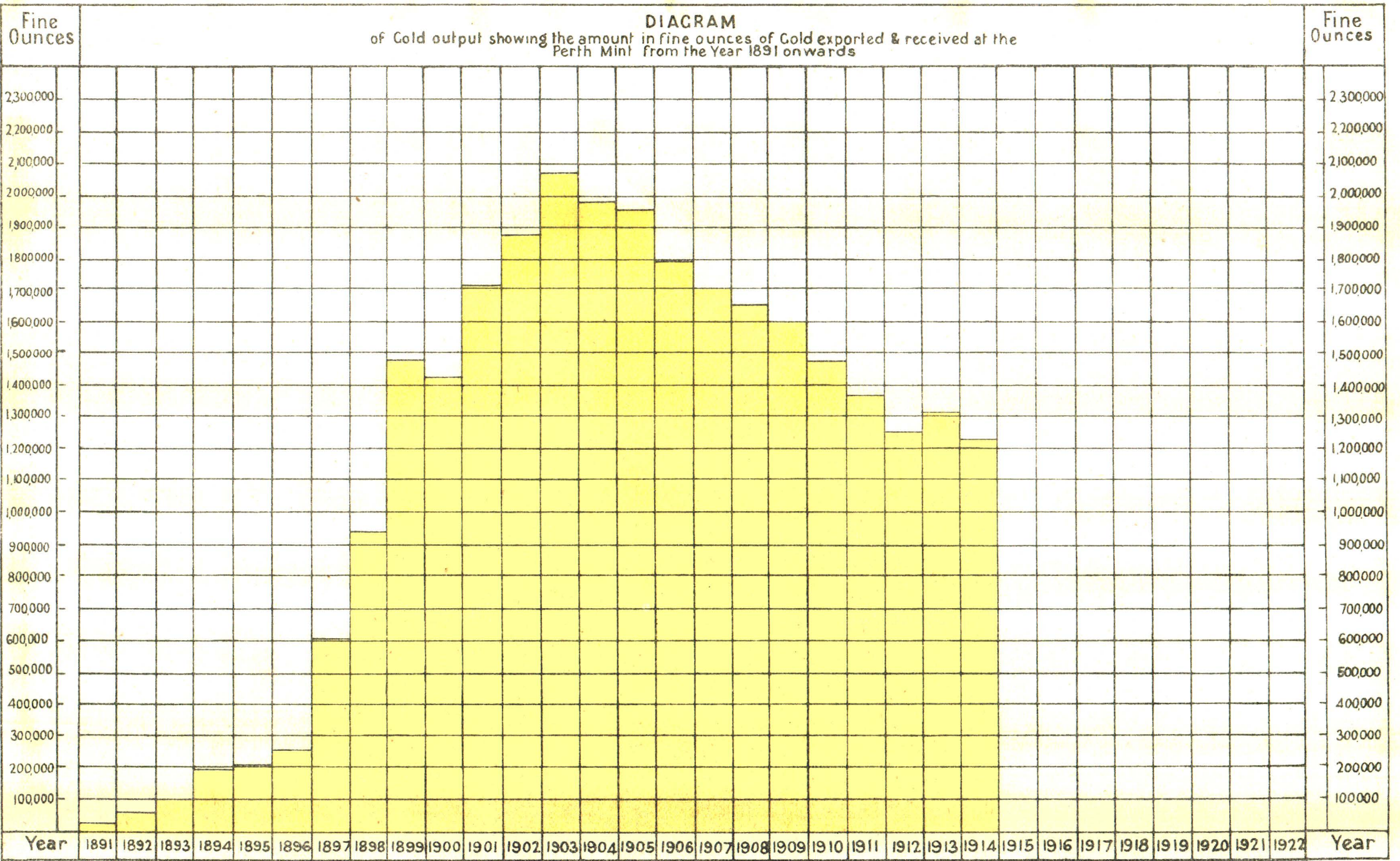
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STATE OF WESTERN AUSTRALIA.

**Report of the Department of Mines for the State of Western Australia
for the Year 1914.**

To the Hon. the Minister for Mines.

SIR,

I have the honour to submit the Annual Report of the Department for the year 1914, 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 Sub-Departments are also submitted.

I have, etc.,

H. S. KING,

Under Secretary for Mines.

Department of Mines, Perth, 31st March, 1915.

DIVISION I.

Summary by the Under Secretary for Mines.

PART I.—GENERAL REMARKS.

- II.—MINERALS RAISED.
- III.—LEASES AND OTHER HOLDINGS UNDER THE 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 1914 was £5,533,990, being £502,125 less than that for the previous year.

Although Coal, Copper ingots, Lead ore, Silver, Zinc, Bismuth, and Mica record increases in quantity, practically all show decreases in value, due to the disorganisation of the metal market upon the outbreak of war.

Coal showed an increase in quantity of 5,392 tons; Copper ingots 101 tons, and Lead ore 385 tons; but Copper ore decreased by 426 tons.

The value of the Gold yield was £5,237,353, being 94.64 per cent. of the total output.

The value of the Coal output was £148,684, of Copper £38,174, of Lead £46,315, and of Tin £35,649.

The dividends paid by mining companies amounted to £799,392, and in the preceding year £910,326, a decrease of £110,934. The figures in last year's Report were understated by £3,689 (*see* Table 9 herein). The total dividends paid to the end of 1914 were £24,702,069.

To the same date the total mineral production was £124,904,975, and the total gold production £120,117,926.

GOLD.

The gold yield shows a decline, being 81,066 fine ounces less than that for 1913, which was 31,385 fine ounces more than that for 1912.

The average value per ton of ore treated in the State as a whole has fallen from 39.19 shillings in 1913 to 37.81 shillings in 1914, and in the East Coolgardie Goldfield, from which comes over 50 per cent. of the State's yield, from 35.64 shillings to 34.20 shillings.

Comparing the tonnages of ore treated in 1913 and 1914 there is a decrease of 85,265 tons in the latter year, during which 2,702,096 tons were treated.

The decreases were in Broad Arrow, East Murchison, East Coolgardie, Coolgardie, Murchison, North-East Coolgardie, Yalgoo, Phillips River, Dundas, and West Pilbara, the tonnages being 85,411, 38,719, 21,026, 14,674, 7,056, 4,497, 4,033, 1,959, 392, and 390 tons respectively less. Larger tonnages were treated in Yilgarn, Mount Margaret, North Coolgardie, Peak Hill, and Pilbara, the increases being 56,958, 28,815, 5,620, 873, and 633 tons respectively.

Working costs show an increase, the average cost per ton of 2,000 lbs. being as published by the Chamber of Mines:—In 1908, 19s. 3d.; in 1909, 19s. 11.5d.; in 1910, 20s. 1d.; in 1911, 20s.; in 1912, 19s. 3d.; in 1913, 19s. 6.6d., and in 1914, 20s. 6d.

There was an increased output in the Yilgarn, Mount Margaret, North Coolgardie, and Phillips River fields. In the East Coolgardie, Broad Arrow, East Murchison, Coolgardie, Murchison, North-East Coolgardie, Yalgoo, Dundas, Pilbara, West Pilbara, Peak Hill, Kimberley, Gasecoyne, and Ashburton fields there were decreases.

The area held under mining lease for all minerals is 50,520 acres, being a decrease of 3,023 acres when compared with 1912. The area leased for gold mining is less by 2,942 acres, and for minerals by 81 acres. The area held under prospecting areas is 32,462 acres, including 23,420 acres for coal and oil. This is a decrease on the area held in 1913 of 15,100 acres, but for gold and base metals the decrease is only 76 acres.

The number of men engaged in all classes of mining is 13,174, an apparent decrease of 1,606 on the figures for 1913, which, however, in regard to gold mining were overstated for that year by the inadvertent inclusion of 742 men engaged in allied occupations, as explained in Table 21 herein. The actual decrease is therefore 864. The number of men engaged in mining for minerals other than gold decreased by 271, all showing a falling-off excepting the figures for pyritic ore, which were slightly increased. In gold mining there was a decrease of 593.

The average value of gold produced per man employed on gold mines has increased from £419.59 in 1913 to £435.82 in 1914. The average tonnage raised per man was 230.51 tons, and in the preceding year 214.08 tons.

In the East Murchison field there was a falling-off. The Black Range district is entirely responsible for this, the closing down for a time of the Yuanmi mine being a big factor. The mines, however, are looking well.

The Lawlers district shows a slight decrease in yield, but an increased tonnage, and this was also the case in the Wiluna district, indicating a depreciation in the grade of ore treated.

In the Murchison Goldfield there was a decrease notwithstanding that the Meekatharra centre gave a

splendid increase on the previous year's output. The mines in this centre continue to open up splendidly.

At Garden Gully the Kyarra is still a regular producer. The Mt. Magnet district had a slight falling-off, but generally the position was well maintained.

The Cue district showed a decrease of over 2,000 ounces, and the industry in that portion of the field was very quiet. The largest decrease was in the Day Dawn district, where the Great Fingall mine had a considerably lessened output consequent on certain engineering difficulties, which, however, it is stated have now been overcome, and an improvement is anticipated.

The production of the Mount Margaret field shows an increase. This is the result of a resumption of work at the Lancefield mine in the Mount Margaret district, which greatly added to the output.

In the Mt. Morgans district work was continued on the Mt. Morgans mine, and the Mt. Morven mine had promising developments. The output showed an increase.

In the Mt. Malcolm district there was a falling-off, but some of the mines had good developments. The Sons of Gwalia is still the principal producer.

In the Coolgardie field there was a decrease, entirely attributable to a falling-off in the Coolgardie district, the Kunanalling district having an increase.

The other districts remained practically unchanged.

The North Coolgardie Field had an increase for which the Menzies District was responsible.

The Menzies Consolidated mine at Woolgar is looking exceedingly well, and the mines at Comet Vale have been producing regularly and the prospects are very bright. In the Ularring, Niagara, and Yerilla districts there were decreases, but little change in the various centres.

The North-East Coolgardie Goldfield had a decrease, and matters were very quiet. Nothing transpired to warrant a hope for any early improvement.

The Broad Arrow Goldfield had a decrease, principally attributable to a reduction in the Ora Banda district, where a stoppage of the treatment plant occurred on the Victorious mine. After considerable alterations and additions it was re-started at the end of the year, and next year should show an increase. Other mines in this district are looking well. The other centres of the field were very quiet.

In the East Coolgardie Goldfield the number of men engaged in mining was 5,003, and in 1913, 5,191; a decrease of 188. This goldfield gave employment to about 41 per cent. of the number of men employed in gold mining, and the reported production during the year was 682,895 fine ounces of gold, about 56 per cent. of the total reported yield. The tonnage treated was 1,691,671 tons, being less than in 1913 by 21,026 tons. The average grade of the ore fell from 35.64 shillings in 1913 to 34.20 shillings in 1914. Although the output shows a decrease, most of the big mines have been developing satisfactorily, and there is a good future ahead of this field.

The Yilgarn field again had an increase, and much activity prevails at Westonia, where the Edna May mine has had most satisfactory developments and others are promising well. The locality is at present a very thriving one. The Bullfinch Proprietary has maintained a steady output, and throughout the field there has been progress and promising developments. In the vicinity of Southern Cross a 10-head mill and

other plant were erected on the Maori Lass mine, and boring on the old Fraser's mine was continued.

The Dundas field had a small decrease.

The various mines have been developed steadily, and the results are said to be encouraging.

The Phillips River field had an increase, the outcome of the re-starting of the local smelters by the Government, which has caused most of the mines in the vicinity of Ravensthorpe and Kundip to be vigorously worked. Developments have been very encouraging, and a considerable improvement is anticipated.

In the Northern Goldfields, Kimberley, Pilbara, West Pilbara, Ashburton, and Gascoyne there has been little change. In Pilbara there was a small decrease, but not much change in the field generally. The State plants at Marble Bar, Bamboo Creek, and 20-Mile Sandy continued to crush for the prospectors whenever ore was available. At Warrawoona the Klondyke Boulder mine was closed down owing, it is stated, to lack of capital to properly equip it. In West Pilbara there was a small decrease, and mining was very quiet. The principal mine, the Whim Well Copper mine, closed down under exemption, but it is hoped that on its expiration operations will be resumed.

TIN.

The quantity of tin exported was 363 tons, being less than in 1913 by 121 tons, and in value by £36,493. The Greenbushes Tinfield produced 244.54 tons, valued at £21,145; a decrease on the preceding year of 213.94 tons, and in value of £29,809; the Pilbara field 87.40 tons, valued at £8,168; a decrease in tonnage of 51.70 tons, and in value of £8,338. None was produced on any of the other fields.

The decreased production in each field is attributable to the slump in the market for base metals.

TANTALITE.

None of this metal was exported or reported.

COPPER.

The value of the copper exported was £38,174, being £104,189 less than in 1913. The quantity raised in the West Pilbara field was 7,764.18 tons, valued at £40,607; a decrease in tonnage of 4,857.55 tons, and in value of £36,271. This is entirely attributable to the lessened output from the Whim Well Copper mine. In the Phillips River field the production was 4,841.15 tons, valued at £37,524; an increase on the preceding year in tonnage of 4,034.20 tons, and in value of £27,787. This is the result of the assistance rendered to the field by the Government re-starting the smelters and making advances on the matte shipped, the company which owned the smelters having ceased operations. The benefits resulting from this assistance have undoubtedly been considerable, and the outlook for the field is much brighter.

Other fields producing were Murchison, 18.59 tons, valued at £275, and Peak Hill 112.70 tons, valued at £2,409.

The average number of men engaged in copper mining was 192, and in 1913, 213.

COAL.

Six coal mines are working on the Collie field, and the output for the year was 319,210 tons, being 5,392 tons more than in 1913.

This is attributable to considerable improvement in the various mines, resulting in an increased output and reduction in price for coal.

The number of men employed, 525, is less by 34 than in 1913, and the output per man was, in 1913, 561 tons, and in 1914, 608 tons.

OTHER MINERALS.

The quantity of silver obtained as a by-product and exported was 189,837 ounces, valued at £22,913, and in the preceding year 188,020 ounces, valued at £23,420. Lead ore to the extent of 3,554 tons, valued at £46,315 was exported, and in the preceding year 3,169 tons, valued at £59,002. Pyritic ore amounting to 9,758.83 tons, valued at £3,485, was reported, and in the preceding year 10,216 tons, valued at £3,658.

No wolfram, asbestos, or mica was reported or exported.

MINING GENERALLY.

This year the whole of the Australian States, including the Northern Territory and Papua, also New Zealand, report decreased gold outputs. The Western Australian production was 54.18 per cent. of the total for Australasia, and in the previous year 51.22 per cent.

The work of the year was again encouraging. The improvement recorded in the previous year at Meekatharra and Weston's continued, the developments at the latter place giving much promise of its probable development into a big field, and fresh discoveries in other parts of the State were very promising.

The assistance to bona-fide prospectors by loans of equipment and transport facilities has been continued. Towards the close of the year most beneficial rains fell throughout the whole of the mining areas, and, as this will greatly facilitate prospecting, it is reasonable to expect new discoveries to follow the renewed activity which is already evident.

The area held under Prospecting Areas for gold and minerals, viz., 9,042 acres, is less than in the previous year by only 76 acres, and indicates that prospecting is still vigorous. The assistance rendered under the provisions of the Mining Development Act, details of which are given in the Report of the State Mining Engineer, published as Division II. of this Report, and which aims at assisting in the development of struggling mines, mostly in the direction of equipping them with machinery, evidences that the Government does its utmost to foster and push on the industry. Assistance is also given by carrying out diamond drilling wherever there is a reasonable prospect of success, and a good deal was done in this direction during the year.

PART II.—MINERALS RAISED.

TABLE 1.

Quantity and Value of all the Minerals produced during 1913 and 1914.

Description of Minerals.	1913.		1914.		Increase or Decrease for Year compared with 1913.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
1. Coal (raised), statute tons	313,818	£ 153,614	319,210	£ 148,684	+ 5,392	— 4,930
{ Ore (exported), statute tons .. .	4,339	136,472	3,913	33,654	— 426	— 102,818
2. Copper { Ingot, Matte, etc. (exported), statute tons	82	5,891	183	4,520	+ 101	— 1,371
3. Gold (exported and minted), fine ounces ..	1,314,043	5,581,701	1,232,977	5,237,353	— 81,066	— 344,348
4. Lead Ore (exported), statute tons .. .	3,169	59,002	3,554	46,315	+ 385	— 12,687
5. Pyritic Ore (reported), statute tons .. .	10,216	3,658	9,759	3,485	— 457	— 173
6. Silver (exported), fine ounces .. .	188,020	23,420	189,837	22,913	+ 1,817	— 507
7. Tin, Ore and Ingot (exported), statute tons	484	72,142	363	35,649	— 121	— 36,493
8. Wolfram (exported), statute tons .. .	1	86	$\frac{1}{2}$	40	— $\frac{1}{2}$	— 46
9. Zinc, Spelter, etc. (exported), statute tons	..	..	22	379	+ 22	+ 379
10. Godolinite (reported), statute tons .. .	1	112	..	..	— 1	— 112
11. Bismuth (exported), statute tons .. .	..	..	9	635	+ 9	+ 635
12. Mica (exported), statute tons .. .	..	..	4	323	+ 4	+ 323
Unenumerated (exported), statute tons ..	..	17	7	40	+ 7	+ 23
Total Values	£ ..	6,036,115	..	5,533,990	..	—502,125

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
14 Years Total	131,532,715	93,716,575	71·25

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 1914.

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

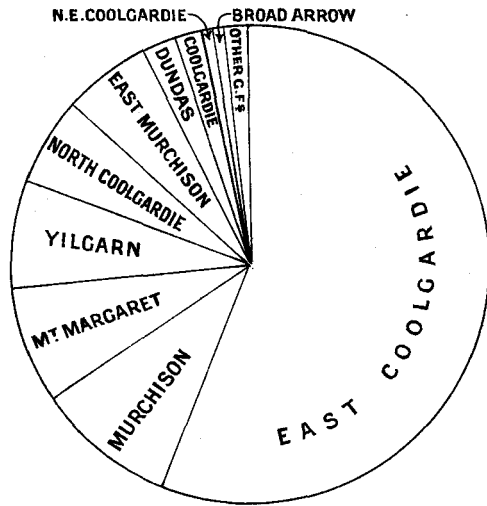


Fig 2. Gold produced from various Goldfields as given by the Export and Mint Returns.

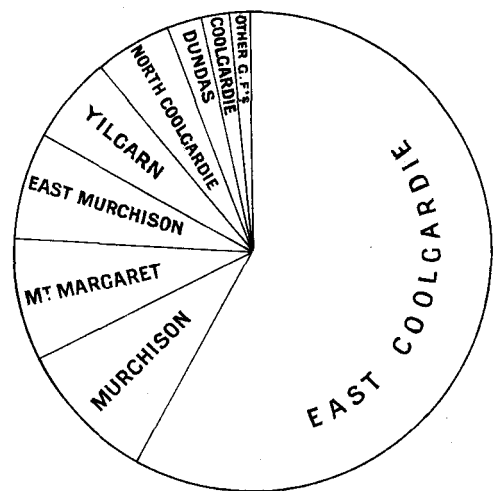


Fig 3. Value of Gold and other Minerals.

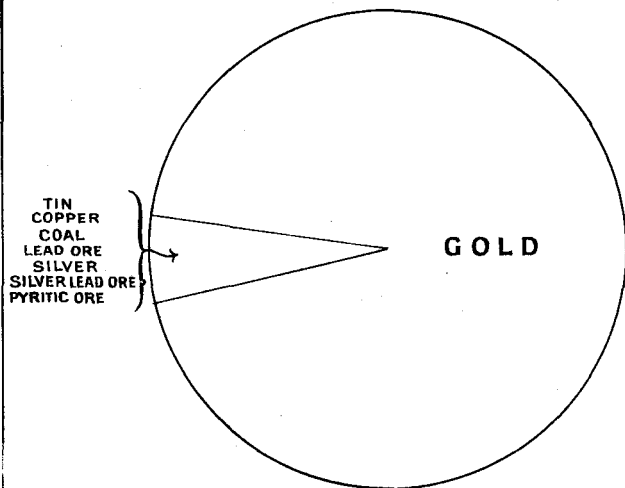


Fig 4. Value of Minerals other than Gold.

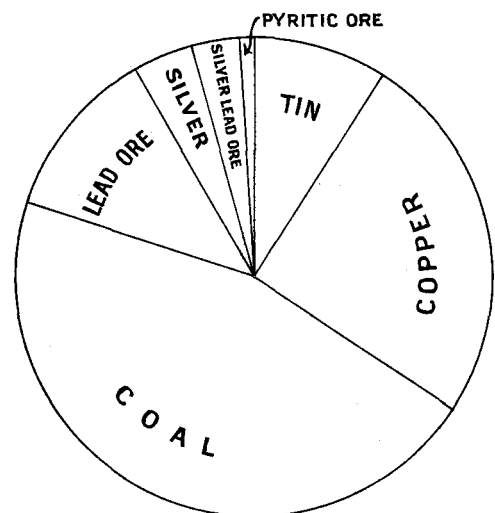


Fig 5. Areas of Land leased for Goldmining on various Goldfields.

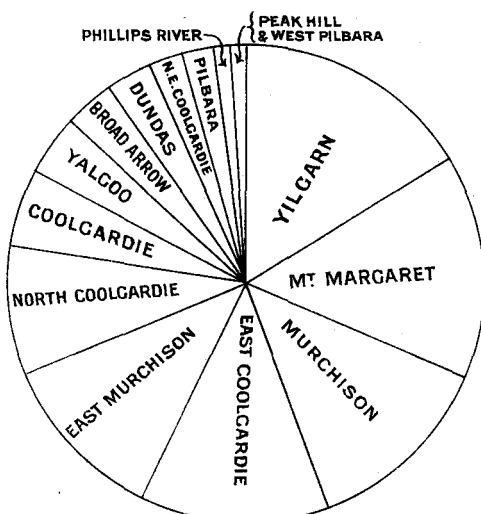
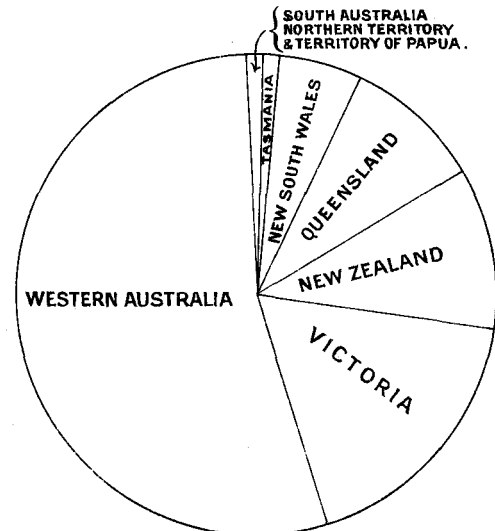
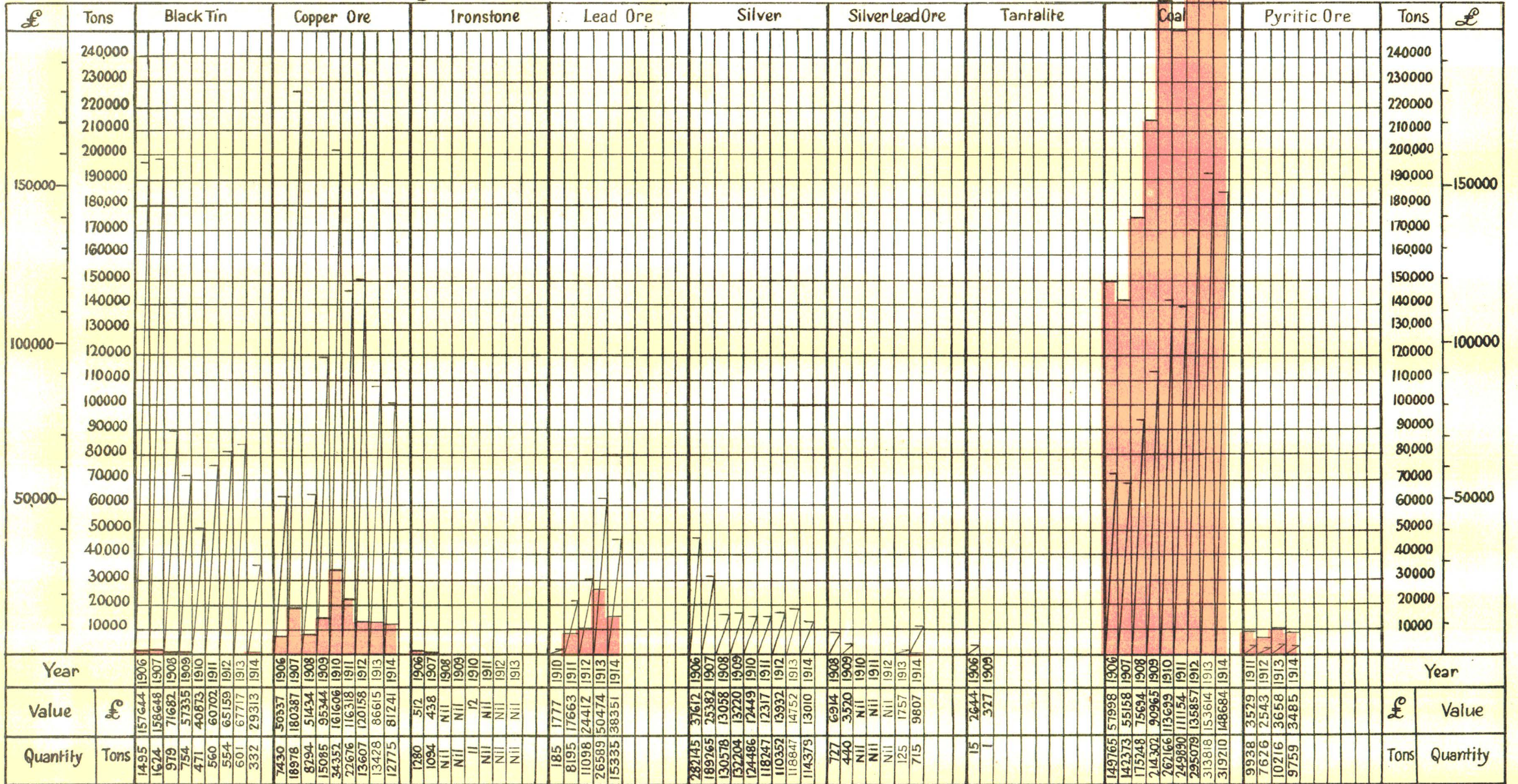


Fig 6. Output of Gold in the States of Australia and the Dominion of New Zealand.



DIAGRAM

of the Mineral Output, showing Quantity & Value of Minerals other than Gold reported to the Mines Department from the Year -1906 onwards.



NOTE. The Pink denotes Quantities produced and diagonal lines Values thereof Where Years not shewn: Values & quantities Nil from 1906

0s	282145	31612	1906	0s	189765	25382	1907	0s	130578	13058	1908	0s	13220	1909	0s	124486	12449	1910	0s	118247	12317	1911	0s	110352	13932	1912	0s	118847	14752	1913	0s	114379	13010	1914				
£	6914	1908	£	5798	1906	£	55158	1907	£	75694	1908	£	90965	1909	£	11154	1911	£	135857	1912	£	153614	1913	£	148684	1914	£	3579	1911	£	2543	1912	£	3658	1913	£	3485	1914

Previous to 1906 the Quantity and value of various Minerals exported amounted to:

Black Tin.....	6,929 Tons	£433,829	Silver Lead Ore....	57 Tons	£4,290
Copper Ore.....	55,272 "	£310,858	Tantalite.....	73 "	£10,575
Ironstone.....	55,446 "	£35,733	Coal.....	834,314 "	£428,910
Lead Ore.....	408 "	£1,906	Limestone.....	93,705 "	£18,290
Asbestos.....	43 "	£1,754	(to 1907)	Total	£1,242,284

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.					
	1913.	1914.	Percentage for each Goldfield.		Average Value of Gold per ton of Ore treated.	
			1913.	1914.	1913.	1914.
	fine ozs.	fine ozs.			shillings.	shillings.
1. Kimberley .. .. .	..	453	..	·04	..	..
2. Pilbara	5,598	5,177	·43	·43	113·85	83·66
3. West Pilbara	1,421	1,023	·11	·08	89·11	92·72
4. Ashburton	12	..	..	..	..	..
5. Gascoyne	31	4	..	..	339·96	..
6. Peak Hill	2,766	2,603	·21	·21	120·96	95·19
7. East Murchison	87,977	70,809	6·77	5·83	39·65	39·82
8. Murchison	122,028	115,722	9·39	9·53	49·67	48·78
9. Yalgoo	8,163	6,026	·63	·50	60·88	73·27
10. Mt. Margaret	91,273	96,793	7·03	7·97	43·22	39·63
11. North Coolgardie	68,527	72,188	5·28	5·95	61·29	61·04
12. Broad Arrow	34,739	9,286	2·67	·77	25·74	27·82
13. North-East Coolgardie	12,393	10,134	·95	·83	49·65	53·20
14. East Coolgardie	719,929	682,895	55·42	56·24	35·64	34·20
15. Coolgardie	31,892	20,981	2·46	1·73	50·66	46·34
16. Yilgarn	82,334	88,745	6·34	7·31	45·21	35·64
17. Dundas	27,039	26,591	2·08	2·19	40·52	41·30
18. Phillips River	2,788	4,665	·21	·38	53·12	158·91
State generally	179	144	·02	·01	..	..
Totals and averages	1,299,089	1,214,239	100·00	100·00	39·19	37·81

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.

The Mount Margaret, North Coolgardie, Phillips River, and Yilgarn fields each show an increase.

TABLE 4.

Number of Gold-producing Mines in the several Goldfields and Districts during 1913 and 1914.

Goldfield.	District.	1913.		1914.		Increase or Decrease.
		District.	Goldfield.	District.	Goldfield.	
Kimberley .. .. .	..	21	..	20	..	..
Pilbara	Marble Bar .. .. .	..	31	10	30	- 1
West Pilbara	Nullagine	10	..	..	4	- 4
Ashburton .. .. .	..	..	8	..	..	..
Gascoyne .. .. .	..	..	..	..	..	..
Peak Hill .. .. .	..	..	8	..	10	+ 2
East Murchison	Lawlers	17	..	13	..	..
.. .. .	Wiluna	14	62	14	66	+ 4
.. .. .	Black Range	31	..	39	..	..
.. .. .	Cue	18	..	23	..	..
Murchison	Meekatharra	49	108	54	120	+ 12
.. .. .	Day Dawn	9	..	10	..	..
.. .. .	Mt. Magnet	32	..	33	..	..
Yalgoo .. .. .	..	..	25	..	28	+ 3
Mt. Margaret	Mt. Morgans	7	..	4	..	..
.. .. .	Mt. Malcolm	29	60	22	47	- 13
.. .. .	Mt. Margaret	24	..	21	..	..
.. .. .	Menzies	35	..	34	..	..
North Coolgardie	Ularring	23	96	23	92	- 4
.. .. .	Niagara	13	..	11	..	..
.. .. .	Yerilla	25	..	24	..	..
Broad Arrow .. .. .	..	..	35	..	30	- 5
North-East Coolgardie	Kanowna	29	37	18	21	- 16
.. .. .	Kurnalpi	8	..	3	..	..
East Coolgardie	East Coolgardie	63	67	53	56	- 11
.. .. .	Bulong	4	..	3	..	..
Coolgardie	Coolgardie	32	45	33	43	- 2
.. .. .	Kunanalling	13	..	10	..	..
Yilgarn .. .. .	..	..	71	..	60	- 11
Dundas .. .. .	..	..	23	..	19	- 4
Phillips River .. .. .	..	..	22	..	23	+ 1
Totals .. .. .	..	..	698	..	649	- 49

TABLE 5.

Gold Yield from Registered Gold Mining Companies and Gold Mining Leases for the Years 1911, 1912, 1913, and 1914.

Goldfield.	REGISTERED COMPANIES PRODUCING OVER 12,000OZS.								REGISTERED COMPANIES PRODUCING UNDER 12,000OZS.								LEASES, EXCLUSIVE OF SUNDRY CLAIMS AND TREATMENTS.							
	1911.		1912.		1913.		1914.		1911.		1912.		1913.		1914.		1911.		1912.		1913.		1914.	
	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	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Pilbara	...	...	...	...	...	...	...	...	...	...	...	1	451	1	727	28	2,796	30	4,358	30	4,106	29	3,233	
West Pilbara	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5	820	3	1,020	8	1,300	4	917	
Peak Hill	...	...	...	...	...	...	...	1	1,134	1	1,047	...	...	...	...	4	330	4	339	8	972	10	1,635	
East Murchison	3	69,573	3	68,908	3	62,100	3	49,456	12	15,319	11	12,063	12	10,226	9	6,334	79	11,406	61	10,873	47	10,504	54	9,878
Murchison	1	36,767	1	27,199	2	40,174	2	33,336	10	20,476	8	17,681	7	16,316	8	18,525	141	57,459	106	47,979	99	56,494	110	58,886
Yalgoo	...	...	...	...	...	...	...	...	2	39	5	2,174	5	3,467	3	1,403	6	547	21	3,481	20	3,598	25	3,351
Mt. Margaret	2	107,918	1	60,593	1	63,313	1	58,936	16	24,982	13	30,266	12	14,895	12	16,504	67	15,571	54	8,818	47	8,117	34	8,153
N. Coolgardie	...	...	...	...	1	14,826	2	35,941	20	22,803	17	24,031	13	20,181	10	5,851	109	32,258	84	26,838	82	23,550	80	21,813
Broad Arrow	...	...	...	...	1	27,067	...	...	...	...	2	5,266	2	19	2	2,840	42	5,205	26	3,297	32	4,998	28	5,034
N.E. Coolgardie	...	...	...	...	...	...	...	...	7	9,710	7	5,597	5	5,706	1	4,573	32	4,771	31	6,139	32	3,908	20	3,137
E. Coolgardie	11	678,903	12	684,853	12	650,195	9	597,946	17	49,984	15	23,060	20	35,671	21	31,363	40	27,909	37	27,381	35	19,776	26	40,849
Coolgardie	...	...	...	...	...	...	...	...	17	20,591	10	24,761	5	19,008	8	8,190	49	9,502	46	12,766	40	9,084	35	8,970
Yilgarn	...	...	...	...	2	47,020	2	54,439	15	10,679	14	6,166	10	17,302	10	20,898	83	6,472	87	12,006	59	11,342	48	8,181
Dundas	1	16,521	1	14,902	1	13,825	1	13,507	5	2,947	4	4,247	2	4,034	2	1,996	35	8,260	17	4,996	20	7,570	16	9,684
Phillips River	...	...	...	...	...	...	...	...	5	1,324	3	151	7	210	10	1,093	19	3,886	16	3,850	15	2,429	13	3,358
Total	18	909,682	18	856,755	23	918,520	20	843,591	127	179,998	110	156,530	101	147,486	97	120,297	739	187,192	623	174,141	574	167,748	532	187,079

TABLE 6.

Increase or Decrease in Output of certain producing Gold Mines in 1914, as compared with 1913.

Goldfield.	District.	Name of Mine.	Gold Production.		Increase or Decrease for Year, compared with 1913.
			1913.	1914.	
			Fine ozs.	Fine ozs.	Fine ozs.
East Murchison	Wiluna ..	1. Western Machinery Co., Ltd.	1,227.82	2,048.66	+ 820.84
Do.	Black Range ..	2. Black Range Mining Co., N.L.	16,894.76	15,131.89	- 1,762.87
Do.	do.	3. Yuanmi G.Ms., Ltd. (Sandstone)	24,931.34	15,315.35	- 9,615.99
Do.	do.	4. Yuanmi G.Ms., Ltd. (Youanme)	24,468.89	19,008.77	- 5,460.12
Murchison	Cue	5. Hidden Treasure	2,795.02	376.78	- 2,418.24
Do.	Meekatharra	6. Commodore G.M. Co., N.L.	3,639.74	3,320.55	- 319.19
Do.	do.	7. Fenian leases	24,805.15	26,401.03	+ 1,595.88
Do.	do.	8. Ingliston Consols Extended leases	11,274.06	10,781.08	- 492.98
Do.	do.	9. Ingliston Extended G.Ms., Ltd.	3,665.56	5,114.88	+ 1,449.32
Do.	do.	10. Kyarra G.M., N.L.	6,821.08	9,582.61	+ 2,761.53
Do.	do.	11. Lake View and Oroya Exploration, Ltd.	14,469.39	16,048.13	+ 1,578.74
Do.	do.	12. Marmont	2,436.67	2,623.97	+ 187.30
Do.	Day Dawn	13. Great Fingall Consolidated, Ltd.	25,704.12	17,317.89	- 8,386.23
Do.	Mount Magnet	14. Empress ..	2,338.60	3,060.80	+ 722.20
Do.	do.	15. Sirdar	1,193.91	976.60	- 217.31
Mount Margaret	Mt. Malcolm	16. Sons of Gwalia, Ltd.	63,313.47	58,935.74	- 4,377.73
Do.	do.	17. North Star: Malcolm Prospecting Co., N.L.	1,706.50	1,261.96	- 444.54
Do.	Mt. Margaret	18. Ida H. G.M. Co., Ltd.	10,319.12	3,939.88	- 6,379.24
Do.	do.	19. Kalgoorlie and Boulder Firewood Co., Ltd.	..	2,954.97	+ 2,954.97
Do.	do.	20. Lady Harriet leases: Mary Mac G.M. Co., N.L.	148.71	3,103.29	+ 2,954.58
Do.	do.	21. Nil Desperandum	914.33	2,433.06	+ 1,518.73
Do.	Mt. Morgans	22. Westralia Mount Morgans Mines, N.L.	176.41	3,685.32	+ 3,508.91
North Coolgardie	Menzies ..	23. Gladsome leases	3,613.63	7,150.89	+ 3,537.26
Do.	do.	24. Sand Queen G.Ms., Ltd.	14,825.95	20,672.27	+ 5,846.32
Do.	do.	25. Menzies Consolidated G.Ms., Ltd.	11,612.75	15,268.42	+ 3,655.67
Do.	do.	26. Menzies	5,909.91	2,792.83	- 3,117.08
Do.	Ularring ..	27. Riverina South leases	735.32	1,174.07	+ 438.75
Do.	Niagara	28. Golden Butterfly G.M. Co., N.L.	2,838.37	3,585.24	+ 746.87
Do.	Yerilla	29. Yerilla King	837.04	1,374.04	+ 537.00
Broad Arrow	..	30. Associated Northern Blocks (W.A.), Ltd.	27,066.68	2,607.15	- 24,459.53
North-East Coolgardie	Kanowna	31. North White Feather G.Ms., Ltd.	4,503.91	4,572.53	+ 68.62
East Coolgardie	East Coolgardie ..	32. Golden Ridge G.M. Co., Ltd.	13,063.33	10,132.81	- 2,930.52
Do.	do.	33. Associated G.Ms., of W.A., Ltd.	36,630.65	33,628.12	- 3,002.53
Do.	do.	34. Associated Northern Blocks (W.A.), Ltd.	15,889.11	6,245.77	- 9,643.34
Do.	do.	35. Golden Horseshoe Estates Co., Ltd.	97,918.59	91,497.11	- 6,421.48
Do.	do.	36. Great Boulder Perseverance G.M. Co., Ltd.	59,625.27	61,149.96	+ 1,524.69
Do.	do.	37. Great Boulder Proprietary G.Ms., Ltd.	132,700.32	132,843.25	+ 142.93
Do.	do.	38. Idaho leases	3,115.94	4,591.02	+ 1,475.08
Do.	do.	39. Ironsides North leases	10,889.39	14,268.98	+ 3,379.59
Do.	do.	40. Ivanhoe Gold Corporation, Ltd.	106,697.29	85,486.66	- 21,210.63
Do.	do.	41. Kalgurli G.Ms., Ltd.	59,173.57	60,431.79	+ 1,258.22
Do.	do.	42. Lake View and Star, Ltd.	62,803.27	63,159.72	+ 356.45
Do.	do.	43. North Kalgurli (1912), Ltd.	4,833.46	2,225.79	- 2,607.67
Do.	do.	44. Oroya Links, Ltd.	36,540.13	38,498.91	+ 1,958.78
Do.	do.	45. South Kalgurli Consolidated, Ltd.	31,024.92	31,250.35	+ 225.43
Do.	do.	46. Golden Zone leases	9,626.43	9,739.89	+ 113.46
Do.	do.	47. Hannan's Reward, Ltd.	3,292.21	1,263.37	- 2,028.84
Do.	Bulong	48. Transcontinental leases	13.50	2,116.23	+ 2,102.73
Coolgardie	Coolgardie ..	49. Burbanks Birthday G.Ms., Ltd.	6,169.95	897.64	- 5,272.31
Do.	do.	50. Burbanks Main Lode (1904), Ltd.	11,410.58	3,973.95	- 7,436.63
Do.	do.	51. Hidden Secret North leases	1,974.11	2,791.23	+ 817.12
Do.	do.	52. Tindal's Coolgardie G.M. Co., N.L.	189.21	2,008.00	+ 1,818.79
Do.	Kunanalling	53. Carbine leases	1,000.00	1,562.67	+ 562.67
Yilgarn	..	54. Bullfinch Proprietary (W.A.), Ltd.	33,760.96	25,682.98	- 8,077.98
Do.	..	55. Comet	2,022.86	1,118.81	- 904.05
Do.	..	56. Corinthian North G.Ms., Ltd.	4,320.01	10,149.25	+ 5,829.24
Do.	..	57. Edna May G.M. Co., N.L.	8,975.21	28,755.69	+ 19,780.48
Do.	..	58. Edna May Central G.M. Co., N.L.	..	1,446.23	+ 1,446.23
Do.	..	59. Great Unknown	1,094.05	393.36	- 700.69
Do.	..	60. Marvel Loch G.M. Co., N.L.	2,988.53	2,165.38	- 823.15
Do.	..	61. Mountain Queen, Ltd.	13,259.36	6,044.49	- 7,214.87
Dundas	..	62. Hampton Uruguay, Ltd.	3,496.65	821.25	- 2,675.40
Do.	..	63. King	196.37	1,929.90	+ 1,733.53
Do.	..	64. Mararoa G.M. Co., N.L.	13,825.24	13,507.11	- 318.13
Do.	..	65. Princess Royal G.M. Co., N.L.	537.83	1,175.03	+ 637.20
Do.	..	66. Viking No. 1 leases	4,764.26	5,658.79	+ 894.53
Phillips River	..	67. Fair Play leases	601.37	1,113.21	+ 511.84

TABLE 7.

Averages of Gold Ore raised and treated, and Gold produced therefrom, per man employed on the several Goldfields of the State, during 1913 and 1914.

Goldfield.	1913.				1914.			
	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. Pilbara	48·98	26·60	65·64	36·31	56·02	32·74	55·17	32·25
3. West Pilbarra	77·65	44·37	81·45	46·54	47·38	34·12	51·71	37·23
4. Ashburton								
5. Gascoyne								
6. Peak Hill	139·22	69·61	198·24	99·12	226·53	107·87	253·77	120·84
7. East Murchison	320·69	177·10	149·67	82·65	268·88	154·01	126·03	72·61
8. Murchison	232·38	95·22	135·88	55·67	266·36	145·65	152·95	83·64
9. Yalgoo	189·24	87·78	135·61	62·84	109·53	50·99	97·08	46·60
10. Mt. Margaret	332·85	193·23	169·53	98·30	368·18	202·59	170·80	94·49
11. North Coolgardie	163·80	87·66	118·16	63·24	169·70	92·01	121·92	66·11
12. Broad Arrow	505·85	328·88	153·24	99·63	207·54	129·83	67·95	42·51
13. North-East Coolgardie	159·36	86·25	88·77	50·40	142·87	80·91	89·46	50·66
14. East Coolgardie	568·06	330·76	238·32	138·77	585·35	339·35	235·66	136·62
15. Coolgardie	124·90	78·73	74·48	46·95	131·29	75·48	71·62	41·17
16. Yilgarn	401·29	197·06	213·57	104·88	490·61	250·51	205·83	100·36
17. Dundas	357·91	212·77	170·72	101·49	432·68	248·39	210·33	120·75
18. Phillips River	114·19	63·62	71·40	39·78	178·17	113·38	333·24	212·06
Total Averages	393·36	214·08	181·50	98·78	410·15	230·51	182·55	102·60

The average value of gold produced per man employed above and below ground was £419·59 in 1913 and £435·82 in 1914. The average tonnage of ore raised shows an increase from 214·08 tons to 230·51 tons. The average tonnage raised per man is again highest in the East Coolgardie Field, viz., 339·35 tons, average value £580·32, the next being Yilgarn Field, with 250·51 tons, average value £426·30.

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 1914.

State.	Output of Gold.	Value.	Percentage of total Output of Australasia.
1. Western Australia	fine ozs. 1,232,977	£ 5,237,353	54·18
2. Victoria	409,706	1,740,320	18·00
3. Queensland	249,468	1,059,874	10·96
4. New South Wales	124,507	528,873	5·47
5. Tasmania	26,243	111,475	1·15
6. South Australia	6,258	26,581	·28
7. Northern Territory	2,532	10,757	·11
8. Territory of Papua (estimated)	13,445	57,112	·59
9. New Zealand	210,787	895,367	9·26
Total	2,275,923	9,667,512	100·00

TABLE 9.

Dividends paid by Western Australian Gold Mining Companies during 1914 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.		Grand Total paid to end of 1914.
		Authorised.	No. of shares issued.	Par Value Shares.	Paid up to.	Paid in 1914.		
						No.	Total Amount.	
		£		£ s. d.	£ s. d.		£	£
Peak Hill	Various Companies							160,666
East Murchison	Black Range G.M. Co., N.L.	80,000	72,500	1 0 0	1 0 0	1	3,625	243,718
Do.	Other Companies							194,250
Murchison	Kyarra G.M., N.L.	60,000	60,000	1 0 0	1 0 0	2	6,000	6,000
Do.	Other Companies							1,827,170
Mt. Margaret	Ida H. G.M. Co., Ltd.	80,000	282,361	0 5 0	0 5 0	1	7,059	85,765
Do.	Sons of Gwalia, Ltd.	350,000	325,000	1 0 0	1 0 0	4	48,750	941,613
Do.	Other Companies							286,918
North Coolgardie	Menzies Consolidated G.Ms., Ltd.	225,000	224,015	1 0 0	1 0 0	1	5,600	5,600
Do.	Sand Queen G.Ms., Ltd.	15,000	60,000	0 5 0	0 5 0	9	35,250	70,500
Do.	Other Companies							440,131
North-East Coolgardie	Various Companies							82,971
East Coolgardie	Associated G.Ms. of W.A., Ltd.	500,000	495,364	1 0 0	1 0 0	1	12,384	716,217
Do.	Great Boulder Proprietary G.Ms., Ltd.	175,000	1,750,000	0 2 0	0 2 0	4	262,500	4,481,800
Do.	Ivanhoe Gold Corporation, Ltd.	1,000,000	200,000	5 0 0	5 0 0	4	130,000	3,318,750
Do.	Kalgurli G.Ms., Ltd.	120,000	120,000	1 0 0	1 0 0	4	96,000	1,468,500
Do.	Lake View and Star, Ltd.	200,000	1,000,000	0 4 0	0 4 0	3	32,000	96,000
Do.	Oroya Links, Ltd.	312,500	1,150,000	0 5 0	0 5 0	2	28,750	71,875
Do.	South Kalgurli Consolidated, Ltd.	200,000	200,000	1 0 0	1 0 0	1	6,250	146,250
Do.	Other Companies							9,266,486
Coolgardie	Various Companies							339,495
Yilgarn	Bullfinch Proprietary (W.A.), Ltd.	500,000	476,150	1 0 0	1 0 0	2	41,664	65,471
Do.	Edna May G.M. Co., N.L.	25,000	42,850	0 10 0	0 10 0	12	68,560	72,845
Do.	Other Companies							51,078
Dundas	Mararoa G. M. Co., N.L.	40,000	100,000	0 8 0	0 3 0	3	15,000	115,000
Do.	Other Companies							147,000
	Total Dividends paid during 1914						799,392	
	Total Dividends paid to end of 1914							£24,702,069

NOTE.—Dividends amounting to £3,529 by the Ida H.G.M. Co., Ltd., and £160 (short stated) by the Edna May G.M. Co., N.L., were declared in 1913, but information did not reach the Department until after the report for that year had gone to press.

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.
	£	£	%	£	%
Prior to 1902 ...	29,722,650	6,076,857	20·5		
1902 ...	7,947,661	1,424,272	18·0		
1903 ...	8,770,719	2,024,152	23·1		
1904 ...	8,424,226	2,051,798	24·3		
1905 ...	8,305,654	2,167,640	26·1		
1906 ...	7,622,749	1,993,657	26·1		
1907 ...	7,210,749	1,738,123	24·1	5,722,273	30·4
1908 ...	6,999,882	1,487,303	21·2	5,503,784	27·0
1909 ...	6,776,274	1,359,088	20·0	5,398,725	25·2
1910 ...	6,246,848	1,028,393	16·5	4,815,541	21·4
1911 ...	5,823,075	826,976	14·2	4,628,666	17·9
1912 ...	5,448,385	814,092	14·9	4,304,161	18·9
1913 ...	5,581,701	*910,326	*16·3	4,528,106	*20·1
1914 ...	5,237,353	799,392	15·3	4,094,336	19·5
Total ...	120,117,926	24,702,069	20·6	†38,995,592	†23·0

* Corrected from previous report.

† Eight last years only.

TABLE 11.

Quantity and Value of Minerals, other than Gold and Coal, reported to the Mines Department during 1914.

Goldfield, District, or Mineral Field.	1914.		Increase or Decrease for Year compared with 1913.	
	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£
BLACK TIN.				
Pilbara Goldfield (Marble Bar District)	87·40	8,168	— 51·70	— 8,338
Greenbushes Mineral Field	244·54	21,145	— 213·94	— 29,809
Murchison Goldfield (Cue District) .. .. .	..	..	— 3·20	— 242
Coolgardie Goldfield (Coolgardie District) .. .. .	..	..	— 15	— 15
Total	331·94	29,313	— 268·99	— 38,404
PYRITIC ORE.				
Mt. Margaret Goldfield (Mt. Morgans District)	9,758·83	3,485	— 457·35	— 173
COPPER ORE.				
West Pilbara Goldfield	7,764·18	40,607	— 4,857·55	— 36,271
Phillips River Goldfield	4,841·15	37,524	+ 4,034·20	+ 27,737
Murchison Goldfield	18·59	275	+ 18·59	+ 275
Peak Hill Goldfield	112·70	2,409	+ 112·70	+ 2,409
State generally	38·50	426	+ 38·50	+ 426
Total	12,775·12	81,241	— 653·56	— 5,374
LEAD ORE.				
Northampton Mineral Field	15,334·62	38,351	— 11,254·91	— 12,123
SILVER-LEAD ORE.				
Ashburton Goldfield	715·10	9,807	+ 589·80	+ 8,050
WOLFRAM ORE.				
Murchison Goldfield (Cue District) .. .. .	..	..	— 4·64	— 69
GODOLINITE.				
Pilbara Goldfield (Marble Bar District) .. .. .	..	..	— 1·00	— 112

TABLE 12.

Quantity of Coal raised during 1913 and 1914, 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.
Collie	1913	tons. 313,818	£ 153,614	141	418	tons. 751	tons. 561
	1914	319,210	148,684	127	398	802	608

The number of men employed at Collieries has decreased by 34, but the output shows an increase of 5,392 tons.

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, 1913 and 1914.

Description of Leases.	1913.		1914.	
	No.	Acreage.	No.	Acreage.
Gold mining leases on Crown land	1,463	21,376	1,281	18,434
" " " private property	1	6	1	6
Mineral leases on Crown land	288	32,113	270	32,012
" " private property	1	48	2	68
	1,753	53,543	1,554	50,520

The total number of leases held for mining has decreased by 199, comprising an area of 3,023 acres, as compared with 1913. Leases for gold mining have decreased in number by 182 and in area by 2,942 acres.

The number of mineral leases has decreased by 17, comprising an area of 81 acres.

TABLE 14.

Number and Acreage of Gold Mining Leases in force each year for the Five Years ending the 31st December, 1914.

GOLDFIELDS.		DISTRICTS.		1910.		1911.		1912.		1913.		1914.		Percentage of Total Acreage.		Increase or Decrease for 1914 compared with 1913.		GOLDFIELDS.
Name.	Proclaimed.	Name.	Proclaimed.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	1913.	1914.	Increase.	Decrease.	
Kimberley	20-5-86	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Kimberley
Yilgarn	1-10-88	...	...	472	9,118	509	10,136	196	3,659	174	3,288	153	2,932	15.38	15.90	...	356	Yilgarn
Pilbara	1-10-88	Marble Bar	6-11-96	21	260	26	277	34	425	32	325	26	265	1.99	2.24	...	11	Pilbara
		Nullagine	6-11-96	16	140	14	122	14	135	10	100	18	149					
Ashburton	11-12-90	...	...	3	48	2	30	...	...	2	48	...	...	.22	...	...	48	Ashburton
		Cue	7-12-94	71	756	56	605	48	629	45	577	29	321					
Murchison	24-9-91	Meekatharra	7-12-94	205	2,670	177	2,350	117	1,497	93	1,226	94	1,227	11.99	13.05	...	157	Murchison
		Day Dawn	10-1-96	49	474	49	445	48	453	40	376	44	477					
		Mount Magnet	7-12-94	51	618	42	485	44	461	40	384	42	381					
Dundas	31-8-93	...	...	71	872	70	862	56	674	54	631	50	596	2.95	3.23	...	35	Dundas
Coolgardie	6-4-94	Coolgardie	7-12-94	100	1,372	68	889	57	733	59	773	55	758	4.93	5.31	...	75	Coolgardie
		Kunanalling	1-9-97	37	488	31	462	26	364	22	281	17	221					
East Coolgardie	1-10-94	East Coolgardie	7-12-94	200	2,868	179	2,596	171	2,417	168	2,353	155	2,140	12.02	12.91	...	189	East Coolgardie
Yalgoo	23-1-95	Bulong	15-4-96	11	45	10	145	7	109	12	217	14	241	3.33	4.08	40	...	Yalgoo
		...	...	38	425	39	500	60	803	54	713	50	753					
North Coolgardie	28-6-95	Menzies	15-4-96	76	1,053	64	897	54	759	54	771	50	730	8.98	8.82	...	294	North Coolgardie
		Ularring	15-4-96	55	720	42	562	33	412	30	383	24	299					
		Yerilla	15-4-96	46	669	40	573	34	489	42	542	29	400					
East Murchison	28-6-95	Niagara	1-4-97	46	580	47	560	24	334	15	224	14	197	12.59	11.42	...	587	East Murchison
		Lawlers	1-7-04	86	1,107	61	914	32	433	22	277	20	233					
		Black Range	1-7-04	151	2,282	127	1,923	109	1,598	106	1,512	99	1,337					
North-East Coolgardie	15-4-96	Wiluna	1-3-10	70	1,181	61	1,027	67	1,113	53	903	32	535	3.21	2.32	...	258	N.E. Coolgardie
		Kanowna	15-4-96	58	682	44	555	57	908	46	602	31	381					
Broad Arrow	20-11-96	...	...	63	803	117	1,912	57	904	79	1,296	43	610	6.06	3.31	...	686	Broad Arrow
Peak Hill	1-4-97	...	...	52	552	50	559	20	279	23	299	14	159	1.40	.86	...	140	Peak Hill
Mount Margaret	1-4-97	Mount Margaret	1-4-97	72	1,197	71	1,248	70	1,170	59	1,043	70	1,197	13.56	15.28	...	82	Mount Margaret
		Mount Malcolm	1-4-97	126	2,314	131	2,415	89	1,657	83	1,535	79	1,462					
		Mount Morgans	2-4-02	47	815	34	650	21	356	20	321	8	158					
West Pilbara	1-11-95	Crown Lands	...	7	72	7	78	9	108	7	82	4	42	.38	.23	...	40	West Pilbara
Do.	...	Private Property	...	1	6	1	6	1	6	1	6	1	6	.03	.03	...	...	Do.
Phillips River	14-9-00	...	...	15	237	26	409	17	257	13	210	12	186	.98	1.01	...	24	Phillips River
Other Localities	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Other Localities
Gascoyne	15-4-97	...	...	...	...	...	...	2	36	...	...	...	...	...	...	...	...	Gascoyne
Totals				2,318	34,544	2,199	34,219	1,636	24,243	1,464	21,382	1,282	18,440	100.00	100.00	...	2,942	

Decrease for 1914: Leases 182, acres 2,942.

TABLE 15.

Number and Acreage of Mineral Leases in force 31st December each year, for the Five Years ending 31st December, 1914.

MINING DISTRICTS.		SUB-DISTRICTS.		1910.		1911.		1912.		1913.		1914.		Increase or De-crease for 1914, compared with 1913.		DISTRICTS.
Name.	Proclaimed.	Name.	Pro-claimed.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Increase.	D-crease.	
														acres.	acres.	
Ashburton	11-12-90	Cue	7-12-94	5	131	4	83	4	83	4	83	5	69	...	14	Ashburton
		Meekatharra	7-12-94	1	12	...	...	1	12	9	255	6	163	...	92	Meekatharra
Murchison	24-9-91	Day Dawn	10-1-96	1	6	1	6	1	6	1	6	1	6	...	...	Day Dawn
		Mt. Magnet	7-12-94	...	...	...	...	...	...	...	...	...	...	...	...	Mt. Magnet
Greenbushes	7-4-92	Marble Bar	16-6-92	49	753	51	751	58	859	51	761	44	627	...	134	Greenbushes
Pilbara	16-6-92	Nullagine	6-11-96	16	567	31	868	37	1,033	21	771	8	205	...	566	Marble Bar
Yalgoo	23-1-95			1	48	1	18	1	3	...	...	...	...	...	...	Nullagine
Yilgarn	22-3-95			1	48	1	48	1	24	11	320	11	256	...	64	Yalgoo
Coolgardie	22-3-95	Coolgardie	22-3-95	2	96	...	...	2	23	1	12	2	15	3	...	Yilgarn
		Kunanalling	1-9-97	...	...	...	...	...	...	...	...	...	...	...	...	Coolgardie
East Coolgardie	22-3-95	East Coolgardie	22-3-95	7	33	9	45	8	40	6	29	5	23	...	6	Kunanalling
		Bulong	15-4-96	...	...	...	...	...	...	...	...	...	...	...	...	East Coolgardie
		Lawlers	1-7-04	5	104	4	96	4	96	1	24	...	...	...	24	Bulong
East Murchison	28-6-95	Black Range	1-7-04	2	6	2	6	4	24	3	31	2	6	...	25	Lawlers
		Wiluna	1-3-10	1	10	...	...	...	...	...	...	...	...	...	...	Black Range
		Menzies	15-4-96	...	...	...	...	...	...	...	...	...	...	...	...	Wiluna
North Coolgardie	16-8-95	Ularring	15-4-96	...	...	...	...	...	...	...	...	...	...	...	...	Menzies
		Yerilla	15-4-96	...	...	...	...	...	...	...	...	...	...	...	...	Ularring
		Niagara	1-3-97	...	...	...	...	...	...	...	...	...	...	...	...	Yerilla
West Pilbara	1-11-95			20	668	14	537	16	552	16	588	16	570	...	18	Niagara
Dundas	27-12-95			1	6	...	...	1	48	1	48	1	48	...	...	West Pilbara
Collie	21-2-96			88	27,255	88	27,125	88	27,126	89	27,417	91	28,057	640	...	Dundas
North-East Cool-gardie	15-4-96	Kanowna	15-4-96	...	...	...	...	...	...	...	...	...	...	...	...	Collie
Broad Arrow	20-11-96	Kurnalpi	15-4-96	1	20	...	...	1	20	1	20	...	...	...	20	Kanowna
Northampton	1-1-97	Crown Lands	...	1	10	1	10	1	10	13	212	10	157	...	55	Kurnalpi
Peak Hill	1-4-97	Private Property	...	...	...	1	20	1	20	1	48	2	68	20	...	Broad Arrow
		Mt. Margaret	1-4-97	...	...	...	...	...	...	...	...	...	...	...	...	Northampton
Mt. Margaret	1-4-97	Mt. Malcolm	1-4-97	...	...	...	...	...	...	...	...	...	...	...	...	Peak Hill
		Mt. Morgans	2-4-02	5	129	6	134	6	134	6	134	6	134	48	48	Mt. Margaret
Gascoyne	15-4-97			...	...	...	...	...	...	...	...	...	...	...	...	Mt. Malcolm
Yandanooka	1-12-97	Crown Lands	...	2	40	2	40	2	40	...	...	...	...	...	...	Mt. Morgans
Phillips River	1-7-99	Private Property	...	2	50	...	...	...	...	...	...	...	...	...	...	Gascoyne
Other localities	...			30	782	22	613	21	607	22	561	23	559	...	2	Yandanooka
				18	772	15	648	22	984	28	733	14	519	...	214	Phillips River
				...	...	...	...	...	...	...	...	...	...	...	...	Other Localities
Totals	...			261	31,567	253	31,049	301	32,359	289	32,161	272	32,080	...	81	

Decrease for 1914: 17 leases, 81 acres.

In the Collie field the largest area is held, viz.—28,057 acres, worked entirely for coal mining, then follow Greenbushes with 627 acres for tin, West Pilbara 570 acres, Phillips River 569 acres, and Peak Hill 550 acres, all for copper.

Taking all the goldfields, the largest percentage of the area leased for gold mining is in the Yilgarn Goldfield, viz.:—15.90; then Mount Margaret, Murchison, East Coolgardie, East Murchison, and North Coolgardie, with percentages of 15.28, 13.05, 12.91, 11.42, and 8.82 respectively.

TABLE 16.

Number and Acreage of Mineral Leases in force on 31st December, 1914, showing Minerals for which they are worked.

Goldfield or Mineral Field.	District.	MINERALS.															
		Coal.		Tin.		Copper.		Iron.		Clay.		Limestone.		Wolfram.		Silver and Lead.	
		Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.
Pilbara	Marble Bar .. .. .	..	..	5	145	1	40	..	..	..	..	..	..	..	..	..	..
West Pilbara .. .. .	.. .. .	..	..	..	..	15	552	..	..	..	..	..	..	..	..	..	18
Ashburton .. .. .	.. .. .	..	..	..	..	1	24	..	..	..	..	..	..	..	..	3	35
East Murchison	Black Range .. .. .	..	..	..	..	..	..	..	..	2	6	..	..	..	..	..	..
Murchison	Cue .. .. .	..	..	1	45	..	..	..	..	..	..	..	..	..	..	..	..
Yalgoo	Day Dawn .. .. .	..	..	..	..	..	..	..	..	1	6	..	..	..	..	..	..
Mt. Margaret .. .. .	.. .. .	..	..	..	..	4	84	..	..	..	..	..	..	..	..	..	..
.. .. .	Mt. Morgans .. .. .	..	..	..	..	5	129	..	..	..	..	..	1	5	..	..	..
.. .. .	Mt. Malcolm .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
East Coolgardie	East Coolgardie .. .. .	..	..	..	..	..	..	..	..	3	11	1	6	..	..	..	..
Yilgarn .. .. .	.. .. .	..	..	..	..	..	..	..	..	1	3	1	12	..	..	..	..
Dundas .. .. .	.. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Phillips River .. .. .	.. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Collie .. .. .	.. .. .	91	28,057	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Greenbushes .. .. .	.. .. .	..	..	44	627	..	..	..	..	..	..	..	..	..	..	..	..
Northampton .. .. .	.. .. .	..	..	..	..	1	20	..	..	..	..	..	..	..	..	..	..
Northampton	(Private Property) .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Peak Hill .. .. .	.. .. .	..	..	..	..	24	550	..	..	..	..	..	..	..	..	..	..
Outside Proclaimed Fields .. .. .	.. .. .	..	..	..	..	1	24	8	352	..	..	..	..	..	1	48	..
Totals .. .. .	.. .. .	91	28,057	50	817	73	1,932	8	352	7	26	4	63	4	106	4	53

TABLE 16.
Number and Acreage of Mineral Leases, etc.—continued.

Goldfield or Mineral Field.	District.	MINERALS.																Total No. of Leases	Total Acreage.	
		Tantalite.		Bismuth and Molybdenite.		Lead.		Mica.		Graphite.		Gravel.		Beryl.		Emerald.				
		Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.		
Pilbara	Marble Bar	2	20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	8	205
West Pilbara .. .. .	.. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	16	570
Ashburton .. .. .	.. .. .	..	..	..	..	1	10	..	..	..	..	..	..	..	..	..	..	..	5	69
East Murchison	Black Range .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	6
Murchison	Cue .. .. .	..	..	1	10	..	..	..	..	..	..	..	..	2	42	2	66	..	6	163
Yalgoo	Day Dawn .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	6
Mt. Margaret .. .. .	.. .. .	..	..	4	114	..	..	..	..	..	..	..	..	..	..	..	..	..	11	256
.. .. .	Mt. Morgans .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6	134
.. .. .	Mt. Malcolm .. .. .	..	..	1	48	..	..	..	..	..	..	..	..	..	..	..	..	..	1	48
East Coolgardie	East Coolgardie .. .. .	..	..	..	..	..	..	..	..	..	..	1	6	..	..	..	..	..	5	23
Yilgarn .. .. .	.. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	15
Dundas .. .. .	.. .. .	..	..	..	..	..	..	1	48	..	..	..	..	..	..	..	..	..	1	48
Phillips River .. .. .	.. .. .	..	..	1	10	..	..	..	..	..	..	..	..	..	..	..	..	..	23	559
Collie .. .. .	.. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	91	28,057
Greenbushes .. .. .	.. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	44	627
Northampton .. .. .	.. .. .	..	..	..	..	9	137	..	..	..	..	..	..	..	..	..	..	..	10	157
Northampton	(Private Property) .. .. .	..	..	..	..	2	68	..	..	..	..	..	..	..	..	..	..	..	2	68
Peak Hill .. .. .	.. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	24	550
Outside Proclaimed Fields .. .. .	.. .. .	..	..	..	..	..	..	3	55	1	40	..	..	..	..	..	..	..	14	519
Totals .. .. .	.. .. .	2	20	7	182	12	215	4	103	1	40	1	6	2	42	2	66	..	272	32,080

TABLE 17.
Number and Acreage of Miscellaneous Leases in force 31st December, 1914.

Goldfield.	District.	LEASES.										Total.	
		Tailings.		Tramway.		Water.		Machinery.		Residence.			
		No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.
Yalgoo .. .. .	.. .. .	..	..	..	..	..	..	1	24	1	12	2	36
West Pilbara .. .. .	.. .. .	..	..	2	25	..	..	..	..	..	..	2	25
East Murchison	Black Range	1	24	..	..	..	..	..	..	..	..	1	24
Murchison	Meekatharra	1	10	..	..	..	..	..	..	..	..	1	10
	Day Dawn .. .. .	..	..	..	..	..	..	..	..	1	1	1	1
Mt. Margaret	Mt. Margaret	1	22	..	..	..	..	..	..	..	..	1	22
North Coolgardie	Menzies .. .. .	..	..	..	..	2	6	..	..	..	..	2	6
N.E. Coolgardie	Kanowna .. .. .	..	..	1	2	..	..	..	..	..	..	1	2
East Coolgardie	East Coolgardie	16	311	..	..	2	47	3	36	1	2	22	396
Coolgardie	Coolgardie .. .. .	..	..	..	..	1	13	..	..	..	..	1	13
Phillips River .. .. .	.. .. .	..	..	3	7	..	..	..	..	..	..	3	7
	Total	19	367	6	34	5	66	4	60	3	15	37	542

TABLE 18.

Claims and Authorised Holdings under "The Mining Act, 1904," and Regulations existing on 31st December, 1913, and 1914.

GOLDFIELD OR MINERAL FIELD.	DISTRICT.	Prospecting Areas.				Water Rights.				Lode Claims.		Alluvial Claims.	
		Number.		Acreage.		Number.		Acreage.		1913.	1914.	1913.	1914.
Northampton .. ..	.. ..	1913.	1914.	1913.	1914.	1913.	1914.	1913.	1914.	1913.	1914.	1913.	1914.
Pilbara	Marble Bar	7	6	99	102	..	..	..	..	..	..	..	..
Do.	Nullagine	11	21	130	315	1	2	1	2	1	..	2	3
West Pilbara .. ..	.. ..	6	6	79	98	1	..	2	..	7	15	..	..
Ashburton .. ..	.. ..	5	5	57	69	4	2	22	7	..	..	..	..
Peak Hill .. ..	.. ..	4	3	72	52	..	..	..	..	..	1	..	..
East Murchison	Lawlers	17	18	249	226	2	4	15	18	1	..	..	..
Do.	Wiluna	17	19	230	246	16	14	16	18	..	..	..	..
Do.	Black Range	31	13	502	189	9	7	22	16	..	..	..	..
Murchison	Cue	27	33	395	475	3	4	7	8	..	..	1	1
Do.	Meekatharra	22	18	286	244	2	2	3	3	2	2	..	..
Do.	Day Dawn	29	47	393	686	1	1	1	1	..	..	..	..
Do.	Mt. Magnet	7	10	99	107	12	13	14	20	..	..	..	..
Yalgoo .. ..	.. ..	22	42	203	402	2	2	2	2	..	..	..	..
Mt. Margaret	Mt. Morgans	16	21	202	291	1	1	3	3	..	..	..	..
Do.	Mt. Malcolm	6	4	84	45	10	5	30	10	..	..	..	..
Do.	Mt. Margaret	26	15	408	202	30	30	200	199	..	..	..	..
North Coolgardie	Menzies	35	37	462	522	26	24	64	65	..	..	4	4
Do.	Ularring	28	21	382	289	10	9	31	27	..	..	..	..
Do.	Niagara	23	20	271	238	4	4	10	10	..	..	..	..
Do.	Yerilla	6	16	84	220	14	11	66	30	..	..	..	..
Broad Arrow .. ..	.. ..	36	25	575	368	8	7	15	12	1	1	..	..
N.E. Coolgardie	Kanowna	46	28	693	404	7	5	25	16	9	8	..	..
Do.	Kurnalpi	16	8	239	124	3	3	5	5	3	4	..	1
East Coolgardie	East Coolgardie	6	8	35	115	..	..	..	..	..	..	..	..
Do.	Bulong	38	21	507	262	10	10	35	34	3	1	4	..
Coolgardie	Coolgardie	8	8	132	115	..	..	..	..	6	..	1	..
Do.	Kunanalling	67	60	892	831	9	10	30	25	4	2	..	..
Yilgarn .. ..	.. ..	10	16	162	224	7	8	42	47	..	..	..	..
Dundas .. ..	.. ..	45	65	701	1,086	3	3	5	5	..	..	..	..
Phillips River .. ..	.. ..	9	15	106	205	10	9	29	26	1	1	..	..
Collie .. ..	.. ..	10	10	141	144	7	6	32	31	..	..	..	..
Greenbushes .. ..	.. ..	2	2	4,000	2,420	..	..	..	..	..	..	..	..
Gascoyne .. ..	.. ..	4	1	72	18	14	12	83	79	..	..	25	21
Outside Proclaimed Fields .. ..	.. ..	2	..	24	..	..	..	..	..	..	..	..	..
Totals .. ..	.. ..	17	10	34,596	21,128	..	..	..	..	..	..	..	..
Increase or Decrease for 1914, compared with 1913 .. ..	.. ..	661	652	*47,562	†32,462	226	208	810	719	38	35	37	30
		-9		-15,100		-18		-91		-3		-7	

GOLDFIELD OR MINERAL FIELD.	DISTRICT.	Dredging Claims.		Residence Areas.		Business Areas.		Machinery Areas.		Tailings Areas.		Garden Areas.		Washing Areas.	
		1913.	1914.	1913.	1914.	1913.	1914.	1913.	1914.	1913.	1914.	1913.	1914.	1913.	1914.
Northampton .. ..	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pilbara	Marble Bar .. ..	..	..	2	1	11	9	1	1	..	..	5	5	..	..
Do.	Nullagine .. ..	..	..	2	3	2	3	1	2	1	..	5	5	..	..
West Pilbara .. ..	.. ..	..	..	13	16	17	17	1	2	..	..	3	3	..	..
Ashburton .. ..	.. ..	..	..	..	..	1	2	..	..	..	..	..	..	..	..
Peak Hill .. ..	.. ..	..	..	..	..	3	8	1	3	1	1	..	..	..	..
East Murchison	Lawlers .. ..	..	..	1	1	1	1	4	4	1	5	2	2	..	..
Do.	Wiluna .. ..	..	..	1	1	1	..	..	..	..	..	4	4	..	..
Do.	Black Range .. ..	..	..	196	201	10	9	2	2	1	1	11	11	..	..
Murchison	Cue .. ..	..	..	9	7	3	3	..	..	1	1	2	1	..	..
Do.	Meekatharra .. ..	..	..	10	10	9	11	4	3	4	3	2	2	..	..
Do.	Day Dawn .. ..	..	..	32	5	..	..	..	..	..	..	5	4	..	..
Do.	Mt. Magnet .. ..	..	..	2	2	2	3	1	1	2	1	7	7	..	..
Yalgoo .. ..	.. ..	..	..	5	3	18	15	2	2	2	..	2	1	..	..
Mt. Margaret	Mt. Morgans .. ..	..	..	..	..	..	..	2	2	..	..	5	6	..	..
Do.	Mt. Malcolm .. ..	..	..	2	2	4	4	..	..	1	3	16	15	..	..
Do.	Mt. Margaret .. ..	..	..	4	8	16	18	5	5	..	..	5	9	..	..
North Coolgardie	Menzies .. ..	..	..	15	27	16	15	1	3	2	2	7	7	..	..
Do.	Ularring .. ..	..	..	..	1	1	..	1	..	..	..	..	..	..	..
Do.	Niagara .. ..	..	..	2	..	1	4	2	2	2	2	3	3	..	..
Do.	Yerilla .. ..	..	..	..	..	3	2	2	2	1	1	1	1	..	..
Broad Arrow .. ..	.. ..	..	..	4	4	17	14	5	3	3	2	1	..	..	..
N.E. Coolgardie	Kanowna .. ..	..	..	1	1	2	..	4	3	2	2	4	4	..	..
Do.	Kurnalpi .. ..	..	..	..	..	1	1	1	1	..	..	..	..	..	..
East Coolgardie	East Coolgardie .. ..	..	..	28	3	9	7	6	4	6	6	24	23	..	..
Do.	Bulong .. ..	..	..	23	2	5	3	1	1	..	..	..	..	..	..
Coolgardie	Coolgardie .. ..	..	..	2	2	3	3	3	3	2	2	3	2	..	..
Do.	Kunanalling .. ..	..	..	1	1	4	4	2	2	..	..	..	..	..	..
Yilgarn .. ..	.. ..	..	..	22	93	15	57	2	3	4	3	3	3	..	..
Dundas .. ..	.. ..	..	..	..	..	1	1	3	3	1	2	3	3	..	..
Phillips River .. ..	.. ..	..	..	..	..	..	..	2	3	2	2	5	5	..	..
Collie .. ..	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Greenbushes .. ..	.. ..	7	7	31	27	4	3	7	5	..	..	8	12	2	3
Gascoyne .. ..	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Outside Proclaimed Fields .. ..	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Totals .. ..	.. ..	7	7	408	424	185	210	68	65	39	39	135	138	2	3
Increase or Decrease for 1914, compared with 1913 .. ..	.. ..	..	..	+16		+25		-3		..		+3		+1	

*1913 including 14 for coal and oil—38,444 acres.

†1914 including nine for coal and oil—23,420 acres.

Last year the number of prospecting areas held was 661, the total acreage being 47,562 acres, which included 14 areas of 38,444 acres for coal and oil.

This year the number held is 652 of a total acreage of 32,462 acres, including nine areas of 23,420 acres for coal and oil.

TABLE 19.

Miners' Rights issued during 1913 and 1914.

Place of Issue.	Miners' Rights.		Place of Issue.	Miners' Rights.	
	1913.	1914.		1913.	1914.
Albany	4	3	Mount Magnet	123	208
Boulder	11	14	Mount Morgans	41	49
Bridgetown	7	..	Mulline	23	17
Broad Arrow	171	95	Nannine	84	..
Broome	6	21	Narrogin	1	2
Bullfinch	16	43	Norseman	89	87
Burtville	16	..	Northampton	44	24
Busselton	5	12	Northam	7	..
Carnarvon	70	28	Nullagine	49	49
Collie	10	10	Onslow	41	37
Coolgardie	252	249	Ora Banda	26	..
Cue	171	156	Payne's Find	36	..
Davyhurst	26	26	Peak Hill	102	47
Derby	4	9	Perth	239	222
Geraldton	4	12	Pinjin	2	..
Greenbushes	169	120	Port Hedland	2	3
Hall's Creek	19	12	Ravensthorpe	74	49
Kalgoorlie	400	369	Roebourne	94	97
Kanowna	110	74	Sandstone	246	252
Kookynie	88	73	Southern Cross	289	187
Lake Darlot	4	..	Wagin	17	..
Laverton	130	145	Waverley	5	..
Lawlers	64	52	Westonia .. .. .	..	164
Leonora	137	101	Wiluna	99	64
Linden	45	..	Wodgina	8	..
Marble Bar	127	159	Wyndham	3	..
Marvel Loch	96	64	Yalgoo	46	97
Meekatharra	180	221	Yarri	3	..
Mt. Jackson	4	10	York	40	7
Menzies	154	130	Youanme	81	..
Mount Egerton	9	..			
			Total	4,323	3,870

TABLE 20.

Number and Acreage of Miners' Homestead Leases in force on 31st December, 1913 and 1914.

Goldfield.	District.	1913.		1914.		Increase.		Decrease.	
		Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.
West Pilbara .. .. .	..	1	30	1	30	..	..	..	..
Greenbushes .. .. .	..	7	931	8	940	1	9	..	..
Pilbara	{ Marble Bar	5	71	5	71	..	..	..	..
	{ Nullagine .. .. .	..	..	..	..	..	..	..	..
Dundas .. .. .	..	26	1,317	27	1,417	1	100	..	..
Broad Arrow .. .. .	..	1	20	2	30	1	10	..	..
Yilgarn .. .. .	..	33	2,252	12	1,021	..	..	21	1,231
Mt. Margaret	{ Mt. Morgans	3	140	3	140	..	..	..	..
	{ Mt. Malcolm	6	1,244	6	1,244	..	..	..	..
	{ Mt. Margaret	16	664	18	844	2	180	..	..
	{ Cue	7	1,212	7	1,287	..	75	..	..
Murchison	{ Day Dawn	10	130	9	125	..	..	1	5
	{ Meekatharra	15	1,853	17	1,933	2	80	..	..
	{ Mt. Magnet	3	40	4	281	1	241	..	..
Yalgoo .. .. .	..	2	280	1	200	..	..	1	80
Coolgardie	{ Coolgardie	38	4,370	28	2,459	..	..	10	1,911
	{ Kunanalling	2	520	2	520	..	..	..	..
East Coolgardie .. .. .	..	104	3,671	100	3,537	..	..	4	134
Phillips River .. .. .	..	151	22,373	149	21,917	..	..	2	456
Peak Hill .. .. .	..	7	740	4	170	..	..	3	570
North-East Coolgardie	{ Kanowna	20	862	20	862	..	..	..	..
	{ Menzies	9	395	9	879	..	484	..	..
	{ Yerilla	1	10	1	10	..	..	..	..
North Coolgardie	{ Niagara	5	80	4	70	..	..	1	10
	{ Ularring	1	20	1	20	..	..	..	..
East Murchison	{ Lawlers	5	1,110	5	1,110	..	..	..	..
	{ Black Range	21	1,522	17	865	..	..	4	657
	{ Wiluna	5	89	4	69	..	..	1	20
	Total	504	45,946	464	42,051	..	..	40	3,895

As compared with the year 1913, there is a decrease in the number of leases by 40, and in acreage by 3,895 acres.

PART IV.—MEN EMPLOYED.

TABLE 21.

Average Number of Men engaged in Mining during 1913 and 1914.

Goldfield.	District.	Reef or Lode.		Alluvial.		Total.	
		1913.	1914.	1913.	1914.	1913.	1914.
1. Kimberley				10	10	10	10
2. Pilbara	Marble Bar	114	99	23	26	137	125
3. West Pilbara	Nullagine	37	43	16	17	53	60
4. Ashburton		28	25	2	15	30	40
5. Gascoyne				9	5	9	5
6. Peak Hill				3	3	3	3
		20	21	3	3	23	24
7. East Murchison	Lawlers	116	111	11	12	127	123
	Wiluna	179	115		1	179	116
	Black Range	748	722	6	7	754	729
	Cue	117	107	11	6	128	113
8. Murchison	Meekatharra	1,525	790	29	22	1,554	812
	Day Dawn	345	299	13	13	358	312
	Mt. Magnet	146	150	13	7	159	157
9. Yalgoo		123	125	11	8	134	133
	Mt. Morgans	49	57	30	28	79	85
10. Mt. Margaret	Mt. Malcolm	632	594	13	14	645	608
	Mt. Margaret	233	363	30	11	263	374
	Menzies	449	474	16	13	465	487
11. North Coolgardie	Ularring	154	143	11	7	165	150
	Niagara	166	158	15	16	181	174
	Yerilla	311	315	29	33	340	348
12. Broad Arrow		343	211	68	68	411	279
13. North-East Coolgardie	Kanowna	205	176	16	15	221	191
	Kurnalpi	31	20	8	6	39	26
14. East Coolgardie	East Coolgardie	5,129	4,897	10	12	5,139	4,909
	Bulong	49	88	3	6	52	94
15. Coolgardie	Coolgardie	556	390	2	3	558	393
	Kunanalling	104	104	2	1	106	105
16. Yilgarn		784	884	12		796	884
17. Dundas		254	216			254	216
18. Phillips River		70	22			70	22
State generally		3	3			3	3
Total—Gold Mining		13,020	11,722	425	388	13,445	12,110
MINERALS OTHER THAN GOLD.							
Tin	Greenbushes	256	119	*21	*5	277	124
	Cue	2	1			2	1
	Marble Bar	17	12	*107	*80	124	92
	West Pilbara	149	75			149	75
Copper	Ashburton	3				3	
	Phillips River	61	82			61	82
	Peak Hill		22				22
Pyritic Ore	Meekatharra		3				3
	State generally		10				10
	Mt. Morgans	27	30			27	30
Lead Ore	Northampton	128	83			128	83
	Ashburton	4	17			4	17
Coal	Collie River	559	525			559	525
Wolfram	Cue	1				1	
Total—Other Minerals		1,207	979	128	85	1,335	1,064
GRAND TOTAL		14,227	12,701	553	473	14,780	13,174

*Classified elsewhere as employed at mines.

Although Meekatharra district shows a decrease of 742 men, the number employed there in mining has not decreased, but the figures in previous years were unduly inflated by the inclusion of wood getters and wood and ore carters.

TABLE 22.
Average Number of Men employed at Mines during 1914.

Mineral.	Above Ground.	Under Ground.	Total.	Percentage of total men employed.	Increase or decrease compared with 1913.
Coal	127	398	525	4.11	— 34
Copper	91	101	192	1.49	— 21
Gold	5,134	6,588	11,722	91.69	— 1,298
Lead	35	65	100	.78	— 32
Pyritic Ore	8	22	30	.23	+ 3
Tin	*199	18	217	1.70	— 186
Wolfram ... ..	...	...	...	...	— 1
Total	5,594	7,192	12,786	100.00	— 1,589

*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 1914, 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 1913.	Percentage of total men employed.	
					1913.	1914.
1. Kimberley ... ..	...	...	...	...	...	...
2. Pilbara	59	83	142	— 9	1.16	1.21
3. West Pilbara	7	18	25	— 3	.22	.21
4. Ashburton ... ..	...	...	...	...	...	...
5. Gascoyne ... ..	...	...	...	...	...	...
6. Peak Hill	11	10	21	+ 1	.15	.18
7. East Murchison	405	543	948	— 95	8.01	8.09
8. Murchison	610	736	1,346	— 787	16.38	11.48
9. Yalgoo	65	60	125	+ 2	.95	1.07
10. Mt. Margaret	453	561	1,014	+ 100	7.02	8.65
11. North Coolgardie	499	591	1,090	+ 10	8.29	9.30
12. Broad Arrow	79	132	211	— 132	2.64	1.80
13. North-East Coolgardie	885	111	198	— 40	1.81	1.67
14. East Coolgardie	2,095	2,890	4,985	— 193	39.77	42.53
15. Coolgardie	210	284	494	— 166	5.07	4.21
16. Yilgarn	453	431	884	+ 100	6.02	7.54
17. Dundas	92	124	216	— 38	1.95	1.84
18. Phillips River	8	14	22	— 48	.54	.19
State generally	3	...	3	...	.02	.03
Total	5,134	6,588	11,722	— 1,298	100.00	100.00

TABLE 24.
Alluvial Gold Workers.

Goldfield.	1913.	1914.	Increase or decrease compared with 1913.
1. Kimberley	10	10	...
2. Pilbara	39	43	+ 4
3. West Pilbara	2	15	+ 13
4. Ashburton	9	5	— 4
5. Gascoyne	3	3	...
6. Peak Hill	3	3	...
7. East Murchison	17	20	+ 3
8. Murchison	66	48	— 18
9. Yalgoo	11	8	— 3
10. Mt. Margaret	73	53	— 20
11. North Coolgardie	71	69	— 2
12. Broad Arrow	68	68	...
13. North-East Coolgardie	24	21	— 3
14. East Coolgardie	13	18	+ 5
15. Coolgardie	4	4	...
16. Yilgarn	12	...	— 12
17. Dundas ... ..	...	...	...
18. Phillips River ... ..	...	...	...
Total	425	388	— 37

PART V.—ACCIDENTS.

TABLE No. 26.

Men employed in Mines killed and injured in Mining Accidents during 1913 and 1914.

A.—According to Locality of Accident.

Goldfield.	Killed.		Injured.		Total killed and injured.	
	1913.	1914.	1913.	1914.	1913.	1914.
1. Kimberley .. .. .	..	..	..	..	..	..
2. Pilbara .. .. .	..	..	..	1	..	1
3. W. Pilbara .. .. .	..	..	1	..	1	..
4. Ashburton .. .. .	..	..	..	..	..	..
5. Gascoyne .. .. .	..	..	..	..	..	..
6. Peak Hill .. .. .	..	..	..	..	..	..
7. E. Murchison	4	2	13	32	17	34
8. Murchison .. .. .	..	4	47	56	47	60
9. Yalgoo	1	..	6	..	7	..
10. Mt. Margaret	1	4	77	85	78	89
11. N. Coolgardie	1	1	3	7	4	8
12. N.E. Coolgardie	1	..	5	4	6	4
13. Broad Arrow	1	1	4	..	5	1
14. E. Coolgardie	11	8	463	527	474	535
15. Coolgardie	2	..	18	16	20	16
16. Yilgarn	2	5	12	13	14	18
17. Dundas .. .. .	..	1	3	4	3	5
18. Phillips River .. .. .	..	..	..	4	..	4
MINING DISTRICTS—						
Northampton	1	..	5	..	6	..
Yandanooka .. .. .	..	..	..	..	..	..
Greenbushes	1	..	..	..	1	..
Collie .. .. .	..	..	84	90	84	90
Swan .. .. .	..	..	..	2	..	2
Total	26	26	741	831	767	857

From the above table it will be seen that the total number of fatal accidents for the year 1914 reached the same figure as for 1913, viz., 26. The number of injured shows an increase of 90 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.

	1913.		1914.		Comparison with 1913.	
	Fatal.	Serious.	Fatal.	Serious.	Fatal.	Serious.
1. Explosives	1	22	..	16	— 1	— 6
2. Falls of Ground	8	75	8	93	..	+ 18
3. In Shafts	7	29	8	26	+ 1	— 3
4. Miscellaneous Underground	4	416	5	476	+ 1	+ 60
5. Surface	6	199	5	220	— 1	+ 21
Totals	26	741	26	831	..	+ 90

All the fatal accidents occurred in gold mines. The death-rate per 1,000 men employed on gold mines was 2.15 as against 1.79 in 1913.

TABLE No. 27.

Deaths of Persons employed at Mines from Accidents during 1913 and 1914.

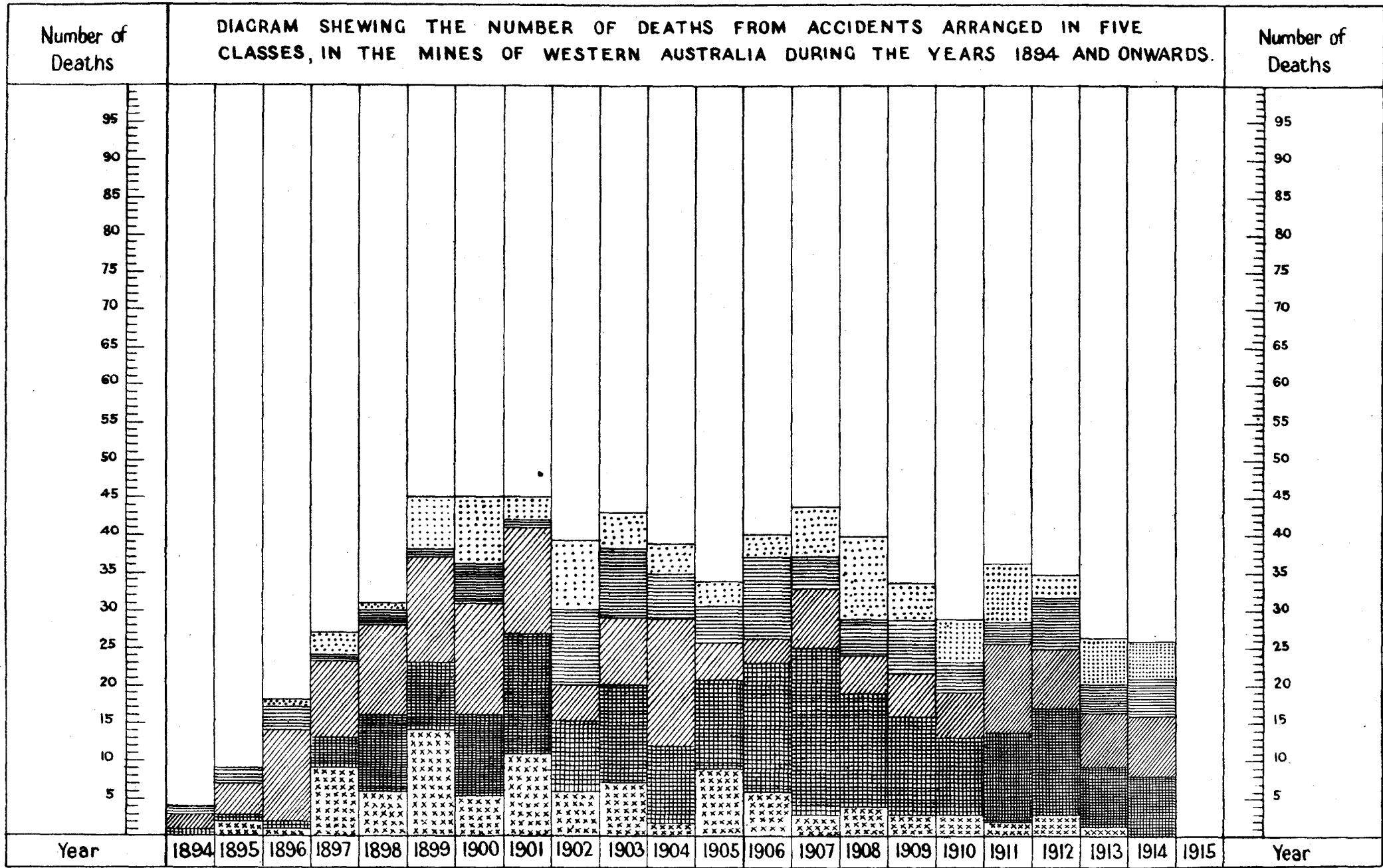
	1913.						1914.					
	Number of Persons killed.			Death Rate per 1,000 Men employed.			Number of Persons killed.			Death Rate per 1,000 Men employed.		
	Above Ground.	Under Ground.	Total.	Above Ground.	Under Ground.	Total.	Above Ground.	Under Ground.	Total.	Above Ground.	Under Ground.	Total.
Coal Mines ... ..	..	..	..	..	..	..	..	..	..	..	..	..
Men employed	(141)	(418)	(559)	..	..	..	(127)	(398)	(525)	..	..	..
Gold Mines	5	19	24	·79	2·68	1·79	5	21	26	·91	3·19	2·15
Men employed	(6,359)	(7,086)	(13,445)	..	..	..	(5,522)	(6,588)	(12,110)	..	..	..
Other Mines	1	1	2	1·85	4·27	2·58	..	..	..	..	..	..
Men employed	(542)	(234)	(776)	..	..	..	(333)	(206)	(539)	..	..	..
Total for all Mines ...	6	20	26	·85	2·58	1·76	5	21	26	·84	2·92	1·97
Total number of men employed	(7,042)	(7,738)	(14,780)	..	..	..	(5,982)	(7,192)	(13,174)	..	..	..

TABLE No. 28.

Deaths from Accidents of persons employed in Gold Mines during 1914, and the Death Rate per 1,000 men employed, and per 1,000 tons of Gold Ore raised during 1913 and 1914 (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.	
	1914.			1914.			1913.		
	Above Ground.	Under Ground.	Total.	Above Ground.	Under Ground.	Total.	Total.	1914.	1913.
1. Kimberley .. ..	..	..	..	..	..	..	..	..	..
2. Pilbara .. ..	..	..	..	..	..	..	..	..	..
3. West Pilbara .. ..	..	..	..	..	..	..	..	..	..
4. Ashburton .. ..	..	..	..	..	..	..	..	..	..
5. Gascoyne .. ..	..	..	..	..	..	..	..	..	..
6. Peak Hill .. ..	..	..	..	..	..	..	..	..	..
7. East Murchison	1	1	2	2·47	1·84	2·11	3·84	·014	·022
8. Yalgoo .. ..	..	..	..	..	..	..	..	..	·093
9. Mt. Margaret .. ..	..	4	4	..	7·13	3·94	1·09	·019	·006
10. North Coolgardie	1	..	1	2·00	..	·92	·93	·010	·001
11. North-East Coolgardie .. ..	..	..	..	..	..	..	4·24	..	·049
12. Broad Arrow	1	..	1	12·66	..	4·74	2·92	·037	·009
13. East Coolgardie .. ..	..	8	8	..	2·77	1·60	2·12	·005	·006
14. Coolgardie .. ..	..	..	..	..	..	..	3·03	..	·038
15. Murchison	2	2	4	3·28	2·72	2·97	..	·020	..
16. Yilgarn .. ..	..	5	5	..	11·60	5·66	2·55	·024	·013
17. Dundas .. ..	..	1	1	..	8·06	4·63	..	·019	..
18. Phillips River .. ..	..	..	..	..	..	..	..	..	..
19. Swan .. ..	..	..	..	..	..	..	..	..	..
Total	5	21	26	·97	3·19	2·22	1·84	·010	·009

The number of Deaths per 1,000 men employed shows an increase from 1·84 in 1913, to 2·22 in 1914, and that per 1,000 tons of Gold Ore raised also shows an increase, being ·010 as against ·009 for the preceding year.



EXPLOSIONS
 FALLS OF GROUND
 IN SHAFTS
 MISCELLANEOUS UNDERGROUND
 ON SURFACE INCLUDING MACHINERY

PART VI.—STATE AID TO MINING.

The number of State batteries existing at the close of the year was 34 (of which one was leased). Six plants were closed, viz., Lennonville, Mt. Jackson, Nannine, Pig Well, Widgiemooltha, Wodgina (tin dressing plant).

The Mount Jackson and Wodgina plants were leased by this Department, and having served their purpose the leases were not renewed.

The Lennonville plant, which had been leased for several years, reverted to the Department and was closed, there being no ore available for treatment.

From inception to the end of 1914, gold and tin to the value of £4,395,008.69 have been recovered at the State plants.

1,017,559.94 tons of gold ore were treated, and produced £3,693,760.47 worth of gold by amalgamation, £507,315.02 worth by cyanidation, £105,990.05 from slimes treatment, £3,316.11 from residues, and 68,259.75 tons of tin ore produced tin to the value of £84,627.04.

During the year the gold ore treated was 56,570.5 tons for 45,641.01 ounces bullion.

The working expenditure for all plants during the year totalled £55,930 9s. 1d., and the revenue £48,583 4s. 5d., which, after including £71 7s. 7d. for additions, etc., and paid from revenue, shows a loss of £7,418 12s. 3d. on the year's operations.

The capital expenditure from the inception of the scheme was £343,211 10s. 5d., £91,981 1s. 8d. being paid from Revenue and £251,230 8s. 9d. from Loan. The cost of administration for the year was £3,609 5s. 8d. as against £3,427 19s. 9d. for 1913.

The working expenditure from inception to the 31st December, 1914, exceeds the receipts by £54,014 13s.

GEOLOGICAL SURVEY.

The work of the Geological Survey Division of the Department did not differ in any essential detail from that referred to in the Annual Report of the preceding year. The operations of the year have been carried out by 18 officers, consisting of eight geologists, three chemists, one petrologist, one general assistant, two draftsmen, two clerks, and a messenger.

The field work of the year, full details of which are set out in the report of the Government Geologist, was primarily planned with the view to the determination of (a) the areal distribution, (b) the mode of occurrence, (c) the geological relationships of the mineral deposits of the State, and (d) the study of the structural features of the formations in which they are contained, as such form the only reliable and safe basis for their economic development, if designed to be carried out along rational and not haphazard lines.

The field work embraced, *inter alia*—

A detailed survey of Meekatharra and its surroundings.

A systematic underground geological survey of the North End of Kalgoorlie.

Investigations into the mining geology of Niagara and Kookynie.

A reconnaissance survey of the country to the Southward of Nullagine lying between latitudes 22deg. to 23deg. 30min. South and longitude 118deg. 52min. to 122deg. 30min. East.

A detailed survey of the Northern portion of the Yilgarn Goldfield, including the newly opened up centres of Westonia, Mount Jackson, and Marda.

The examination of the lime and phosphate deposits of the South-West Division.

The resident officers have been continuously engaged in chemical, physical, and petrological researches, arising out of the field work, the care of the Survey collection, and assisting in and meeting the various requirements of inquirers at the offices of the Survey.

The number of geological publications which have been distributed greatly exceeded that of previous years, and indicates a growing appreciation of the scientific investigations carried out by this Division.

ASSISTANCE UNDER THE MINING DEVELOPMENT ACT, 1902.

The following statement shows the sums advanced during the year 1914 under the Mining Development Act:—

	£	s.	d.
Advanced in aid of mining work and equipment of mines with machinery	3,098	0	3
Advances in aid of erection and equipment of crushing plants, including subsidies paid on stone crushed for the public ..	5,586	4	10
Advances in aid of boring ..	1,084	11	11
Providing means of transport ..	122	3	3
	£9,891	0	3

In addition to the above, amounts totalling £7,634 9s. 1d. were expended from Mining Development Vote on various matters for the assistance of mining, such as water supply, roads, subsidies to assist carting of ore long distances, and subsidies for development work done below 100 feet level in small mines.

Included in the amount of £7,634 9s. 1d. is the sum of £6,671 3s. 4d. on account of the purchase of tailings. Included in the amount set against Advances in aid of Erection, etc., is the sum of £1,337 5s. 9d., being the subsidies paid to owners of plants crushing for the public, the conditions being that they crush for the public at fixed rates, in most cases a further requirement being imposed as to purchasing or treating tailings. The ore crushed at such plants during the year amounted to 12,009 tons.

The receipts under Mining Development Act, exclusive of interest payments, amounted to £16,034 3s. 9d., made up as follows:—

	£	s.	d.
Refund of advances ..	1,297	0	3
Sales of securities ..	128	15	9
Miscellaneous ..	14,608	7	9

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

ASHBURTON GOLDFIELD.

There was no output of gold during the year, and nothing occurred to warrant a prediction of any revival of gold mining in this field in the immediate future.

The output of silver-lead ore was 715.10 tons, valued at £9,807; an increase on the preceding year in tonnage of 589.60 tons, and of value £8,050.

BROAD ARROW GOLDFIELD.

The output of gold was 9,286 fine ounces, and in the preceding year 34,739 fine ounces; a decrease of 25,453 fine ounces. This decrease is principally attributable to the falling off from the Ora Banda District, owing to the stoppage of the treatment plant on the Victorious mine. After considerable necessary alterations and additions it was restarted in December, and the coming year should see an increase.

Other mines in this district have been actively worked with encouraging results.

The other centres of the field did not give signs of any improvement.

COLLIE COALFIELD.

The output of coal for the year was 319,210 tons, and in the preceding year 313,818 tons; an increase of 5,392 tons.

Considerable improvements have been effected in the various mines, resulting in an increased output and a reduced price for coal. The local consumption and that of the Railway Department have both increased. The coal bunkered at the port of Fremantle showed a decrease on the previous year, but at Bunbury there was a compensating increase. The falling off at Fremantle is attributable to the absence of German steamers, which used to take in a large quantity of coal. The increase at Bunbury is owing to an increased number of cargo steamers calling there.

Business has continued prosperous, building operations in the town have been active, and the outlook is most promising.

COOLGARDIE GOLDFIELD.

The output of gold for the year was 20,981 fine ounces, and for the preceding year 31,892 fine ounces; a decrease of 10,911 fine ounces. This decrease is entirely attributable to a falling off in the Coolgardie district, the Kunanalling district having shown an increase.

In the Bonnievale centre there was not any improvement.

In the Burbanks centre several mines were in active operation, and the results are encouraging.

At Eundynie the Hidden Secret mine is still employing a good number of men.

At Gibraltar, Londonderry, Red Hill, and Widgiemoaltha a good deal of prospecting was carried out.

In the Kunanalling district there was an improvement, and several properties were actively worked. At Jourdie Hills two mines produced a fair amount of gold.

The outlook for the field is good.

DUNDAS GOLDFIELD.

The output of gold for the year was 26,591 fine ounces, and for the preceding year 27,039 fine ounces; a decrease of 448 fine ounces.

The mines in this field have been developed steadily, and with encouraging results.

On the Viking additional machinery is being erected, and an increase in the tonnage is intended. The outlook for the field is good.

EAST COOLGARDIE GOLDFIELD.

The output of gold was 682,895 fine ounces, and for the preceding year 719,929 fine ounces; a decrease of 37,034 fine ounces.

Apart from an important development on the Golden Horseshoe mine, there has not been any occurrence of note on any other of the large mines. The output from the Ivanhoe mine in the early part of the year was considerably reduced in consequence of a fire which took place on the property.

In the Bulong district there has been some activity at Randalls, and a plant has been erected on the "Santa Claus" mine, which should be of considerable assistance to prospectors.

The outlook for the field remains good.

EAST MURCHISON GOLDFIELD.

The output of gold was 70,809 fine ounces, and for the preceding year 87,977 fine ounces, a decrease of 17,168 fine ounces.

This decrease is almost entirely attributable to the Black Range district, a largely contributing factor being an industrial dispute at the Yuanmi mine, which, in consequence, was practically closed down for several weeks, thus considerably restricting the output. The mines in this district, however, continue to look well.

In the Lawlers district there was a slight decrease in the gold production, but an increase of over 500 tons in the tonnage treated. There was little change during the year.

In the Wiluna district there was also a small decrease in production, and an increase of over 1,000 tons in the ore treated. Most of the properties have been vigorously worked with encouraging prospects.

The outlook for the field is promising.

GASCOYNE GOLDFIELD.

Applications for three Gold Mining Leases at Bangemall were made, but nothing is yet known as to their future prospects. A little prospecting has been done on the Mica leases referred to in last year's Report, but, owing to the state of the market, vigorous development is not expected for some time. The output of gold was four (4) fine ounces, and in the preceding year thirty-one (31) fine ounces.

GREENBUSHES MINERAL FIELD.

The output of black tin for the year was 244.54 tons, valued at £21,145, and in the preceding year 458.48 tons, valued at £50,954; a decrease in tonnage of 213.94 tons, and in value of £29,809.

In the early part of the year mining was brisk, but the outbreak of the European war had a depressing effect on operations, and consequent reduction in output resulted. The fall in the price of tin also militated against any activity in production. Any immediate improvement is not anticipated.

KIMBERLEY GOLDFIELD.

The output of gold was 153 fine ounces, and in the preceding year 300 fine ounces. The statistical tables show the figures for the year as 453 fine ounces, the 1913 returns having come to hand too late for inclusion in that year's tables.

The gold is all alluvial won by fossickers, and there are not any indications of an improvement.

MOUNT MARGARET GOLDFIELD.

The output of gold for the year was 96,793 fine ounces, and for the preceding year 91,273 fine ounces; an increase of 5,520 fine ounces. In addition, 9,758.83 tons of pyritic ore valued at £3,485 were raised; a decrease on the preceding year in tonnage of 457.35 tons, and in value of £173.

The Mount Margaret district showed an improvement to the extent of 8,562 fine ounces, principally attributable to the re-opening of the Lancefield mine, but many other mines also had increased activity.

In the Mount Morgans district work has been active on the Mount Morgans mine, and the Mount Morven mine at the old Mount Margaret centre has been developing promisingly. The output of the district shows an improvement to the extent of 3,625 fine ounces.

In the Mount Malcolm district there was a falling off of 6,667 fine ounces. The principal mine is still the Sons of Gwalia, which continues to maintain a steady output. Several other properties are also developing well. Near Leonora a mineral lease was taken up for mining for molybdenite, and appears to be a promising proposition.

The outlook for the field is good.

MURCHISON GOLDFIELD.

The output of gold was 115,722 fine ounces, and in the preceding year 122,028 fine ounces; a decrease of 6,306 fine ounces.

Copper ore to the extent of 18.59 tons, valued at £275, was also raised, but none in the preceding year.

In the Meekatharra district there was an increase of over 7,000 ounces, and the mines in the immediate vicinity of Meekatharra have been opening up splendidly.

At Garden Gully the production was also in excess of last year. The principal mine here is the Kyarra, which has been a constant producer. A new discovery was made about 1½ miles South-West of this mine, and gives much promise of becoming a payable proposition.

At Yaloginda sundry small shows have contributed to the output, but work on the Chunderloo mine was suspended to permit of the raising of further capital for development. At Nannine and Quinns matters remained very quiet, also at Gabanintha, Burnakurra, Jillarwarra, Chesterfield, and Gum Creek. At Ruby Well and Holden's Find, two new centres which were included in the district at the commencement of the year, developments have not progressed as satisfactorily as at first anticipated.

In the Mount Magnet district there was a small decrease, but the mines throughout it have well maintained their position excepting at Lennonville, which is practically deserted.

In the Cue district there was a decrease of over 2,000 ounces, due to reduced outputs from some, and a cessation of output from other, mines. A few mines, however, showed increased outputs, but not sufficient to make up the deficiency. The outside

centres were mostly very quiet, the only new find being at Paton's, about 20 miles North of Cue, where a promising reef was unearthed.

In the Day Dawn district there was a decrease entirely attributable to a lessened output from the Great Fingall mine, but it is expected, now that certain engineering difficulties have been overcome, that there will be a return to regular and possibly increased outputs. At Pinnacles, a locality from whence a new find was reported, a good deal of activity is in evidence, and a promising group of leases is being developed. There was little change in the other portions of the district.

The outlook for the field is good.

NORTHAMPTON AND YANDANOOKA MINERAL FIELDS.

There were not any minerals reported from Yandooka.

In the Northampton field the output of lead ore was 15,334.62 tons, valued at £38,351, and in the preceding year 26,589.53 tons, valued at £50,474; a decrease in tonnage of 11,254.91 tons, and in value of £12,123.

The falling off in production is directly the result of the effect on the market of the European war, the small claim holders finding it impossible to dispose of their product at a profit. Work was therefore restricted to the main mines of the field. On a return to normal conditions the outlook for this field is considered very promising.

NORTH COOLGARDIE GOLDFIELD.

The output of gold was 72,188 fine ounces, and in the preceding year 68,527 fine ounces; an increase of 3,661 fine ounces.

In the Menzies district there was a substantial increase, and the Menzies Consolidated mine at Woolgar continued to develop exceedingly well. For the first time in its history it was able to pay a dividend of 1s. per share, amounting to £5,600, to its shareholders.

In the vicinity of Menzies two or three mines have been opening up promisingly.

At Comet Vale the mines have continued to produce regularly, the output showing an increase, and the locality is very thriving. At Goongarrie and Mount Ida matters were quiet.

In the Ularring district there was a decrease, and mining was very dull. In the Niagara district there was a decrease in the gold output, but the tonnage treated was slightly higher. There was not any development of note recorded. In the Yerilla district there was also a decrease, but there has not been much change in the various centres.

The outlook for the field is good.

NORTH-EAST COOLGARDIE GOLDFIELD.

The output of gold was 10,134 fine ounces, and in the preceding year 12,393 fine ounces; a decrease of 2,259 fine ounces. In the Kanowna centre there was little change, and nothing to indicate any immediate improvement. The other centres were also very quiet. In the Kurnalpi district nothing of note transpired.

PEAK HILL GOLDFIELD.

The output of gold was 2,603 fine ounces, and in the preceding year 2,766 fine ounces; a decrease of 163 fine ounces. Copper ore to the extent of 112.70 tons, valued at £2,409, was also produced. This copper came from new discoveries at Kumarina and Ilgarere, where there are some promising shows. At Mount Egerton and Peak Hill there was a con-

tinuance of prospecting, and some of the developments are promising.

PHILLIPS RIVER GOLDFIELD.

The output of gold was 4,665 fine ounces, and in the preceding year 2,788 fine ounces; an increase of 1,877 fine ounces. The production of copper ore was 4,841.15 tons, valued at £37,524, and in the preceding year 806.95 tons, valued at £9,737; an increase in tonnage of 4,034.20 tons, and in value of £27,787. Most of the mines in the vicinity of Ravensthorpe and at Kundip have been vigorously worked, as a consequence of the Government leasing and working the local smelters. Advances have been made against the ore raised, and this has been a tremendous assistance to the various leaseholders. Some of the developments in the mines are most promising, and the indications are that there will be a considerable improvement in the field in the near future.

PILBARA GOLDFIELD.

The output of gold was 5,177 fine ounces, and in the preceding year 5,598 fine ounces; a decrease of 421 fine ounces.

Black tin to the amount of 87.40 tons, valued at £8,168 was raised, and in the preceding year 139.10 tons, valued at £16,506; a decrease in tonnage of 51.70 tons, and in value of £8,338.

There has not been much change in this field. In the Marble Bar district the State plants at Marble Bar and Bamboo Creek have been partially employed, and have been of immense benefit to the district, as, but for them gold mining would have practically ceased. The low state of the market for base metals affected tin mining most detrimentally, but things looked brighter towards the close of the year.

At Warrawoona the Klondyke Boulder mine was unfortunately compelled to close down owing, it is stated, to lack of capital to properly equip it. Nothing favourable transpired in connection with the discovery of silver-lead at Gregory Ranges, referred to in last year's report. In the Nullagine district a good deal of prospecting of the alluvial gold leads existent there was carried out, and there are indications that they will be worked on a large scale in the near future. The State plant at 20-Mile Sandy continued operations whenever sufficient stone was ready for treatment. Good rains have fallen on the field, which should result in vigorous prospecting.

WEST. PILBARA GOLDFIELD.

The output of gold was 1,023 fine ounces, and in the preceding year 1,421 fine ounces; a decrease of 398 fine ounces. Copper ore to the extent of 7,764.18 tons, valued at £40,607 was raised, and in the preceding year 12,621.73 tons, valued at £76,878; a decrease in tonnage of 4,857.55 tons, and in value of £36,271. Mining in this field was particularly quiet, and the principal mine, the Whim Well Copper mine, closed down, and is now under exemption, which expires early in the New Year. It is hoped that on

its expiration active operations will be re-commenced. There is nothing to warrant a hope of any considerable improvement in the immediate future.

WEST KIMBERLEY MAGISTERIAL DISTRICT.

No work was done on the Iron Leases at Yampi Sound, but efforts are being made to raise capital to properly develop them. During the year a new discovery of copper was made, on which a fair amount of work was done, and which promises to develop well.

YALGOO GOLDFIELD.

The output of gold was 6,026 fine ounces, and in the preceding year 8,163 fine ounces; a decrease of 2,137 fine ounces. At the various centres in the field vigorous prospecting has been pursued. At Payne's Find, some of the shows are very promising. At Field's Find, Gullewa, and Melville a few prospectors were working, but nothing of note transpired. In the vicinity of Yalgoo matters are very quiet. At Yuin the Royal Standard Mine resumed operations towards the close of the year. At Warriadar there has been a deal of activity, and hopes are entertained that the locality will develop into a good one.

The outlook for the field is good.

YILGARN GOLDFIELD.

The output of gold was 88,745 fine ounces, and in the preceding year 82,334 fine ounces; an increase of 6,411 fine ounces.

The greatest activity has prevailed at Westonia, where the consistently satisfactory results obtained at the Edna May mine, and promising developments at several other mines have attracted a considerable number of prospectors and business people. The centre has shown remarkable progress, which promises to continue.

Mt. Jackson has been handicapped, owing to lack of water, but it is expected to strike an adequate supply in the "Butcher Bird" lease, whereon a battery has recently been erected.

At Golden Valley and Ennuin a considerable amount of prospecting has been carried out with promising results.

At Bullfinch and Corinthian there has not been much change. At the former the Bullfinch Proprietary has been a steady producer.

At Hope's Hill, Kennyville, and Marvel Loch mining has been quiet.

In the vicinity of Southern Cross a 10-head plant and other equipment were erected on the "Maori Lass" mine, and boring on the old Fraser's mine was continued.

In the Nevoria centre the large low grade deposits on the great Victoria and Broncho Horseshoe are being steadily developed.

At Parker's Range several properties are also being actively prospected, and the results are encouraging.

The outlook for this field is very good.

TABLE 29.

Value of Mining Machinery and Number of Stamps and other Mills erected on the 31st December, 1914, compared with the previous Year.

Goldfield.	District.	Value of Mining Machinery.		Batteries. Number of Stamps.		Mills.																			
		1913.	1914.	1913.	1914.	1913.								1914.											
						Prospecting.	Ball.	Griffin.	Huntington.	Tremain.	Puddlers.	Other Crushers.	Flint.	Grinding Pans.	Prospecting.	Ball.	Griffin.	Huntington.	Tremain.	Puddlers.	Other Crushers.	Flint.	Grinding Pans.		
1. Kimberley	...	5,000	4,000	45	30				1																
2. Pilbara	Marble Bar	13,457	12,967	50	55																				1
	Nullagine	4,924	5,574	30	33	1																			1
3. West Pilbara	...	3,850	3,700	25	35	1																			2
4. Ashburton	...																								
5. Gascoyne	...																								
6. Peak Hill	...	9,943	9,011	40	40																				
7. East Murchison	Lawlers	40,461	35,511	148	148									2		4									
	Wiluna	93,972	58,487	95	95	2		2								1									2
	Black Range	157,153	157,711	135	135			4			1							1							10
	Cue	32,949	20,166	70	70																				4
8. Murchison	Meekatharra	134,929	164,410	211	206									1		3									25
	Day Dawn	204,250	203,450	60	60																				8
	Mt. Magnet	38,041	27,258	55	70	1					2			1											7
9. Yalgoo	...	41,239	42,214	83	88																				1
	Mt. Morgans	14,100	11,220	65	60																				7
10. Mt. Margaret	Mt. Malcolm	210,730	232,743	215	162																				15
	Mt. Margaret	121,053	79,290	154	104																				14
	Menzies	66,574	61,664	90	115						1														17
	Ularring	26,879	16,950	65	55						2														3
11. North Coolgardie	Niagara	18,565	18,291	70	60																				7
	Yerilla	19,906	14,576	50	45	1																			5
12. Broad Arrow...	...	41,180	47,105	88	70	1				5															11
13. North-East Coolgardie	Kanowna	26,910	21,350	138	138																				6
	Kurnalpi	150	140	5	5	1																			
14. East Coolgardie	East Coolgardie	1,636,548	1,568,675	655	630	1	42	18	12		2	42	33	189	1	50	13	10			1	41	33	181	
	Bulong	3,500	11,700	10	30																				1
	Coolgardie	106,671	94,285	253	263							2		11											12
15. Coolgardie	Kunanalling	12,350	11,788	85	85							1		3											3
16. Yilgarn	...	166,378	186,849	177	192							1	2	4	15										21
17. Dundas	...	183,958	32,703	130	100								4	14											16
18. Phillips River	...	12,880	12,400	40	45	2							1	1											1
State generally	...	50,000	40,000										1												
Total Gold-extracting Machinery		3,498,500	3,206,188	3,337	3,224	11	49	18	22	2	8	81	39	385	5	59	15	17	2	4	80	42			397
Total Machinery, other than Gold-extracting		299,614	312,620	10	10		1		2		4	14		2	1			2		2	17				2
TOTAL MINING MACHINERY		3,798,114	3,518,808	3,347	3,234	11	50	18	24	2	12	95	39	387	6	59	15	19	2	6	97	42			399

PART VIII.—EXISTING LEGISLATION.

At the close of the year the Acts in force relative to mining were:—

1. "The Mining Act, 1904."
2. "Sluicing and Dredging for Gold Act, 1899."
3. "Mines Regulation Act, 1906."
4. "Coal Mines Regulation Act, 1902."
5. "Mining Development Act, 1902."
6. "Mines and Machinery Inspection Act, 1911."

There was not any legislation directly affecting the industry passed during the year, but the following amendments to, and additional, Regulations were gazetted:—

Under "The Mining Act, 1904"—

Amendments to Regulations 66a and 123.

Under "The Mining Development Act, 1902."—

Regulations governing the purchase of auriferous copper ores at the State Smelting Works on the Phillips River Goldfield.

PART IX.—INSPECTION OF MACHINERY.

The Chief Inspector of Machinery reports that the number of useful boilers at the end of the year totalled 3,039 as against 2,980, total for the preceding year. This shows an increase of 59, notwithstanding those permanently condemned, which are deducted from the total. The Goldfields districts, on the whole, show no decrease this year, but on the contrary a slight increase accounted for in the East Coolgardie district. The districts comprised in the South Western Division account for the balance of the increase.

Of the total 3,039 useful boilers, 1,402 were out of use at the end of the year. 1,641 thorough and 103 working inspections were made, whilst 1,673 certificates were granted.

Permanent condemnations totalled 38, and temporary condemnations 52. Conversions and exportations reduce the original figure by 5 only.

The total number of machinery plants in use was 3,674 against 3,425 for the previous year. Inspections made total 2,430, and certificates granted 2,428 against 2,137 in the previous year.

Two hundred and twenty-three (223) applications for engine-drivers' certificates were received and dealt with by the Board during the year, and 180 certificates granted as follows:—

First Class Competency	..	20
Second Class Competency	..	33
Third Class Competency	..	57
Locomotive Competency	..	18
Traction Competency	..	9
Interim Competency	..	27
Copies of lost and destroyed certificates	..	16
		180

In carrying out inspection and other work, the total mileage travelled during the year was 47,323 against 48,173 for the previous year, showing a decrease of 850 miles.

PART X.—SCHOOL OF MINES.

Steady progress has been maintained at the School during this, the eleventh year of its existence. The effect of free tuition, which has obtained from the beginning of the year, has been to attract an increased number of students, especially in the preparatory classes of chemistry, physics, geology, drawing and mathematics, but its influence on the more advanced classes has been comparatively slight.

The concession has enabled a number of youths to obtain instruction, who would not have attended under the system of payment of class fees, and it is anticipated that as time goes on it will be more and more appreciated. Students generally have taken a higher proportion of classes than formerly.

The attendance was fairly well maintained during the first and second terms, but from the end of the latter it was affected by the absence of students on military duty consequent on the outbreak of war. The work has been maintained at a high standard, and the examination results at the end of the year were satisfactory.

The question of the affiliation of the School and the relation which it will bear to the University will be brought up for consideration during 1915. In the meantime, the Professorial Board has agreed to give recognition to certain work done by students prior to matriculation in March, 1917.

The system of free assays for prospectors has been continued, and a total of 318 assays and determinations was made. These have been performed in a careful manner, and a large amount of valuable information has been given to prospectors.

CONCLUSION.

During the year the Woods and Forests Department was placed under the control of this Department, and the report of the Acting Inspector General for the six (6) months ended 31st December last is attached hereto as Division VIII.

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

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

H. S. KING,
Under Secretary for Mines.

Department of Mines,
Perth, 31st March, 1915.

DIVISION II,

REPORT OF THE STATE MINING ENGINEER FOR THE YEAR 1914.

The Under Secretary for Mines, Perth, W.A.

Office of the State Mining Engineer,
Mines Department, Perth, W.A.,
30th April, 1915.

Sir,

For the information of the Hon. the Minister for Mines, I have the honour to submit the following report on the work of my Branch for the year 1914.

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

On 31st May, 1914, Mr. J. O. Hudson resigned from the position of Inspector of Mines at Kalgoorlie, in order to take up a position under the Government of Tasmania, and up to the end of the year the duties of the office were carried out by Mr. Greenard, Inspector of Mines for the North Coolgardie Goldfield, who has since been appointed permanently to the position, Mr. H. P. Rockett, Inspector of Mines, Mt. Margaret Goldfield, taking over the Northern part of Mr. Greenard's district. Mr. C. Bircher was appointed Electrical Adviser to the Department, with powers and duties of an Inspector of Mines as far as electrical equipment is concerned.

Inspectors' Reports.—Annual Reports have been received from all the Inspectors of Mines on the work of their offices and progress of their districts for the past year, from which the following extracts are submitted:—

CENTRAL GOLDFIELD.

Mr. W. M. Deeble, Inspector of Mines, report dated 2nd February, 1915:—

"I beg to submit, herewith, my annual report on the progress of mining in the Peak Hill, Murchison, and Yalgoo Goldfields, for year 1914:—

PEAK HILL GOLDFIELD.

"There is very little news to report in the Peak Hill Goldfield. Copper lodes have been discovered in two places, and rich samples brought in, but the prospectors have been unable to do anything further as they cannot deal with the propositions themselves, and there seems to be very little money available for anything but proved high-grade ores at present.

"At *Ilgarere*, which is about 120 miles North-East of Peak Hill, a number of copper leases were taken up, but up to date very little has been done on them. On the main show there, known as the 'Towers and White's,' two shafts have been sunk on lenses of ore. In one shaft the ore is 12in. wide, and in the second 4ft., both being very rich. The lens of ore, as far as can be seen, is in a wide lode channel, and it is quite possible for a number of lenses of ore to be running parallel as well as lengthways along the line, but nothing has been proved yet.

"At a place known as *Kumarina*, situated about 90 miles North-East of Peak Hill, there is another group of copper shows; most of them are raising exceptionally rich ore. Just before war was declared parcels of hand-picked ore were sent away that varied from 43 per cent. to 50 per cent. copper. Anything up to 40 per cent. ore had to be stacked, as it would not pay under the conditions. There is a large area of copper-bearing country in this district, but the present indications are that very little will be done to develop it until after the war.

"At *Mount Egerton*, which is situated about 100 miles North-West of Peak Hill, there were about 20 men working at the time of my last visit. The two main shows are the Hibernian and the Homeward Bound. The former has a reef averaging 4ft. wide, and I am informed has crushed 900 tons for an average of 14dwts. over the plates. The last crushing from the Homeward Bound was 81 tons for 135ozs.

"Peak Hill is very quiet, and there is nothing new to report in the immediate district.

MURCHISON GOLDFIELD.

"*Ruby Well* is also very quiet. The Harder-to-Find G.M. has been keeping a five-head mill going one shift only owing to the shortage of water. The manager stated on my last visit that he expected to start sinking the main shaft at an early date to get more water and prove the mine at a deeper level.

"*Holden's Find.*—There are two parties working leaders and crushing rich ore from them, 163.75 tons yielding 327.44 ozs. of gold. Unfortunately the large reef, over which an option was taken by a South Australian Syndicate this year, did not come up to expectations, and operations ceased.

MEEKATHARRA DISTRICT.

During the year this district showed a substantial increase both in tonnage and gold yield. The total tonnage returns show that 11,516.82 tons more than the preceding year have been treated, and the fine gold return is 4,052.62ozs. more.

"As several mines have increased their crushing capacity and a new ten-head mill is being erected, it is only reasonable to expect that there will be a continued increase during the coming year.

"The Kyarra G.M., situated about 10 miles North of the townsite, has been crushing with a ten-head mill, and has mined and milled 11,875 tons for 4,520.528ozs. and treated 22,060 tons of slimes for 5,042.081ozs., giving a total value of £40,619.

"The lowest level in this mine is only 300ft. deep, so it can be seen that this has been obtained with a small amount of development work.

"Early in November a 'new find' was made about one mile South-West of the Kyarra mine, and some rich specimens obtained. At the time of my last visit gold was showing along a leader about 18in. wide for a distance of from 5ft. to 6ft. The prospectors had up till then dollyed about one cwt. of ore and obtained 35ozs. 9dwts. of gold. I may mention that the first stamper battery erected on the Murchison Goldfield was erected within a mile of this new find, and was of the light dolly-pot order, that would shut down any mine however rich.

"At the Northern end of the Meekatharra mines proper, a number of miners have been working with varying results. The mine giving regular employment is the Commodore G.M. The deepest level in this mine is 400ft. The lode is large in places, but irregular. During the year 9,020 tons have been milled for bullion valued at £11,547, and 4,820 tons of sand cyanided for bullion worth £2,440, making a total value of £13,987. The accumulated slimes, 4,200 tons, are said to assay 14s. 9d. per ton.

"Ingliston G.M.—This mine is South of and adjoining the Commodore, and has been crushing very rich ore during the last two years. The owners decided during 1913 to erect a treatment plant on their mine out of gold won, and this has just been completed. The plant consists of a new ten-head Fraser & Chalmers' stamper mill, 1,250lb. stampers, with a 9in. x 15in. rock breaker. The power will be supplied by a 120 h.p. Akroyd Producer and a 90 h.p. Tangye gas-engine, variable admission. The poppet-heads are 60ft. high, and the hauling will be done by a winch with steam supplied from a Cornish boiler. The future of this mine seems very promising.

"Macquarie G.M. is being developed, but no crushings of note have been dealt with. A shaft 10ft. x 4ft. in the clear has been sunk, and a crosscut put off in the lode at that depth, but very little can be said as to the values at present.

"Ingliston Extended G.M.—Mining has been carried on with varying results during the year. The ore chutes are difficult to follow, and the manager has not been able to pick up the continuation of the rich ore worked around the surface in former years.

"Ingliston Consols Extended.—This is one of the rich mines of the district. During the year 23,926 short tons of ore have been treated for a return of £46,621. The deepest level in the mine is No. 6—750ft. deep. The reef is showing 20 inches of stone and 40 inches formation. The manager values the whole width at 50s. per ton. With such highly satisfactory prospects the management proposes to erect new poppet-heads, and sink the main shaft at an early date. The mine is now equipped with a fifteen-head mill, concentrators, rock-breakers, and cyanide plant, and the whole is being supplied with power from a wood-gas power plant, which is doing remarkable work at a very low cost.

"Fenian G.M.—Another lift of 100ft. has been sunk during the year, and the main shaft is now a total depth of 891ft. and the lowest level 850ft. The total tonnage crushed for the year was 38,138 tons, valued at £112,414 17s., which is close to 60s. per ton—the average for the previous year. The total production from the mine up to December 31st, 1914, was 154,059 tons for 133,869.60 fine ozs. of a value of £569,376 12s. 11d., and the dividends paid £249,665 17s. 6d. When it is considered that there are now only 15 stampers in use, it will be seen

that it is a remarkable mine. A new wood-gas engine has been erected during the year, and it is proposed to erect another 260 B.H.P. gas engine, one Merton roaster capable of treating eight tons of raw concentrates per day, two grinding pans, and two agitating vats.

"Marmont G.M.—The lowest level in this mine is at 416ft. depth. At this depth the prospects were sufficiently encouraging to induce the management in the latter part of the year to sink the shaft to a deeper level. The main shaft is now down 480ft. There is a ten-head mill on the mine, and 3,861 tons of ore were treated for a return of 2,483ozs. 18dwts. of gold.

"Queen of the Hills G.M.—The main shaft has been sunk to a depth of 455ft. and the No. 5 level put in to lode at 449ft. depth. The manager reports that driving North and South on the lode at this level has exposed ore of satisfactory value. The lode in this mine is different to those in the other large mines, and the ore is of an oxidised ironstone material. The crushing is done with two Holman pneumatic stampers, that seem to be doing very good work on this class of material. 45,660 short tons have been treated during the year for a return of 17,412.635ozs. of bullion, valued at £68,028 18s. 5d. During the coming year it is intended to erect one 12in. x 20in. geared winding-engine, and one 165 B.H.P. gas engine.

"Globe G.M., situated four miles South of Meekatharra. The work carried on has been chiefly of a prospecting nature to try and pick up a chute of ore worked some years ago.

"Yaloginda.—The only shows worth mentioning at this place as having done anything during the year are the Rocklee and the Chunderloo, also the Mystery, and in neither of these is there anything special to record.

NANNINE DISTRICT.

"Quinn's.—There are a number of men working around this place on contact leaders, which make irregular patches of rich ore. There are three parties working on reefs: one, the Phoenix, is being worked from a shaft 130ft. deep. The ore is being raised by a naphtha-driven friction winch, which is suitable for this purpose, but hardly safe to raise men by or for men to work under. The reef at the bottom level is erratic in size but will probably average 4ft. in width. The last return at the time of visit was 205 tons for a yield of 13dwts. 15grs. per ton over the plates.

"Singapore G.M.—A shaft down on this ground 40ft. deep, and a drive then on the reef 60ft. South-West produced 102 tons, from which a yield of 85ozs. 9dwts. was obtained over the plates.

"Nowthanna G.M., situated about four miles South-West of Quinn's.—The work on the reef has been carried down on the underlie for a depth of about 90ft., the underlie being approximately 45 degrees. The reef is large, but owing to the irregular way it has been worked it would be difficult to give even a rough estimate of its width. The last crushing when I visited the mine at the latter part of November was 81 tons for 6dwts. 11grs. per ton over the plates, and the sands were said to assay 7dwts. 4grs. per ton. Another parcel of about 100 tons was then ready for the mill.

"Gabanintha.—Enterprise G.M.—This mine is being worked from a shaft 75ft. deep, and the ore contains gold and copper, which is being hand-picked and sent to the smelters. There have been two discoveries at Gabanintha, which go to show that ordinary

prospecting methods of napping and dollying stone that in the opinion of the prospector would be likely to carry gold, would not have disclosed these. One was discovered by the prospector loaming until he obtained a trace of gold, and by following it by loaming until he found the cap of the reef, about a foot under the surface. While I was there about 2½ozs. of gold was dollyed from about 4lbs. of stone. Another discovery was made in a coarse jointy greenstone rock. A crushing of the material of 32 tons returned 35ozs. over the plates, and a second parcel of 28 tons returned 24ozs.

"Nannine.—There is very little mining doing at this place, and the only mine that has kept the place going during the year is now under exemption.

"Tuckanarra.—To the East of Tuckanarra is the Nemesis G.M., which has given some phenomenal returns from time to time. During the past year 56 tons have yielded 348.73ozs. of fine gold.

CUE DISTRICT.

"Cue.—There has been a decrease of gold won in this district, but in the latter part of the year there were some very promising developments. At *Pinnacles* the various shows are being opened up, and assays show there is some high-grade ore there. The lodes are large and can be easily and cheaply worked.

"From a 'new find' 20 miles North of Cue, 36 tons of ore has been treated for a yield of 24.88ozs. of fine gold.

"At the Big Bell, situated 20 miles West of Cue, very little is being done. During the year the Big Bell, through which there is a lode over 60ft. in width, has returned 78.53ozs. fine gold from 352 tons.

"Around the town of Cue the Light of Asia G.M. is showing the most improvement. The main shaft is down 253ft. deep, and the bottom level has been driven on the reef at 242ft. depth. The stone crushed from the drive and a short stope returned 794.26ozs. of fine gold over the plates from 528.5 tons of ore. A new winder, poppet-heads, and crushing plant are being erected on the mine.

"The Agamemnon G.M. has been a regular producer during the year. The main shaft is 263ft. deep, but the work for the year has been carried on from a level 196ft. deep. The yield for the year has been 1,053.26ozs. over the plates from 2,055.5 tons.

"The Vera G.M., situated within the townsite of Cue, has produced 138.44 fine ounces from 209.5 tons. Last year this show produced 287 tons for a return of 350.83 fine ozs. All the quartz has been taken from above the 60ft. depth.

"From the various Prospecting Areas in the Cue district 816.24 tons have been crushed for a yield of 570.8 fine ozs.

"After the recent rains several pieces of quartz showing rough gold were picked up between Cue and Day Dawn, where no mining is being carried on, which shows there is something new to be discovered about that part.

"Day Dawn.—Great Fingall Consolidated, Ltd.—This mine has been employing about 21 per cent. of the workers of this district, and although there has been a reduction in the gold return, the average number of men employed is very near that of the previous year. There have been difficulties met with in improving the ventilation of the mine, and in installing sand-conveyors to get filling into the worked-out ground, but now these have been overcome the prospects seem to indicate that the coming year will give better results than the one just passed. The gold

yield from the mine during 1914 was 17,317.89ozs. from 39,238 tons.

"Creme d'Or G.M.—The deepest working in this mine is only 200ft., and the ore coming from the stopes above the level has been giving very satisfactory returns. 1,050 tons have been treated during the year for a yield of 749.09 fine ozs. from over the plates.

"Parisian G.M., situated on the South side of the Fingall. During the year 238.5 tons have been treated for a return of 126.74ozs. fine.

"Mainland.—Enterprise G.M.—Two prospectors have been working for some time at the Mainland, and last February they came across rich gold on a contact vein and dollyed 30ozs. of gold, and during the year they dollyed altogether 503.63ozs. of gold.

"Lake Austin.—At Lake Austin mining is practically at a standstill.

MOUNT MAGNET DISTRICT.

"Moyagee.—In the Moyagee district, at a place known as Blackman's Patch, the results being obtained from the number of men there are very satisfactory. Whitehead and party's 'Moyagee' have two shafts 80ft. deep which are connected at the bottom. The reef averages 20in. wide. A parcel of 57 tons returned 136.25ozs. fine.

"Moonlight G.M., worked by Messrs. Reid and Kochler. The shaft is down 180ft. and the ore is raised by a geared winch and steam supplied by a vertical boiler. A drive has been put along the reef at 160ft. depth, the reef being very erratic in size. The last crushing of 19 tons returned 101.57ozs. of gold won over the plates, and the owners state the sands assayed 34dwts. per ton.

"Lennonville.—Empress G.M.—This mine was taken over by a company during the latter part of the year, and the work started on was cutting down the shaft so as to deal with an increased output. The mining formerly was not carried out in a miner-like fashion. The main shaft was 180ft. deep and the ground being stoped 250ft. deep. It is now proposed to sink the shaft deeper than the stopes, and so be able to deal with the ore at about half the cost. The quartz crushed during the year was 865.5 tons for 2,932.97ozs. gold over the plates, and for the previous year 445.5 tons for 2,338.6ozs. The mine was taken over about October last, and it will be some months before the shaft can be cut down and the sinking completed. It is proposed to sink the shaft down to 350ft. depth, and to instal a 90 h.p. National Suction gas plant, belt-driven air compressor, one air-driven winch, and a new set of poppet-heads 66ft. high.

"Mount Magnet.—Practically all the mining in this district is being done by small parties of miners, and in a number of cases excellent results are being obtained. Among them is noticeable the return from the Ready Money G.M., from which has been dollyed 917.24ozs.; Treasury G.M., 73 tons for 666.41ozs.; and Mountain View, 49.5 tons for 344.43ozs.

"The gold obtained this year from the Mount Magnet District is 11,894.34ozs. fine gold from 8,150.21 tons, or an average of 1.45ozs. per ton.

YALGOO GOLDFIELD.

"St. Michael G.M., situated about 15 miles from Yalgoo.—The main shaft is down 102 feet vertical. Some high returns have been obtained from this show, but only 28.5 tons have been crushed this year for a yield of 68.12 ozs. The owner has been erecting a

five-head mill, to be driven by a 37 H.P. suction gas engine. This plant has just been completed.

"*Melville.*—At Melville, which is situated about 12 miles north of Yalgoo, several new promising discoveries were made in the latter end of 1914, but very little has been done on them up to date. The first one met with is on the side of the main road to Melville, and has been named the Black Watch. A shaft has been put down on the large ironstone formation to a depth of 35 feet. At that depth a crosscut has been put across the lode 20 feet west and 7 feet east, and the owners state this samples 6dwts. per ton. To the north of this shaft a cross lode is showing which intersects the main lode, and at the point of intersection coarse gold could be seen. Adjoining this is the Iron Duke, where a shaft has been sunk 30 feet. The quartz is of a sugary nature. I could not see any gold in the dump at the mouth of the shaft, but three samples, taken from different parts of the dump and dollied, gave very high results.

"*Gullewa.*—At Gullewa a 'new find' of molybdenite was reported, and on visiting the district I found that most of the reefs in the granite around that place carried the mineral in small quantities, but did not see anything that I thought would be payable. At Mugga Mugga Hills, situated about seven miles from Gullewa, a crushing of 118 tons was crushed for a return of 112ozs. fine gold.

"*Field's Find.*—At this place a few prospectors are getting a little gold, but very little is being done in the way of practical mining.

"*Warriedar.*—This place is situated about 20 miles south-west of Field's Find, and the prospects for the amount of work done are very promising.

"*Mug's Luck G.M.*—A shaft has been sunk on this for a depth of 33 feet, and costened at intervals in the reef for a distance of 480 feet. At one point on the reef an open-cut has been made, and 100 tons taken out and sent to Field's Find, and crushed for a return of £183 over the plates.

"*Aurum G.M.*—A shaft has been sunk on this lease to a depth of 135 feet on the reef. At 120 feet depth sulphide ore was struck. The oxidised ore in shaft is said to assay from 6dwts. to 25dwts. per ton, but no ore has been crushed from this line. There is about 300 tons of ore at surface in the dump.

"*Warriedah G.M.*—A shaft has been sunk on this property on the lode to a depth of 90 feet, and a crushing of 30 tons of picked ore obtained in development work was crushed at Field's Find for a yield of 1oz. 5dwts. per ton. The sands are said to assay 1oz. 19dwts. 2gr. per ton.

There were four other shows being worked at the time of my last visit.

"*Payne's Find.*—At Payne's Find there are a number of miners working for themselves, and the most of them seem to be doing fairly well. The leaders are in most cases on the small side, but the luses are usually good. All the returns from here have been reported and are hardly worth repeating here.

Dust and Ventilation.

"In the above goldfield the mines generally are not dusty, and the ventilation is fairly good. At the beginning of the year the Great Fingall G.M. was very badly ventilated, but great improvements were made by putting in two six-foot diameter fans made on the mine. The top of 'Armstrong's' Shaft was closed in at the top and one of the fans placed in there, and the second fan was placed at the bottom of No. 13 level to urge the air current in the required direction. The calculated capacity of each fan is 50,000 cubic feet

per minute, but owing to leakages they are probably doing about 30,000 cubic feet. The effect has been to reduce the temperature throughout the lower levels by about 20 degrees.

Accidents.

"During the year 1914, four fatal accidents were debited to these goldfields. The first was to a man named G. Smith, who was engaged on the vacuum slimes plant, and was called in to assist to clean up the zinc out of the precipitating boxes. He helped to clean up some which were put in the acid tub and the acid put on. After working at this for about three-quarters of an hour he was relieved and returned to the slimes plant, where he worked for about an hour, until 8 a.m. He then rode a bicycle to the town and had a glass of beer at an hotel, when he became sick. He then had a glass of spirits and went home. After reaching home he became very ill, and died seven days later. The peculiar thing about this is that none of the men who worked through the same clean up and must have inhaled considerably more, felt any effect, and even Smith seemed to be in his usual health when he left the mine.

"The second accident was to John Spaak, who was employed as a carpenter. This man was told to repair an ore bin on surface. He was seen working on the top of the ore bin just before crib time, and after crib a fitter was passing and found the body on the ground at the bottom of the bin.

"The third fatal accident was to a shift boss named William Pritchard, who was known to be very careful. After firing out in a stope he went to see if the ground was safe, and whilst examining it a large rock fell on him.

"The fourth was to H. E. McCleery, who was in charge of sand pipes, through which the sand is dropped down a compartment in the shaft in the Great Fingall Mine. Whilst doing something to the pipes some distance below the surface, he either fell, or was knocked down the shaft by a moving cage.

"By the foregoing it will be seen there have been two fatal accidents which are purely mining accidents, but in neither case was anyone to blame as far as I could see."

EAST MURCHISON GOLDFIELD.

Mr. A. W. Winzar, Inspector of Mines, reported on 4th February, 1915:

I beg to submit my report on the above Goldfield for the year 1914.

"During the year the whole of the District has been worked by motor, this being both fast and economical when compared with horses. The mileage covered amounted to 5,260, and the inspections were 193.

"There were four prosecutions undertaken by the Inspector: one under the Mines Regulation Act, 1906, and three under the Inspection of Machinery Act, 1904. In all cases convictions were obtained.

"Strict attention has been given to the ventilation, and to the keeping of the mines in as good a condition from a health point of view as possible. The mine managers have been notified that all dust producing machines must be fitted with dust allaying apparatus, or means taken to prevent its formation.

"In one instance I noticed some defective explosive being used on one mine. The Inspector of Explosives visited the locality, and inspected and destroyed the defective portion of the material. In one accident from premature explosion it was re-

ported that the fuse had run. I gave the balance of the coil, from which the particular piece had been cut, a severe testing, and could find nothing wrong with it, its burning rate being 92 seconds per yard. Tests of other portions from the same bundle were equally satisfactory.

Accidents.

"There were 61 accidents reported for the year. Of these 29 were minor, 30 serious, and two fatal. Forty-nine occurred underground, and 12 on the surface. Of the fatal accidents, the first was caused by a shoveller getting crushed by a skip under the No. 15 plat at the Black Range Mine. There was no evidence to show how the man came to get caught. The second one occurred to the engine-driver on night shift at the same mine. It appears that he followed his usual custom of oiling the compressor at a little before crib time, and was found by the fireman some time later, crushed between the flywheel and the floor. The man had been off three shifts, and was receiving medical attention, and had evidently returned to work before he was fit to, and it is surmised that he probably fainted when near the revolving wheel, and fell against it.

"In all cases of accidents careful investigations were made, and no contravention of the Acts and Regulations was found to have taken place.

BLACK RANGE DISTRICT.

Mining Progress.

"There have been no sensational discoveries for the year. Several new leases were taken up at *Hancock's*, and these are at present being vigorously prospected. The grade is found to be low and all the work done is surface excavating.

"The total yield for the year was 59,547.7 fine oz. from 124,569 tons, as compared with 74,093 fine oz. from 163,932 tons for 1913. The chief cause of the fall in yield and tonnage was owing to the stoppage of the Youanmi Mine during the middle of the year. In June, July and August, 2,162 tons were treated for 1,141.28 fine oz., as against an average of 5,000 tons per month. The Oroya Black Range also showed a big drop, and is now all on tribute. Mining in the district is very quiet. There are two shows being worked by the Oroya on option, and are said to be looking promising. The Black Range Mining Co. have ceased work at the bottom levels, and are taking out the shaft pillars. The Black Range West obtained exemption during the year, and expect to resume operations early in the coming year.

"The following are the principal yields, with a few remarks on the individual mines.

"The Black Range Mining Co. sunk their main internal shaft to a depth of 1,100 feet from the surface. The bottom showed plenty of stone, but little gold. The strike at the No. 15 level early in the year proved disappointing. The Company are now taking out the rails, etc., and have come up to No. 7, and are taking out the stone under the shaft. They are still driving south on the upper levels. The yield for the year was 15,132 fine ounces from 28,848 tons.

"The Black Range West obtained 786.41 fine ounces from 935.50 tons. The main haulage winze was sunk to the 550ft. level, and a drive put in

south without getting any values for the length driven. Owing to shortage of funds, the mine ceased work and obtained exemption. Good values were showing in the south end of the 494ft. level at the time of closing down.

"The Oroya Black Range Company crushed 32,935 tons for a yield of 13,238 fine ounces, and tributers on the property obtained 2,077 fine ounces from 2,684 tons treated. This mine is now being worked entirely by tributers. The Company is working Blair's leases at Hancock's, and the Wanderie Leases, under option.

"The Margaret crushed 1,460.50 tons for 414.90 fine ounces, and drolled 470 fine ounces. The Oroya Black Range Co. had an option over this property during the year, but did not exercise it.

"The Wanderie group, which includes the Trafalgar, crushed 262 tons for 244 fine ounces. This mine is on option to the Oroya Co., who are sinking the Trafalgar shaft, and taking out an underhand stope. The ore shoot is rather short, though a fair width. There are other shoots which will, no doubt, be tested in due course. The prospects are good at time of writing.

"The Pyx G.M. crushed 189 tons for 170 fine ounces. The shaft is down 193ft. on a reef from 1ft. to 3ft. wide; the ground is heavy and needs careful attention. The mine is equipped with a Hornsby oil engine, operating a two-throw pump, and small friction winch, and reflects credit on the owners.

"At *Hancock's* several leases were pegged during the year, gold being found in a hill traversed by jasper bars and ironstone. Messrs. Blair and Party took out two crushings from the Great Kohinor Lease. The first gave 6.36 fine ounces from 43.50 tons, and the second 60 fine ounces from 61 tons. The Oroya Mine have the leases on option and are crushing from them. The values are said to be patchy and rather on the low side. At present all the ore is being taken from surface excavations. Adjoining leases are being prospected. The "Allies" put through a test crushing of 12 tons for 1.32 fine ounces, and are still prospecting their show. The values are scattered, and they have so far opened up nothing of importance.

"The Royal Oak ceased operations and have taken out the pumps. A party of tributers is working on the property. The company crushed 1,470.50 tons for 651.44 fine ounces, whilst the tributers treated 152.25 tons for a yield of 187.30 fine ounces. They are now working in the upper levels.

"The Comedy King crushed 315.50 tons for 676 fine ounces, and the owners intend sinking on the reef below the bottom level.

"The Faugh-a-Ballagh is flooded in the lower levels, owing to the closing down of the Royal Oak. They crushed 596 tons for 692 fine ounces. They are now working the upper levels.

"At *Maninga Marley*, the Havilah mine and plant has been purchased by the Havilah Development Syndicate. The machinery has been overhauled, and the owners expect to bale the water out in the near future.

"The Marley North put through 256 tons for 224 fine ounces. The owners of this show purchased the old Maninga Marley Mine, and utilise the battery for their crushing.

"*Barrambie*.—The cyanide plant on the Barrambie Ranges G.M. has been working continuously during the year, treating the accumulated slimes, with, I understand, payable results. No mining has been carried out on the mine.

"The Lilyvale crushed 134 tons for 119.12 fine ounces. This show has been tested to a depth of 80 ft., and shows fair stone in the bottom. Owing to storm water, the mine was flooded towards the latter end of the year, and the workings collapsed. The owners are now crosscutting off a new shaft to strike the reef.

"There are a few prospectors operating around *Lupton's*, and small crushings are put through at intervals.

"*Youanmi Centre*.—The Youanmi Gold Mines Ltd. have crushed for the year from their Youanmi G.M. 47,702 tons for 19,008.70 fine ounces, showing a drop on the last year's total. This fall in output was due to industrial trouble in the middle of the year. The mine is opening up well in the bottom levels, and the shaft was sunk 130ft. below the No. 4 level, and a plat cut. Sinking is to be continued. The oxidised portion of the ore is about cut out, and the whole of the output will have to be roasted later on, owing to sulphides of antimony, etc. The ore is rather refractory and needs careful treatment. Should future developments warrant it, the plant will probably be enlarged by the addition of another roaster.

"The United crushed 1,011 tons for 183oz. This mine was looking well on my last visit. A new shaft south had cut the lode, and fair values were showing. There is a large parcel at grass, which will be crushed early in the new year.

"At *Curran's*, the Red, White and Blue crushed 1,226 tons for 378.60 fine ounces. The tailings are yet to be treated, and are said to be worth 5dwts. The five-head mill erected on this property has worked well and is up-to-date, being operated by a gas engine and wood producer. The mine looked well on my last visit, a fair sized body of stone showing in the North shaft. I understand the shortage of water for crushing hampers operations somewhat. Several of the prospectors around Curran's crushed small parcels, but returns were low.

LAWLERS DISTRICT.

"This district has improved during the latter end of the year. No new finds have been made, the ore being obtained from the old mines. The district shows an increase in tonnage, though a decrease in gold won on the previous year, the figures being:—

1913 .. 5,818 tons for 4,843 fine ounces.

1914 .. 6,333 " " 4,318 "

The coming year should show an increase on the previous two years. The Never-Can-Tell is not producing now, the work on it being confined to prospecting.

"The Great Eastern is being worked by a syndicate, who have purchased five head of stamps in the old mill, and are crushing fairly constantly. Nothing of importance has been opened up so far: 599 tons were crushed for 263 fine ounces. Some of the material crushed came from around the old mill.

"The Queen crushed 197 tons for 340 fine ounces. This mine is equipped with a three-throw pump, operated by a petrol engine. The reef would average about 18 inches in width, and on my last visit the show was looking particularly well.

"The May Bee crushed 876 tons for 278.50 fine ounces. The last crushing gave 64 fine ounces from 38.50 tons. This came from a sandstone reef, about 35ft. down which, on my last visit, showed 10ft. wide with stone in the end of the crosscut, and gave good pan prospects. This formation runs on the eastern side of the other reefs, of which there are several on the property, and all carry values. I consider the prospects of this show decidedly encouraging, and expect some good yields to be got from it in the coming year.

"The Waroonga has been acquired by Messrs. Langford, Finch & Party, who have erected a 10-head mill with suction gas plant. Work has been confined to above the 100ft. level. It is the intention to unwater the mine later and work the lower levels: 2,943 tons were treated from the property for 698 fine ounces.

"At *Sir Samuel*, Brown and Pola crushed from the Canberra 69 tons for 244 fine ounces. The leader is small, and is in hard country. There are a few other small shows working in the locality.

"At *Kathleen Valley* the Yellow Aster is looking very well. The new shaft is down 90ft. and drives are being pushed ahead at the 75ft. A total of 50ft. has been driven north and south in stone 5ft. wide, worth 12dwts., with ore in both faces. This reef is in granite country with good walls: 567.50 tons were crushed for a yield of 298 fine ounces. This is the only mine working in the locality.

"At *Darlot* nothing of importance has been opened up. The workings on the Deep Lead collapsed and nothing further has been done. The St. George struck a small patch and doliied 37.50 fine ounces, and crushed 18.50 tons for 28.74 fine ounces.

"The Rosewood crushed 32.50 tons for 60.70 fine ounces. The reef is small and the country hard, and the crushing took a long time to get. There are a few dryblowers and prospectors still around Darlot.

"At *Wilson's Patch* only a few dryblowers are working.

"The Victory, near *Doyle's Well* crushed 88 tons for 309oz. for the year.

"*Wiluna*.—There has been nothing of importance opened up, nor any new discoveries made at this centre for the year. The tonnage of ore extracted shows an increase over the previous year of 1,112 tons, though the gold returns are less by 492 fine ounces. The State Battery is to be fitted with a sliming and vacuum filter plant to enable a closer extraction to be made, it being generally understood that the residues can be brought down to about 6s. or 8s. per ton, which is considered good for Wiluna ore. The Western Machinery Co. have let the Violet leases, late Gwalia Consolidated Co., on tribute to Mr. G. Dawson, who has crushed 7,629 tons, mostly taken from the old open cuts. No development work was done on the leases, and no ore reserves are opened up. During December the water was taken out to the 90ft. level in the South shaft, and ore is now being extracted from the stopes above the level. All the old workings and timber are in good condition, the ground being good standing and easily worked.

"The Essex treated 1,045 tons for 264 fine ounces with about 10dwt. in the sand for the year. Here again no reserves are opened up. The ore is taken out to water level. At present the owners are working a leader, which crushed 54 tons for 71 fine ounces. The mine is troubled with very heavy water,

and would need a good pumping plant to cope with it.

"Mossman's P.A. 119J crushed 573 tons for 70.6 fine ounces with about 8dwts. in the sands. The claim is worked to water level. At present a new shaft is being sunk to catch the continuation of the lode south. No machinery is on the Area.

"The Happy Jack crushed 400 tons for an ounce per ton, and is reported to be looking very well. The shaft is down 90ft., water level being 30ft. At 75ft. the lode has been struck and is at present 16ft. wide, and assays from 17dwts. up. A boiler and winch are used to keep the water down. This property should show some good returns during the coming year.

"The Caledonian closed down after crushing 131 tons for 223 fine ounces. A slide cut the reef off, and owing to heavy water and hard country the mine was abandoned. The owners shifted the boiler and pump to the Ulina, which has also been stopped, the grade being too low and the ground difficult to keep up. 931 tons were crushed for 133oz. fine and 8dwts. in the sands.

"The Bulletin is being worked by tributers, who obtained two crushings which were unpayable. The plant on the property is used for treating part of the ore from the Violet leases.

"The Moonlight has done very little work for the year. The intention was to instal a tube mill for sliming. However, crushing has again been started, and ore from the open cut and Lone Hand lease is being treated. No developments of importance have occurred on this mine.

"*Mt. Keith.*—The Aurora has been worked continuously for the year, and 513 tons were crushed for 428 fine ounces. At the time of my last visit stoping was being done about the 140ft. level. The stone was small, and occurs in lenses.

"The Grand Schlam crushed 265 tons for 257oz. The ground is heavy in this mine near the water level and is hard to keep up.

"There are several shows working in a small way. The State Mill crushed 1,135 tons for 907 fine ounces. The locality is very quiet. The reefs occur in lenses and can be traced for a considerable distance on the surface. Shafts have been sunk at different places and all show gold, though not in sufficient quantity to be payable. A few shafts have been sunk on side lines during the year without payable results, and there is still a little prospecting being done.

MT. MARGARET AND NORTH COOLGARDIE GOLDFIELD.

Mr. H. P. Rockett, Inspector of Mines: Report dated 18th February, 1915:—

"I beg to present to you my Annual Report for 1914 on the Mount Margaret and North Coolgardie Goldfields.

"During the year inspections of mines were made necessitating travelling over 7,500 miles.

Prosecutions.

"For breaches of the Mines Regulation Act there were six prosecutions: one for breach of Section 42 relating to the employment of foreigners; one for breach of the sanitary provisions of the General Rules of Regulation No. 4; and four for breaches of the General Rules regulating the Storage and Handling of Explosives.

Fatal Accidents.

"In the Mount Margaret Goldfield there were three fatal accidents, and in the North Coolgardie Goldfield one. Each of these was carefully investigated and reported upon.

Ventilation.

"The ventilation of the mines has been improved by the laying of dust. In the case of dry machine-holes, this was effected by the provision and compulsory use of atomisers directing very fine sprays of water at the collars of the holes. In stopes, where practicable, some of the water from the level above is run down the footwall, the quantity being regulated and restricted to that required to damp the ore sufficiently to lay the dust. Where this cannot be conveniently done, water from buckets is used, and atomisers are provided at the chute-doors.

Sunday Labour Permits.

"No permits for Sunday labour were issued.

General.

"There are no new finds to report, but one or two old camps are receiving attention, as the British Lion Lease, in the Cock of the North group, about five miles east of Laverton, on the Northern extension of the Ida H. line, and the Goodenough in the Picton group, near Menzies.

"The tonnage of ore treated in this Inspectorate for the year approximates 304,800 tons, from which more than 168,600 ozs., worth over £716,000, was obtained, an increase on last year's figures of more than 34,000 tons of ore and over 8,000ozs. of gold.

"Throughout this Report the quantities of gold are given in fine ounces.

NORTH COOLGARDIE GOLDFIELD.

"The most important centre from the point of view of gold yield in the North Coolgardie Goldfield is *Comet Vale*. The three mines, the Sand Queen, the Gladsome, and the Happy Jack together, by their increased output, made up for the decreased yield as compared with 1913, of some other centres, and left a balance, for 1914, of 3,000ozs. on the right side.

"The largest producer of the group is the Sand Queen, which contributed to the State's output of gold some 20,315ozs., obtained from 24,250 tons of ore. At this mine, for the twelve months, development work was completed as follows:—Driving, 903 feet; winzing, 379 feet; rising, 219 feet; and nearly £9,000 was expended in additional plant and machinery. It is proposed to sink the main shaft during 1915 another 150 feet, and open out at the 650ft. level.

"The Gladsome Mine yielded 7,149ozs. from 8,040 tons ore treated, and the Happy Jack 802ozs. from 1,286 tons.

"Except P.A.'s the only other mine in the neighbourhood is the Lake View, formerly Comet Tunnel, situate about two miles East of Comet Vale townsite. The total recorded output to date from this mine is 523ozs. from 1,062 tons.

Menzies.—In the Woolgar and Menzies centre the Menzies Consolidated Gold Mine still holds pride of place, and with its output of 29,800 tons, worth 15,200ozs. odd, comes second only to the Sand Queen as the premier producer in the North Coolgardie Goldfield. This mine is the mainstay of the Menzies and Woolgar towns, and has been a regular

producer for 18 years. In December last the first dividend of sixpence was paid. The prospect for 1915 is said to be greatly improved owing to increased values lately disclosed by development work. The main shaft, already 1,446 feet deep, is now in course of being sunk. The footage for the year in development is approximately as follows:—Shaft-sinking, 49 feet; winzing, 450 feet; driving, 800 feet; cross-cutting, 180 feet.

"The Menzies Gold Mine has now ceased operations under this name, but one of the leases, the Lady Shenton, is still being worked by another party. The Menzies Gold Mine obtained nearly 2,800ozs. from 1,900 tons ore, and the Lady Shenton 129ozs. from 329 tons.

"The Balkis crushed 244 tons, yielding 212ozs.

"The Flying Fish crushed 146 tons, yielding 187ozs.

"The Lady Harriet crushed 387 tons, yielding 174ozs.

"The Flying Fish S. crushed 239 tons, yielding 133ozs.

"The Associated Northern Company have taken an option of purchase over the old Goodenough Lease at Picton, about three miles North-East of Menzies town, and a contract has been let to drive the bottom level.

"The *Ularring*, *Davyhurst*, and *Mulwarrie* centres are very quiet. Why this once flourishing district is so neglected is very hard to say. One thing, at least, seems certain—the ground is not nearly worked out.

"At *Davyhurst*, Messrs. Cassidy and party raised 1,325 tons from their Expansion Lease, and obtained 192ozs. gold. The party have their own crushing and cyanide plant on the lease.

"The Golden Eagle yielded 241ozs. from treatment of 521 tons, while from the Waili 178ozs. were obtained from 53 tons.

"At *Mulwarrie* Messrs. Lewis and party crushed 118 tons for 95ozs.

"*Mulline*.—At Mulline the Young Australian crushed 222 tons for 253ozs., and the Lady Gladys 291 tons for 150ozs., while the Peach Tree and Belle Mai each had small crushings.

"*Riverina*.—The Riverina South produced 1,540 tons worth 781ozs.

"*Goongarrie*.—The New Boddington at Goongarrie yielded another rich crushing—136 tons for 462ozs.

"*Mt. Ida*.—In the neighbourhood of Mt. Ida the Unexpected South, with its yield of 547ozs. from 484 tons, is the largest producer, whilst the Mt. Ida West comes next with 276ozs. obtained from 198 tons. The Wild Rose produced 235ozs. and the Forest Belle 146ozs.

"*Yerilla*.—At the Yerilla centre the output is considerably below that of 1913 in both tonnage and value, due chiefly to the temporary closing down of the Yerilla King Mine in the latter part of the year, after producing 2,307 tons yielding 1,355ozs. It is expected that work in this mine will be resumed during the current year.

"The Viola also is closed, as well as that old-time phenomenally rich mine the Queen of the Earth. A little prospecting in this locality might expose another Queen of the Earth.

"*Yarri*.—Yarri is quiet. Very little work has been done outside the Wallaby and Wallaby Central, which together produced 238ozs., and that rich show, the Dostmund West, from which 404ozs. were obtained from 122 tons.

"*Edjudina*.—Edjudina is dull, but there are still some 30 men on the line of lode. No large crushings are reported, the principal being:—

Neta, 81 tons for 150ozs.

Neta Extended, 81 tons for 86ozs.

Senate, 184 tons for 92ozs.

"*Pingin*.—Except for cyaniding sand at the State Battery, Pingin is almost deserted.

"*Tampa*.—At Tampa the yield is much smaller than that of last year, owing to the stoppage of work on the Butterfly, which, after obtaining over 3,500ozs. from 14,836 tons ceased operations. The Butterfly is now believed to be undergoing reconstruction, and it is expected that operations will be resumed during 1915.

"The Hawk closed down after producing nearly 140ozs.

"*Kookynie*.—At Kookynie a promising lode was found in the Champion. This mine is in the hands of tributers, and little is known of the development.

"The upper workings of the Cosmopolitan still attract tributers, who produced, during the year, 239 tons of ore worth 208ozs. Other mines are the Altona and the Altona South, and the May Bee and Orion, at Niagara.

"*Linden*.—There has not been any development of note in this centre, and the tonnage and gold yield show a marked falling-off as compared with last year's. This is chiefly due to the failure of the Devon Consols and the Great Carbine—two important producers in 1913—to re-open. Several of the mines look promising, and would seem well worth examination by strong companies.

"The largest returns for the year are from the Blue Danube, with 210 tons for 210ozs.

Grand Junction, 228 tons for 236ozs.

Democrat, 61 tons for 201ozs.

Bindah, 501 tons for 238ozs.

"*Yundamindera*.—At this centre mining is practically at a standstill. Messrs. Huntley and party found a rich pocket of 9 tons, worth 24ozs., but the Battlesville returns were not satisfactory.

Several of the mines about this centre are very well worth examination, notably the Potosi, which had yielded 18,694ozs. obtained from 38,449 tons at the end of 1906.

MOUNT MARGARET GOLDFIELD.

"The total output of gold for the year was 96,733 ozs. obtained from 204,571 tons of ore, being an increase of 5,460ozs. and 27,960 tons as compared with 1913.

"For the first ten months the rainfall for the year was below normal, and consequently there was a decrease in the amount of prospecting done and the number of small mines and P.As. worked, as the cost of water and supplies was, in some cases, prohibitive.

"No new mines were found, but several old claims were re-opened, and in one or two instances there were increases both in tonnage and gold from regular producers.

"*Leonora*.—The Sons of Gwalia continues to be the largest producer in the Eastern Goldfields outside the Golden Mile. The mill crushed 160,963 tons for 58,971ozs., worth £250,509, which brings up the total output from the mine to well over two millions of tons, and just short of £4,000,000 sterling.

"During 1914 the erection of the following addi-

tions to the plant was completed:—

- 1 660 H.P. Gas Engine and accessories.
- 1 380 H.P. Wood-Gas Generator Scrubbers.
- 1 110 K.W. Generator.
- 1 60 H.P. Motor.
- 1 Air Compressor.
- New Vacuum Slimes Plant and 45 Frames.
- Gas Calorimeter.

"In all, 7,699 feet of development work were done in the mine. The main shaft was sunk a further 224 feet to the total depth of 3,122 feet from the surface, on the incline. No. 20 level has been opened for nearly 1,500 feet, and No. 21 level has just been started. Cross-cutting, amounting to 2,712 feet, was done. The ventilation of the mine is good, and dust is practically a thing of the past. The slight falling-off in the year's output, as compared with that of 1913, is not due to shortage of ore.

"Under the new name of the Leonora Proprietary, two of the old Tower Hill leases are again being worked. Late in the year a five-head mill and a cyanide plant were erected, and to the end of December 360 tons of ore treated had yielded 53ozs.

"The Gwalia Central's Trump lease continues to turn out rich ore, 165 tons yielding 488ozs., but the company's leases south of the Tower Hill are entirely unproductive. Over 400 feet of driving and crosscutting were done—most of it in the South Leases.

"The Leonora Gold Blocks treated 698 tons for 342ozs. The year's work was confined almost entirely to stoping.

"Messrs. Hewett's mine, the Auckland, yielded 133 tons carrying 65ozs.

"The Casino is, for the present, practically closed down. For the year it produced 160 tons worth 249ozs.

"Some other local crushings were:—

- Ping Pong, 29 tons for 105ozs.
- Leonora Main Reefs, 49 tons for 239ozs.
- Victor, 57 tons for 109ozs.; dollied, 340ozs.
- Nil Desperandum, 11 tons for 27ozs.
- Rajah, 33 tons for 56ozs.

"*Malcolm.*—In this centre mining is exceedingly dull. The North Star is the mainstay of the town. During the year the North Star crushed 2,551 tons for 1,262ozs., or £5,360. It is greatly to be regretted that the working costs leave no margin of profit. A capital expenditure of less than £1,000 on small additions to the plant and the sinking of the main shaft would probably place the venture on a sound foundation in a small way.

"The Richmond Gem produced 11 tons, worth nearly 3ozs. to the ton.

"Messrs. Robinson and party's Triangle Mine, near the old Black Chief at Randwick, treated 48.25 tons for over 463ozs. One portion of this tonnage—about 5cwt.—contained the phenomenal quantity of 180.10 fine ozs. gold.

"At *Mertondale* there are a few prospectors, and the sand at the Merton's Reward is being treated.

"*Dodger's Well* and *Linger and Die* are deserted. A mineral lease for molybdenite was applied for. This lease is situate approximately two miles east of the No. 9 Well, and about a quarter-mile north of the old Cue-Morgans road, on the eastern end of a long, stony ridge. This find has been known for a number of years, but nothing was done with it. The present owners, Messrs. J. G. Thomas and party, expected to have made the show a going concern long ago, but owing to the war there is not now much demand for molybdenum. The molybdenite is found in

a quartzite vein 1 to 12 inches wide between pegmatite walls.

"*Diorite King.*—The King of the Hills, the Artful Dodger, and a few P.As. are all that are working in this vicinity. The King of the Hills crushed 145 tons for 271ozs., and the Artful Dodger obtained 133ozs. from 37 tons.

"*Murrin Murrin.*—There has not been any revival in the industry at this centre during the year. Nearly the whole of the work done in this locality is confined to the Nangaroo and Eulammina Mines, the former owned by the Nangaroo Mines, Ltd., and the latter by the West Australian Copper Co., Ltd. These are the only two copper mines operating in the Mount Margaret or North Coolgardie Goldfields.

"Fortunately, the war has not made any appreciable difference in the output from these mines. The outputs are given as—Eulammina, 8,329 tons, and Nangaroo 1,490 tons of copper ore, realising approximately 40s. per ton for copper and sulphur contents. With the exception of 130 feet of driving in the Nangaroo and 247 feet of driving in the Eulammina very little development work was done.

"*Pig Well.*—At this centre the Harriston has been working for the whole year, much exploring work was done, but owing to the cost of raising the large amount of water with which it is necessary to cope each day, only high-grade ore can be profitably handled.

"*Morgans.*—At Morgan's, the once rich Westralia Mount Morgans Mine is still working in a small way. The policy adopted is not very progressive, and work is confined almost entirely to treating ore originally used as filling in depleted stopes. A few feet of driving was done in No. 2 level, on what it was hoped would prove to be a continuation of one of the original rich shoots. Nothing definite was arrived at, and it may quite easily be that systematic exploration would be richly rewarded.

"The Mount Morven, close to the old Mount Margaret Reward, crushed 565 tons for 376ozs. The owner, Mr. W. Fawkner, expects to make some additions and alterations to the plant during the current year.

"The Guest's lease is in the hands of tributers, who crushed 140 tons for 119ozs.

"The Millionaire has been taken up by Dr. Hill, of Laverton, who confidently expects to have the mine running on a profit-earning basis at an early date.

"*Laverton.*—For the year the total output of gold from this district was 25,473ozs., an increase of 9,124-ozs. as compared with last year. This increase was, in a large measure, due to the resumption of operations at the Beria Consols (late Lancefield) combined with increased outputs by the Ida H. and Mary Mac Companies.

"The Ida H., which employs about 100 men, treated 16,584 tons for 13,500ozs. The latest developments have been so encouraging that it has been decided to convert the main incline shaft between the 500 feet level and the 1,300 feet level into the main shaft, by sinking from the surface, and from each intermediate level, and connecting through with the main incline shaft at the 500 feet level. The combined length of the proposed sinks is about 700 feet. For some of this distance the new shaft will pass through old stopes. It may happen that after the shaft has been in work for a while, difficulty will be experienced in keeping the skip road in proper alignment.

"Considerable additional plant has been erected during the year, including a 5 feet grinding pan, cyanide vat, boiler (16 feet x 6 feet 6 inches), and a Wheeler condenser.

"Development work, totalling 1,327½ feet, was completed, in which the principal items are:—

Sinking incline shaft, 176 feet.
Driving, 530½ feet.
Cross cutting, 30 feet.
Rising, 322 feet.
Winzing, 199½ feet.

"Augusta G.M.—This mine has discarded much of the old machinery with which it was burdened, and has erected in its place a new gas engine for driving the mill and air-compressors, and a new cyanide plant. Owing to many contributing causes 1,540 tons only were treated, yielding 352ozs. It is proposed to make alterations to one of the internal shafts, which, it is expected, will materially expedite the passage of ore from the lower levels to the surface.

"Bega.—From this little mine 142ozs. of gold were obtained from 42 tons of ore. Last year 128ozs. were obtained from 24 tons. It would seem that the vicinity is well worth the attention of individual prospectors.

"There is very little to report from the British Flag or any other shows in this neighbourhood.

"The British Lion Lease, one of the Cock of the North group, situate about five miles east of Laverton on the northern extension of the Ida H. line, crushed a parcel of 46 tons, which yielded 21ozs. There are said to be about another 100 tons of the same grade ore broken ready for crushing.

"The Mary Mac Company's Lady Harriet Mine has been a regular producer for the last year, raising 7,894 tons of ore, which yielded 3,003ozs. Considerable additions have been made to the plant, including a direct-acting winding engine with boiler, head-frame and accessories, while a ten-head battery of 1,275lb. stamps, with a Hadfield rock breaker, 5 feet grinding pan, and 75 H.P. Crossley gas engine are in course of erection. 1,016 feet of development work was completed. It is expected by the owners that the mine will continue to be a profitable one for many years to come.

"Late in 1913 the Lancefield Mine was purchased by the Kalgoorlie and Boulder Firewood Company, and re-named the Beria Consols.

"Early in 1914 the work of overhauling, and in some respects, re-arranging the plant was taken in hand, and later, the mine became once again a regular producer, giving employment to nearly 200 men. Much had to be done in repair work, and considerable additional machinery had to be erected, while a greater amount of old machinery was discarded. Amongst the additions to the plant are a large-gearred winding-engine, with drums about 14 feet in diameter at the main shaft; two powerful gas engines for driving the air compressor and reduction plant; a large Ridgway Filter in place of the filter presses, and numerous smaller additions.

"Underground the mine is well opened up, and very little development work will be necessary for a year or so. The gold return for 1914 does not represent the total value of the ore won for that period on account of absorption of gold by new plant, and consequent temporary loss. The recorded yield was approximately 10,000 tons, worth 3,000ozs.

"Burtville.—At Burtville and Mt. Weld the Nil Desperandum takes first place in the output for the year with 2,433ozs. obtained from 978 tons. The Black Swan, which runs its own one-head mill, comes next with 405ozs. from 268 tons.

"Amongst the crushings from this centre were the following:—

Redeemed, 128 tons for 155ozs.
Nulla Nulla, 92 tons for 163ozs.
Boomerang, 64 tons for 70ozs.
Various P.As. 283 tons for 192ozs.

"The Childe Harold has been the scene of some activity during the last few months. The five-head battery was removed from the Mikado and re-erected on the Childe Harold. No returns are yet available.

"Very little work is being done in the locality of the Mikado, or the Edith Hope or Sailor Prince.

"Duketon.—Mining at Duketon is very flat. After a lengthy stop the Mulga Queen was re-started by new owners and has crushed 360 tons, worth 235ozs. From the Limonite 71ozs. were obtained from 77 tons over the plates—the gold in the sand and slime not being estimated—and 128ozs. were dollied.

"At *Erlistoun*, from near the old Baneygo Mine, 18ozs. were obtained from 10 tons, while 16ozs. additional were dollied."

EAST COOLGARDIE GOLDFIELD.

Mr. W. F. Greenard, Inspector of Mines: Report dated 7th April, 1915:—

"I have the honour to submit to you my Annual Report for the information of the Hon. the Minister for Mines upon the administration and working of the "Mines Regulation Act, 1906," on the East Coolgardie, Broad Arrow, and North-East Coolgardie Goldfields for 1914.

"A systematic inspection of the mines in the above Goldfields has been continuously carried on. The ventilation of all the mines has received constant attention. The temperatures of all working places are regularly taken, and where any temperatures are found above those allowed by the Act, work is immediately stopped until connections are made or other means taken to reduce the temperatures to that approved by law.

"The air currents are now recorded on all plans of the mines, and many thousands of pounds have been spent during the last eight months on having the intake and return air currents clearly defined and fixed; by these means the up-cast and down-cast are maintained continuously one way.

"Dust.—Water stations have been fixed on all levels, and the levels are now equipped with water-trucks for spraying purposes, so all levels are regularly sprayed and all ore broken is damped, both in stope and development work. This means complete suppression of dust from those heads.

"The suppression of dust from back holes is not so satisfactory, but with the bag dust-collectors and sprays in use, we are in hopes of reducing the dust completely. Anyhow, a great effort is being made to catch the manager and miner making dust, when a recommendation will be made immediately for prosecution. I am very pleased to inform you that our efforts to suppress dust have been extremely successful; 95 per cent. of the dust has been suppressed. It only remains to continue the pressure for the complete suppression of dust.

"Safety cages, hooks and gates are in use in all the mines, and are regularly tested and passed.

"Explosives are stored in the mines according to the Mines Regulation Act, but we are endeavouring to reduce the quantities stored to a minimum. We are also carefully seeing that the mines are equipped

with necessary canisters and requirements to carry explosives to and fro for firing purposes.

"Stopes.—The filling of stopes and the securing of the back has had continuous supervision. There have been two or three fatal accidents from falls of backs. This is an extremely difficult matter to deal with, as a certain amount must be left to the individual miner as to what is safe, and even then it is possible for the most experienced miner to mistake the condition of the back, but the Department can rest assured that we are keeping a constant pressure on the underground managers, shift-bosses and miners to keep the *backs* as safe as possible. We are insisting on well filled stopes.

"Accidents.—There have been eight (8) fatal accidents:—Four falls of ground in stopes; two shafts; one winze; one sand pass.

"The accidents from falls of ground in stopes were searchingly investigated before the Coroner and jury, and in no case was any negligence disclosed.

"The two fatal accidents in shafts were thoroughly inquired into and no negligence disclosed, but evidence disclosed the fact that a little more caution on the part of the victims themselves would have avoided the catastrophes.

"The winze accident was due to unforeseen conditions. The sand-pass was due to insufficient care on the part of the men concerned in the work, but the jury looked upon the accident as one inseparable from mining.

"Sanitation has been carefully attended to. Pans are supplied everywhere possible, and deodorants supplied in large quantities, and everything is done to keep the mines in a healthy condition.

"Complaints under the Mines Regulation Act have been fully inquired into, and the compliance with the Act in detail fully insisted on.

"In conclusion, every effort has been made to make the mines as safe as it is possible to have them, and the Act has been strenuously enforced for the protection of everyone employed in and about the mines."

Mr. E. Gourley, Inspector of Mines: Report dated 11th January, 1915:—

"I beg to submit to you my Annual Report, for the year ending 31st December, 1914, on the mines in the district which I inspect.

Boorara: "Golden Ridge G.M.—Work has been continued throughout, and the 20 head of stamps have crushed 31,594 short tons, valued at £43,127.

"Development:—1,358 feet of driving and cross-cutting has been done, and 457 feet of diamond drilling. No. 1 bore was put out from the end of west crosscut at 500ft. level, a distance of 203 feet at 45° south; No. 2, 91 feet at 45° west, and No. 3 157 feet vertical. No values were cut, but a strong flow of water which, with the present water making at 35,000 gallons per diem, was more than they could cope with, so the bore was plugged up.

"No new machinery was erected during the year, excepting a new smoke-stack to replace the old one burnt out. A considerable amount has been spent during this year on options, looking for a new property to take the place of the old mine, which appears to be nearly worked out. So far they have not found a suitable property.

"Waterfall.—No mining work has been done of any note, but the old tailings dump is being re-treated.

"*Kanowna.*—The old Moonlight Lead has been opened up by Donnen and party, who have erected a 10 h.p. oil engine and a 5in. plunger pump, and several payable crushings have been taken out on what looks like a tributary off the main lead. This mine is at present under exemption. Norton and party have sunk a new shaft on the adjoining lease east, and bottomed at 110 feet with deeper ground in the south end of the shaft. A drive has been put out in this direction, but no payable values were met.

"A 6 h.p. oil engine and a 3in. plunger pump have been erected on this lease, which is also under exemption.

"Golden Valley.—A Kalgoorlie syndicate have been treating the old slimes dump for a considerable time. They also erected a 10 h.p. oil engine and a three-throw pump which, however, was not strong enough to cope with the water, so a 6in. Cornish lift was put in and the mine unwatered. I inspected the underground workings, which I found to be below the bottom of the shaft, a depth of 70 feet; but I could not see the bottom, as the water was not quite out. The quartz reef is about six feet in width, and has been worked for about 150 feet in length, the samples from which, I am told, were highly payable. The mine has been worked to a standstill and now requires capital to open it up, but the syndicate, I am told, were unable to raise it on account of the war, so the pump has been drawn and the water again allowed to rise.

"Robinson Gold Mine, owned by Reidel & Norton, has been in the hands of tributers. One party has been stoping out a leader above the 100ft., and some rich, small parcels of stone have been mined up to as high as 11ozs. to the ton; the ground is very hard, and it takes a long time to get a crushing out. Other parties have not made wages. The whole of the plant has been sold and removed.

"Sunset Lease.—Williamson & Pender have broken out about 100 loads of lode material from above the 80ft. level, which proved unpayable. They have unwatered the mine, which is 200 feet in depth, and have continued the level north for 25 feet. The reef averages about 10 inches in width, and is worth about 50s., but up to the present the expenses have been so heavy that they have not made a profit.

"Ballarat Lease.—This has been taken up by Messrs. Wilmot and Harrop, and a start has been made to erect machinery. Poppet heads 40 feet in height have been placed in position. Cornish boiler, pumping engine, and a 6in. Cornish lift is on the ground, purchased and removed from the Robinson G.M. They propose to unwater the mine, and develop it at the 300ft. level.

"Q.E.D. and Last Chance mines have not been worked, except two parties fossicking after leaders from the surface down to 40 feet in depth.

"Golden Crown.—A new reef has been discovered in the hanging wall of the old workings at the 100ft. level, from which payable small parcels have been crushed, and a winze being sunk on this reef carried payable values over a width of 24 inches down to a depth of 35ft. below the level.

"Luck at Last.—I have sampled this mine on behalf of the Mines Department on account of the owners applying for assistance under the Mines Development Act, but the samples taken did not prove payable values, and a crushing taken out of the bottom since has borne out these results. Since then

a prospecting drive has been put out north of shaft at 100ft. for a distance of 40 feet, but no values were met with. A new shaft was being sunk on the south-west of the old workings when last visited, and the reef was expected to be cut at 50 feet.

"Red Hill Leases.—Small leaders are being worked here by several parties, and some good yields per ton have been obtained, but owing to the narrow veins and the hard porphyry country rock it takes a long time to break a parcel.

"White Feather Main Reef.—Robinson and party have held this mine on tribute for the past year, and are working on what appears to be a branch reef of the old workings in the footwall at and above the 300ft. level. They are under heavy expanse, having to bale a large quantity of water every day, yet they have been making good wages. Two new ropes have been put on, and the new rock drills of the Jack Hammer type have been installed. There are 13 men in this party. Smith and party are working on the same reef at the 200ft. level.

"Lily Australis Mine.—This mine is under the same management as the Main Reef, and entirely in the hands of tributers, who have done 385 feet of development work, consisting of driving 235 feet, winzing 60 feet, crosscutting 90 feet, but the results have not been very encouraging, although some far stone has been discovered at the 800ft., 700ft., and 500ft. levels. The majority of tributers have been taking out blocks of ground left standing by the company when it ceased operations some two years ago. 9,545 tons have been crushed for a yield of 4,572.53 fine ozs., and the residues, which are retained by J. L. Martin, who owns the public battery, are estimated at 8s. per ton; in addition, the old residue dump has been retreated for a yield of 684.05 ozs., worth £3 12s. 6d. per oz., from 12,000 tons. It appears to me that unless some development work is carried out that it is only a matter of time when this mine will be worked out.

"Alluvial Lead.—Several men are employed taking out small parcels of leadings, but they have all been low grade so far.

"Rollo's Reward.—A series of hand bores have been put down on this area, but no payable values have been obtained so far.

"P. Areas.—I have inspected two of these on several occasions, but nothing of any consequence has been discovered.

KALGOORLIE DISTRICT.

"Uneda G.M. or Reefers Eureka has been worked continuously by owners, and the crushings taken out have only just paid wages.

"Golden Zone.—Shaft known as Kalgoorlie Star has been equipped with a winding engine boiler and a four-drill air compressor and unwatered down to the 200ft. level. At 50ft. level a good deal of development has been done on a lode, from which 5,000 tons of ore have been treated for an average of 2ozs. to the ton. Levels are now being driven at the 100ft. north and south; a total of 390 feet of driving has been done.

"Mystery G.M.—No development work has been done on this mine, but owners have been crushing from stopes and from a big fall of ground which occurred some time ago. Tons crushed 1,600, yielding £1,600.

"North Collier.—Owners have done 200 feet of driving during the year, and 60 tons of ore have been treated for an average yield of 24 dwts. to the ton. A new prospecting shaft is now being sunk.

"Enterprise G.M.—A new main shaft has been sunk to a depth of 145 feet. Set of poppet heads 40 feet in height, ore bin, a new 5-head Huntington mill, return water pump electric-driven friction winch, and a 22 h.p. Crossley gas engine. The base of Huntington mill has been renewed on two occasions due to breakage by explosives, which have for some unexplained reason got into the mill. 1,682 tons have been crushed for a yield of 326.94 ozs. fine gold.

"Golden Dream Mine.—This has been closed down for some time and the machinery has been sold.

"Devon Consols.—Owners have been working on this lease and also two parties of tributers, but nothing of any importance has been discovered.

"Hannans Reward and Reward North.—This mine has been worked continuously by H. Raven on tribute, and 12,000 tons of ore have been treated for a return of £12,000. 1,000 feet of development work, chiefly driving, 400 feet of which has been done on the Hannans North Lease.

"Cassidy Hill Mine.—Owners have been developing a small leader at the 180ft. level, about 200 feet of driving, and 100 feet of crosscutting, and tributers have been sinking winzes on a series of cross leaders which, from the returns, are very rich.

"Maritana Hill Mine.—This mine has been chiefly in the hands of tributers, but the owners have also done some development work at the 80ft. level; values however are low grade in the large ore body. Tributers have been following small leaders, and some very good returns have been obtained.

"Lord Nelson Mine.—A new shaft 6 x 3 has been sunk on this lease to a depth of 145 feet, and a leader which had been previously worked in the shallow ground for very good results, but the values have not continued. Several parties of tributers have been doing very well, working flat leaders on the east side of the lease.

"Hidden Secret.—Tributers have been working on this lease with very poor results.

"Creswick Lease.—A set of poppet heads 40 feet in height, a 5ft. Huntington mill, Thomas winder, suction gas plant, return water pump, and a 3-throw pump 4in. dia., have been erected on this lease, and some crushing has been done, but values over the plates have been unpayable, the gold being lost in the residues for the time being.

"North End Mine.—The plant and leases have been sold during the year, Forwood, Down & Co. being the purchasers, who have let the mine on tribute to several parties, one or two of which have been making good wages, but nothing of any importance has been opened up.

"Crosus South Mine.—The Hannans Central Milling Co. has held this mine on tribute and have had several tribute parties at work; nothing of any importance has been discovered, but good wages have been made in several places.

"Paringa G.M.—Development work in this mine has been confined to driving the No. 1 level north a distance of 200 feet and rising in three different places over this level for an average height of 25 feet. Nothing of any importance was discovered, and the workings have been let on tribute. Several other parties of tributers have also been working in

different places on the lease with varying success, Wilson and party being the most successful on the Associated Northern boundary, but their values are confined to the oxidized zone, from the 130ft. level upwards.

"North Kalgurli.—Development work to the extent of 600 feet of driving and 450 feet of sinking has been done, and a good body of ore has been opened up below the 500ft. level in a winze below this level. This ore is a heavy sulphide, and they cannot get a good extraction from the ordinary battery treatment. They are now waiting for the sulphide mill to start. At the No. 3 and 4 levels nothing of note has been discovered. Several other parties of tributers working from the 100ft. level up to the surface in different parts of the lease have been doing well.

"Shepherd and Trenwith secured a tribute on all vacant ground on the lease at the beginning of the year, and have entirely repaired the whole plant, replacing the steam for suction gas power; a 5ft. Huntington mill has also been put in. The grade of ore mined by this party was too low to be payable. They are now crushing for the public.

"Ironsides North Mine.—Development work has been carried out with good results, according to the returns, at the 300ft. and 400ft. levels. A good-looking body of ore has been opened up 140 feet in length, and the adjoining lease has been acquired on the south end, formerly known as the Union Jack.

"Associated Northern Mines.—During the year milling has been discontinued, and the majority of the plant removed to the Victorious Mine, Ora Banda, the Kalgoolie property being let to numerous parties of tributers, some of which have been doing well, notably Duke and Richards. A tribute has also been let for the retreating of the residue dump.

"New North Boulder Mine.—Nothing of any note has been discovered until the last month of the year, when a nice body of ore was discovered near the boundary of the Oroya North Blocks. This is a continuation of what is known as Rutter's shoot. 337 feet has been done and 433 feet of driving, chiefly on the boundary of the Associated.

"Boulder No. 1.—This mine is in the hands of tributers, and a good find by Oates and O'Hanlon near the tram line to the Boulder Block has yielded some very rich returns. A large number of tributers were given blocks, and numerous shafts were sunk, varying in depth from 30 feet to 100 feet, crosscutting in most shafts being done both east and west, but nothing of any note was discovered by the tributers in Albert's shaft, except Spargo and party, who made very good wages from the block.

"Central and West Boulder.—Tributers have done a lot of development work both in the main shaft workings and from different prospecting shafts. Horn and party have been crushing regularly from this block, and making good wages. Lundi and party discovered a new shoot of ore on the Associated boundary, from which they obtained good results, but the ore body is very erratic and gold contents patchy. The company in the early part of the year carried out some development work on a shoot of ore which appeared like a split off the main lode. Values were patchy and the ore body of no length. It was then let on tribute.

"Trafalgar Lease.—This was worked by a syndicate in the early part of the year, and crushings were taken out which were not payable. It has since been abandoned.

"Lake View South Mine.—This has been worked by Prosser and party, who have erected a Huntington mill, cyanide plant, suction gas engine, and have crushed from different places 1,700 tons of ore. 115 feet of driving has been done, and 54 feet of winze sinking.

"Lake View South Extended.—The owners have carried out some development in sinking 150 feet and crosscutting about 200 feet, but no values were struck, so work has been discontinued.

"Idaho G.M.—Star of Aberdare Lease. Crosscutted for a distance of 200 feet east from old main shaft and connected with old level at 100 feet in depth. This level has been continued south for 100 feet, and the lode has been crosscut through in one place and proved to be 22 feet in width, worth 32s. per ton. This lode has been worked on the surface for a width of 20 feet for a good length by opencut. On the Idaho lease 100 feet of driving has been done, crosscutting 40 feet, rising 80 feet, all at and above the 200ft. level, and from this and the Star of Aberdare lease 13,000 tons of ore have been milled for a payable return.

"Corn Cob.—A new vertical shaft 6 x 3 has been sunk, and timbered to a depth of 145 feet and the lode driven on for a distance of 100 feet. A rise has been put up to connect with the old workings, from which some payable crushings have been taken out. Values do not appear to go down in this lode, and so far the development work has been disappointing. Tributers have held and worked the northern portion of the lease, and some very rich leaders have been mined, but they are short in length, and very narrow.

"Williamstown Lease.—This is owned by a syndicate, and 140 feet of driving and 60 feet of sinking has been done. Crushings taken out have shown a fair profit, and appear likely to continue.

"Levant Lease.—A shaft has been sunk to a depth of 70 feet on a short lens of ore on fair values, but not sufficient length and width to be payable.

"Smithfield.—Turn of the Tide Mine has been examined on behalf of the Mines Department, results of which have been reported to Head Office. While out there I inspected Barrett and Rasmussen's mines, and also the adjoining lease on the south end. Some very rich ore has been mined from both these leases, but the richest ore has been mined at Barrett and Rasmussen's lease. The shoots are short and narrow.

"Hampton Plains.—A visit of inspection on behalf of the Mines Department has been paid to P.A. No. 715E, but I see no prospects of this becoming a payable mine.

"Bulong.—Two visits of inspection have been made to this district, but there is very little work doing, only about 20 miners being employed looking for contact leaders.

"Four hundred and thirty-three inspections have been made during the year. No fatal accidents have occurred in my district."

Mine.	Average Number of Men employed.	
	Surface.	Underground.
Golden Ridge	35	75
Moonlight Lead	1	4
Golden Crown .. ..	..	4
White Feather Main Reef	3	11
Lily Australis	9	40
Sunset Lease	1	15
Ballarat Lease	2	..
Q.E.D. Lease .. ..	..	2
Golden Valley	8	..
Robinson G.M. .. ..	..	8
Last Chance .. ..	..	3
Luck at Last .. ..	..	3
Red Hill Leases .. ..	..	9
Alluvial Leads .. ..	..	10
Public Crushing Mills	..	..
Reidel & Norton	6	..
Martin's	12	..
Uneda G. M. .. ..	..	2
Golden Zone	10	14
Mystery	3	3
North Collier .. ..	..	3
Enterprise	3	9
Hannan's Reward	12	23
New North Boulder	3	14
Lake View South	4	4
Golden Dream .. ..	..	4
Devon Consols .. ..	..	4
Cassidy's Hill	6	25
Maritana Hill	5	20
Lord Nelson .. ..	..	8
Hidden Secret .. ..	..	6
Rollo's Reward	2	..
North End Mines .. ..	..	8
Cresus South	4	64
Paringa	2	25
North Kalgurlu	9	36
Ironsides North	8	14
Associated Northern	20	40
New North Boulder	3	14
Boulder No. 1	2	20
Central and West Boulder	2	14
Trafalgar Lease .. ..	..	2
Lake View South Extended	..	2
Idaho G.M.	8	20
Corn Cob .. ..	..	4
Williamstown Lease .. ..	..	3
Lone Hand	1	2
Ivy Lease .. ..	..	3
Bonnie Play .. ..	..	2
Fair Play .. ..	..	3

Mr. W. Phoenix, Inspector of Mines: Report dated 10th March, 1915:—

"I have the honour to submit, for your information, Annual Report for 1914:—

"The mines have been regularly inspected, and steps taken to have defects likely to cause danger remedied. I have kept in close touch with the working of these mines, and everything of a dangerous nature has received immediate attention. The whole of the mines have been worked in a satisfactory manner, and with due regard to the safety of the men employed.

"Gates on Cages.—The gates on cages are giving every satisfaction.

"Ropes.—The system of examining and lubricating ropes is very satisfactory, and every care appears to be taken of them. There is no record of rope breaking during the past year.

"Dust and Ventilation.—Special attention has been given to the direction and volume of air cur-

rents. Ventilating doors have been fixed in various places, which is the means of distributing the air. These air currents have been measured with the anemometer, and the temperatures taken with the Dry and Wet bulbs, and also observations of the conditions of men at work in various places have been noted. This has been a guide to the adequacy or otherwise of ventilation.

"The question of the prevention of dust has been carefully gone into and means provided whereby the dust can be minimised almost completely. A previous report has given a detailed account of what has already been done. This important matter is still receiving very careful attention.

"Fixed Chairs in Shafts.—Fixed chairs in shafts have been discontinued and travelling chairs are adopted on nearly all of the mines. These are giving every satisfaction.

"Accidents.—It is to be regretted we have had several fatal accidents from falls of ground.

"I have given this matter very close attention, and find that they are mainly due to the want of individual care. Constant exposure to danger seems to make the men underrate the liability to accident, and have a disregard to the provisions established for their safety.

"The serious accidents from falls of ground have been considerably reduced during the past 12 months. What we want really is well trained underground officials, who will not allow the slightest risk to any workmen under his charge. This will tend greatly to reduce accidents from falls of ground.

"Safety Appliances.—Safety appliances are well looked after and regularly tested.

"Complaints.—Proceedings for breach of the Act were in all cases rendered unnecessary by prompt attention to the regulations.

"Explosives.—The explosives used in these mines are of good quality. The accidents due to explosions in these mines were—fatal, none; serious, two; minor, two. Taking into consideration the amount used, I consider this result very satisfactory.

"Every provision is made to safeguard the men in carrying explosives to their respective working places.

"Development.—There have been but few developments of note. The mines in my charge continue to maintain their output regularly."

COOLGARDIE, YILGARN, AND DUNDAS GOLDFIELDS.

Mr. J. Crabb, Inspector of Mines: Report dated 8th January, 1915:—

"I beg to submit my Annual Report ending 31st December, 1914, regarding the progress of mining and the working of the Mines Regulation Act, in the Coolgardie, Yilgarn and Dundas Goldfields:—

COOLGARDIE GOLDFIELD.

"Mining in this Goldfield has been somewhat dull, and I regret to say that the present outlook is not particularly bright.

Higginsville.

"At the Sons of Erin (G.M. Lease 4184), which is owned by Forwood, Down, & Co., Limited, a good

deal of work has been done by a party of tributers with highly satisfactory results. A small quartz vein was discovered in the bottom of the main shaft, and on developing it, its width improved from a few inches to 4ft., and the values from a few dwts. to 30dwts. per ton. This new discovery has given a new lease of life to the property, and it seems very probable that the tributers, who have the mine for a fairly long period, will do well.

Eundynie.

"There has been a slight improvement in the grade of ore at the bottom level of the Hidden Secret North, and the tributers, who are vigorously developing and prospecting different parts of the mine, are hopeful of obtaining highly satisfactory results.

"This mine has been placed at a disadvantage, owing to scarcity of fresh water for steaming purposes. To overcome this drawback mention has been made of erecting a producer gas plant. It seems highly probable that if such a plant were erected, it would enable the owners to treat many thousands of tons of ore, which is ready to be stoped, and turn same to profitable account. It is also thought that by the introduction of a producer gas plant, public crushings could be undertaken at a much lower rate than it is possible to crush for at present, and thereby cause the reopening of some of the shows that are now idle, and also encourage prospecting.

Widgiemooltha.

"A good deal of prospecting has been done here, and satisfactory returns have been obtained from some new discoveries.

"From the Connie K.G.M., which is owned by Messrs. Kingswood and Burt, some high-grade ore has been treated. A recent crushing of 18 tons gave a return of 54oz., or an average of 3oz. per ton.

"Pustkuchen and party, who have a prospecting area at Mt. Morgans, are getting encouraging results. From a parcel of 50 tons treated during the early part of December, an average of 15dwt. per ton was obtained.

"The Flinders G.M. still continues to produce high-grade ore, the latest return being 2oz. 14dwt. per ton.

"The holders of a prospecting area half a mile north of the Ironside had a parcel of 12 tons treated at the Flinders battery for 30oz. 18dwt.

Burbanks.

"The output of gold from the Burbanks centre did not come up to expectations, and, generally speaking, the outlook of mining just now does not appear promising.

"At the Burbanks Main Lode, work has been almost entirely confined to stoping above the lower levels.

"A good deal of work has been done by tributers at the Burbanks Birthday, but results therefrom have not been satisfactory.

"Mining operations have ceased at the Glenloth South G.M., with the exception of working the air compressing plant, which is now being run for the purpose of supplying air to the Ivanhoe Burbanks G.M. At this latter property, developments in the

bottom level have been satisfactory, and the owners anticipate profitable returns from the ore above this level.

Gibraltar.

"During the early part of the year a tribute party took over the Reform G.M., but owing to the ore treated being too low-grade to cover working expenses, the tribute was discontinued.

"A crushing of nine tons from P.A. 1063, of which H. Camp and J. Dejarles are the holders, was treated at the Reform battery for a return of 11oz.

Coolgardie.

"Mining in the Coolgardie district has been somewhat dull.

"During the latter part of the year more satisfactory results were obtained from Tindals G.M., and as there seems to be every likelihood of the sulphide ore being profitably treated, the prospects of the property are said to be much brighter.

"At Griffiths G.M., Mr. Griffiths has erected a Huntington mill, which he expects to have running within the next few weeks. There are large quantities of lode material at different points on this property which Mr. Griffiths reckons can be made to show a substantial profit.

"From a number of prospectors' shows, good returns have been obtained from fairly large parcels of ore.

"At New Bayley's very little work has been done. A party of tributers made an attempt to treat the filling from some of the old stopes, but after treating a few hundred tons found it to be unpayable. A good deal of money was spent in providing and arranging necessary plant to enable tributers to treat ore at the mine.

"A Huntington mill and producer gas plant are being erected on the Daisy G.M. by a Kalgoorlie Syndicate. There is a large quantity of ore here which is thought can be profitably treated.

Bonnievale.

"Mining at Bonnievale has been very dull, and apart from the Vale of Coolgardie, very little has been done.

Kunanalling.

"During the early part of the year an option was taken over the Turn of the Tide and De Gracie's show by a Melbourne Company, but after doing a fair amount of development was turned down.

"From the Premier G.M. some small parcels of ore have been treated, which gave satisfactory results. Most of the ore was obtained from small lenses of quartz, discovered a little west of the main line of lode.

"Very little mining has been done at the Star of Fremantle, and as the owner does not appear to be in a position to develop the property to such an extent as it evidently warrants, good progress can hardly be expected.

Carbine.

"A new pumping plant has been erected by the owners of the Carbine G.M. at their main water supply, situated about four miles north of the mine. The erection of this plant will, no doubt, enable the owners to crush more continuously.

YILGARN GOLDFIELD.

"Generally speaking, the outlook of the mining industry in this field may be regarded as being most satisfactory.

Marda.

"Development and prospecting work in this promising centre has been held in check somewhat through want of crushing facilities. This drawback, however, is likely to be overcome soon by the starting of the Butcher Bird Mill.

"At the Butcher Bird G.M., a producer gas plant and five-head mill have been erected, and a small parcel of stone from the mine treated, which gave a return of a little over 1oz. per ton.

"Just at present there is not sufficient water to enable the owners to undertake much crushing for the public, but when the water supply is increased and public crushing commenced, it seems to me that good returns may be expected, not only from the Great Unknown and Allen's Find, but from other shows that could not produce ore rich enough to show a profit by carting to Mt. Jackson for treatment.

Golden Valley.

"There has been a little more activity at this centre, and seeing that a company has taken over some shows at Marie's Find, and is preparing to develop the long line of reef, it is only reasonable to suppose that the output of gold from this quarter will be increased considerably in the near future.

Messrs. Heffernan and Swanson discovered some very rich stone on the lease that was known as the Pine Hill at a point 150ft. from where gold was first found on the Eastern fields. Sufficient work has not yet been done to form an opinion as to the importance of the discovery.

Bullfinch.

"Good progress has been made at the Bullfinch Proprietary, and its future prospects are said to be most favourable. The total working expenditure for the month of November was 15s. 7.6d. per ton. A profit of £3,712 8s. 3d. was made on the treatment of 6,158 tons of ore.

Corinthian.

"Very good progress has been made at the Corinthian North G.M. during the year. A treatment plant is being erected for the purpose of dealing with the sulphide ore.

Westonia.

"Most gratifying results have been obtained from the Edna May.

"During the six months ended 2nd November, the grade of the 14,938 tons broken, comprising 8,273 tons from the 73ft. level, is given at 107s. 5d. per ton. In May last, it was estimated that the ore reserves were 30,000 tons, of an average value of 95s. per ton, down to the 150ft. level. Now the high-grade ore available is calculated at 40,250 tons, of which 27,750 tons, averaging 103s. per ton, are credited to the 150ft. level, and 12,500 tons, worth 105s. are at the 225ft. level.

"Edna May Deep Levels.—At this property a start has been made to sink a shaft for the purpose of discovering the Edna May line of lode, which is expected to be intersected at a depth of about 500ft.

A 10-stamp mill and producer gas plant have been erected on the Edna May Central.

"A large quantity of ore has been opened up, and the mine is reported to be looking well.

"A lease, known as the Battler, which is situated a few miles from the Edna May, in a north-westerly direction, is reported to be opening up well. At present it is under offer for £8,000.

Marvel Loch.

"Mining at this centre has become somewhat dull. The Mountain Queen has ceased operations, and the plant is now being removed.

"A considerable amount of tributing has been done at the Marvel Loch G.M., and the Comet.

Neveria.

"A party of men have taken the Never Never mine on tribute for a fairly long period, and recently they have been rearranging and repairing the plant.

Great Victoria.

"A good supply of water has been obtained at the Great Victoria G.M., at a depth of 300ft., which enables the mill to be run full time.

"A plant is being erected by Messrs. Allsop and Don to treat the accumulated sand and slime.

Parker's Range.

"Very good results have been obtained from the different small shows at this centre, and the outlook is promising.

"The Spring Hill Co. have erected a 10-stamp mill on their property, which they expect to have going shortly.

"Now that a good supply of water is assured, it is confidently thought that the large lode can be profitably treated.

DUNDAS GOLDFIELD.

"The principal gold producers on the Dundas Goldfield were the Mararoa, Viking No. 1, and the Iron King.

"The developments in the bottom levels at the Mararoa have not been considered very satisfactory, but hopes are entertained of discovering profitable ore at still greater depth.

"At the Viking No. 1 the lode has been proved to maintain its width and values to 700 feet in the incline shaft.

"From the Iron King, which has been purchased by the Lady Miller Company, a considerable quantity of ore has been treated at the Lady Miller Battery; the returns from this property have not come up to general expectations. The ore is being mined from an open-cut and carted to the Lady Miller. If the property eventually justifies an aerial tramway it is intended to erect one. This method would of course enable the ore to be transported at a much cheaper rate than at present.

"The Princess Royal is being worked by a party of tributers who have done fairly well.

"A number of small shows are being worked, which keep the State Mill fairly well employed.

ACCIDENTS.

"All the accidents which occurred have been reported to your office. In each case when the accident proved fatal, the Coroner's Jury found that death

was due to accident, for which no blame was attachable to anyone.

PROSECUTIONS.

"I did not find it necessary to take proceedings against any person for non-compliance with the provisions of the Mines Regulation Act.

SUNDAY LABOUR.

"Four Sunday Labour Permits were granted, two of which were for the Marvel Loch, the others being for the Edna May and the Bullfinch. Several other applications were made, but on making close inquiry I could not see my way clear to grant them.

VENTILATION.

"The ventilation of the whole of the mines has been good, so good, in fact, that it was most obvious that there was no necessity to take any readings of the temperature of the air. In one mine it was found that there was little or no air current in portions of it, consequently I requested that air-doors be provided at such points as would ensure a regulation velocity; this work is now being done. A good deal of attention has been paid to the prevention of dust, and in some mines when it was considered bad, water has been laid into the stopes, and after each firing a jet of water is played in the faces and broken material. This has a most beneficial effect, especially when good air currents are made to circulate through the workings.

"A number of men are beginning to realise the advantage of wearing respirators, and wear them constantly whilst at work shovelling or working a rock-drilling machine. There are others, however, who consider the wearing of respirators, and the use of water as being of little or no value, and cannot be persuaded to use either."

COLLIE COALFIELD.

Mr. R. McVee, Inspector of Mines: Report dated 18th January, 1915.

"There were six mines in operation at the beginning of the year. A fire occurred in the Premier Colliery during February, and it was found necessary to seal the mine completely down. Coal winning operations ceased at this mine at the end of February, the trade of the mine being absorbed by the other mines on the field, and consequently there was no reduction in the output from the field due to this cause.

"The total output of coal from the field amounted to 319,150 tons, being an increase of 5,060 tons over

the output of 1913. The increase no doubt would have exceeded that recorded for the previous year, viz., 19,013 tons, had normal conditions prevailed in the industry. The outbreak of the European war in August, and its continuation, have very materially affected the bunkering trade of some of the collieries, notably that of the Co-Operative Colliery, who were the contractors for the supply of bunker coal to the German mail boats. This trade has been entirely cut off, and the war has also affected the bunkering trade in other directions. From figures supplied by the mines affected, the loss to the district in this direction is roughly 4,000 tons monthly.

"The strike on the Westralian section of the Transcontinental railway, combined with the carpenters' strike, both of which occurred during the period under review, to some extent affected the coal consumed on the railways owing to the slackening of traffic in the timber industry during that period. Despite this fact the supplies of coal taken by the railways show an increase over 1913 of 9,244 tons; the total amount supplied by the various mines to the railways being 181,095 tons or 56.74 per cent. of the total output. The coal supplied to private consumers amounted to 138,055 tons, or 43.26 per cent. of the total output, the reduction in the quantity supplied to this market as against that supplied in 1913 being 4,184 tons.

"Approximately 85 per cent. of the output was produced by means of electric coal-cutting machinery, the remaining 15 per cent. representing the output of coal won by hand mining. There are in use in the field 4 Jeffrey coal-cutters, 11 Sullivan coal-cutters, and 7 Jeffrey electric borers.

"The Westralian Colliery is now electrically equipped, and in future the whole of the coal from this mine will be obtained by means of coal-cutting machines.

"Under existing conditions the amount of coal now won by hand mining in the whole of the district does not exceed 3 per cent. of the total output; this comes from the winning places. The following table sets out the amount of coal produced from each colliery, together with number of men employed; the amount of coal produced per man per annum, also the average number of days worked per fortnight at each of the collieries; the latter being based on figures regularly obtained from each colliery office.

"The whole of the averages for the Premier Colliery are based on the output for the first two months of the year, with the exception of the number of men employed; the average given being for the year.

Table of Output and Averages.

Name of Mine.	Total Output in tons.		No. Men employed.		Total.	Average Tonnage per man.	Average Days worked per Fort-night.
	1914.	1913.	Under-Ground.	Surface.			
Co-operative	82,013	75,818	101	27	128	640.72	9.0
Cardiff	75,224	75,660	83	20	103	730.33	8.0
Proprietary	73,569	41,191	70	31	101	728.5	9.57
Scottish	43,407.5	48,961.5	66	26	92	471.82	10.26
Westralian	42,297	39,270.1	65	16	81	522.18	10.16
Premier	2,639.6	33,189.4	5	4	9	372.10	9.5
Totals	319,150.1	314,090.0	390	124	514	..	..

"The average number of men employed in the industry for the year was 514, a reduction of 45 on the number employed in 1913. The total tonnage produced per man employed was 621 tons, as against

541 tons for the previous year, an increase of 80 tons per man.

"The East Perth Pipe and Pottery Company's clay mine at Muja has been in constant operation during the year. The clay is of excellent quality for the purpose for which it is being used, and several beds of good quality clay have been proved to exist on the company's property. The average number of men

employed in getting clay at the mine is seven, and the total output per week is from 40 to 50 tons.

ACCIDENTS.

"The total number of accidents recorded for the year amounted to 115. There were no fatal accidents, and only four of the accidents reported resulted in very serious injury to the parties concerned.

Table containing Summary of Accidents for 1914.

Name of Mine.	Classification.					Nature of Injury.			Total.	Percentage of whole of Accidents for Field.	No. of Accidents per 1,000 tons of coal raised.
	Miscellaneous Underground.	Falls.	Explosives.	In Shafts.	Surface.	Serious.	Minor.				
Co-operative	36	7	Nil	Nil	1	33	11	44	38.2	536	
Proprietary	15	1	Nil	Nil	2	14	4	18	15.6	244	
Cardiff	11	Nil	1	Nil	4	12	4	16	13.9	212	
Scottish	21	1	Nil	Nil	5	22	5	27	23.5	622	
Westralian	6	Nil	Nil	Nil	2	7	1	8	7.0	190	
Premier	1	1	Nil	Nil	Nil	2	Nil	2	1.8	757	
Totals	90	10	1	Nil	14	90	25	115	100.0	..	

Note.—Premier Colliery ceased operations at the end of February, the average therefore extending over two months only.

"Miscellaneous underground accounts for 78.26 per cent. of the total. This class of accident can only be avoided by the exercise of greater care on the part of the workmen.

COAL MINES ACCIDENT RELIEF FUND.

"The operation of the above fund during the year has on the whole been of a satisfactory nature. In the whole of the accidents recorded the injured men have received benefits from the fund. These amount to 27s. weekly for full members, 13s. 6d. weekly for half members, 10s. per week for widows, and 2s. 6d. for each child under the age of 14 years. The demand upon the fund is almost equal to the income, and no great reserve has been built up, although the fund has been in existence for a considerable number of years. The Collie mining district has so far been fortunate, inasmuch as no accident or disaster has occurred similar to those which have occurred in other coal mining centres of the world. There has also been remarkable freedom from fatal accidents in the field. As a result permanent charges upon the fund by widows and orphans are not great, there being at present only one widow and six children upon the fund. Difficulty arises in some instances in regard to claims upon the fund, owing to the regulations not being complied with. As a result some of the claims made upon the fund during the year have not been recognised. A remarkable lack of interest in the working of the fund and the regulations relating thereto is displayed by a very large percentage of the workmen employed in the industry. This is apparent when a meeting is called for the purpose of electing committee men, who are elected by the employees. The calling of the meeting devolves upon myself as Inspector of Mines, and although there are over 500 men employed in the industry, and notices are posted at the various mines seven days before the meeting is held, the greatest number present at any of these

meetings during the last two years has not exceeded ten. This speaks for itself in regard to the amount of interest evinced in the working of the fund.

PROSECUTIONS.

"No prosecutions have taken place throughout the year.

SUNDAY LABOUR PERMITS.

"Eleven permits, under Section 46 of 'The Mines Regulation Act, 1906,' were granted, and the number of men employed thereunder was 75. Most of the permits were granted during the busy period of the year, and involved work which could not be done whilst the mines were at work without materially hampering operations.

VENTILATION.

"The ventilation of the mines has on the whole been of a satisfactory nature. In some instances neglect in keeping the air up to the working faces has occurred, but this has been rectified without delay when attention has been drawn to it. The temperature of the various mines has been very constant throughout the year, ranging from 66°-69° Fahr. at Westralian Colliery; 67°-71° Fahr. at the Scottish Colliery; and 70° Fahr. at the Premier Colliery.

"Hygrometrical readings reveal the fact that the air in the whole of the Collie Mines is highly saturated with moisture.

"Cardiff Colliery.—Degree of saturation ranges from 88 per cent. at point where intake splits at foot of dip heading, to 93 to 98 per cent. in workings and 100 per cent. in main return at the foot of the upcast shaft.

"Proprietary Colliery.—82 to 98 per cent. in the workings, and 98 per cent. in the main returns at bottom of the upcast shaft.

"Co-operative Colliery.—93 to 100 per cent. in the workings, 100 per cent. in the main returns and returns from districts.

"Scottish Colliery.—94 to 98 per cent. in the workings and 100 per cent. in the main returns from workings.

"Westralian Colliery.—94 to 98 per cent. in the workings, 100 per cent. in the main return airway.

"Premier Colliery.—96 to 98 per cent. in the workings and 98 per cent. in the main return airway.

"The readings remain practically the same throughout the year.

GENERAL PROGRESS.

"The general progress of the field for the year has been very satisfactory, notably in regard to development and equipment of the mines.

"Most of the mines have a considerable amount of reserve workings and no difficulty would be experienced in very considerably increasing the number of men employed, and also the output produced. Unfortunately the present demand for the coal renders this impossible. The increase each year in output is consistent but not as great as could be desired. Each of the mines in the district has added to its equipment.

"At the Proprietary Colliery every convenience in the shape of workshops, storerooms, etc., has been provided. Two dwelling houses have been erected for the mine officials.

"Two large pumps have been installed underground, also an improved "Jeffrey Shortwall" coal-cutter, whilst at the surface additions in the shape of a large haulage engine, an 80 K.W. electric generating plant, and a ventilating fan have been made.

"At the Co-operative Colliery the addition of one of the latest types of 'Sullivan Ironclad' coal cutters, the cutter bar of which is 7ft. 6in., and an auxiliary fan have been made to the underground plant.

"Cardiff Colliery.—This company has added another large pump to its plant underground. A 10in. borehole was put down from the surface to take the delivery from this pump. A 55 H.P. Westinghouse motor for driving the pump has also been installed.

"Scottish Colliery.—Since the present company took over this colliery considerable additions have been made to the plant. The additions are 1 Bellis Morecom H.S. Compound engine, 150 H.P. direct coupled to a J.P. Hall 110 K.W. generator; 1 J.P. Hall motor, 34½ H.P.; 1 B.T. Houston motor, 30 H.P.; 1 Cornish boiler, 26ft. x 6ft. 6in.; 1 Lancashire boiler, 26ft. x 6ft. 6in., and a large surface condenser.

"Westralian Colliery.—Considerable alterations and improvements have been effected at this colliery during the year. The mine is now electrically equipped, and the whole of the output since the middle of December has been obtained by means of electrically driven coal-cutters. The whole of the coal handling and screening plant at the surface has been reorganised. The company has installed a cleaning and picking belt, 40ft. x 4ft., with the necessary driving gear, fitted with a friction clutch, a new screen and gravity side tippler, together with small coal elevator and 'Nut' coal screening plant, complete the additions to the coal-handling plant. Another Lancashire boiler, 25ft. x 6ft., has been added to the boiler range.

"The electric plant newly installed consists of one 160 H.P. Bellis Morecom H.S. compound engine, direct coupled to a 100 K.W. British Thomson Houston D.C. generator, together with the necessary switch board, gear and cables. The plant under-

ground consists of two large Gould pumps, two General Electric Company's U.S.A. 10 H.P. motors, and two of the latest type of 'Sullivan Ironclad' coal-cutting machines.

"Premier Colliery.—Coal producing operations ceased at this colliery at the end of February, owing to an outbreak of fire on the side of the main dip haulage road. The outbreak occurred in the vicinity of a steam pump, and at the point on the main heading at which the 'creep' (referred to in last annual report) had been most severe. The steam pipe leading to the pump, also the exhaust steam pipe, passed through a bord to the back heading of the main slant heading. The roof in the bord had fallen on the pipes, completely covering them to a depth of 7ft.-9ft., and, without doubt, the origin of the fire was due to the heating of this material by the steam pipes. It was impossible to cut off these pipes from the pump until another back heading to the main dip haulage road had been driven, as the back heading originally driven in conjunction with the main heading had been completely closed, owing to the effects of the creep. It was the intention of the company to remove the steam pipes into the heading when completed, but, unfortunately, the heating had already occurred. Efforts were made to cope with the fire, by filling out the material, but the area over which the trouble extended was so great, and the immediate surroundings so bad, owing to the effects of the 'creep,' that it was impossible to deal effectively with the trouble by localising it. It was finally decided to seal the mine down; this was successfully carried into effect at the end of March. The mine remained sealed until August 28th, when the seals were broken and the mine reopened. The fire was found to have been extinguished, the water having risen over it. Owing to the soft nature of the floor, the effect of the water was very noticeable at the point where the creep had occurred, the main heading and the back heading thereto being almost entirely closed. The effect of the water in the workings would also be nearly as bad. The company finally decided to abandon these workings, and commence operations at some other point on the property. To this end prospecting by means of hand boring has been carried out on one of the lower seams. The sinking of a shaft to this seam was carried to a depth of 65 feet, and to within 20ft. of the seam, but the volume of water met with rendered further sinking impossible with the plant at hand, and the sinking had to be abandoned. The company are now engaged in boring nearer the outcrop of the seam.

PROSPECTING.

"Prospecting has also been carried out on the area recently held by J. Johns to the north-west of the Premier colliery, and the discovery made of what is reported as a 9ft. seam of coal. The supposed seam lies at a depth of from 40ft. to 50ft. from the surface. A small prospecting shaft was sunk to a depth of about 30ft. Water was met with, but the pumping plant in use was unable to deal with it, although the inflow was not great. The sinking was abandoned, and the nature of the supposed seam still remains in doubt. The area has again been taken up for prospecting purposes.

"I have pleasure in being able to report a very decided improvement in the electric installations underground at most of the mines. The transmission cables are being re-organised, and the old class of cable (referred to in last annual report) gradually cut out, and a high class of mining cable installed in its stead. New main transmission cables, with high class of insulation have been installed at the Cardiff, Scottish, and Proprietary collieries. The whole of the work done, and the material used at the Westralian Colliery in connection with the new installation is of a high standard, and the work of re-organising the installations underground at the other mines is being carried out in a very efficient and satisfactory manner. I trust I shall be able to report in the near future that the whole of the installations in the mines of the district have been brought up to the standard required by the proposed special rules on electricity, the introduction of which will be beneficial to the electric installations of the district, in so far that good work and material is required to comply with them, and consequently a higher efficiency will be obtained from the generating plants, and a greater margin of safety ensured to those employed in the mines in which it is in use."

PILBARA, WEST PILBARA, AND PHILLIPS RIVER GOLDFIELDS, GREENBUSHES AND NORTHAMPTON MINERAL FIELDS.

Mr. S. Cullingworth, Relieving Inspector of Mines: Report dated 16th February, 1915:—

"I have the honour to submit my Annual Report for 1914.

"During the early part of the year I was away on long service leave, returning to work in June.

"Important additions have been made to the districts under my control, notably the Nor'-West Mining Centres. The stone quarries and certain clay pits near Perth were also brought under the Mines Regulation Act and included in my inspectorate.

"The outbreak of the European war has had a somewhat disastrous effect on the metal mines in the various districts enumerated. One of the largest employers of labour, the Whim Well Copper Mines, has found it necessary to close down, and most of the men employed in the tin-mining industry were for a time thrown out of employment. During the earlier stages of the war tin was hardly marketable at all. One or two dredging plants at Greenbushes continued working, but most of the tin-mining centres in the Nor'-West were practically deserted. During November buyers began to come forward, but the quotations are much lower than at the beginning of the year. Still there is a renewal of activity at Greenbushes, dredges are resuming work and parties working underground.

"At Northampton, where the lead mines were developing in a satisfactory manner, a set back was experienced. The Government was able to come to the assistance of the smaller mines by advancing on their ore, but the larger mines having contracts for the disposal of their products in Germany had to cease work. They have now been able to make arrangements for the sale of their concentrates in England, and work is being gradually resumed.

"The Phillips River Field has also been adversely affected, for although the Government Smelter has been buying all ore which came forward, there has been a drop of £10 in the price of copper since the beginning of the year.

PILBARA AND WEST PILBARA FIELDS.

"Marble Bar.—The chief centre of activity in the Marble Bar district is at *Bamboo Creek*, where several mines are yielding highly satisfactory results. The mines in question were worked many years ago by companies, but after a brief period of prosperity work was stopped through various causes, and the place became practically deserted until the present owners took up the leases again. On the surface the ore bodies appear to have been rather small quartz veins, which gradually widened out, and in some cases are now "formations" of chloritic schist traversed by seams and veins of calcite and quartz, and as the "formation" portion of the lode carries values apparently equal to those in the quartz, the whole width of material available for stoping is by no means inconsiderable. In the Prophecy, for instance, the ore body exposed in the lower adit level is from 7 to 8 feet, or more, in width.

A round of crushings at the State Battery had just been completed previous to my visit, the totals being 1,421 tons for 1,322 fine ounces gold over the plates. A cyanide plant has been erected, and will no doubt add materially to the gold output. In common with other districts in the North-West, there is a shortage of water for crushing purposes, possibly due to a great extent to the dry seasons prevailing.

"Among the chief producers are the Federation, Kitchener, Bonnie Doon, and Mt. Prophecy, which, since they have been taken up under their present lease numbers, have yielded as under:—

	Tons.	Fine ozs.
Federation yield to date ..	= 238·75	263·47
Kitchener yield to date ..	= 277·25	956·15
Bonnie Doon yield to date ..	= 786·75	530·97
Mt. Prophecy yield to date ..	= 153·00	82·65

"Previous to this they, or portions of the present leases, were held under different numbers, and are mentioned in Bulletin No. 15 by the Government Geologist.

"Mt. Prophecy.—An English company owned this property many years ago, and the earlier workings are described by Mr. Maitland in the Bulletin quoted. The present owners continued the company's tunnel at the base of the hill, and intersected the lode, which they have driven on for about 50 feet. The lode matter consists of quartz and the formation previously mentioned, the whole making a body of crushing material 7 to 8 feet or more in width. It would seem as though the formation did not occur in the upper levels, or was not considered of any importance, as the reef is described as being narrow and irregular. The lode at the present level looks very promising, and is well worth developing.

"The Federation.—A quartz reef is being worked which, as the returns show, is high grade. There is a main shaft down to 100 feet, and this is connected with another shaft distant about 150 feet north-west. The ground between the shafts has been stoped, and the owners are now developing by a winze from the northern shaft.

"The Bamboo Queen.—This was formerly owned by a company which I am informed put down a good three compartment shaft to 150 feet; the present workings are at 100 feet. The owners have driven about 150 feet at this level. The lode appears to be somewhat erratic, but at the north-west

end of their workings a good body of payable stone is ready for stoping.

"Kitchener.—Previously owned by an English company. Since the present owners have had it the ore won has been very high grade. There is a hauling shaft 170 feet in depth, equipped with an oil engine and winding winch. The workings are at 100 feet, where an underhand stope is being carried along. The lode, which consists of formation similar to that in the Prophecy, with quartz veins and stringers, is from 4 to 6 feet in width, and has been opened at this point for about 100 feet in length.

"Bonnie Doon.—The lower workings were under water. I understood from the manager the water was preserved for the public battery, which draws part of its supply from this mine. An adit level is being driven on a large quartz reef at about 60 feet from the outcrop.

"None of the mines have yet attained any great depth below the level of the valley, but it is very encouraging to find a field which was once deserted yielding payable returns.

"The tinfield of *Moolyella* is almost abandoned; there were probably a dozen white men working. The surface or shallow alluvial appears almost exhausted, though probably a lot of the old ground would pay if it were possible to sluice it.

"At *Marble Bar* itself some half-dozen claims are being worked by small parties. The owners of the *Jo Jo*, a mine which has given consistently good returns, are erecting a battery. They have, they state, in addition to high-grade stone a large tonnage of low-grade ore, which they think can be more profitably treated on the ground. The total tonnage to date from this mine is 1,408.5 tons for 1,596.41 fine ounces.

"The *Viking* is another lease which has given noteworthy returns, viz.:—728 tons for 680.65 fine ounces. All the mines in this centre are working at shallow depths, on rather flat quartz veins.

"*Nullagine*.—The alluvial deposits of *Nullagine* were being exhaustively tested by the representative of an English company; the results are not known. Should they be satisfactory as regards quantity and value, it would mean the introduction and expenditure of a large amount of capital.

"A number of parties are at work within carting distance of the Government Battery at *Sandy Creek*, and it is confidently expected that 1,000 tons will be ready to crush when the battery starts. So far as could be judged from my first and necessarily short visit to this locality, there should be opportunities for prospecting parties within range of the Government battery. Numerous reefs exist, and have been intermittently worked, and although not generally large have given good returns. One of the most notable properties is the *Little Wonder*, which has produced 3,763.22 fine ounces from 984.50 tons.

"Perhaps one of the largest veins, and one of the most systematically worked, is the *Bill Jim*. On this mine an underlay shaft has been sunk 180 feet in depth on the reef, and a level driven 150 feet in length. The reef, as exposed, varies from 2 to 4 feet or more in width; the reef has also been traced for a considerable distance on the surface, and by older workings. The owners had over 300 tons of stone raised ready for crushing, and stoping was being continued. The mine has yielded previously

860 tons for 748.23 ozs. over the plates, and the parcel now being raised is expected to be of about equal value.

"*Eastern Creek*.—The yields from these properties have been remarkably high, as the following table will show:—

	Tons.	Yield, fine ozs.
Doherty Reward	561.25	1,600.46
Crescent	700.75	1,157.53
Morning Star	367	838.22
Shamrock	350.25	594.47

"The locality is severely handicapped by shortage of water. The owners of the above leases have a battery and cyanide plant, but through lack of water have not been able to crush for some months.

"Work is now chiefly confined to developing one line of reef on what is known as *Doherty's Reward*. This has been opened up by five shafts, each roughly 100 feet from the next, the deepest being 70 feet. The ore body is a quartz vein of the usual lenticular character, running with the strike of the country. It is not of large size, varying in width from 18 inches to 3 feet, but as each shaft has been sunk on stone, which is showing in the bottom and ends of the shafts, a large quantity should be won from this line of reef.

"At *Warrawoona* a tribute party was taking out a block of stone above water on the *Klondyke Boulder* mine (since abandoned).

"From *Marble Bar* the route taken was through *Lalla Rookh* to *Wodgina*, thence to *Whim Creek* and *Roebourne*.

"The *Lalla Rookh* has lately been taken up by a working party, who intend to erect a battery on the ground; work had hardly started at the time, so it was not possible to go below. The past records from this mine are good, and the present owners are sanguine they can obtain good stone right away.

"There are no other mines working in the district now, though possibly the re-erection of a battery on the *Lalla Rookh* may induce others to try the locality.

"At *Wodgina* only the *Mt. Cassiterite Company's* leases were being worked by parties of tributers. There were four parties working, but their operations are chiefly confined to the surface, or shallow levels in the decomposed portion of the ore-bodies, very little work having lately been done between *Wodgina* and *Whim Creek*. I understand that two men were working at *Towramma*, but as the horse feed was exhausted, and I was due at *Whim Creek*, the mine was not visited.

"*Whim Well Copper*.—In common with other metal mines *Whim Well* has been adversely affected by the war, and before my arrival the manager had found it necessary to discharge all hands.

"During the past year the shipment of crude ore to Europe has been continued. It was confidently expected on the completion of the *Murex* concentrating plant that this method would be discontinued, but unfortunately the plant, on which a large sum of money was expended, does not seem to be a success as yet; at all events it has been found necessary to ship the ore without treatment. No-work has been done below water level, all the ore having been obtained from the upper levels. Several fresh lenses, or bunches of ore, have been discovered lying just over or just under other worked-out masses. It is indeed a most remarkable mine, and consider-

ing there is no development work done, in the ordinary acceptation of the term, ahead of ore getting, it is astonishing how they have been able to fill the arriving ships from irregularly occurring bunches of ore. Some of these deposits are of great size, and have provided hundreds of tons of ore, but there is no certainty that they will be large, nor is there any certainty as to where or when the next payable mass is going to be found. From January to July this year 7,736 tons were shipped, valued at £40,475.

"No mining work of any consequence is going on near *Roebourne* and the *Uaroo* Silver Lead mine in the Ashburton district has also had to cease working for the time. The amount produced by this mine from January to July this year was 632.1 tons, valued at £8,877.

NORTHAMPTON.

"Baddera Mine.—Developments continue to be of a satisfactory nature, and the mine and mill worked full time until August. After a temporary stoppage work was resumed in November. The No. 2 level has been extended, and is now almost 1,000 feet in length. The values are payable, and north of the shaft the lode is from 12 to 15 feet in width. No. 3 level is 460 feet in length, also in a lode of good values and width. The output for the year was 14,956.4 tons of ore yielding 1,796.51 tons of lead. There is also a little silver and gold in the ore.

"Narra Tarra.—Development work has been continued on this mine, and the No. 2 level at 250 feet is now 650 feet in length; the lode for the greater part of this distance is of good grade, and varies from 3 feet to 10 feet in width. A somewhat similar plant to that on the Baddera is being erected. The output for the year was 378.22 tons of ore, yielding 277.57 tons lead.

"Kirtton's South.—The Government has assisted the owners of this mine to put up an efficient crushing and concentrating plant, consisting of rock breaker, rolls, pulsator jig, and Wilfley tables, the whole being driven by a gas engine. The pulsator jig is a new feature. It is a very small machine with the guaranteed capacity of a much larger ordinary jig. There has not been much development work on the mine during the year. Several parcels of high-grade ore, hand-picked, have been despatched.

"South of the above, and on the same lode, is the Main Lode, on which a shaft has been sunk 70 feet, and a small oil engine, winch, and pump erected; a level has been driven northwards, and is now in good-grade ore.

"On the other mines in the locality development work has been intermittent, and there is nothing as yet to report.

PHILLIPS RIVER.

"From one cause and another this field does not progress as well as could be wished; partly owing to the reason previously mentioned, and partly because no large companies are now operating, and little capital is forthcoming for development; the mines, generally speaking, have to produce sufficient ore to pay both working and development, and any fresh equipment required, which they cannot always do. There are some mines at *Kundip*, for instance, which should be producing good tonnages of ore, and are not doing so. Their owners have spent large sums in each, erecting crushing plants, which are now more or less useless, as the ore is essentially a smelting ore. The mines have been

worked to water level, and now require pumping plants, better hauling machinery, and fresh development below water, which the owners apparently cannot pay for, or carry out. The State Smelting Works are offering better terms than the district has enjoyed before, but the ore is not coming forward in anything like the quantity it should.

"The following parcels of ore, which have been treated from the *Kundip* centre, serve as instances to show the high value of the ore per ton:—

Hillsborough—288.45 tons of ore yielded 912.87 fine ozs. gold, and in addition 14.87 tons of copper were produced.

Fairplay—486.63 tons of ore yielded 1,113.21 fine ozs. gold, and in addition 20.89 tons of copper were produced.

"The Elverdton mine, situated half-way between *Kundip* and *Ravensthorpe*, has been the chief employer of labour, but as this ore contains very little gold, and the price of copper has been comparatively low, the mine has not been worked at a profit.

"The Mt. Desmond and the Marian Martin leases have been worked by parties of tributers. The total output from the Phillips River district was:—

Gold.—2,494.32 tons ore for 4,665.42 fine ozs. of gold.

Copper.—4,841.15 tons ore for 613.23 tons of copper.

GREENBUSHES.

"The chief producers have been:—

The Greenbushes Development Co.

Mr. F. A. Moss, Spring Gully Dredge.

Messrs. Blakeney and Teed's Dredge.

Messrs. Barrymore and party (Phœnix).

"The total output from the field was 244.54 tons of black tin.

ACCIDENTS.

"Phillips River.—There were four serious accidents, necessitating the injured persons being absent from work for over a fortnight, at the State Smelter.

"Swan District.—One serious accident at *Boya* Quarry; one serious accident at *Parkerville* Quarry.

"Pilbara.—One serious accident at *Federation* mine.

"There were no prosecutions for breaches of the Act."

Mr. C. Bircher, Electrical Adviser to the Mines Department: Report dated 13th January, 1915:—

"I have the honor to submit my report on the condition of the electrical installations of the metaliferous mines of the State.

"General Conditions.—The conditions prevailing on the larger of the Gold Mines of the Eastern Gold-fields, with regard to the electrical installations, are generally good. Most of the mines have passed through the initial stages of electrical equipment of their treatment plants, and at present can show an advancement on the utilisation of electricity in mining operations perhaps equal to any mining district of the world. These mines are awake to the many advantages and economy of the electrical driving of machines, and have, particularly in the past five years, installed apparatus of suitable quality and well adapted to the dryness of the atmosphere and the dusty conditions in which they are placed. The greater number of mines have installed three phase current, and have the advantages of the induction motor, which, being free from rubbing contacts, is a great advantage in the dusty atmosphere.

The advent of the revised English rules of 1910 is being reflected in the class of apparatus being sold for mining purposes in Western Australia. Most of the English manufacturers are now designing their switch gear and other auxiliary apparatus in accordance with the regulations then laid down. This is a great advantage here, and will tend to eliminate cheap, shoddy, and unsafe electrical apparatus from the market. The Kalgoorlie district was at one time flooded with a quantity of cheap German switches, and on the principle which then prevailed that the cheaper article should be installed, providing it would do what was required of it, that is to make and break the circuit, not taking into consideration the safety of such operation. It was to this type of switch that two of the accidents recorded during the year were due; they were severe burns received on the back of the hand. A third accident was due more to the want of care on the part of the workman than to faulty apparatus. It is gratifying to find that no accident of a serious nature occurred during the past twelve months.

"Cables and Wires.—Coincident with the greater expansion of the electrically-driven machine, cables and wires of improved quality, and more suited to the purpose, were installed in the different mines. In the dry climate of the inland districts, and where summer temperatures are generally high, cables with rubber insulation deteriorate rather rapidly. These cables, when it does rain, or when they otherwise become wet, are a source of danger if placed within reach of the ground. To prevent accident from this cause, I have insisted on their being placed out of reach as much as possible. For underground lighting and motor work the mining companies do not now hesitate to instal suitably armoured cables. The high maintenance costs of ordinary insulated cables and the frequent faults developed in them have convinced the companies that suitable cables in the end prove the cheaper. Cables in some places were placed too near the ground, and in reach; these have now been altered and made safe.

"Diversity of Plant.—Although three phase current is gradually becoming uniformly used, there still exist several direct current installations. Some have a frequency of 40 cycles, and others 50 cycles; had there been uniformity in this respect, supplies would perhaps be cheaper. One mine stands alone in using the two phase four-wire system.

"Improvement since Inspection.—As soon as rigid inspection of plant was determined, an immediate improvement was noticed in the smaller installations. The motor control boards and instruments were improved in type, and erected in a more workmanlike manner, and greater precautions taken against fire.

"Skilled Attention.—Some of the older installations show clearly the careless work effected by unskilled or careless workmen. These are now being put in order and in accordance with the Regulations.

"Earthing.—A considerable diversity of opinion existed amongst the mining electricians as to the definition of an efficient earth, and some were firm in their opinions that their own methods were quite safe, leaving out of consideration that earthing wires and earth connections may be required to discharge considerable quantities of electricity. Safety is so much dependent on efficient earthing that I

have taken some trouble to clear up the situation, and by a series of tests have convinced most of the electrical foremen of the necessity for good connections, and the importance of the size and position of earth plates and the connections to same. On some mines pipes conveying the wires to the motors are let into concrete, and to these pipes the motor frames and switch cases were earthed. The resistance of concrete is so variable, and generally so high, that it is quite unsuitable as an earth. The following values of the resistance of concrete as a conductor will serve as example. Small blocks of good concrete were cast 15 c.m. cube and embedded in these were two plates 7 c.m. x 11 c.m., placed 2.5 c.m. apart. During the period of setting, the resistance was at first low, but increased daily, until at the end of 90 days it increased to more than 10,000 ohms. It was found that the resistance was greatly dependent on the weather. The blocks were then placed in water for eight hours, and, on testing, the resistances had fallen to 1/10 of their former values. Some of the blocks were then subjected to 220 volts between the plates. The heat developed gradually raises the temperature, the resistance falls, the moisture in the block gradually volatiles, and small cracks are noticed in the concrete. It is evident from the above that the resistance varies between widely divergent maxima and minima, and largely depends on the water contents of the concrete, and generally the resistance is so high that it could be rightly classed amongst the partial conductors of electricity, and in no case could be considered an efficient earth. The resistance of a pipe driven into the ground varied from 5 to 180 ohms, depending on the nature of the soil surrounding it. With the soil quite dry, particularly after a long dry summer, the resistance to earth of such a pipe would probably rise much higher.

"Earthing Systems.—Many of the mines of the Kalgoorlie district have now completed an earthing system, which consists of one of the pipe lines with screwed joints (such as the fire line), and is connected to earth at several points. Generally three or four earth plates are required, and the average resistance of such an earthing system is about 2 ohms. To fix a reasonable resistance of such an earthing system, insufficient time has been devoted and inadequate tests made, and it will require a further study of the conditions of the immediate surroundings to fix a standard that can be reasonably maintained.

"In conclusion.—With the rapid growth of electrical power in the operation of machines on our mines, and the general use of voltages of 500 to 600 volts at these machines, the advances made in the manufacture of switching and controlling gear demands, in my opinion, a revision of the rules and regulations that are now incorporated in the Mining Act.

"I beg to recommend that special rules be framed, attached to which should be a complete set of memoranda defining clearly the meaning of the rules, which will serve the purpose of enabling the mine managers to purchase apparatus best suited to their purpose. This will also minimise the chances of purchasing cheap, dangerous, and unreliable apparatus so much installed in the past, and will thus increase the safety of persons, and be the means of saving money in maintenance costs.

"Several of the mining companies have assisted me in making many useful tests, and I am particularly grateful to the Golden Horseshoe Estates, and the

Great Boulder Perseverance Gold Mine, for their kind assistance."

MINING ACCIDENTS.

The mining accidents for the year 1914 are tabulated in Tables 26, 27, and 28,* with the previous year's totals for comparison, and forwarded herewith for the Secretary for Mines' Annual Report, together with a diagram of the fatal accidents year by year and their causes. As pointed out in previous years,

the accidents tabulated in the above returns are restricted entirely to such as have happened to persons engaged in the occupation of mining, and which have been a result of their occupation. The following statement, however, shows also the total number of fatal accidents recorded as having happened on mines, whether to persons employed on the mines or not, for the last five years. During 1914 no fatal accidents other than to persons employed in mining were reported to this office.

	1910.	1911.	1912.	1913.	1914.
Total fatal accidents on mines reported	34	44	38	26	26
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	5	7	3	..	..
Fatal accidents to men engaged in mining	29	37	35	26	26
Total men engaged in mining (average)	17,711	16,596	14,961	14,780	13,174
Accident death rate, per 1,000 men engaged in mining	1.64	2.23	2.34	1.76	1.97

In Table 26 the accidents are classified according to causes, and it will be seen from it that during 1914 twenty-six persons were killed and 831 registered as seriously injured, as compared with 26 killed and 741 seriously injured in 1913. ('Serious injury' being such as disables the sufferer from working for 14 days or more.) The diagram† shows graphically the totals of fatal accidents year by year since 1891.

In Table 27 is shown the death rate per 1,000 persons employed on surface and underground in gold, coal, and other mines, the general average rate for 1914 being 1.97, as against 1.76 for 1913. The rates per 1,000 are based upon the figures in your table No. 21, which gives a grand total for 1914 of 13,174

men employed at mines above and underground, inclusive of alluvial workers.

Table 28 gives a summary for 1914 of all fatal accidents above and below ground in gold mines only, with rates per 1,000 men employed, and per 1,000 tons of ore raised, similar figures for 1913 being given for comparison. The number of men on which these rates are based is taken from your Table No. 23, and does not include alluvial workers.

Attached hereto is a general table classifying the fatal and serious accidents during 1914 according to the gold or mineral field in which they occurred, and also according to causes, the totals from each cause for 1913 being shown for comparison.

—	Explosives.		Falls of Ground.		In shafts.		Miscellaneous Underground		Surface.		Machinery.		Total.	
	F.	S.	F.	S.	F.	S.	F.	S.	F.	S.	F.	S.	F.	S.
1. E. Coolgardie	5	3	48	2	17	3	313	..	101	..	43	8	527
2. Mt. Margaret	4	..	5	3	3	1	39	..	27	..	7	4	85
3. Murchison	1	16	1	4	..	26	2	6	..	4	4	56
4. E. Murchison	2	..	7	1	..	..	17	..	4	1	2	2	32
5. Coolgardie	4	..	2	..	..	..	6
6. Yilgarn	1	3	1	1	..	1	6	..	3	..	2	5	13
7. N. Coolgardie	2	..	2	..	..	..	1	..	..	1	2	1	7
8. N.E. Coolgardie	2	..	..	..	2	..	..	..	..	..	4
9. Broad Arrow	1	..	..	1	..
10. Dundas	1	..	..	1	..	1	..	1	..	1	1	4
11. Pilbara	1	..	..	..	..	..	..	..	1
12. Peak Hill
13. Yalgoo
14. Phillips River	4	..	..	..	4
15. Collie	1	..	11	..	..	..	67	..	10	..	1	..	90
16. Greenbushes
17. Northampton
18. W. Pilbara
19. Swan	1	..	1	..	..	..	..	..	..	..	..	..	2
Total for 1914	16	8	93	8	26	5	476	2	158	3	62	26	831
Total for 1913	1	22	8	75	7	29	4	416	4	137	2	62	26	741

FATAL ACCIDENTS.

Hereunder are brief particulars of each of the fatal accidents reported during the year 1914:—

In Shafts.

At the Ida H. G.M., Mt. Margaret Goldfield, a shift boss hurrying to descend a little-used internal

shaft to get at the pumps lost his footing in getting on to the ladders, and was killed by falling 115 feet. A verdict of accidental death was given by the Coroner's jury. (396/14.)

A fatal accident occurred at the Ida H. G.M., Mt. Margaret Goldfield, to a miner engaged in repairing the main incline shaft. Hearing the pump in a higher

level racing he climbed up the ladder to stop it, and fell either from the ladder or the plat. Life was extinct when the body was found. There was no necessity for him to climb the ladder. The Coroner's jury returned a verdict of accidental death, with no blame attachable to anyone. (1335/14.)

A fatal accident at the Maori Lass G.M., Yilgarn, occurred in the open-cut workings through deceased attempting to take off the side board, used to prevent the ore running over the sides of the skip, after the hoist signal had been given. To remove the side board deceased had to get on to the front of the skip, where he was caught and crushed against the timbers when the skip moved. The Coroner's jury brought in a verdict of accidental death with no blame to anyone. (1494/14.)

At the Black Range G.M., Black Range, a man, by some means unknown, became caught between the skip and floor of plat at No. 15 plat. When last seen alive deceased was sitting down at the plat. The Coroner's jury gave a verdict of accidental death, no blame being attachable to anyone. (1916/14.)

At the Golden Butterfly G.M., Mt. Malcolm, a man received internal injuries, from which he died the following day, through being crushed between a water skip and the shaft timbers. Contrary to orders he appears to have attempted to ride in the skip, and after signalling to hoist was unable to squeeze himself into it before he was caught by the timbers when the skip was pulled up. The Coroner's jury returned a verdict of accidental death, with no blame to anybody. (1947/14.)

An accident occurred at the Golden Horseshoe Mine, Kalgoorlie, in which one man was killed and another very seriously injured. At the time of the accident the two men, together with several other timbermen, were being conveyed to the surface in the cage, when, as they neared the No. 12 level, deceased overbalanced in some way and fell from the cage, dragging his mate with him, their legs having become entangled. The accident was probably due to deceased allowing his shoulder to protrude from the cage, and become caught under the framed sets. The men being the timbering gang did not use the gates on the cage provided for use at change of shifts. The Coroner's jury found that the occurrence was purely accidental, and that no blame was attachable to anyone. (2093/14.)

A fatal accident occurred in the shaft of the Great Fingall G.M., Day Dawn, through a cage being lowered on to a man who had gone down a ladder near the top of the cage-way to attend to the pipes used for lowering sand filling. He had not informed the engine-driver that he was going down, and the latter lowered his cage in the usual process of trying it before beginning the regular work of the shift, and swept the deceased off the ladder, causing him to fall to the bottom of the shaft. The Coroner's jury brought in a verdict of accidental death. (3820/14.)

At the Great Boulder Perseverance G.M., Kalgoorlie, a trucker after getting out of the east skip at the 1,750-foot plat opened the gate of the centre compartment of the shaft and walked into it, falling a distance of 300 feet. The gates were strong and well secured, and the plat lit with electric light. The Coroner's jury returned a verdict of accidental death, with no blame to anyone. The accident appears to have been due to some mental aberration of the unfortunate sufferer. (236/15.)

FALLS OF GROUND.

At the Golden Horseshoe G.M., Kalgoorlie, a man while assisting to bar down a large flake of ground was killed through rocks falling on him. The fall was caused by a greasy plane in the back of the stope, and extending from wall to wall. The stope at its highest point was 13 feet by 12 feet wide, and was being worked on the flat back system. The ground was considered to be of good standing nature. The Coroner's jury returned a verdict of accidental death, with no blame to anyone. (609/14.)

Fenian G.M., Meekatharra.—After four sand-blasts had been fired a shift boss proceeded to examine a stope to see that all was safe for the men to return to work, when a heavy fall of rock occurred, pinning him to the ground. He succumbed to his injuries some hours later. The Coroner's jury returned a verdict of accidental death without blame to anyone. (1720/14.)

At the Marvel Loch G.M., Yilgarn Goldfield, a fatal accident occurred to a man who was about to bar down a piece of bad ground through a quantity of rock coming away suddenly upon him, and inflicting very severe injuries, to which he succumbed. The Coroner's jury returned a verdict of accidental death, adding the following rider:—'We consider that underhand stoping in that class of country is undesirable.' The Inspector of Mines did not think that the work was carried on with proper regard to safety, but could not recommend prosecution of any person in the face of the evidence of witnesses at the Coroner's Inquest that all reasonable precautions were taken. (1882/14.)

At the Golden Dream G.M., Parker's Range, a man was killed while in the act of filling a bucket at No. 2 level, through a quantity of ground coming away from the side of the drive and falling on him. The ground was not considered to be dangerous. The Coroner's jury returned a verdict of accidental death, with no blame to anyone. (2236/14.)

At the Great Boulder Proprietary G.M., Kalgoorlie, a man was killed through a fall of about five tons of rock under which he was working. The ground which fell had been thoroughly examined and tested with two bars by deceased and his mate, and was considered safe, but on an examination of the back after the accident a false or slippery head was revealed. The stope was between 9 and 10 feet high. The Coroner's jury returned a verdict of accidental death, with no blame to anyone. (3347/14.)

At the Mararoa G. M., Norseman, a man was killed by a heavy fall of ground while in the act of barring down loose ground after firing. Deceased and two of his mates had previous to the accident sounded the ground and considered it safe to work under. The Coroner's jury returned a verdict of accidental death, with no blame to anyone. (3385/14.)

At the Marvel Loch G.M., Yilgarn Goldfield, three tributers were at work in the south end of the No. 2 level taking out a block of stone under the level, when nearly the whole of the level collapsed completely. The men had just taken out the filling from a chute directly over the No. 2 winze for the purpose of filling in the ground where they were working, when a heavy fall occurred in the old stopes directly over the level, starting a collapse which smashed the level timbers, and caused ground to fall on one of the men, killing him instantly. Another man was caught by the falling ground, but his mate by great exertions and courage was able to extricate him before a fur-

ther fall took place, which must have killed him also. Both men were able to get into safety in the end of the level, but were completely shut in by the fallen ground. Previous to starting to take out the ore the tributers had spent a fortnight in timbering and securing their working place, but were unable to examine the old stopes above it. The accident was probably due to an unduly large amount of filling having been at some time removed from above the No. 2 level, and to water having got in during heavy rains a short time previously. The fall extended for a length of about 50 feet, and to a height of 50 to 60 feet. Efforts were at once commenced under the direction of the Inspector of Mines to penetrate the fallen ground to ascertain if there were any survivors, 50 men working in six four-hour shifts. They were soon encouraged by hearing the entombed men knocking. The work of the rescuers was difficult and very dangerous, being all through broken ground, but was successful in recovering the two imprisoned men on the third day after the fall. It was impossible then to recover the body of the dead man, and the danger of the operations was demonstrated by the collapse of the rescuer's drive very shortly after the two men were extricated. One of them, Frank Mazza, showed conspicuous bravery in rescuing his mate from his perilous position when the first fall occurred, and a Certificate of Bravery was issued to him by the Mines Department. In order to recover the body of the man who was killed, it was found necessary to make a new drive in solid ground to reach it. The Coroner's jury found no blame attachable to any person. (3397/14.)

While working at the 1,300ft. level of the Great Boulder Proprietary G.M., Boulder, a man was killed by a fall of about 15 tons of earth, death being instantaneous. The deceased and his mate at the time of the accident were testing the ground, and had just barred down a small piece of rock when the large fall occurred. Witnesses seemed very confident that the ground appeared safe before the accident, but the Inspector of Mines was of opinion that it would have been wiser to have used more timber. The Coroner's jury returned a verdict of accidental death, with no blame to the management of the mine. The Inspectors of Mines have been instructed to insist on the systematic use of timber in all cases where there is any doubt of the ground being secure without it. (789/14.)

MISCELLANEOUS UNDERGROUND.

While a miner was attempting to lower, by hand, a bucket of water and tools down a winze in the Sons of Gwalia G.M., Mt. Margaret Goldfield, the rope to which it was attached became tangled round his leg, lacerating the thigh so severely as to necessitate amputation of the limb, death resulting shortly after the operation. The Coroner's jury returned a verdict of accidental death with no blame to any person. (2627/14.)

At the Golden Horseshoe G.M., Kalgoorlie, a fatal and deplorable accident occurred to a man, who, with another, was assisting his injured and partially stunned mate out of a stope. To reach the plat they had to cross a pass, which was partly covered with a plank and two poles, and on stepping on to the plank it either slipped or broke, and deceased was precipitated to the bottom, about 75 feet. The Coroner's jury returned a verdict of accidental death, but that there was not sufficient evidence to show definitely how the accident happened, or that anyone was to

blame. There does not appear to be any reason for blaming any person for this fatality. (2708/14.)

A man while attempting to clear a pass which had become blocked at the Corinthian North G.M., Yilgarn G.F., was killed through the ore on which he was sitting on top of the pass suddenly falling away and carrying him with it. He and his mate had driven a pipe down into the ore, and he was shaking it when the ore gave way. His mate had suggested to him that it was not safe to be on top of the ore in the pass, but deceased thought that a man could not fall between the logs across the top of the pass. The Coroner's jury returned a verdict of accidental death, with no blame to any person. (3285/14.)

An accident occurred at the Oroya Links G.M., Kalgoorlie, to a man who was assisting to put timber across a mullock pass at the 200ft. level, through the mullock he was standing on giving way and precipitating him down the winze a distance of 140 feet. Death was instantaneous. The winze was well protected, and the requirements of the Mines Regulation Act carried out. The Coroner's jury returned a verdict of accidental death, with no blame to anyone. (3730/14.)

At the Kalguri G.M., Kalgoorlie, a man employed clearing a pass at the 750-foot level was buried by a rush of sand breaking away the stopping. Efforts were made to extricate him before the sand covered him, but the rush of sand was too strong, and on freeing him some 40 minutes later life was extinct from asphyxiation. Deceased was a very careful and practical miner, and the stopping was considered perfectly safe. The Coroner's jury found that deceased came to his death through a fall of sand, and that no blame was attachable to anyone. The Inspector of Mines has instructed that double stoppings will be required in such cases. (3749/14.)

SURFACE.

At the Great Fingall G.M., Cue, a man while at work at the acid treatment of slimes from the precipitating boxes failed to make use of the hood provided for the acid tub, and was poisoned by the fumes arising from it, the poisonous gas being probably arseni-uretted hydrogen. The evidence showed that he had felt bad effects from fumes on previous occasions, and also that the cords suspending the hood were tangled and out of order for allowing it to be fitted to the tub. The Coroner's jury returned a verdict of accidental death with no blame to anyone, but nevertheless the case was most carefully considered by the Crown Law authorities before decision was reached that in the circumstances there were no grounds for action against any person, deceased himself having been more to blame than anyone. (496/14.)

At the Associated Northern Blocks G.M., Ora Banda, a man was engaged cutting short ends of logs into chocks for shaft packing, when one of them twisted out of control and was violently thrown against his chest with such force as to inflict fatal injuries. He was an experienced sawmill worker, and the saw was in good order. The Coroner's jury brought in a verdict of accidental death, no blame being attachable to anybody. (917/14.)

Ingliston Extended G.M., Meekatharra.—While repairing an ore bin, a carpenter fell from the platform on which he was standing, sustaining such injuries as to cause his death a few hours later. No one witnessed the accident, but it was probably due to

deceased inadvertently allowing a piece of timber he was using to be caught by the rockbreaker flywheel. The Coroner's jury found that death was accidental, and that no blame attached to any person. (1264/14.)

At the Menzies Consolidated G.M., Menzies, a fatal accident occurred to a man attending to the battery machinery. From the evidence it would appear that deceased was attempting to remove the rockbreaker belt from its driving pulley with his hands, when his arm became caught, and he was dragged round the shafting, receiving very severe injuries, to which he succumbed two days later. The Coroner's jury gave a verdict of accidental death, with no blame attachable to any person. The method of removing the belt was, however, one which should not have been used. (300/15.)

SERIOUS ACCIDENTS.

The term 'serious' is here applied in accordance with Section 26 of 'The Mines Regulation Act, 1906,' to such accidents as are attended with injuries of a nature which prevent the sufferer from attending to his ordinary work and earning his usual pay for a period of 14 or more days, although only a small proportion of the 'serious' accidents cause permanent disablement. For example, of the 831 'serious' accidents during 1914, 527 were recorded from the East Coolgardie Goldfield, but only 25 cases out of the number were of breakage of the larger bones, permanent injury to limbs, or injuries likely to have lasting disabling effects. The balance were injuries of a less serious nature, such as bruises, cuts, broken and crushed fingers and toes, scalds, burns, poisoned cuts, shocks, smaller dislocations, strains, wrenches, etc., but sufficiently serious to cause the sufferer to be absent from work for 14 days or more.

EXPLOSIONS AND EXPLOSIVES.

During the year 1914, 16 persons were seriously injured through explosions. In eight cases the explosions occurred more or less prematurely, or before the men reached a safe place; in one case a man trod on a detonator, causing it to explode; while in another instance an explosion occurred through a man who was using gelignite to light a fuse allowing a portion of the burning material to fall on the charges; another man was hurt by an explosion of some gelignite which was among the broken rock which he was removing, and which he must have struck with his pick; and in two cases men were hurt by detonators exploding unexpectedly; in two cases plugs of gelignite became jammed in holes and exploded while being pressed in; and in one case an explosion occurred while boring through some explosive left behind from a previous shot being struck by the drill.

FALLS OF GROUND.

Ninety-three serious accidents occurred during 1914 through 'Falls of Ground.' In eight cases the injuries were received while the men were engaged in the dangerous but necessary work of taking down loose ground after firing. In the majority of cases the accidents were purely accidental mishaps, and of a sort inseparable from mining, unpreventable by exercise of ordinary skill and care, but in several instances the Inspectors of Mines were of opinion that the accidents would not have occurred if the men concerned had been reasonably careful.

IN SHAFTS.

Twenty-six accidents, classed as serious, occurred in shafts from the following causes:—six from objects falling down the shafts, such as buckets, stones, timber, and a drill; four from men falling down shafts; five from men receiving injuries through parts of their body protruding from cages and being caught by the shaft timbers; one through a skip becoming derailed; seven through accidents to cages whilst men were riding in them; two through being struck by trucks in inclined shafts; and one through the side of the shaft collapsing while poles were being removed from an old stage.

MISCELLANEOUS UNDERGROUND.

Four hundred and seventy-six persons were more or less seriously injured by miscellaneous accidents underground. In 126 cases the injuries were received while handling and loading skips and trucks, through fingers and bodies being jammed against shoots and other trucks, toes and feet 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 121 cases the injuries were caused through falling and rolling loose rocks and stones, such as runs of ore and mullock, while shovelling, or stones running down rills and ore shoots; and 14 men received severe cuts and bruises while handling sharp stones. Thirty-eight were injured handling rock drills and coal-cutting machines and parts of same, and four by the stages on which machines were erected collapsing. Other falls in the working from stages and ladders in rills and passes, and so on, caused injury to 10 persons, and 29 were hurt by falling tools and pieces of machinery. Flying splinters of stone and steel were responsible for 25 men being injured, and 16 were hurt while handling timber. Five men were injured through falling down ore passes; two men were kicked by horses, and in one case a horse trod on the driver's foot. The remaining 85 cases were due to various accidental causes—jarring of hands and feet, blows from tools, strains, burns, and so on. Many of these accidents, no doubt, could have been avoided by the exercise of greater care on the part of the injured parties, but the majority must be regarded as purely accidental mishaps.

SURFACE (INCLUDING MACHINERY).

Two hundred and twenty surface accidents were recorded during 1914. Four men were scalded by hot water and 13 burnt in various ways. Twenty-eight persons sustained injuries from falls caused by missing their footing, slipping, etc.; 13 were hurt by trucks and skips, by being jammed or struck by them, by them capsizing, or by the men sustaining strains while working them. Flying splinters injured three men, and three got their hands jarred. Falls of timber and pieces of machinery while being handled accounted for 17 cases of injury. Sixty-five were caused by machinery in motion, seven of these being caused by handling belts in motion. Thirty men were hurt while handling timber, three men while lifting rocks, and two by being kicked by horses. Other causes of 39 accidents were strains from lifting heavy weights, tools slipping and inflicting cuts and bruises, and so on. The majority of these accidents were mishaps of an accidental char-

acter, the only way of preventing which is the exercise of greater care and forethought on the part of the workmen, and were not from causes which could be effectively dealt with by restrictive regulations, with perhaps the exception of those due to handling belts in motion.

WINDING MACHINERY ACCIDENTS

(without serious injury to persons).

In conformity with Regulation 11 of "The Mines Regulation Act, 1906," the Inspectors of Mines have reported, and made careful investigation of the following accidents to winding machinery during 1914, which did not result in serious injury to any person.

Overwinding.

An engine-driver at the South Kalgurli G.M., through an error of judgment slightly overwound the skip in the north compartment, severing the pin in the detaching hook, and so releasing the rope. The skip hung up on the safety appliances and no harm was done. (670/14.)

At the Great Boulder Perseverance G.M. two slight overwinding accidents took place on successive days, through the engine-drivers being new to the use of the steam brakes with which the winding engine had just been fitted. In the first case the south cage was hung up and the thimble broken, and the north cage fell about 15 feet, bending its swinging chairs. No serious damage was done. (607/14.)

An engine-driver, while hauling water with the tanks at No. 3 shaft of the Golden Horseshoe G.M., overwound the south tank to the pulley wheel; the straps of the tank were sheared off and the rope released, while the tank fell into the well hole below the 2,000 feet level; some of the shaft guides were torn away and very much knocked about. The shaft was repaired and haulage operations resumed three days later. (1166/14.)

While hauling ore at the No. 2 shaft of the Golden Horseshoe G.M., the engine-driver overwound the south cage, causing the copper rivet in the safety hook to be sheared, and releasing the rope. The safety hook held in the ring, and the grips acted and held on the guides. The rope was again connected and the cage lowered to the surface and found to be in good order. (1167/14.)

An overwind occurred at the main shaft of the Great Boulder Proprietary G.M., the safety hook being pulled into the thimble and the rope released. No damage to the shaft resulted as the safety hook and catches acted well. (2465/14.)

At the Bullfinch Proprietary G.M. the engine-driver failed to reverse the lever when lowering the cage from the surface, with the result that the rope automatically became detached, and the cage hung up in the thimble. (124/14.)

An overwinding accident occurred at the Sons of Gwalia G.M. through the depth indicator pointer dropping nearly an inch owing to one of the screws falling out. As a movement of $\frac{1}{4}$ inch of the indicator pointer represents one revolution of the winding drum, or about 33 feet of rope, the skip would therefore be about 120 feet higher than expected. The skip was taken up to the pulley, but owing to the prompt action of the engine-driver, combined with the satisfactory working of the gear for prevention of overwinding, very little damage resulted. (744/14.)

At the Fenian G.M. an engine-driver missed the

indicator mark and so overwound his cage, but only slight damage resulted. The safety catches held the cage. New head gear has been since installed as there was too little clearance previously. (769/14.)

At the Great Fingall G.M. the engine-driver overwound the north skip in the internal shaft, breaking two oregon beams in the head gear. (744/14.)

An accident at the Sons of Gwalia mine in 1913 through overwinding was not reported till 1914, too late to be included in the 1913 returns. The bridle of the skip was bent and one bearer broken. The mishap was due to an error of judgment on the part of the engine-driver. (811/14.)

An overwind at the Great Fingall mine through an indicator chain coming off has been already included above among those attended with injury to persons, as a man was hurt in this case. (2101/14.)

Breakage of Winding Ropes and Chains.

At the Great Fingall Consolidated G.M. three accidents occurred within one week through breakage of winding ropes. One breakage was due to a skip being off the road in the internal shaft, the rope breaking when a jerk came upon it in the effort to pull the skip back on to the rails. Next day, after cutting 100 feet off the rope and reshoeing it, it was again put into use, but broke again after hauling three skips of ore. No one was injured, as men had been forbidden to use the skips for travelling. The rope was the old one which had been used for sinking the shaft, and a new one was in readiness for use with a new winding engine. The old rope was not in good condition. (550/14.)

The other accident was to the winding rope in No. 4 winze, which broke while hauling up a skip full of ore. The driver had reported a bad place in the rope the day before, and as the hauling of men was not at once discontinued the manager was prosecuted for breach of Regulation 10, Clause 5, and fined. The rope was in bad condition when tested. (551/14.)

At the Oroya Black Range G.M., while hauling from the winze with the winch the spindle of the pulley broke, allowing the rope to jerk back, and the sudden heavy strain broke the rope at the shoe, when the skip ran 60 feet down the incline and became derailed. (821/14.)

At the Sons of Gwalia G.M. the chain attached to the mullock truck under the timber trolley snapped, and the truck went to the bottom of the shaft. The accident was probably due to the jerk caused by the winding rope slipping off a coil on which it had been riding. (3122/14.)

An accident in 1913 at the Sons of Gwalia mine was omitted from the record for 1913, and is now noted. The pump rope broke and jumped on to the track of the skip, causing this to become derailed and slightly injuring a man. (3463/13.)

At the Yerilla King G.M. the winding rope in the south compartment of the main shaft parted at about four feet above the shoe: no damage resulted. The rope was found to be badly corroded internally. (937/14.)

Derailed of Skips.

The accident in file 551/14 above noted under breakages of ropes was due in the first place to a skip jamming in the skids and becoming derailed.

A skip full of men travelling in the main shaft of the Sons of Gwalia mine was thrown off the track by

a 5ft. steel drill which had been dropped in the shaft by some mischance, and which lay diagonally across the rails. The skip was knocked about a good deal, but fortunately none of the men sustained any serious injury. (1149/14.)

At the Sons of Gwalia G.M. the empty south skip was being lowered in balance with the full north skip which was being raised, when the former left the rails above the No. 4 level. The cause of the accident could not be ascertained, everything being in good order so far as could be found. The skip became badly jammed and much bent, and a good deal of damage was done to the shaft timbers. (3121/14.)

At the same mine the north skip became derailed at the tip, the accident probably being due to the skip being lowered back too quickly, causing the rear wheels to bounce off the track. No damage was done. (3120/14.)

The Sons of Gwalia skip became derailed again while being lowered very slowly with ten men in it, and in this instance also the cause could not be ascertained, everything being apparently in good order. No damage resulted, and none of the men were injured. It is noticeable that these derailments of the skip in this mine while the skip was being lowered are all inexplicable, while two on the upward journey were due to obvious impediments. (3119/14.)

Mishaps to Cages and Skips in Shafts.

At the Great Boulder Perseverance, while hoisting ore from the 1,900-foot level in the north compartment of the main shaft, the skip tipped and landed into the 400ft. plat. The cap-piece and skip were somewhat badly damaged. The safety hook broke and freed the rope, which fell off the sheave on to the head frame. It is possible that the skid opposite the plat may have been displaced. (1996/14.)

At the Great Boulder Perseverance G.M. the skip in the north compartment upset, and became jammed at the 500ft. level. The shackle broke and released the rope. The accident appears to have been due to the breaking of the tipping arm on the skip, which allowed the skip to upset. The rope was carefully examined, but showed no signs of injury. (3386/14.)

At the same mine the skip in the north compartment of the main shaft caught on the loading shoot at the 300ft. level. The safety hook broke, and freed the rope, and no damage was done. Work was resumed within a few hours. (744/14.)

At the same mine also, the skip in the south compartment of the main shaft became jammed at about the 900ft. level owing to a skid breaking, but no serious damage was done. (932/14.)

Mishap to Cage.

At the Great Boulder Perseverance G.M. an accident was caused by a self-dumping truck, which had had the handle of its swinging door broken and tied temporarily, tipping up while being hoisted to surface in the cage, through the lashing becoming loose and allowing the catch to become freed. The body caught under a cap-piece, and the side straps of the cage were broken. The cage then jammed in the shaft between No. 2 and 3 levels, and the detaching hook broke and released the rope. The cage fell with one pair of grippers catching, which eventually brought the cage to rest between the 13 and 14

levels. No damage was done to the engine or rope, and very little to the shaft timbers. The cage was much damaged. (1549/14.)

Mishaps to Winding Engines.

At the Ivanhoe G.M. an obstruction of the throttle valve caused a stoppage of the engine. (744/14.)

At the same mine new drums were fitted to the winding engine, and the indicator spur-wheels were refitted to these drums. After two days' work three teeth were found to be broken, owing probably to the wheels having been badly put together, so that the teeth did not mesh well. (1485/14.)

At the Ivanhoe G.M. also the starting valve was found to be unable to shut off steam through a small set pin having got loose and become caught under the valve. The pin did not belong to the valve mechanism, and must have been used in making it. No damage was done to the shaft. (724/14.)

At the Lake View and Star G.M. one half of the clutch spider of the main winding engine developed a crack through two of the spokes, the boss, and the landing carrying the lagging. (1484/14.)

At the Oroya Links G.M. the cylinder on the winding engine developed a crack along nearly its full length at an old crack which had been bored out and fitted with a liner some years ago. No men were being raised or lowered. (1162/14.)

At the Black Range West G.M. while bailing operations were in progress with a small winch the piston of this became detached from the rod and broken into pieces. The cause of the accident is unknown. No damage resulted. (1328/14.)

At the Queen of the Hills G.M. one arm of the drum cracked midway between the boss and the rim, another arm cracked near the junction of the arm with the rim of the drum, and subsequently another crack occurred in the inner flange. The Inspector of Mines considered the accident due to the engine having passed its limit of safe loading. (1606/14.)

Striking Chairs.

A winding accident in the Yuanmi G.M. has already been included among the accidents attended with injury to persons. The brake slipped, and the cage bumped heavily on the chairs causing injuries to a man who was in it. (2782/14.)

A somewhat similar accident, through an error in judgement of the engine-driver, caused a rather severe shock to a man in the Associated G.M. (1107/14.)

PROSECUTIONS FOR BREACHES OF THE MINES REGULATION ACTS AND REGULATIONS.

During 1914 informations were laid on 56 charges against 51 persons, but one case was subsequently withdrawn. The charges against six men were not sustained, and were dismissed, but in all the other instances the prosecutions succeeded, and fines of various amounts were imposed on the offenders.

Section 25.—A manager was proceeded against for neglecting to enforce General Rule 39, but the charge ultimately was withdrawn, as the evidence was found to exonerate him.

Section 32 General Rules: General Rule (3) (g).—A miner was fined £1 and £2 16s. 6d. costs for carelessly leaving explosives unprotected in a stope. A manager was fined £10 and £1 3s. costs for

neglecting to provide proper canisters for carrying explosives; two miners were fined £1 and 8s. costs each for neglecting to use canisters provided by the management, the explosives being allowed to remain on the floor of the drive uncovered, and one miner was fined £1 and 2s. costs for allowing gelignite to lie about uncovered in his working place.

General Rule (9).—A manager was fined £2 and £3 0s. 8d. costs for neglecting to use sufficient timber to make the working place safe, through which neglect a man was seriously injured by a fall of ground.

Sections 40 and 43.—A manager and 26 men were proceeded against for breaking ore on Sundays without having received the necessary permission from the Inspector, and the manager was fined £5 and 3s. costs; 20 men were fined £1 and 3s. costs each, and the charges against six men were dismissed. In another instance a manager was fined £1 and 4s. costs on each of six charges of employing men on Sunday without permission, and the six men so employed were fined 10s. with 4s. costs each.

Section 42 (4).—A manager was fined £1 and 4s. costs for neglecting to carry out the Inspector of Mines' instruction to discharge a person unable to speak the English language.

Section 44.—A deputy manager was fined £2 and 4s. 6d. costs for employing men on a Sunday without permission having first been obtained.

Regulation 4, General Rule 30.—A miner was fined £1 and 14s. costs for wilfully polluting the workings of a mine.

Regulation 4, General Rule 39.—Three miners were fined £1 and 3s. costs each for entering a hung-up pass from below for the purpose of freeing it.

Regulation 10, Clause 5.—A manager was fined £5 and costs for allowing a defective rope to be used for raising and lowering men after the defect had been reported to him.

Inspection of Machinery Act, Section 65, Subsection (2).—By arrangement with the Inspection of Machinery Branch, and under the powers of Section 32 of "The Mines Regulation Act, 1906," the Inspector of Mines conducted prosecutions against a superintendent for employing two engine-drivers, and the two engine-drivers for taking charge of steam engines without holding the requisite certificate. The superintendent was fined £2 and costs 18s. 4d., one driver £2 and costs 7s. 6d., and the other driver £1 and costs 7s. 6d.

EXEMPTIONS FROM SECTION 31, SUBSECTION 4, OF "THE MINES REGULATION ACT, 1906."

During the year 1914 28 exemption certificates were issued to allow men to take charge of machinery where it was impracticable for divers reasons to employ a duly qualified engine-driver. In such cases the Inspectors of Mines examine the applicants on the machinery to which the exemption applies, and report that they are capable of handling and taking charge of it. These exemptions are only permitted for hauling ore or materials. They have proved of very great benefit to a number of small outback mines where there is not constant work for a certificated engine-driver.

SUNDAY LABOUR IN MINES.

During 1914, 44 Sunday labour permits were issued to various mines, on account of urgent exigencies

which required such labour in order that the ordinary work of the mine should not suffer. For example, 60 men were allowed to be employed on surface for three shifts repairing the rock-breaker station after a fire in the Ivanhoe mine, and 104 men underground three shifts getting ore to keep the mill going, as the fire had seriously retarded the ordinary ore-breaking operations. In the Collie collieries several permits were issued for Sunday employment of men in repairing and altering haulage and other roads, installing pumps, and for similar purposes, the work being such as could not be carried out on week-days without serious limitation of work in the working faces of the mines while it was in progress. In other cases permits were granted for employment of men in putting down sand filling into a mine which could not be got down on working days without stopping ore-breaking operations; for shaft sinking when large influx of water required work to be kept constantly going; for securing treacherous ground; for timbering workings; and for sundry other necessary operations in and about mines in regard to which the Inspectors of Mines were satisfied that employment of men on Sundays was necessary in order to prevent total or partial stoppage of employment of the usual complement of men during the following week. Each case has been considered on its merits, and unnecessary Sunday work has been strictly repressed.

NEW MINING DISTRICT.

In order to apply the provisions of the Mines Regulation Act to the large quarries and clay pits round Perth, a new mining district, to be known as the "Swan Mining District," has been proclaimed as from 1st day of March, 1914. This district is under the care of Inspector Cullingworth, with headquarters in Perth.

NEW REGULATIONS UNDER MINES REGULATION ACTS.

There were no new regulations made under "The Mines Regulation Act, 1906," or "Coal Mines Regulation Act, 1902," during 1914.

THE MINING DEVELOPMENT ACT, 1902.

Appendix I. to this report contains notes on the present position of the various mining ventures to which Government assistance has been given by way of loans or subsidies under "The Mining Development Act, 1902," or from the Mining Development Vote, and tables showing how the moneys have been expended and what returns have been made. The expenditure on mining development unfortunately has not been so productive of improvement in the condition of the industry as might reasonably have been hoped.

SAMPLING MINES PREVIOUS TO MAKING ADVANCES.

Subsequent experience has confirmed the remarks on this heading made in my annual report for 1913, there having been more than one instance in which good cases appeared to be made out for loans in aid of development of mines, which were greatly modified after having the propositions sampled.

ADVANCES ON ORES OF COPPER, LEAD, TIN, ETC.

The Sampling Floor laid down in "J" Shed at Fremantle has been of much service during 1914, though not yet availed of to the extent it might have been, with advantage to sellers of ore. Most of the parcels of ore sampled were copper ores from Ilgarere, Kumarina, Gabanintha, and Day Dawn, but some lead ore from Northampton was also received. In the earlier part of 1914 advances were made on parcels of ore after sampling on the lines laid down in the notice in the *Government Gazette* of 29th November, 1912, relative to advances on ores sampled at Roebourne, but the outbreak of war in August, 1914, paralysed the export of ore for the remainder of the year. After much consideration the Government decided to extend their system of advances on ores so as to include all sorts of mineral products, if necessary, and new conditions were published in the *Government Gazette* of 19th December, 1914. The intention of this scheme was to grant advances on the value of the ores at point of shipment from the State sufficient to pay the most urgent costs incurred in raising the ore, leaving the balance actually realised on sale to be paid when it became available. The system is not one of purchase of the ores, or of speculation in them on the part of the Government, but simply of assisting prospectors and mine owners to attain a market for their product on reasonable terms, and to give them an advance to meet their immediate needs for subsistence while waiting to receive the full proceeds of sale. Owing largely to the very uncertain state of the metal markets from the time of the outbreak of the war up to the end of 1914, and the difficulty of obtaining shipping facilities, except at greatly increased freights and insurance charges, very little use was made of this form of Government assistance up to the end of the year, though there has been an improvement since then.

ADVANCES AGAINST LEAD ORES FROM UAROO.

The outbreak of the European war destroyed the ordinary facilities for marketing lead ores as well as those of other base metals, and caused the temporary closing down, among others, of the Uaroo Silver Lead mine in the Ashburton Goldfield. The owner, Mr. John Thomson, however, after negotiations with the Government and the Commonwealth Bank, was able to resume working the mine on advances made by the Bank at the rate of £5 10s. per ton up to a total not to exceed £6,000, or £1,100 per month, against ore delivered at Onslow, on a guarantee from the Government to indemnify the bank in case the proceeds of sale of the ore should not be sufficient to repay the advances, with interest at six per cent., such guarantee, however, to become operative only in the event of the London price of lead falling below £13 10s. per ton. The Government also undertook to give Mr. Thomson a subsidy on his lead sufficient to bring the price up to £13 10s. a ton in case it had to be sold below that price. Since the date of the agreement the London price of lead has not been below £20 per ton, and there is no likelihood of the guarantee being required. The ore averages about 65 per cent. lead and 17 oz. of silver per ton, and is sampled at Onslow by the wharfinger previous to shipment. Up to the end of 1914 none had been shipped, and since then Mr.

Thomson has terminated the agreement, and made other arrangements. The help given by the Commonwealth Bank and the Government, however, enabled work to be carried on on the mine for some months, which otherwise could not have been done.

PHILLIPS RIVER SMELTING WORKS.

Early in 1911 the late Phillips River Gold and Copper Co., Ltd., suspended its operations at its smelting works, and later on went into liquidation, and in 1913 the whole of their leases and property were purchased by Mr. Neil McNeil, of Perth, who reopened the Elverdton mine himself, and arranged for several of the other leases to be worked on tribute. He offered to sell the smelting works and concentrating mill to the Government, but this was not agreed to, and eventually an arrangement was made at the end of 1913 whereby the Government leased the smelting works and mill on a rental reckoned on the tonnage of ore treated, and undertook to smelt the ores of the district on a tariff and conditions notified in the *Government Gazette* of 25th February 1914. The Government took over the Works in December, 1913, and began to put them in order in January, 1914, at the same time purchasing ore as it was sent in. The works were not in good order, and considerable expenditure had to be incurred to put them in a condition for resuming smelting. In April, 1914, Mr. Richard Shepherd, who had been appointed manager, took charge of the works, and the following is his report of the year's operations thereafter:—

"I have the honour to submit the following report on operations at the State Smelting Works, Ravenshorpe, during the year 1914:—

The accumulation of ores by purchase, under the tariff for treatment, at the Ravenshorpe works was begun in January, and by the end of June 3,024 tons of gold and copper-bearing material had been collected. As sufficient stocks of coke, flux, and firewood had been delivered by the middle of the following month to ensure a successful start, and the smelting plant had meanwhile been overhauled and renovated, the blast furnace was blown-in on the 23rd July and the making of matte commenced. During August and September smelting continued without interruption, and 2,995 tons of ore were treated for a product of 586 tons of matte, estimated to contain 286 tons of copper, 694 ounces of gold, and 1,000 ounces of silver.

Early in October the converter plant was started and the bessemerising of the matte produced by the blast furnace to blister copper began. This change of policy was advisable for both technical and commercial reasons. The high gold values in the ores, which were beginning to come in from the Kundip end of the field, were more satisfactorily concentrated and kept track of in a smaller tonnage of metallic copper of a high degree of purity, and the anticipated saving in the cost of freight and realisation more than compensated for the increased cost of further treatment. Since the starting of the converter plant, to the close of the year, 1,921 tons of ore, much of which was mainly gold-bearing, were smelted and 126 tons of blister copper were produced. This blister contained 99 per cent. pure copper, 1,728 ounces of gold, and 923 ounces of silver.

During the last quarter of the year the rainfall was abnormally heavy, some 1,008 points being registered on the field. This seriously interfered with the cart-

ing of the flux and firewood. Lack of these supplies and the intervention of the Christmas holidays caused a suspension of smelting operations on 39 days during the three months. Owing to these interruptions it was not possible to finish the treatment of ore purchased, or clean up the half products lying about the works so as to close this, the first campaign, with the year.

With the figures still incomplete, it is not possible to analyse the costs or metallurgical extractions and as, owing to the war, the product is still unsold, the commercial figures would only be estimates, even if such an analysis were attempted. Under the circumstances it is perhaps necessary to state that, though the campaign is not yet finished at time of writing, there is no reason to suppose that the final figures, when available, will be unsatisfactory.

Owing to the highly siliceous composition of most of the ores offering, it was apparent from the first that heavy fluxing would be necessary. Ample quantities of ironstone were available for quarrying on M.L. 279, known as the Iron Knoll and distant $2\frac{3}{4}$ miles in an air line from the Works. The limestone quarry, from which most of the flux used by the Phillips River Co. was derived, is some six miles from Hopetoun, and involves five miles of road haulage in addition to 27 miles by rail. As this quarry produces stone of only moderate quality for fluxing, experiments were made at the beginning of the campaign which proved that limestone could be completely done without, and its use has been discontinued.

During the intervals when the Smelting Works were shut down by want of firewood and flux the furnace crew were employed overhauling the concentrating mill, as there are dumps of second class ore accumulating on the field, discarded from the ore raised for smelting, which can be treated at a small profit by concentration. This work of renovation is now approaching completion.

Though the rainfall has seriously retarded smelting, it has kept the Government dam at Cordingup full. The capacity of this dam is approximately 25,000,000 gallons, and as it is of excellent quality, there is no likelihood of a recurrence of the water problem which hampered the work of the Phillips River Co. during their last year's operations.

When smelting started in July it appeared probable that the ore available for purchase would not keep the furnace in blast more than half time. It was expected that the first run would close when 4,000 tons had been dealt with. By the close of the year this amount had been exceeded by 916 tons, and it is evident that it will be doubled before the campaign is brought to a close.

As work is proceeding smoothly, and the advantages of local smelting in the prompt agreement of weights and assays and the saving in freights are fully realised, the various mine owners and prospectors of the field are increasing their output. This is especially the case with the mines at the Kundip end of the field where, as depth increases, the auriferous ores formerly treated by battery are becoming so basic and cupriferous as to render concentration by fire a metallurgical as well as a commercial necessity. On recent developments it should be possible to keep the smelter almost constantly employed during the current year."

The financial outlay involved in the purchase of the ore was met by the Western Australian Bank

allowing an overdraft up to £25,000 for this purpose, to be repaid from the sale of the matte or copper produced.

As shown by the manager's report the year 1914 terminated in the middle of an unfinished campaign of the smelter, and therefore it was not possible to obtain a very satisfactory balance sheet to show the result of the operations to 31st December, 1914. Up to the end of the year none of the copper had been sent away for sale, the price of the metal being low, and there being difficulty in getting satisfactory terms for disposal of the product. Since the end of the year there has been a great improvement in both these respects.

An analysis at the Laboratory of the Geological Survey of W.A. of about 200 tons of the matte first produced from the smelter resulted as follows:—

No.	Private Mark or Description.	Result of Analysis.
6782	Matte, Phillips River Smelter—	
	SiO ₂ .. .. .	.41
	Cu	48.58
	As .. .. .	.13
	Sb	Nil
	Pb	Nil
	Bi	Nil
	Ni .. .. .	.20
	Co .. .. .	.18
	Fe	20.52
	Fe ₃ O	5.54
	S	24.38
	CaO .. .. .	.03
	H ₂ O .. .. .	.02
		99.99

Gold, 1oz. 2dwts. 21grs. per ton.
Silver, 3ozs. 13dwts. 17 grs. per ton.

An analysis of a bulk sample of the blister copper produced was also made at the Geological Survey Laboratory, which returned:—

L. 6801—Blister Copper drillings—			
Copper	.. Cu	.. 99.020	per cent.
Nickel	.. Ni	.. 0.246	"
Cobalt	.. Co	.. 0.041	"
Sulphur	.. S	.. 0.380	"
Arsenic	.. As	.. 0.012	"
Antimony	.. Sb	.. 0.009	"
Iron	.. Fe	.. 0.047	"
Silica	.. SiO ₂	.. 0.035	"
Alumina	.. Al ₂ O ₃	.. 0.027	"
Lime	.. CaO	.. 0.012	"
Magnesia	.. MgO	.. 0.005	"
Gold	.. Au	.. 0.053	"
Silver	.. Ag	.. 0.022	"
Phosphorus	.. P	..	Slight trace
Lead	.. Pb	..	} Nil
Bismuth	.. Bi	..	
Tin	.. Sn	..	
Manganese	.. Mn	..	
Zinc	.. Zn	..	} 0.090 per cent (by difference)
Oxygen	.. O	..	
Total	.. ..	.. 100.000	

Gold = 17oz. 8dwt. 11grs. per ton.
Silver = 7oz. 7dwt. 0grs. per ton.

The high gold value of the blister copper, as compared with the matte, is due to the fact that a good deal of rich gold ore from Kundip was smelted with the copper ores from which the copper was produced.

The re-opening of the smelting works has given a strong impetus to mining in the Phillips River Field, in spite of the depression in the market for copper, which was the first result of the outbreak of the European war. It was owing entirely to the Government support of the works and purchases of ore that it was possible for any copper mining to be carried on through this dull time.

Owing to the change in conditions brought about by the war, it was necessary to alter the conditions of purchase, so that the Government no longer undertook to buy the product at the price ruling at the expected date of its shipment from Albany, but simply made advances in accordance with the tariff, leaving the balance to be paid to the owners of the ore to be determined by the price realised, less all expenses of treatment and realisation.

FIELD WORK.

In January, 1914, a visit was made by myself to the Phillips River Goldfield in connection with the establishment of the State Smelting Works there, and another again in November when the smelting works were in active operation. A report on the field was published in Bulletin form in March. In June and September visits were made to Kalgoorlie in connection with inquiries into the questions of suppression of dust and improvement of ventilation in the mines and establishment of a mill for treatment of sul-

phides. As a result of this visit a loan was arranged to be made to Messrs. Allsop and Don, to assist them in putting the Hainhault mill into order as a public sulphide mill. In July and August a long round was made from Meekatharra to Yaloginda, Holden's Fnd, Peak Hill, Ilgarere, Kumarina, Mt. Egerton, Ruby Well, Wiluna, Gabanintha, Quinn's, Nannine, Poona, Cue, Day Dawn, Pinnacles, and Big Bell (Paton's Find), but owing to press of other work it has not yet been possible to get out any detailed description of these districts. In August I visited Greenbushes in connection with proposals to advance money against tin ore raised, and later in the year again visited Kalgoorlie and Phillips River districts.

Except for the visit to Murchison and Peak Hill fields, most of the visits of the year have been in connection with special matters requiring official attention, rather than for general inspection of the mines, and reports for publication have not been required in these cases. During August a visit was made to the Kendenup Graphite mine, a short description of which is appended as Appendix No. II.

I have, etc.,

A. MONTGOMERY,
State Mining Engineer.

APPENDIX I.

LOANS AND SUBSIDIES UNDER "THE MINING DEVELOPMENT ACT, 1902," AND THE MINING DEVELOPMENT VOTE: ACTION DURING 1914.

(Nos. in italics represent Nos. in last year's report.)

(a)—*Advances for Pioneer Mining and Prospecting.*

1. *Sunset G.M.L. 1300X, Kanowna, formerly Sunbeam G.M.L. 1121X (1).*—In last year's report the notes on No. 33, *Sunset G.M.L. 2240, Golden Valley*, should have referred to the above mine, the transactions as to *Sunset G.M.L. 2240* having terminated in the previous year. See No. 39 of Annual Report, 1912. During 1914 Messrs. Williamson and Pender continued to work the *Sunset* mine, formerly *Sunbeam*, but with only indifferent success, the reef being small, though values obtained were at times good. No repayments were made of loan or interest. (2239/12.)
2. *Eclipse G.M.L. 1047X, Gindalbie (2).*—During the year the air compressor was sold for £40. (1144/12.)
3. *Westralia Tasmania G.M.L. 1665T and Mt. Noungel G.M.L. 1745T, Erlistoun (3).*—The values in the mine being too poor to work, the Minister approved of the battery being removed from it to a more payable proposition. At the close of the year Mr. Dwyer was testing the *Golden Spinifex* and the *Rose of Persia* gold mines to determine on which to erect the battery. (2427/11.)
4. *Greenbushes Prospecting and Mining Co., Ltd., Greenbushes, South Cornwall, M.L. 300 (4).*—Proposed arrangements for again working this mine on tribute fell through in the earlier part of the year, and nothing was done afterwards, the outbreak of war paralysing tin mining at *Greenbushes* for the time. (977/12.)
5. *North End Mines, Ltd., Kalgoorlie, G.M.L. 4037E, Devon Consols South Extended (5).*—This mine obtained exemption early in the year, and no further transactions have taken place on account of the loan on it. (228/14.)
6. *Jupiter G.M.L. 771M, Mt. Magnet (6).*—During the year the head gear was loaned to the owner of the *Patrick G.M.* at £1 per annum advance, conditionally on his returning it to the *Jupiter* on demand without cost to the Department. In November the reservation was cancelled, and the ground thrown open for application as a gold-mining lease. The loan was reduced by £6. (319/12.)
7. *Wheal May Lead Mine, Northampton (7).*—The plant belonging to this venture is still stored at *Geraldton*, no sale having yet been effected. (1807/09.)
8. *W.E.G., G.M.L. 505G, Niagara (9).*—Nothing has been done during 1914 in regard to the loan outstanding on this mine. (4286/10.)
9. *Klondyke Boulder, G.M.L. 604, Warrawoona (12).*—During the year the company found themselves in difficulties for want of funds, and filed their schedule in June. At the end of the year the mine was let on tribute. (360/14.)
10. *Britannia G.M.L. 953M (13).*—During the year the boiler was sold for £36. (909/12.)
11. *Water Supply to Low-Grade Mines (14).*—The subsidy of 1s. 6d. per 1,000 gallons of water supplied by the Water Supply Administration, allowed to *Hannans Consols, the Golden Dream, the Lone Hand*, and some other very low-grade mines at *Kalgoorlie*, at first granted up to 31st March, 1913, and subsequently extended for another year, was reconsidered at the end of March, 1914, and authorised to be continued. It has enabled some of these very poor mines to continue in operation when otherwise they would have been unable to carry on. (1098/14.)
12. *V's United, G.M.L. 271F, Mt. Morgans (15).*—No transactions took place on this account during 1914 beyond renewal of insurance policies on the building containing the plant. (2426/11.)
13. *Balkis, G.M.L. 5354z, Menzies (16).*—During the year two crushings were put through, 57 tons yielding 71.30oz. of gold, with sands assaying 8dwt. 12grs. per ton, and 85 tons yielding 59ozs. of gold, the sands assaying 6dwt. per ton. The loan was reduced by £7 13s. (3016/11.)
14. *Lady Seddon, G.M.L. 633B, Black Range (17).*—The party being unable to meet their liabilities, the plant was put up for auction, but no bids were received. At the end of the year the sale of the engine and winch for £160 was being effected. (4556/11.)
15. *Princess Royal Syndicate, G.M.L. 222, etc., Cue (18).*—In February, 1914, an offer was received to take this mine on tribute, but after some delay the tributers decided not to go on with the matter. Some tools were sold privately, and tenders were again called for the mine and plant, and the plant and buildings were sold for £80. In December the land was thrown open again for selection free of encumbrances, and the transactions in respect to this loan may now be regarded as terminated. (3118/13.)
16. *Riverina, G.M.L. 123U, Mulwarrie (19).*—During the year the owner of this mine treated 1,600 tons of accumulated residues for a return of £640, and a further 2,000 tons were awaiting treatment. A fair amount of development work was accomplished, and a new boiler and cyanide plant purchased and placed on the mine. No reduction of the

loan was effected, as difficulty was experienced all along in carrying on operations. (1373/12.)

17. *Champion South, G.M.L. 817N, Nannine (20)*.—The plant on the above mine, which was purchased under a hire purchase agreement by Mr. Crockford, was re-erected at Meekatharra, and named the Rocklee Battery. 242 tons of ore were crushed during the year for the public, and the loan reduced by £12 2s. (2257/12 and 999/14.)

18. *Great Carbine G.M.L. 928R, Linden (21)*.—During the year the full amount owing on account of the loan, together with interest, was paid, and the transaction therefore ended. (1197/09 and 1668/14.)

19. *Stanley, G.M.L. 1271X, Kanowna, J. Rollo and M. Gregor (22)*.—The oil engine and pump were allowed to be removed to Rollo's Reward G.M. for the purpose of unwatering the shaft, the balance of the plant being stored in the Mining Registrar's yard, Kanowna. No reduction of the loan was effected during 1914. (3730/13.)

20. *Havilah Development, G.M.L. 345B, Black Range (23)*.—A fair amount of sinking and development work was done during 1914, but not enough to reach the reef. The Havilah G.M. and machinery thereon having come into the market, were acquired by the syndicate, and at the close of the year arrangements were being made to let the lease and tailings residues to a tribute party, and to work the Havilah Development lease from the Havilah mine. (1370/13 and 2826/14.)

21. *The Globe G.M. Syndicate, G.M.L. 912N, Meekatharra (24)*.—During the year prospecting work was carried on, but as nothing payable was met with the Hon. the Minister approved of repayments on account of the loan being allowed to remain over till January, 1915. The loan was reduced by £10. (830/13.)

22. *The Bullrush Gold Estates, N.L., Yuin. Erection of a Telephone Line, Yalgoo to Yuin (25)*.—During 1914 the loan was further reduced by an amount of £150. (3715/12.)

23. *P.A. 485Y, Jenkins, Brown and party, Bulong (26)*.—The loan was written off as a bad debt during 1914. (1803/13.)

24. *Morning Star, G.M.L. 4484E, Boulder (27)*.—In April the Ivanhoe Venture Syndicate made an offer to purchase the electric motor formerly belonging to the "Morning Star" party, on hire purchase terms, for £30, which was agreed to. The loan was reduced by £13 during the year. (3786/12.)

25. *Lake View, G.M.L. 606, Payne's Find, Yalgoo Goldfield (28)*.—Work was continued on this mine throughout the year, but no payment has yet been made for the pipes laid on to the supply tank at the State Battery. The supply unexpectedly ran short, and water could not be supplied while the State Battery was running. The date for repayment of the loan was deferred to January, 1915. (2372/11.)

26. *Comstock W.A., G.M.L. 1079Y, Randalls (29)*.—A crosscut was driven east 23 feet, through very hard rock, into the lode, which showed very low values. About 200 tons of ore were raised from the 40ft. level. At the end of the year work in connection with the shaft was at a standstill pending the results of the crushing. (1104/13.)

27. *Lubra Queen, G.M.L. 734G, Kookynie (30)*.—During February, 1914, the company were granted a further loan of £500 on the security of their tail-

ings, said to amount to 3,000 tons, conditionally on these being treated at the Niagara State Battery; any surplus after cartage and treatment charges to go towards reduction of the £500 and the previous loan. The company were also given permission to erect a cyanide plant for treatment of their own tailings to be subsequently produced. In July, the company being unable to carry on, the Department foreclosed, and arranged for treatment of the sands at the Niagara State Battery. Tenders were called for the mine and plant, but as those received were too low, the mine and plant were offered to the principal shareholder, Mr. Rea, for the debt remaining after treatment of the sands, payable on easy terms until the balance of the debt and accrued interest should be wiped off. The tailings, on being treated, proved to be of much lower value than was expected. The loans were reduced during 1914 by £105 12s. 9d. (3363/14.)

28. *Princess Royal G.M. Company, N.L., Princess Royal G.M.L. 106, Dundas (31)*.—During the year the mine was worked by a party of tributers above the 400ft. level, the lower levels being filled with water. No reduction of the loan was made. (3573/12.)

29. *Dostmund G.M.L. 788R, Yarri (32)*.—During the year the owner of the above mine filed his schedule, and the Official Receiver called for tenders for the mine and plant, but no tender had been accepted up to 31st December. (3541/13.)

30. *Hawk G.M.L. 725G, Niagara (35)*.—Owing to the owners being unable to make the proposition pay they abandoned the mine, and the Department foreclosed on its mortgage during the early part of the year. Tenders were called for the purchase of the mine and plant, but no offers had been received before the end of the year. (3254/14.)

31. *Crete d'Or G.M.Ls. 389D, 421D, and 422D, Day Dawn (36)*.—The owner of the above mine being unable to meet his liabilities, the Department, under pressure from the other secured creditor, foreclosed on its mortgage, and the plant and mine were advertised for sale. The sale was withdrawn, however, on the Department agreeing with the other secured creditor to give Mr. Cairns another chance to work his mine and meet his liabilities, conditionally on all work being first approved by the Inspector of Mines, and any surplus after payment of working expenses being divided between the Department and the other creditor *pro rata*. The mine was making good progress at the end of the year, but no reduction of the loan had then been made. (3373/13 and 1913/14.)

32. *Metzke and party, P.A. 647 (37)*.—During the year a considerable amount of development work was accomplished. A drive was put in N.W. from the west crosscut in fairly good wash, but after going in 45 feet it showed very poor prospects. The bottom at the end of the N.W. drive appeared to be composed of rotten granite or porphyry, but elsewhere it was apparently decomposed greenstone. The work proved the existence of a lead carrying gold, and in parts payable for puddling treatment. Some fairly heavy gold was obtained, one piece being said to weigh 1oz., another about 15dwts., and several up to 6dwts. Some pieces appeared to be water worn, but others showed no signs of wearing by attrition. A shaft sunk 150 yards away from the second vertical shaft gave no prospects. The run of

wash met within the drives and crosscuts appeared to be very narrow, and the ground heavy and greasy, necessitating strong timbering. A block of wash was taken out along the course of the lead in the N.W. drive, for treatment at the State Battery, and in it an 8dwt. slug and a quartz specimen showing good gold were found. At the end of the year the P.A. was taken up as G.M.L. 1180. The loan was reduced by £6 9s. 5d. during the year. (263/14 and 2302/14.)

33. *Maori Lass G.M.L. 2416, Yulgarn (38)*.—The battery started crushing on 9th March, 1914, and several parcels of stone were put through, but owing to the low grade of stone the company were unable to carry on without further capital, and obtained six months' exemption in October in order to try and form a stronger company to work the mine and acquire further ground. At the end of the year a proposition to crush for the public was being considered by the company. (2126/11 and 3392/14.)

34. *Nungarra Junction G.M.L. 619B, Black Range (39)*.—During the year a tribute was let on the mine, and later the transaction was brought to a satisfactory conclusion by settlement of the full amount owing. (4645/09.)

35. *H. A. Ryan, Mt. Ryan Reward M.L. 45, Poonah. Mining for Emeralds (40)*.—The new shaft was sunk 28ft. 6in., but all the stones discovered were of inferior quality, and work was discontinued for a time. (3946/12.)

36. *Tanawa G.M.L. 635B, Black Range*.—Towards the latter end of 1913 the Minister approved of a loan of £100 to Messrs. Wetzlar and party, to further prospect and develop their mine, the loan to bear interest at 5 per cent. and to be repayable on demand; 10 per cent. of all gold won to be paid towards interest and repayment of the principal, and a mortgage and bill of sale were taken over the mine and plant thereon. A considerable amount of sinking, crosscutting, and driving was accomplished without showing more than an occasional colour of gold by panning. At the end of the year the mine was not being worked. (1403/14.)

37. *Coolgardie Prospecting, Development, and Mining Co., N.L., Coolgardie (1912 Report No. 7)*.—The plant on the Undaunted G.M. was sold during the year on hire purchase terms, for £110, to the Griffiths G.M. (838/13.)

38. *Griffiths G.M.L. 4448*.—In August, 1914, Messrs. J. Griffiths and V. Delfs applied for a loan of £400 under Part II. of the Mining Development Act, 1902, for the purpose of erecting a Huntington mill on their mine. The application was refused. The plant on the Undaunted G.M. was sold to them under a hire purchase agreement, and in December they applied for a loan of £100 to erect the plant on their mine. The matter was under consideration at the close of the year. (2575/14.)

39. *Light of Asia G.M.L. 1148, Murchison*.—At the latter end of 1913 a loan of £825 was granted to the owner of the above mine to assist in sinking a new shaft to a depth of 250 feet. A bill of sale and mortgage were taken over the mine and plant, the loan to be repayable within three years by 10 per cent. of all gold won from the mine, payable after each crushing. At about 238 feet the reef, about 6 feet wide, was cut through. A crushing of 145 tons put through in November gave a return of 166.85 fine ozs. Owing to the heavy expense entailed

in putting the mine into working order, repayments were deferred to the end of September. No reduction of the loan was effected up to the end of the year. (589/14.)

40. *May Bee G.M.L. 1163, Lawlers*.—Early in 1914 the owners of the above mine, Messrs. Richards and Poole, were granted a loan of £300 to assist them in purchasing and installing a pumping plant and pipe line from a water shaft about 1¼ miles from their mine to the storage tank at the battery, the loan to bear interest at 5 per cent. per annum and to be repaid in two years by monthly payments of £12 10s. A mortgage and bill of sale were taken over the plant and pipe line. Up to the end of the year no repayments had been made on account of the loan. (2429/14.)

41. *Geneve G.M.L. 1010R and Neta G.M.L. 1011R, Edjudina*.—The owner of the above mines was granted a loan of £200 for the purpose of purchasing and erecting a boiler at his battery; the loan to be secured by a mortgage over the leases, and bill of sale over the boiler and any other plant on the mines the property of the applicant. At the end of the year the boiler was being placed in position. (2985/13.)

(b)—*Assistance in erecting Batteries and Treatment plants to be used for Ore Treatment for the Public.*

42. *Spring Hill G.M.L. 724, Parker's Range (41)*.—During the year a company was floated to work the mine, and the Minister approved of the loan remaining on mortgage for a further three years, the company to pay at least half of the proceeds of any calls made on existing contributing shares, and repayments of the loan of not less than £78 quarterly, to start on 1st April, 1915, the whole of the loan to be liquidated before any dividends declared, and the company to crush for the public at least ten days per month. An agreement to this effect was being drawn up at the end of the year. (499/14.)

43. *Never Never G.M.L. 665, Yulgarn (42)*.—During the year the mine was let on tribute, and a further loan of £150 granted for the purpose of repairing and renovating the plant. The loan was reduced by £39 4s. 2d. (3438/13.)

44. *Lady Pratt G.M.L. 1228x, Mulgarrie (44)*.—Public crushing was continued throughout the year, the price for crushing being allowed to be increased to 12s., and subsidy thereon to 2s. per ton. The loan was further reduced by £19 4s. 4d. (4475/11.)

45. *Royal Mint G.M.L. 549, Yalgoo (45)*.—During the year the plant was sold to Mr. L. H. Young for £50, and the ground thrown open. (2021/14.)

46. *Malcolm Prospecting Company, No-Liability, North Star Mine, Mt. Malcolm G.M.L. 1175c (46)*.—Work in the mine was carried on throughout 1914 without the company being able to pay off any of their debt to the Government. (4416/11.)

47. *Randwick G.M.L. 978c, Mt. Malcolm (47)*.—The boiler on this mine was sold for £150 under a hire purchase agreement to the owners of the North Star G.M., Malcolm. (1575/14.)

48. *Hornsby G.M.L. 937x, Yaloginda, formerly North Pole and Gibraltar (48)*.—Early in the year Messrs. Rupe and Young separated, and the latter carried on the operations by himself. Learning that he was believed to be intending to cyanide the sands at the mill and sell the plant, the Department fore-

closed, and offered the security for sale, but no tenders were received, though there were propositions from two parties to lease the plant. Eventually the plant was sold to Messrs. Kirkland Bros. for £500, payable by 5 per cent. of all gold won from their own mine, the Mystery, and 5 per cent. of all proceeds of crushing for the public; the plant to be kept open for public crushing on same terms as when held by Rupe and Young. (3409/12 and 2186/14.)

49. *Phoenix G.M.L. 622N, Quinn's (50)*.—The ground was thrown open at the beginning of the year, the Department's security to be protected in the event of the lease being taken up again. (3911/10.)

50. *Southern Cross G.M.Ls. 1076 and 1067, Bulong (51)*.—The party being unable to carry on, the Department foreclosed on its mortgage, and tenders were called for the mine and plant at the end of the year. (4726/11.)

51. *Ravensthorpe Battery Co. (52)*.—Public crushing was continued at times throughout the year, but very little crushing was done, and no reduction on account of the loan made. (3683/12.)

52. *Great Victoria G.M.L. 719, Yilgarn (53)*.—This mine has been kept going all through 1914, notwithstanding great difficulties. The returns by amalgamation since crushing commenced up to the end of June, 1914, were £13,447 16s. 11d., but as this was only 10s. 11d. per ton, the owners were unable to make any repayments of their loan, and were allowed further time for these until their cyanide plant should be erected. In September they reported having 27,045 tons of sands on hand, containing, according to assay, gold to the value of £21,080, and estimated to give an extraction of 12s. 4d. a ton, and were trying to arrange for a cyanide plant, but this was not completed till after the close of the year. A much better water supply than formerly has been obtained in the mine. (1780/14.)

53. *Battaglia and party, Battlesville G.M.L. 931R, Yundamindera (54)*.—Operations at this mine during 1914 were very unprofitable, but the owner was still struggling to carry them on at the end of the year. (371/13.)

54. *Red, White, and Blue G.M.L. 641B, Curran's Find, Yuanmi (55)*.—During 1914 a fair amount of development work was done on the mine, and several crushings put through the battery, a total of 1,493 tons being treated for a return of 399ozs. 9dwts. Several parcels of stone were also crushed for the public. At the end of the year the battery was running well, and proving of great benefit to the district. The loan was reduced by £2 8s. 11d. (1758/14.)

55. *McCahon and party, Cyanide Plant at Mt. Ida Battery (56)*.—There is nothing further to report on this matter for 1914. (363/12.)

56. *Donovan's Find G.M.L. 768, Yilgarn (57)*.—During the year several crushings were put through, and additional cyanide plant erected, but no reduction of the loan was effected, the quantity of ore received from the public not being up to expectations. (3145/12.)

57. *King's Sound Mining Co., Ltd., Taylor's Wolfram Reward M.L. 146H, Derby (58)*.—The company being unable to carry on, went into liquidation in January, 1914. Nothing has been done towards realisation of the security. (1064/13.)

58. *Chunderloo G.M.L. 1084N, Yaloginda, The Lane Mill Syndicate (59)*.—During the year the company took over the boiler from the Britannia G.M.,

and a cage from the Princess Royal at Cue. A further loan of £500 was granted, and a mortgage and bill of sale taken over the mine and plant, the said loan to be added to the principal of the existing loan and repayable as a portion thereof. An allowance of £5 per foot for sinking and cross-cutting was at first agreed to, but owing to a hard bar being struck below 108 feet the allowance was increased by £2 per foot. No reduction of the loan was effected during the year. (1399/14.)

59. *Star of Fremantle G.M.L. 645s, Kumanalling (60)*.—There were no transactions in connection with the loan to this mine during 1914. (3912/12.)

60. *S. Graham, M.A. 14, Hope's Hill (61)*.—Crushing was carried on at this battery during 1914, and the loan reduced by £49 15s. 9d. (94/13.)

61. *Erection of Public Battery on Harder to Find G.M.L. 364P, Ruby Well (62)*.—During the year public crushing was continued, and repayment of the principal and interest owing was completed. (146/14.)

62. *Transcontinental G.M.L. 805Y, Santa Claus G.M. Co., Randalls (63)*.—The battery was completed and running satisfactorily early in the year, and several parcels were put through for the public, but considerable difficulties were experienced, for various reasons, in getting supplies of ore of good grade from the lease itself, and up to the end of the year it had not been possible to get any repayments of the loaned moneys. (303/14.)

63. *Hornsby G.M.L. 937N, Nannine (formerly North Pole and Gibraltar) (1912 Report No. 52)*.—During 1914 the plant and tailings on this mine were sold to A. G. Kirkland for £500, under a hire purchase agreement. (2186/14.)

64. *Butcher Bird No. 1, G.M.L. 1933, Marda*.—In February, 1914, an application was received from the syndicate owning this mine for a loan in aid of erection of a battery, which would be open as a public crushing plant. The manager of the mine stated he had obtained a good supply of water in the mine. A loan of £1,500 was approved, payable at the rate of two-thirds of the cost of battery plant and machinery, and one-half of costs of transport and erection, repayable within three years. Public crushing to be done at rates and terms in force at the Mt. Jackson State Mill. In September, when the battery was practically completed, it was found that the water supply in the mine was not nearly sufficient for battery purposes, and the best hope of getting more appeared to be by sinking deeper. A further loan of £3 per foot up to £150 was allowed for sinking the water winze to obtain a larger supply. Up to the end of the year only one small crushing was put through the mill. (5651/10 and 293/15.)

65. *Aurum G.M.L. 711, Warridah, Yalgoo Goldfield*.—In September, 1914, an advance of £200 was granted to Messrs. Nevill and Loader for the purpose of sinking for a battery water supply. The advance was on a £1 for £1 basis, the cost of sinking the first 100 feet not to exceed £1 per foot, the Inspector of Mines to fix the rate for further sinking. A mortgage and bill of sale were taken over the mine; the loan to bear interest at 5 per cent., payable half yearly, the principal to be repayable by 5 per cent. of all gold won from the mine. In the event of a sufficient water supply being obtained, the applicants to erect a 10-head battery, and crush for the public on terms prevailing at Payne's Find State Battery, with a Govern-

ment subsidy of 2s. a ton on all ore crushed for the public, the said subsidy to be applied in reduction of the loan and interest thereon. Up to the end of the year the shaft was sunk 150 feet, a little water was obtained at 130 feet, but after that the country became drier. (3507/13).

66. *Kirton's South M.L. 127, Northampton.*—The owners of the above mine having applied for a loan, the mine was examined by the Inspector of Mines, and sampled enough to give a general idea of its prospects. As the district required a dressing plant for public use, as well as this mine, a loan of £2,000 was granted in June, 1914, for the purpose of purchasing and erecting an ore-dressing plant. A Bill of sale and first mortgage were taken over the mine and plant, the loan to bear interest at 5 per cent., payable on demand. Subsidies for public crushing and 10 per cent. of the proceeds of sale of all ore produced from their own mine to go towards reduction of the loan. At the end of the year the mill was nearing completion. (1525/13 and 2939/14.)

67. *Sunrise G.M.L. 910, East Murchison.*—Messrs. Langsford and Finch, the owners of the above mine, were granted a loan of £800, on a £1 for £1 basis, for the purpose of purchasing and erecting a 5-head battery and suction gas plant. A mortgage and bill of sale were taken over the mine and plant. The loan to be repayable with interest at 5 per cent. per annum by 10 per cent. of all gold won from the mine, payable after each crushing, and 1s. per ton from all ore crushed at the battery from ground outside the mine, whether the property of the applicants or not. £400 of the loan to be repaid within two years of the first instalment, and the balance within three years. At the end of the year the plant was in course of erection. (3215/05.)

68. *Public Mill for Treatment of Sulphide Ore at Kalgoorlie—Loan to Messrs. Allsop and Don.*—For several years past there has been a strong demand for a State Mill for treatment of sulphide ores of Kalgoorlie and Boulder, but the supplies of ore in sight have been insufficient to warrant the Government in undertaking this enterprise. With the removal of the Associated Northern Mill last year and the stoppage previously of the Kalgoorlie Gold Recovery plant, the facilities to owners of the smaller mines and tributaries to obtain treatment for the more refractory ores requiring roasting became almost non-existent, and efforts were made by the Government to find some way of ensuring fair treatment for them. Several propositions were considered, but ultimately Messrs. Allsop and Don offered to supply facilities at the Hainault Mill if assisted with a loan of £1,000 under the Mining Development Act. They would rent the Hainault plant, then out of use, and fit it up for public crushing, and purchase all public ore presented to them for treatment on the following tariff of charges:—

SULPHIDE ORES.		£	s.	d.
Ores having an assay value of—				
12	dwt. per ton or under	0	17	0
12-13	" "	0	18	0
13-14	" "	0	19	0
14-15	" "	1	0	0
15-16	" "	1	1	0
16-17	" "	1	2	0
17-18	" "	1	3	0
18-19	" "	1	4	0
19-20	" "	1	5	0
rising thereafter by 6d. per dwt. up to a maximum charge of 6s. per ton.				

CONCENTRATES.

		£	s.	d.
Not more than 30	dwt. per ton	2	0	0
" "	35 " "	2	5	0
" "	40 " "	2	10	0
Over 40	" "	3	0	0

Payment to be made upon an extraction of 90 per cent. of the value, taking gold at 80s. an ounce.

If sufficient profits should be made on the treatment of the ore the Government may require the charges to be reduced.

All arrangements for the loan of £1,000 to Messrs. Allsop and Don were completed in 1914, but the agreement was not signed till January, 1915. (2344/05.)

(c)—Boring.

69. No further transactions have been recorded during 1914 in connection with the loans for boring mentioned in paragraph 64 of last year's report, and as it is unlikely that anything further can be effected in recovery of any of these expenditures they may now be regarded as to be written off.

70. *The King's Cairn Mining Company, Ltd., Parker's Range (65).*—No transactions during 1914. (1583/13.)

71. *Allerton G.M.L. 2529, Southern Cross (66).*—There were no transactions on this account during 1914. The lease was forfeited in July, 1913, and the account may be considered closed. (134/12.)

72. *Boring at Fraser's Mine, Southern Cross (67).*—No. 5 bore was continued to 800 feet. It passed through what was probably the Fraser's South Extended series of lodes at from 301 to 360 feet, but the only assay values obtained were 2dwt. 11gr. of gold per ton at 317 to 322 feet, corresponding very well with the expected position of the Fraser's South Extended lode. When passed through, the lode formation appears to be comparatively little altered from the original country, pointing to the veins at this place being outside of any considerable shoot of ore.

The bore was continued, and from about 600 feet to 739 feet passed through several bodies of quartzose and pyritic lode matter, which might be Fraser's reef series, but gave no gold in assay returns.

No. 6 bore was then put down opposite the open cut on the N.W. side of Fraser's No. 1 shaft, and went to a depth of 1,019 feet. Traces of gold occurred in the core at 155 feet to 162 feet, 200-205 feet and 211-213 feet, and again at 346-348 feet. Fraser's lode was passed through at 377 feet to 385 feet 6 inches, the first four feet assaying 3dwts. 6grs. of gold per ton, and the next 4½ feet 8dwts. 17grs. per ton. Traces of gold were got again at 417 feet, 418 feet 6 inches, and at 434 to 438 feet, but though a good deal of quartz occurred in the cores down to 677 no gold was obtained beyond a trace at 644½ to 649½ feet. This was in the middle of a large body of quartz corresponding very well with the expected position of the "Battery" or "Buck" reef of Fraser's series. Below this, however, an assay of 6dwts. 13grs. of gold per ton was obtained from the core from 734½ to 738½ feet, and traces at 740 and 802 feet. The values at 736 feet were in quartz and chloritic schist carrying pyrrhotite and pyrites, belonging to a vein apparently not previously known.

It is somewhat notable that the lode at 377 to 385½ feet was not recognised as lode matter by the foreman in charge, who describes all the core at that point as "schist," while the petrological description

also would not necessarily indicate a lode, being "chlorite-calcite rock, chlorite schist, in places brown and green." The assay of the core, however, revealed the values, and on plotting the section these are found to occur almost exactly where Fraser's lode would be expected to be cut. The values, though not high, are fairly satisfactory at this point, averaging about 6dwts. per ton, which would be quite a usual average value for probably the majority of bore-hole tests taken at random through the payable parts of the Fraser's ore body.

The No. 6 bore was completed on 21st March, 1914, but owing to financial difficulties no more bores were gone on with. The total cost of the boring done (4,903 feet in all) was £4,227 7s. 5d., being an average cost of 17s. 3d. per foot, but was higher than it should have been in the first two bores. The others were bored on contract at prices from 13s. to 15s. per foot, according to the depth. The boring syndicate's share of the costs was £1,409 2s. 5d., but only

£788 2s. 11d. had been paid by them up to the end of the year.

The boring results show that the lodes constituting Fraser's series are very persistent, both to the S.E. of any previous workings and in depth, and maintain their expected position at the depths at which they were cut. Though the assays are not very encouraging they are probably quite as good as would be got from bores put in at random through many parts of the lode which have proved payable when worked out by mining, the richer parts which bring up the general average being patchily distributed and easily missed by a bore. Taken with the results of mining operations at the higher levels they appear to justify much hope that the reef will be worth working below the present bottom level. (3115/13 and 109/14.)

73. *Purchase of Carbons, Repairs to Drills, Cartage and Crushing Subsidies, etc.*—Expenditure on these items is shown in the tables herewith.

Summary of Expenditure on Mining Development under Mining Development Vote from 1st January to 31st December, 1914.

Mine or Owner.	Mining Centre.	Amount.	Total.
<i>A.—Advances in Aid of Mining Work and Equipment.</i>			
Davidson, G. W.	Randell's	£ 28 0 0	£ . s. d.
Havilah Development Syndicate	Black Range	110 6 10	
Jenkins, Brown, Cramp & Cramp	Bulong	22 10 0	
McDermott & Soanes	Yaloginda	172 0 0	
Metzke, Svendsen & Watson	Darlot	79 11 10	
Mararoa G.M. Co	Holden's Find	394 4 3	
Ryan, Alex.	Poona	69 10 0	
Dower & others	Northampton	35 0 0	
McCulloch, Matthew	Phillip's River	10 3 3	
Rea, F. R.	Poona	744 0 0	
Langford, Frank	Lawlers	556 10 0	
Kinneen, Bower & others	Black Range	86 6 6	
Lubra Queen	Niagara	500 0 0	
Poole, Richard	Lawlers	300 0 0	
		3,108 2 8	
Less credits by repayments, Globe G.M. and Maori Lass		10 2 5	3,098 0 3
<i>B.—Advances in Aid of Erection and Equipment of Batteries for Public Crushing.</i>			
Johnson & Friedman	Randall's	560 5 1	
Red, White and Blue Leases	Curran's Find	226 4 7	
Butcher Bird Syndicate	Marda	1,485 17 9	
Thring Bros. & Dwyer	Northampton	1,726 8 9	
Mandelstam, A. S.	Edjudina	164 12 0	
Loader & Nevill	Warridah	135 0 0	
Parkinson & Dunn	Ravensthorpe	60 10 0	
		4,358 18 2	
Less credit by repayment, Ruby Well		109 19 1	4,248 19 1
<i>C.—Boring Advances.</i>			
Fraser's	Southern Cross . . . . .	..	1,084 11 11
<i>D.—Miscellaneous Expenditure.</i>			
Rebates on Water Supply . . . . .		..	407 3 10
Preliminary Investigations Sampling Mines . . . . .		..	103 10 5
<i>Subsidies Carting long distances to Batteries.</i>			
Dyer, S. and others	Gabanintha	3 6 0	
Menhennett, S.	do.	1 10 0	
Morgans, E. A.	do.	1 17 6	
Bonnar, L.	Ilgarere	25 1 10	
Palmer, A. B.	do.	40 0 0	
Pustkuchen, L. M.	Widgiemooltha	16 14 1	
Chambers & Oates	Meekatharra	14 10 3	
Francisco, Towers & party	Ilgarere	40 0 0	
Humphreys, W. M.	do.	29 3 2	
Bird, W. J.	Kumarina	31 0 0	
Munroe, D.	Peak Hill	24 12 0	
Fey, Henry	Kumarina	128 0 0	
			355 14 10
<i>Subsidies to Batteries.</i>			
Trude, F. B., 2,567 tons	Ruby Well	634 9 6	
Gem Consolidated, 125 tons	Kundip	32 14 0	
Spicer, J., 121½ tons	Tampa	9 2 3	
Ware, C. H., 282 tons	Kundip	14 2 0	
Mandelstam, A. S., 771½ tons	Edjudina	57 10 9	
Ravensthorpe Battery Co., 225 tons	Ravensthorpe	11 5 0	
Gem G.M. Syndicate, 265½ tons	Kundip	6 7 0	
Stuckey, N. S., 223½ tons	Carrabin	22 7 0	
Graham, S., 1,746½ tons	Southern Cross	66 9 9	
Poole, H., 803 tons	Lawlers	80 6 0	
Langford & Smith, 2231 tons	do.	223 2 0	
Bellchambers, F., 379 tons	Curran's	37 18 0	
Santa Claus, 298 tons	Randall's	22 7 0	
Patterson, W. A., 321½ tons	Parker's Range	16 1 6	
Buhlmann, 393 tons	Mulgarrie	19 13 0	
White, G. W., 1,014½ tons	Lawlers	71 9 0	
Crockford, 242 tons	Yaloginda	12 2 0	
			1,337 5 9
<i>Subsidies Development Work.</i>			
Hill, W. S.	Linden	42 16 0	
Klemtz, O. E.	Black Range	26 11 8	
Werner, F.	do.	27 9 0	
			96 16 8
<i>Providing Transport for Prospectors.</i>			
Purchase of Horses, Camels, etc. . . . .		..	122 3 3
Purchase of Tailings . . . . .		..	6,671 3 4
Total . . . . .		..	£17,525 9 4

The amount, £6,671 3s. 4d., set against Purchase of Tailings is the net Expenditure after deducting recoups and is represented by tailings lying at the various State Batteries throughout the State.

"THE MINING DEVELOPMENT ACT, 1902."

Advances Written off to 31st December, 1914.

Year Authorised.	Name of Mine or Borrower.	Nature of Work.	Locality.	Amount of Loan and Interest written off.	Date written off.
1902	Manners & Gore	Battery erection	Gabanintha	£ 285 0 4	29-5-05
1903	Cheyne, C. C.	Sinking shaft	Yandanooka	70 17 10	31-12-04
	Foran and party	Opening deep alluvial lead	Kalgoorlie	150 0 0	14-2-06
	Hannan's Reward and Mt. Charlotte G.M. Co., Ltd.	Boring for reef	Kalgoorlie	383 11 9	31-12-04
	Irwin River Coal and Prospecting Syndicate	Boring for coal	Irwin River	925 6 0	23-3-05
	Jamieson, C. A.	Opening deep alluvial lead	Smithfield	50 0 0	30-6-04
	South Fingall G.M. Co., Ltd.	Boring deep alluvial lead	Day Dawn	1,030 18 0	18-1-04
	Waite and party	Opening deep alluvial lead	Trafalgar	100 0 0	18-4-05
1904	Admiral G.M.L.	Boring for reef	Peak Hill	719 1 1	30-3-06
	Blake, McKinnon, & Muir	Working deep lead	Kanowna	50 0 0	23-9-04
	Bell, Wm.	Battery water supply	Mosquito Creek	520 12 6	31-12-05
	Jones and party	Oversight	Bulong	882 15 9	27-3-11
	Marshall, Geo.	Erection of puddler	Coolgardie	152 17 2	15-2-06
	Ninety Eight G.M.L.	Sinking shaft	Bulong	262 2 11	13-3-07
	President Loubet	Sinking shaft	Callion	255 18 3	12-6-07
	Stuart, Rollo, & McIvor	Boring for lead	Kanowna	262 11 6	22-5-07
	Tierney and party	Sluicing alluvial	Coolgardie	150 0 0	22-10-04
	Westralian Mining and Oil Corp., Ltd.	Boring for oil	Warren River	618 14 7	20-3-06
	White Flag Consols	Sinking shaft	Wilson's Patch	48 10 5	3-10-06
1905	Battler's Hope	Sinking shaft	Greenbushes	118 18 4	6-6-07
	Brooklyn G.M.L.	Sinking shaft and purchase of machinery	Lennonville	91 1 11	18-6-09
	Chadwick's Reward	Sinking shaft	Koolyanobbing	110 3 5	30-6-08
	Great Northern G.M. Co.	Sinking shaft	Kalgoorlie	203 5 0	8-4-08
	Iron King G.M.L.	Water supply	Bullabulling	25 0 0	29-6-05
	Haddon G.M.	Water supply	Southern Cross	71 8 4	22-11-06
	Little Doris G.M.L.	Battery erection	Erlistoun	356 3 0	25-9-08
	Monkland G.M.L.	Sinking shaft	Gindalbie	576 7 6	28-4-09
	Mt Ida Battery Lease	Sinking shaft	Mt. Ida	313 6 2	29-5-07
	Pakeha G.M. Co.	Sinking shaft	Paddington	149 15 5	24-4-08
	Rollo's Reward G.M. Co.	Sinking shaft	Kanowna	314 16 3	20-4-10
1906	Trenton G.M. Co., N.L.	Crosscutting main shaft	Day Dawn	621 4 6	4-5-10
	Coolgardie Opal G.M. Co.	Crosscutting main shaft	Coolgardie	102 4 6	10-10-07
	Hague & Arthur	Battery erection	Menzies	158 19 7	3-9-08
	Kalgurli G.M. Syndicate	Mining development	Paddington	239 19 11	23-4-08
	Kingsmill, W. J., and party	Driving tunnel	Ravensthorpe	204 15 8	9-3-10
	Lubra G.M.	Purchase of machinery	Kookynie	64 15 10	23-3-10
	Menzies Prospecting and Development Co.	Sinking shaft	Menzies	594 0 11	3-3-09
	M.L. 374, Lost and Found .. .. .	.. .. .	Greenbushes	64 4 1	22-8-11
	Nicholson, Mahoney and O'Donohue	Battery erection	Gum Creek	351 14 2	5-2-08
	W.A. Sluicing Syndicate	Water supply	Coolgardie	309 1 3	21-2-07
1907	Coady, J. H.	Making briquettes	Collie	82 3 2	29-4-08
	Corrin, J.	Sinking shaft	Nullagine	195 3 1	26-8-08
	Cross, F.	Sinking shaft	Yarri	50 0 0	28-4-07
	Dellavedora and party	Sinking shaft	Parker's Range	106 13 10	27-11-08
	Elias, T.	Driving tunnel	Greenbushes	245 17 11	24-6-08

	Just-in-Time G.M. Co.	Battery erection	Mt. Morgans	1,011 19 9	3-12-08
	Providence Copper G.M. Co.	Sinking	Goongarrie	22 5 7	14-5-08
	Robinson and party	Battery erection	Mt. Ida	136 14 9	24-6-08
	Reid, G.	Sinking	Peak Hill	25 11 3	22-6-08
	Tierney, Aldridge, and party	Crosscutting	Coolgardie	162 6 3	18-2-09
	Whale, G.M.	Mining development	Niagara	129 18 3	29-12-08
1908	Chamberlain North G.M.	Extending tunnel	Wodgina	77 8 11	14-9-10
	Kanowna Low Grade	Purchase of machinery	Kanowna	93 17 3	16-2-10
	Shekleton, J. H.	Making briquettes		105 9 4	28-6-10
	Roebourne C. and G. Mines	Battery erection	Roebourne	169 10 9	29-10-12
1909	Dreadnought	Sinking shaft	Menzies	307 6 2	20-3-12
	McLellan & Smith	P.A. 221 W.	Broad Arrow	50 0 0	19-7-11
	Callion G.M. Co.	Erecting battery	Menzies	800 19 0	19-8-14
1910	Manton & Newson	Purchase and Erection of Machinery	Menzies	195 19 11	22-8-11
1912	Jenkins, Brown, and party	Driving from shaft	Bulong	436 15 1	21-4-14
				16,366 4 1	

Mining Development Expenditure.

Advances outstanding at 31st December, 1914.

No. of File.	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 Dec., 1914.
					Previous to 1914.	During 1914.	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.
90/12	Alicia	254F	Mt. Morgans ..	245 0 0	195 0 0	.. .. .	.. .. .	195 0 0	4 2 6	54 14 8	249 14 8
909/12	Britannia	953M	Mt. Magnet	150 0 0	114 12 6	.. .. .	.. .. .	78 12 6	.. .. .	9 4 6	87 17 0
3016/11	Balkis	5354z	Menzies	300 0 0	265 10 0	.. .. .	7 13 0	257 17 0	32 9 7	6 10 10	264 7 10
3715/12	Bullrush Gold Estates .. .. .	.. .. .	Yalgoo	200 0 0	175 10 0	.. .. .	.. .. .	150 0 0	25 10 0	9 18 5	25 10 0
2257/12	Champion South	817N, 1039N	Nannine	400 0 0	400 0 0	.. .. .	.. .. .	350 0 0	50 0 0	29 11 8	69 19 8
3323/08	Coolgardie P.D. & Mining Syndicate	4093, 4117	Coolgardie	1,500 0 0	904 10 5	.. .. .	.. .. .	110 0 0	794 10 5	19 19 10	862 7 2
1986/10	Coolgardie Redemption	3918, 4052	do.	1,000 0 0	1,020 16 9	.. .. .	.. .. .	32 18 0	987 18 9	.. .. .	1,061 1 5
2334/12	Crete D'Or	389, 421, 422D ..	Day Dawn	1,000 0 0	1,000 0 0	.. .. .	.. .. .	1,000 0 0	.. .. .	130 4 9	1,130 4 9
427/11	Comstock	1079Y	Randall's	200 0 0	109 12 6	28 0 0	.. .. .	137 12 6	7 11 7	3 9 8	141 2 2
29/05	Dostmond	788R	Yerilla	350 0 0	337 11 8	.. .. .	.. .. .	15 9 5	322 2 3	.. .. .	322 2 3
1144/12	Eclipse	1047x	Gindalbie	450 0 0	498 19 1	.. .. .	.. .. .	252 5 0	246 14 1	.. .. .	246 14 1
3166/09	Emily	1510	Day Dawn	400 0 0	372 1 9	.. .. .	.. .. .	372 1 9	.. .. .	44 7 10	416 9 7
3594/09	Globe Gold Mine	912N	Nannine	500 0 0	444 2 9	.. .. .	.. .. .	10 0 0	434 2 9	26 10 3	445 4 6
838/13	Griffiths' Mine	4448	Coolgardie	110 0 0	110 0 0	.. .. .	.. .. .	110 0 0	.. .. .	.. .. .	110 0 0
4689/06	Havilah Development	345B	Black Range	600 0 0	491 15 10	60 16 3	.. .. .	552 12 1	30 6 10	13 19 10	566 11 11
3786/12	Hanby and Lugg .. .. .	.. .. .	Kalgoorlie	30 0 0	30 0 0	.. .. .	.. .. .	27 0 0	.. .. .	0 9 9	27 9 9
4738/09	Hawk	725G	Desdemona	107 0 0	107 0 0	.. .. .	.. .. .	107 0 0	6 19 8	3 7 10	110 7 10
319/12	Jupiter	771M	Mt. Magnet	400 0 0	401 0 0	.. .. .	.. .. .	108 4 1	292 15 11	5 0 0	338 7 2
2255/11	Kalgoorlie North End Development Co.	3880, 4146E	Kalgoorlie	1,500 0 0	1,500 0 0	.. .. .	.. .. .	25 0 0	1,475 0 0	20 11 3	1,516 11 7
1101/09	Kanowna Prospecting Co.	323X	Kanowna	750 0 0	666 9 3	.. .. .	.. .. .	7 0 0	659 9 3	.. .. .	659 9 3
2825/07	Kingdom Come	M.L. 112	Northampton	200 0 0	204 14 0	.. .. .	.. .. .	204 14 0	5 8 6	15 11 0	220 5 0
4548/11	Klondyke Boulder	604	Warrawoona	1,000 0 0	999 10 7	.. .. .	.. .. .	88 5 6	911 5 1	34 5 4	99 9 3
2186/14	Kirkland, A. G.	Mach. Area 12N ..	Nannine	500 0 0	500 0 0	.. .. .	.. .. .	500 0 0	.. .. .	8 7 1	508 7 1
1035/10	Kinneen, Bower, and others	635B	Black Range	100 0 0	.. .. .	86 6 6	.. .. .	86 6 6	.. .. .	2 13 0	88 19 6
735/10	Lady Seddon	633B	Sandstone	200 0 0	136 0 0	.. .. .	.. .. .	136 0 0	.. .. .	23 1 6	159 1 6
363/06	Lady Florence	1265	Cue	1,000 0 0	1,000 0 0	.. .. .	.. .. .	1,000 0 0	.. .. .	259 19 9	1,259 19 9
3751/10	Lubra Queen	734/5, 744, 749G ..	Kookynie	1,500 0 0	1,000 0 0	500 0 0	105 12 9	1,394 7 3	.. .. .	123 15 1	1,518 2 4
3507/13	Loader & Nevill	711	Yalgoo	200 0 0	.. .. .	135 0 0	.. .. .	135 0 0	.. .. .	0 15 10	135 15 10
4000/05	Mindeloo	1518	Mindeloo	300 0 0	198 17 0	.. .. .	.. .. .	10 0 0	188 17 0	8 1 1	196 18 1
278/12	Morning Star	4484E	Boulder	368 0 0	284 19 4	.. .. .	.. .. .	105 0 0	179 19 4	6 8 9	186 8 1
2126/11	Maori Lass	2416	Yilgarn	600 0 0	600 0 0	.. .. .	.. .. .	0 2 5	599 17 7	30 0 0	615 0 0
4164/12	Metzke and others	P.A. 647	Lake Darlot	200 0 0	119 8 9	69 18 9	.. .. .	182 18 1	1 19 7	8 6 8	191 4 9
3461/08	North End Mines	4054, 4037, 4039, 4231	Kalgoorlie	1,000 0 0	436 10 0	.. .. .	.. .. .	436 10 0	.. .. .	.. .. .	436 10 0
3573/12	Princess Royal	106, 187, 587, 840, 972	Norseman	2,000 0 0	2,000 0 0	.. .. .	.. .. .	2,000 0 0	.. .. .	198 9 7	2,198 9 7
2898/11	Princess Royal	222, 653, 1016, 1048, 1114	Cue	1,000 0 0	1,000 0 0	.. .. .	3 10 0	996 10 0	80 0 0	14 16 8	1,011 6 8
3409/12	Rupe & Young	Mach Area	Nannine	848 17 5	848 17 5	.. .. .	500 0 0	348 17 5	.. .. .	24 13 5	373 10 10
1373/12	Riverina	123N	Mulgarrrie	500 0 0	468 19 10	.. .. .	.. .. .	468 19 10	23 6 6	35 13 8	504 13 6
1240/12	Richards & Poole	1163	Lawlers	300 0 0	.. .. .	300 0 0	.. .. .	300 0 0	1 3 10	7 11 5	307 11 5
2219/99	Rea, F. R.	1151, 1148, 1252, 1362, 1498	Cue	825 0 0	.. .. .	744 0 0	.. .. .	744 0 0	8 19 6	18 16 2	762 16 2
697/09	Sunbeam	1121x	Kanowna	1,000 0 0	1,038 4 4	.. .. .	399 14 0	638 10 4	116 16 8	45 13 9	684 4 1
499/11	Sunset	2240, 2253	Southern Cross ..	100 0 0	90 0 0	.. .. .	5 17 0	84 3 0	.. .. .	.. .. .	84 3 0
977/12	South Cornwall	567	Greenbushes	1,170 2 0	1,170 2 0	.. .. .	26 0 0	1,144 2 0	.. .. .	.. .. .	1,144 2 0
2376/10	Stanley G. M.	1271x, late	Kanowna	150 0 0	112 0 0	.. .. .	.. .. .	112 0 0	2 5 6	8 9 0	120 9 0
2426/11	V's United G.M.	271F	Mt. Morgans	672 2 0	578 16 1	.. .. .	140 0 0	438 16 1	3 19 5	34 14 1	473 10 2

4645/09	Werner, F.	619B	Nungarra	150 0 0	143 17 3	..	143 17 3	..	8 2 0	0 1 11	0 1 11
2239/12	Williamson & Pender	..	Kanowna	180 0 0	180 0 0	..	..	180 0 0	..	10 10 3	190 10 3
4286/10	W. E. G. Gold Mine	505G	Niagara	500 0 0	297 13 1	..	..	297 13 1	..	89 10 4	387 3 5
2427/11	Westralia Tasmaria	1665, 1745T	Erlistoun	300 0 0	300 4 9	..	51 0 0	249 4 9	90 2 8	12 16 9	262 1 6
1807/09	Wheal May	Loc. 6	Northampton	300 0 0	302 4 6	..	40 0 0	262 4 6	5 15 9	14 9 8	276 14 2

B.—ASSISTANCE IN ERECTING BATTERIES AND TREATMENT PLANTS TO BE USED FOR CRUSHING FOR THE PUBLIC.

2120/09	Battlesville Mine	931R	Yundamindera	1,063 16 2	1,063 16 2	..	..	1,063 16 2	7 7 6	174 6 8	1,238 2 10
5651/10	Butcher Bird	1933OL	Yilgarn	1,500 0 0	..	1,485 17 9	..	1,485 17 9	..	50 15 8	1,536 13 5
3145/12	Donovan's Find	768	Jacoletti	1,000 0 0	1,000 0 0	..	..	1,000 0 0	..	125 4 1	1,125 4 1
3155/11	Great Victoria Leases	719, 944/5, 1229	Southern Cross	2,000 0 0	1,641 15 0	..	0 17 9	1,640 17 3	189 4 5	42 9 4	1,683 6 7
1343/07	Hodder, E.	Mach. Area 64	Randall's	253 3 2	253 3 2	..	148 13 0	104 10 2	6 8 4	35 11 3	140 1 5
2106/12	Johnston and party	1086, 7, 8	Bulong	1,500 0 0	924 10 11	560 5 1	..	1,484 16 0	22 7 0	51 0 1	1,535 16 1
2322/11	King's Sound Mining Co.	M.L. 146H	Derby	500 0 0	500 0 0	..	..	500 0 0	..	28 10 11	528 10 11
4475/11	Lady Pratt	1228x	Mulgarrie	250 0 0	205 4 10	..	126 1 6	79 3 4	33 18 7	2 2 10	81 6 2
3785/08	Lady Agnes	910Y	Bulong	480 0 0	486 12 3	..	93 4 9	393 7 6	..	27 7 5	420 14 11
3215/05	Langford, F.	910 E.M.	Lawlers	800 0 0	..	585 17 0	29 7 0	556 10 0	..	21 2 0	577 12 0
4416/11	Malcolm Prospecting Co.	1175c	Malcolm	1,550 0 0	1,550 0 0	..	..	1,550 0 0	402 0 8	269 9 8	1,819 9 8
2985/13	Mandelstam, A. S.	1010R	Edjudina	200 0 0	..	164 12 0	..	164 12 0	..	0 17 10	165 9 10
363/12	McCahon and party	..	Mt. Ida	400 0 0	400 0 0	..	..	400 0 0	..	27 14 5	427 14 5
5947/10	McDermott & Soanes	1084N	Nannine	2,032 12 8	1,532 12 8	172 0 0	..	1,704 12 8	..	125 18 8	1,830 11 4
4224/11	Never Never	665	Yilgarn	1,000 0 0	1,073 15 9	..	590 14 1	483 1 8	218 13 2	12 7 5	495 9 1
3911/10	Phoenix	622N	Quinn's	250 0 0	250 0 0	..	16 5 9	233 14 3	17 12 1	17 5 11	251 0 2
2325/11	Ravensthorpe Battery Co.	..	Ravensthorpe	1,300 0 0	1,038 8 2	..	..	1,038 8 2	..	228 14 5	1,267 2 7
1353/10	Red, White, and Blue	641B	Curran's Find	2,137 0 0	2,524 7 0	152 2 0	..	2,676 9 0	37 18 0	152 18 8	2,829 7 8
919/14	Rocklee G.M.	..	Yaloginda	350 0 0	350 0 0	..	..	350 0 0	12 2 0	12 14 2	362 14 2
3551/10	Randwick	978C	Malcolm	560 0 0	577 3 5	..	43 4 6	533 18 11	..	45 3 5	579 2 4
1518/12	Royal Mint (Late Mystery)	19H	Yalgoo	..	50 0 0	..	20 0 0	30 0 0	0 10 0	..	30 0 0
4726/11	Southern Cross and Southern Cross S.	1067, 1076, W.R. 27Y	Bulong	1,000 0 0	1,000 0 0	..	95 15 3	904 4 9	31 12 6	172 13 6	1,076 18 3
3362/11	Spring Hill	721	Parker's Range	655 0 0	655 16 5	..	19 2 0	636 14 5	189 2 10	78 19 11	715 14 4
4422/07	Star of Fremantle	645s	Kunanalling	325 0 0	320 0 0	..	..	320 0 0	32 3 7	8 2 7	328 2 7
1525/13	Thring Bros. & Dwyer	127	Northampton	2,050 0 0	..	1,731 15 9	..	1,731 15 9	0 4 4	21 1 8	1,752 17 5

C.—BORING ADVANCES FOR 1914.

Fraser's	2,671 12 6	1,084 11 11	..	3,756 4 5	3,756 4 5
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D.—MISCELLANEOUS ADVANCES.

Ryan, A. H.	30 10 0	69 10 0	..	100 0 0	100 0 0
McCulloch	25 3 3	..	25 3 3	25 3 3
Mararoa	..	..	..	..	..	394 4 3	..	394 4 3	..	..	394 4 3
Payne's Find Development Co.	..	..	..	..	98 6 6	..	..	98 6 6	..	..	98 6 6
North Baddera	40 0 0	..	40 0 0	40 0 0

51,512 13 5	43,353 6 2	8,390 0 6	3,916 3 5	47,827 3 3	1,896 12 10	3,346 3 11	51,173 7 2
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A.—Pioneer Mining and Prospecting	27,356 1 5	23,155 11 5	1,924 1 6	2,732 17 10	22,346 15 1	695 7 10	1,613 11 5	23,960 6 6
B.—Assistance in Erecting Batteries, etc.	24,156 12 0	17,397 5 9	4,852 9 7	1,183 5 7	21,066 9 9	1,201 5 0	1,732 12 6	22,799 2 3
C.—Boring Advances	..	2,671 12 6	1,084 11 11	..	3,756 4 5	..	..	3,756 4 5
D.—Miscellaneous Advances	..	128 16 6	528 17 6	..	657 14 0	657 14 0

51,512 13 5	43,353 6 2	8,390 0 6	3,916 3 5	47,827 3 3	1,896 12 10	3,346 3 11	51,173 7 2
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APPENDIX No. II.

GRAPHITE AT KENDENUP.

The graphite deposit at Kendenup, near to Mr. J. F. T. Hassell's homestead, was discovered many years ago, and I understand that more than one attempt has been made to open it up in past years. When I visited it last November the old workings were fallen in and could not be examined, and the only exposure of the graphite deposit which could be seen was in a vertical shaft which had been sunk to a depth of about 70 feet, and a drive therefrom at about 50 feet from surface, which had been carried in about 24 feet from the west side of the shaft on a course running N. 75deg. W., and a short distance in the opposite direction east of the shaft. The graphite which originally was found in an old open-cut about 18 feet south of the shaft, came into the latter at about 30 feet, the underlay being about 1 in 2 to the south, but from this point downwards the shaft was in graphitic material to the bottom, and the dip appears to have become much steeper. The deposit has not yet been well exposed, as it has nowhere been cut across from side to side. In the drive it is seen that there are at least five feet in thickness of somewhat soft clayey material full of scales and crystals of graphite, and presenting a distinctly laminated appearance. The lamination probably conforms closely with the dip of the deposit as a whole, but as the "walls" are not yet seen there is still some doubt as to the course, the true dip, and the thickness of the graphite-bearing deposit. At surface the old workings seem to show a strike somewhat to the south of west, but the drive runs north of west about 15deg. and seems to be fairly well along the course of the vein. For the present we may say that the course is roughly east and west, and dip to the south at a fairly steep angle.

Owing to the graphitic material being soft and greasy it has been difficult to maintain the shaft, which is not suitable for continuation of work. The material is much stained with brown oxide of iron down to about 65 feet, below which depth the iron-bearing minerals have been little oxidised.

The enclosing rock is not well seen anywhere in the workings, and is not clearly exposed on surface anywhere in the immediate vicinity of the shaft. The surrounding country is gneissic granite and mica-schist, and the material near the top of the shaft looks like rock of this character very much weathered. There is a good deal of white clay about the old surface workings, and a number of fractured crystals of green beryl have been washed from this, suggesting that there is some likelihood that a pegmatite dyke exists. The occurrence of the graphite is not yet clear enough to enable a decided opinion to be passed upon it, but present appearances lead me to think that the graphite is formed in a plane of shearing of the country, along which faulting movement

has taken place, very possibly accompanied by intrusion of a pegmatite dyke. The deposit therefore appears to be of the nature of a true lode, and seems likely to extend to some considerable distance both in strike and dip. If it continues of the same size and value as in the present workings, there seems much promise that it may become a payable mining proposition. More extensive development is required, however, and the owner's proposal to sink a new shaft to a depth of 100 feet on the hanging wall side of the lode, and to crosscut it therefrom and open it by driving a level, is quite what ought to be done.

Two rough samples of the graphitic lodestuff were taken by me, one from all round and over the heap of brown-stained material raised from the shaft and 50 feet level, and another from about 70 feet depth in the shaft, where the brown iron ore mostly disappears. The Government Assayer's report is:—

" 34 / 14.

6967D—C .. Grab sample Fixed carbon, 19.03 per cent.
from dump Burns very slowly.

Gangue:—clay, limonite, chloropal (Fe₂O₃, 3SiO₂, 5H O)
quartz, muscovite.

6968D—D .. Depth 70ft. Fixed carbon, 22.68 per cent.
Burns very rapidly.

Gangue:—clay, chloropal,
quartz, limonite, muscovite.

The ash in each case is moderately fusible and consists mainly of silica, alumina, and ferric oxide, with traces of magnesia and potash. The constituents of the gangue are given above approximately in relative order of importance."

Some portions of the veinstuff were much richer in graphite (fixed carbon of the analysis) than the samples analysed, but the latter would represent fairly well the bulk of the material raised.

Mr. S. W. Parker, a director of the Kendenup Graphite Coy., Ltd., which has been formed to open up this deposit, has shown me a small sample of coarse sealy graphite, which seems to be of excellent quality, washed from the iron-stained ore, and states that the cleaning of the graphite by washing presents little difficulty in the case of this part of the mined material, but that he had not been so successful as yet in getting clean graphite from the less weathered ore. Doubtless a good deal of experimenting will have to be done to devise the best method of extracting clean graphite under the local conditions, but the material raised from the mine being of good grade it should not take long to find means of extracting a marketable product. Flotation methods appear likely to be particularly useful in concentrating graphite.

A. MONTGOMERY,
State Mining Engineer.

18th February, 1915.

**ANNUAL REPORT OF THE BOARD OF EXAMINERS FOR COLLIERY MANAGERS' AND
UNDER MANAGERS' CERTIFICATES UNDER "THE COAL MINES REGULATION ACT,
1902."**

The Secretary for Mines, Perth, W.A.

Office of the State Mining Engineer,
Department of Mines, Perth, W.A.,
27th April, 1915.

The Coal Mines Regulation Act, 1902.

Sir,

We have the honour to submit, for the information of the Hon. the Minister for Mines, the Annual Report of the Board of Examiners for the year 1914.

The Board held two meetings during the year, the first on 30th April, and the second on 22nd October, 1914.

EXAMINATION FOR CERTIFICATES.

One candidate sat for a first class certificate of competency, but as the Board was not satisfied with the results of the examination no certificate was issued.

Three candidates sat for the examination for second class certificates of competency and two certificates were granted; the other candidate's papers did not reach the standard required for a pass.

The successful candidates for examination were Hugh Stewart and Benjamin Samson, to whom second class certificates of competency were issued.

An application for a first-class certificate of service was received, which the Board was unable to deal with as the necessary evidence as to sobriety required by Regulation 28 had not been forwarded by the applicant.

ORAL EXAMINATIONS.

A resolution was passed to the effect that the Board may require first-class candidates to attend at Perth for oral examination, and second class candidates to be orally examined by the Inspector of Mines on the same date as their written examination.

A copy of the papers set for the written examinations is appended to this Report. Oral examinations were also held.

We have, etc.,

A. MONTGOMERY,
State Mining Engineer, Chairman.

HARRY P. WOODWARD,
pro Government Geologist, Member.

R. McVEE,
Inspector of Mines, Collie, Member.

F. A. LANE,
Acting Secretary.

**EXAMINATION FOR SECOND-CLASS CERTIFICATES OF COMPETENCY AS UNDER
MANAGER OR OVERMAN.**

**SUBJECT: VENTILATION AND DANGEROUS
GASES.**

Tuesday, April 7th, 1914, 10 a.m. to 11.30 a.m.

Possible
Marks.

- | | |
|----|--|
| 50 | (1.) Describe briefly the use of the following instruments in mines—
(a.) Thermometer.
(b.) Barometer.
(c.) Anemometer.
(d.) Hygrometer. |
| 50 | (2.) What is the object of using brattice? Describe different sorts of brattice work, stating the conditions under which use of each would be preferred. |
| 50 | (3.) What is the object of splitting the air? To what general result is it conducive, and how is it effected? |
| 50 | (4.) What is "Fire-damp"? Describe how you would test for its presence, and the precautions to be taken if it is found to be present in dangerous quantity. |
| 50 | (5.) Describe minutely how you would arrange to ventilate a single heading, driven in solid ground, so as to restrict as little as possible, or not at all, the quantity of air passing through a district. |
| 50 | (6.) Under what circumstances, and from what causes, does natural ventilation occur in a mine in which there is no artificial source of heat? What change in conditions would have the effect of stopping or reversing the direction of the air current? |

300

The Coal Mines Regulation Act, 1902.

EXAMINATION FOR SECOND-CLASS CERTIFICATES OF COMPETENCY AS UNDER-MANAGER OR OVERMAN.

SUBJECT: MINING OF COAL.

Tuesday, 7th April, 1914, 11.30 a.m. to 1 p.m.

Possible
Marks.

- 50 (1.) What conditions should be taken into consideration in deciding upon the size of pillars to be left when working on the bord and pillar system?
- 50 (2.) Show by sketches and description how you would secure the working places in a long-wall face.
- 40 (3.) In shot firing by electricity in a mine, which do you prefer, "high" or "low" tension fuses?
Give reasons for your preference, and state the differences in principle between the two systems.
- 50 (4.) Describe the methods you would employ, and precautions you would use, in removing pillars from an area in the mine in which the bords have been completed.
- 55 (5.) What type of coal-cutting machine would you recommend to work a seam of coal having a very uneven floor and a bad roof? The mine is a fiery one. Give reasons for your answer.
- 55 (6.) In a mine liable to spontaneous combustion, what precautions would you take to minimise the dangers pertaining thereto, and how would you prefer the workings laid out?

300

The Coal Mines Regulation Act, 1902.

EXAMINATION FOR SECOND-CLASS CERTIFICATES OF COMPETENCY AS UNDER-MANAGER OR OVERMAN.

SUBJECT: ARITHMETIC.

Tuesday, 7th April, 1914, 2 p.m. to 3 p.m.

Possible
Marks.

- 15 (1.) The specific gravity of coal is 1.2, what is the weight of a cubic yard?
- 15 (2.) How many revolutions will a wheel 3ft. in diameter make in running four miles?
- 20 (3.) A, B, and C work together in a drive 6ft. x 9ft. and excavate 20ft. of drive; A works $4\frac{1}{2}$ days; B works $5\frac{1}{2}$ days, and C works 6 days. They are paid 4s. per cubic yard. How much does each receive?
- 20 (4.) How many gallons of water would be held by a circular shaft 10 feet in diameter and 100 feet deep?
- 20 (5.) Coking coal is raised at 5s. per ton and the yield of coke is 60 per cent. What is the cost of coal to obtain one ton of coke?
- 10 (6.) Simplify—

$$\frac{1}{12} \text{ of } \frac{3}{5} \text{ of } \frac{5}{16}$$

$$\frac{3}{9} \text{ of } \frac{5}{8} \div \frac{4}{5}$$

100

The Coal Mines Regulation Act, 1902.

EXAMINATION FOR SECOND-CLASS CERTIFICATES OF COMPETENCY AS UNDER-MANAGER OR OVERMAN.

SUBJECT: ROADWAYS.

Tuesday, 7th April, 1914, 3 p.m. to 4 p.m.

Possible
Marks.

- 50 (1.) In a stone-drift dipping 1 in 3, what arrangements would you make (a) for ventilation of the drift, (b) removal of broken rock, (c) to provide against runaway skips going down the drift—electric power being in use throughout the mine?
- 50 (2.) Give your opinion on the advisability or otherwise of stripping a fault which has crossed the main dip heading of a mine with a "slant" heading which is to be used as a main haulage road.
- 50 (3.) A main haulage road is to be widened for the purpose of laying a double road; roof and floor are good. Describe how you would arrange for carrying out the work.
- 50 (4.) How would you proceed to clean up a large fall in a main haulage road dipping 1 in 6? Show by sketches how you would secure the place, and describe the precautions to be taken to ensure safety of the workmen engaged.
- 50 (5.) In a mine using electric power of not less than "medium pressure," how would you fix the main cables where they pass along roadways so as to protect passers-by from coming in contact with them. What are the principal causes of danger in using electric power in mines?
- 50 (6.) What points have to be kept in view in making permanent main roads for haulage and ventilation underground, and in maintaining them after they are made?

300

The Coal Mines Regulation Act, 1902.

EXAMINATION FOR SECOND-CLASS CERTIFICATES OF COMPETENCY AS UNDER-MANAGER OR OVERMAN.

SUBJECT: "THE COAL MINES REGULATION ACT, 1902."

Tuesday, 7th April, 1914, 4 p.m. to 5 p.m.

Possible
Marks.

- What are the requirements of the Act regarding—
- 20 (1.) Inspection (a) Before the men commence work, and
(b) Whilst the men are at work?
- 15 (2.) Prompt treatment of sufferers from accidents in and about mines?
- 20 (3.) (a.) The number of men to be employed in each district or split, and
(b.) The ventilation of districts?

- | | | |
|-----|--|--------------------|
| 15 | (4.) Period of employment of persons below ground in any mine? | Possible
Marks. |
| 15 | (5.) Duties and responsibility of the Manager of a mine? | |
| 15 | (6.) Signalling in mines? | |
| 100 | | |

The Coal Mines Regulation Act, 1902.

EXAMINATION FOR FIRST-CLASS CERTIFICATES OF COMPETENCY.

SUBJECT: ARITHMETIC.

Tuesday, 7th April, 1914, 10 a.m. to 11 a.m.

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| Possible
Marks. | |
| 25 | (1.) How many superficial feet of timber are there in 20 pieces 6in. x 4in. x 20ft., 4 pieces 12in. x 4in. x 15ft., 6 pieces 10in. x 8in. x 12ft., 84 pieces 6in. x 1in. x 18ft., and 100 pieces 4in. x 1in. x 20 ft.? |
| 30 | (2.) A rectangular concrete tank is 18 feet long by 12 feet wide at the bottom, and 27 feet long by 18 feet wide at the top; how many gallons of water will it hold, the depth being 12 feet? |
| 40 | (3.) What is the total value of 2,894 tons 13cwt. 3qrs. of large coal at 10s. 6 $\frac{3}{4}$ d. per ton, and 98 tons 14cwt. 1qr. of nut coal at 8s. 1 $\frac{1}{4}$ d. per ton? |
| 30 | (4.) What is the square root of 24,336 and of 85 $\frac{14}{15}$ th? |
| 40 | (5.) Divide .00481,344 by 1.472 to four places and express the following as vulgar fractions .536, 6.002, .003. |
| 35 | (6.) A tunnel is driven 75 yards 7 feet at the top and 9 feet wide at the bottom, and 7 feet 6 inches high. What would be the cost per cubic yard of the tunnel if the price was £3 per lineal yard? |
| 200 | |

The Coal Mines Regulation Act, 1902.

EXAMINATION FOR FIRST-CLASS CERTIFICATES OF COMPETENCY.

SUBJECT: SURVEYING.

Tuesday, 7th April, 1914, 11 a.m. to 1 p.m.

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| Possible
Marks. | |
| 30 | (1.) Describe how you would test the adjustments of a dumpy level and correct any errors. |
| 35 | (2.) Make a specimen page of a level-book showing levels taken over a line on uneven ground from six settings of the instrument and with not less than four readings of the staff from each station, and plot the section to appropriate scales on the squared |

paper supplied, assuming that the first backsight is taken on a point 82.97 feet above datum.

- | | |
|----|---|
| 35 | (3.) A mine has two deep shafts (A and B) connected underground. The underground connection requires a traverse of not less than six lines. Describe shortly how you would carry true bearings from the surface survey into the mine. |
|----|---|

- | | |
|----|---|
| 40 | (4.) Line. True bearing. Distance.
A B 27deg. 30min. 84ft. 3in.
B C 64deg. 15min. 101ft. 0in.
C D 130deg. 45min. 110ft. 6in.
D E 207deg. 00min. 213ft. 9in. |
|----|---|

Calculate the bearing and length of the line E A completing the traverse.

- | | |
|----|---|
| 30 | (5.) Plot the traverse in Question (4) and calculate the area enclosed by it. |
| 30 | (6.) How would you proceed to lay out a curve of 200 feet radius by the method of offsets, using chords of 20 feet? |

200

The Coal Mines Regulation Act, 1902.

EXAMINATION FOR FIRST-CLASS CERTIFICATES OF COMPETENCY.

SUBJECT: GEOLOGY.

Tuesday, 7th April, 1914, 2 p.m. to 4 p.m.

- | | |
|--------------------|---|
| Possible
Marks. | |
| 20 | (1.) An outcrop of a horizontal coal seam is found on the side of a mountain of which the top is composed of dolerite and the slopes are much covered with loose stones of dolerite, how would you proceed to examine the country to find whether the coal may be expected to pass under the igneous rock or to terminate against it? |
| 20 | (2.) Give a brief description of the principal geological features of the Collie Coal-field, with diagrammatic sections. |
| 15 | (3.) How would you distinguish between Anthracite, Cannel coal, Bituminous coal, Brown coal, and Lignite? What are your views upon the causes of their differences? |
| 15 | (4.) How do you explain the common occurrence in coal seams of partings, bands of bright coal, and pyrites; and of beds of fire-clay and iron ore in proximity to coal seams? |
| 15 | (5.) What are "faults"? Make diagrams showing different sorts of faults. How are they caused? |
| 15 | (6.) Explain with examples how fossils are made use of in determination of the geological age of coal seams. |

100

The Coal Mines Regulation Act, 1902.

EXAMINATION FOR FIRST-CLASS CERTIFICATES OF COMPETENCY.

SUBJECT: THE COAL MINES REGULATION ACT, 1902.

Tuesday, 7th April, 1914, 4 p.m. to 5 p.m.

Possible
Marks.

- 13 (1.) What are the provisions of the law with regard to working underground on Sundays?
- 16 (2.) In what respects do the provisions of "The Inspection of Machinery Act, 1904," and "The Mines Regulation Act, 1906," apply to Collieries?
- 14 (3.) What are the penalties which may be inflicted on any person in a mine guilty of wilful negligence endangering life or limb, and in what circumstances may imprisonment be ordered?
- 16 (4.) How far is a manager responsible for the observance of the General Rules, and how can he clear himself of responsibility in the event of a breach by some other person?
- 13 (5.) What is an adequate amount of ventilation?
- 14 (6.) What is the rule with regard to engine-drivers remaining at their engines while persons are underground in mines usually entered by means of machinery?
- 14 (7.) What is the rule as to employment of inexperienced persons in coal getting?

100

The Coal Mines Regulation Act, 1902.

EXAMINATION FOR FIRST-CLASS CERTIFICATES OF COMPETENCY.

SUBJECT: MACHINERY.

Wednesday, 8th April, 1914, 10 a.m. to 1 p.m.

Possible
Marks.

- 25 (1.) Describe the precautions you would employ in fixing the cables in a mine for an electric coal-cutting service to avoid risk of accident to men employed in the mine.
- 30 (2.) Describe, with a diagram, the working of an electrically-driven three-throw plunger pump.
- 35 (3.) Describe, briefly, the sort of engine and pitwork you would use in installing a Cornish single-acting pump to raise 600 gallons of water a minute from a depth of 200 yards in a vertical shaft.
- 30 (4.) In fast winding from deep shafts what different methods are commonly employed for compensating for the variation in the load on the engine due to the changes in the relative positions of the rising and descending cages?
- 30 (5.) What is the horse-power of a pump engine to raise 1,000 gallons of water per minute from a depth of 75 fathoms?
- 30 (6.) In a system of direct colliery haulage, show how you arrive at the load on the rope and the horse-power of the system.

Possible
Marks.

- 30 (7.) Compare endless rope haulage and main and tail rope haulage, mentioning their comparative advantages.
- 30 (8.) State your views with regard to winding ropes upon the following points, viz.:—
(a.) The ratio the load should bear to the breaking strain.
(b.) Methods of capping and frequency of re-capping.
(c.) Turning ropes end for end.
(d.) Length of time they may be used.
- 30 (9.) Water has risen 72 yards in a shaft 14ft. in diameter; the feeder is equal to 250 gallons per minute. How long will a 16in. set with an 8ft. stroke going 6 strokes per minute be in pumping out the water?
- 30 (10.) Explain how you would change a hauling rope end for end.

300

The Coal Mines Regulation Act, 1902.

EXAMINATION FOR FIRST-CLASS CERTIFICATES OF COMPETENCY.

SUBJECT: MINING OF COAL.

Wednesday, 8th April, 1914, 2 p.m. to 5 p.m.

Possible
Marks.

- 25 (1.) Show with the aid of a diagram how a mine may be worked in "panels"? In what circumstances would you select this system of working?
- 30 (2.) Describe the method you would employ in sinking a shaft through a stratum of soft running sandy ground, which is over 100 feet thick, is met with at a depth of over 500 feet, and contains much water. Show by diagrams and description how you would line the shaft to keep out the water.
- 25 (3.) In working a field of coal, which lies nearly horizontally from a deep shaft, a fault is encountered at a distance of 1,000 feet from the shaft, which throws down the seam 100 feet: describe and compare various methods of proceeding to open up the mine beyond the fault, it being impracticable to sink a new shaft.
- 20 (4.) Describe shortly the equipment and training of a Rescue Brigade, formed to deal with accidents from explosions and mine fires.
- 25 (5.) What is meant by the calorific value of coal, and how is the calorific value arrived at?
- 25 (6.) What are the respective advantages and disadvantages of bord and pillar and long wall methods of working coal seams?
- 30 (7.) Why is a round or circular shaft almost universally adopted in modern collieries in preference to the square, oblong, oval, or any other shape?
- 30 (8.) Describe the advantages of coal-cutting machines over hand labour, and explain conditions where their installation would not be advantageous.

Possible
Marks.

- 25 (9.) How would you be guided in laying out shaft pillars and pillars for the protection of surface buildings and railways?
- 25 (10.) What precautions would you take to reduce the dangers from coal dust in a fiery mine?
- 20 (11.) How would you secure a circular shaft while sinking, and how would you keep it circular and plumb?
- 20 (12.) Describe how you would prevent the oscillation of a kibble in a sinking shaft.

300

The Coal Mines Regulation Act, 1902.

EXAMINATION FOR FIRST-CLASS CERTIFICATES OF COMPETENCY.

SUBJECT: VENTILATION AND DANGEROUS GASES.

Thursday, 9th April, 1914, 10 a.m. to 1 p.m.

Possible
Marks.

- 30 (1.) Describe clearly the method of testing for fire-damp with a safety-lamp, and discuss its limitations.
How much fire-damp would have to be given off to foul a current of 8,000 cubic feet of fresh air per minute sufficiently to allow the presence of gas to be detected by the ordinary safety-lamp?
- 30 (2.) Explain the principal causes of fires in the underground workings of collieries, and the measures to be taken to prevent or minimise the occurrence of such fires.
- 30 (3.) A fire having broken out seriously in a worked-out portion of a mine, describe various ways of proceeding to isolate and extinguish the fire, and point out circumstances in which each would be applicable.
- 25 (4.) Explain the principle of action of a water-gauge and describe the manner of using it. What is the pressure in lbs. per square inch indicated by one inch of water gauge?
- 35 (5.) A current of 30,000 cubic feet of air per minute is split into three airways A, B, and C, of which the co-efficients of friction are respectively, .002, .0025, and .003. A is 1,000 feet long, of circular section and 24 square feet area, B is 2,000 feet long, of square section and 24 square feet area, and C is 3,000 feet long of rectangular section, 6ft. x 4ft. How much of the current would pass through each airway?
- 30 (6.) If the velocity of an air current is doubled and the length of the airway doubled, the water gauge in the first place being .2, what will it now be?
- 30 (7.) Give an idea of the quantity of carbon dioxide formed by the burning of a ton of coal containing 70 per cent. carbon.
- 30 (8.) Say if you consider there is any advantage in having auxiliary fans underground in addition to the main fan at the surface. Explain fully.

Possible
Marks.

- 30 (9.) A fan engine whose indicated horsepower is 62 is circulating 125,000 cubic feet per minute through a mine with a water gauge of 2.3 inches. What is the percentage of useful effect?
- 30 (10.) If the quantity of air circulating in a mine is 36,000 cubic feet per minute with an effective 4-horse fan power, how much would this quantity be increased if the fan power was increased to 32-horse power?

300

The Coal Mines Regulation Act, 1902.

EXAMINATION FOR SECOND-CLASS CERTIFICATES OF COMPETENCY AS UNDER-MANAGER OR OVERMAN.

SUBJECT: VENTILATION AND DANGEROUS GASES.

Tuesday, 6th October, 1914, 10 a.m. to 11.30 a.m.

Possible
Marks.

- 45 (1.) In taking air measurements in a Collie mine the following conditions were found to exist in one of the districts:—Intake to district 20,000 cubic feet of air per minute; return at last cut through on return side and 50 yards from face of last bord 17,000 cubic feet per minute; temperature of working faces 70 deg. Fah., temperature at return 68 deg. Fah. What in your opinion was the condition of the ventilation in this particular district?
- 50 (2.) If the quantity of air measured in the main intake airway of a mine is 150,000 cubic feet per minute with a temperature of 58 deg. Fah., what quantity would you expect to obtain in your main return airway if the temperature was 70 deg. Fah.?
- 55 (3.) Describe the principal gases met with in coal mines. Under what circumstances do they occur? What effect have they upon men and lights?
- 50 (4.) If you have 35,000 cubic feet of air per minute passing through a mine with a W.G. of 1.5in., what must be the height of the W.G. if the quantity be raised to 50,000 cubic feet per minute, and what is the theoretical horse power required in each case?
- 50 (5.) Express an opinion on the utility of auxiliary fans for mine ventilation in the Collie mines. If using them, in what part of the district would you place them, and how would you arrange your workings to get the best results from their use?
- 50 (6.) Explain how it may happen that dry coal dust becomes a source of danger in mines, and how it may be rendered harmless.

300

The Coal Mines Regulation Act, 1902.

EXAMINATION FOR SECOND-CLASS CERTIFICATES OF COMPETENCY AS UNDER-MANAGER OR OVERMAN.

SUBJECT: MINING OF COAL.

Tuesday, 6th October, 1914, 11.30 a.m. to 1 p.m.

Possible
Marks.

- 45 (1.) Explain the terms "creep" and "thrust." How are they brought on in underground workings, and what precautions would you adopt to prevent them?
- 50 (2.) How are spontaneous fires caused underground? What are the first indications, and how would you deal with them?
- 60 (3.) Sketch and describe the general lay out of a district in any local mine with which you are acquainted, in which coal-cutting machines are at present in use, or in which they are being introduced. Show sufficient working places to keep one machine going, the position of the electric cables, and the method in which you would lay out your roadways in order to get the highest possible efficiency from your machine?
- 45 (4.) In proceeding to draw timber in pillar workings what precautions do you think necessary? What would you use, and where would you commence? Roof, fairly strong shale.
- 50 (5.) Describe a system of hydraulic stowage, and discuss the merits and demerits of this method of filling in mines.
- 50 (6.) Describe a good method of capping a steel wire haulage rope.

300

The Coal Mines Regulation Act, 1902.

EXAMINATION FOR SECOND-CLASS CERTIFICATES OF COMPETENCY AS UNDER-MANAGER OR OVERMAN.

SUBJECT: ARITHMETIC.

Tuesday, 6th October, 1914, 2 p.m. to 3 p.m.

Possible
Marks.

- 20 (1.) How many tons of coal will be produced from a 6ft. cut in an eight yard bord, when the seam is 9ft. thick, and the specific gravity of the coal 1.36?
- 20 (2.) If the cost of driving a cross measure drift 12ft. x 7ft. is ninety-four shillings per fathom, what will be the total cost if drift is 150 fathoms in length, and what is the cost per cubic yard of rock removed?
- 15 (3.) What is the weight of water contained in a tank 16ft. x 9ft. x 5ft. and how many gallons does it contain?
- 15 (4.) Add together the following fractions $12/7$, $3/8$, $5/14$, and $24/35$.
- 15 (5.) If six men earn £14 8s. in six days, in what time will nine men earn the same amount?
- 15 (6.) What is the cost of 2 ton 13 cwt. 2 qr. 17 lbs. at 17s. 9d. per cwt.? If the price goes up $12\frac{1}{2}$ per cent. what would it be per ton?

100

The Coal Mines Regulation Act, 1902.

EXAMINATION FOR SECOND-CLASS CERTIFICATES OF COMPETENCY AS UNDER-MANAGER OR OVERMAN.

SUBJECT: ROADWAYS.

Tuesday, 6th October, 1914, 3 p.m. to 4 p.m.

Possible
Marks.

- 25 (1.) Describe briefly the arrangements you would make in installing an endless rope jig in the main "ganning" bord of a rise district, to deliver the coal to the main haulage rope. Average grade 1 in 15. Where would you place your tension wheel, and why? Illustrate your answer by sketches.
- 20 (2.) Make neat sketches illustrating the method of timbering you would adopt on a main haulage road in a mine, the roof being a friable shale, sides strong, and floor moderately hard.
- 20 (3.) In a mine in which the floor is undulating the main levels follow a course in order that the water may at all times drain from the face of the level, what are the advantages and disadvantages of this method of driving? What method of driving the levels would you adopt under the circumstances?
- 20 (4.) A downthrow fault of 30 feet is met with in the main dip haulage road of a mine in which the dip of the seam is 1 in 10, it has been decided to put a drive through the fault at a grade of 1 in 5 to cut the seam on the downthrow side of the fault. Describe the work you consider necessary in commencing the drive.
- 15 (5.) If the bars in a main road with a bad roof had become rotten what instructions would you give as to their removal, If the bars were good and the props were rotten, what instructions would you give?

100

The Coal Mines Regulation Act, 1902.

EXAMINATION FOR SECOND-CLASS CERTIFICATES OF COMPETENCY AS UNDER-MANAGER OR OVERMAN.

SUBJECT: THE COAL MINES REGULATION ACT, 1902.

Tuesday, 6th October, 1914, 4 p.m. to 5 p.m.

Possible
Marks.

- 30 (1.) What are the duties and responsibilities of the Under-Manager or Overman—
(a.) Under the Coal Mines Regulation Act?
(b.) Under the Special Rules of a colliery with which you are acquainted in the Collie district?
- 20 (2.) Why does the Coal Mines Regulation Act require that Special Rules shall be established at every mine?
- 15 (3.) What are the requirements of the Act regarding sanitation in and about mines?
- 20 (4.) What qualifications are necessary before a person can take charge of any machinery used in connection with the working of a mine?
- 15 (5.) What does the Act require in regard to dimensions of travelling roads?

100

DIVISION III.

REPORT OF THE SUPERINTENDENT OF STATE BATTERIES.

Department of Mines,

State Batteries Branch,

Perth, 25th March, 1915.

The Under Secretary for Mines, Perth.

Sir,

I have the honour to submit, for the information of the Hon. Minister, my report upon the work done by the State Batteries Branch of the Mines Department during the year 1914, being the seventeenth Annual Report.

To the report are appended 11 Schedules, showing details of returns under various headings, and three appendices, to which references are made throughout the report.

MILLING.

At the close of the year, the Department was operating 31 batteries for the treatment of gold ores, comprising 230 head of stamps; there being 15 ten-head mills and 16 five-head mills. One mill was leased (Tuckanarra 10-head), at which public crushings were treated at State Battery rates. During the year six plants, comprising 45 head of stamps, were closed (*see* "Plants closed").

The tonnage milled amounted to 56,570½ tons and was crushed in 921 separate parcels, the average weight of the parcels being 61.4 tons.

The tonnage showed a decrease of 4,002¼ tons when compared with the tonnage milled during 1913.

There were 77,670 stamp days (Sundays excluded) during the year, whilst there was only sufficient ore supplied for treatment to keep the batteries at work 13,505 stamp days, or 17.3 per cent. of the time.

The average duty per stamp per 24 hours was 4.185 tons, the stamps being run at 95 to 110 drops per minute, the average of the screens used containing approximately 850 holes per square inch. The length of drop varied according to the nature of the ore being crushed, between 3in. and 8in. The average weight of the stampers approximated 1,000lbs.

The gold recovered by amalgamation amounted to 74.2 per cent. of the gross value of the ore. At Wiluna, where the ore does not lend itself to the amalgamation process, 8,536 tons were milled. At all batteries, excepting Wiluna, the recovery by amalgamation was equal to 79.0 per cent. (Schedule 5.)

Revenue amounted to £26,153 5s. 7d., equal to 9/2.95 per ton; a decrease of 2.45 pence per ton as compared with 1913 revenue.

Expenditure amounted to £35,566 19s. 8d., equal to 12/6.88 per ton; an increase per ton of 1.22 pence when compared with last year's expenditure.

A loss of £9,413 14s. 1d. was incurred.

The decline in tonnage milled of 4,002¼ tons was responsible for an increase in cost of 1.22 pence per ton, whilst revenue decreased 2.45 pence per ton, making the above-mentioned loss exceed last year's loss by £258 1s. 8d. (Schedules 1 and 8.)

CRUSHING CHARGES.

After the outbreak of the calamitous European war, it was decided, in order to facilitate the production of gold and assist the matter of unemployment consequent upon the effects of the war, to allow temporary reductions in milling charges upon low-grade ores milled at State batteries.

The reduction in milling charges came into force on the 1st October. To the close of the year the amount of rebates allowed totalled £999 10s. 6d. Milling revenue account was recouped to that extent from the Mines Development Vote, in order to keep the year's account on the same basis as previous year's accounts. (See Appendices "A," "B," and "C.")

TIN TREATMENT.

The treatment of tin ore was conducted at three plants during the year. Two plants at Greenbushes and one at Wodgina were operative. The plant at Wodgina, which had been leased for two years, was handed over to the owners on the 31st December.

Tin treatment operations from a point of view of tonnage were not at all satisfactory during the second half of the year.

Of the 3,340 tons treated during 1914, 2,936 tons were treated during the first half-year. The first reason for the greatly decreased tonnage can be traced to the fall in the price of tin prior to the war, and the second to the practical closing of the market when the European war commenced (August).

Only 91 parcels were treated, averaging 36.7 yards each. The yardage treated shows a decrease of 4,692 yards, or 58.4 per cent., as compared with results for 1913.

The weight of Black Tin recovered was 39.913 tons.

The expenditure was £1,317 9s. 1d., and revenue £759 19s. 4d., the loss being £557 9s. 9d., or £44 1s. 4d. more than for 1913. (Schedules 1 and 8.)

SAND TREATMENT.

Only 6,218 $\frac{3}{4}$ tons were treated during the year, the operations showing a profit of £415 5s. 11d.

Sand treatment is being abolished as quickly as circumstances will permit, the sand being mixed with slime at most plants now, and treated under the heading of "Tailings Treatment." (Schedules 3 and 9.)

SLIME TREATMENT.

6,246 $\frac{1}{2}$ tons were treated at a loss of £578 4s. 1d. Of the tonnage treated 4,506 $\frac{1}{2}$ tons were treated in the final run of the filter press plant at Norseman. This treatment, like the above, is being done away with as circumstances permit. (Schedules 3 and 9.)

TAILINGS TREATMENT.

This process has proved highly successful under the conditions which prevail at our numerous small plants.

32,723 $\frac{1}{2}$ tons were treated for an expenditure of £10,126 11s. 6d., equal to 6/2.26 per ton; the revenue being £12,913 8s. 10d. or 7/9.93 per ton. A profit of £2,786 17s. 4d. was made.

At the close of 1915 it is anticipated that all batteries will be equipped with Tailings Treatment plants, with the exception of Mt. Ida and Marble Bar, at which centres tailings are not treated. (Schedules 3 and 9.)

ADDITIONS AND EQUIPMENT.

Only £71 7s. 7d. was spent under this heading, the amount being charged to working expenditure.

REPAIRS AND RENEWALS.

£3,455 10s. 9d. was expended in repairs and renewals to the mills, and £589 8s. 1d. was spent on tailings treatment plants, a total of £4,044 18s. 10d., the whole amount being charged to working expenditure.

Comparative Synopsis of Results at State Batteries for Twelve Months ending 31st December, 1913 and 1914.

Operation.	1914.			1913.		
	Tonnage.	Expenditure per ton.	Revenue per ton.	Tonnage.	Expenditure per ton.	Revenue per ton.
		s. d.	s. d.		s. d.	s. d.
Milling	56,570 $\frac{1}{2}$	12/6.88	9/2.95	60,572 $\frac{3}{4}$	12/5.66	9/5.40
Sand Treatment	6,218 $\frac{3}{4}$	8/4.87	9/8.90	18,300	7/11.67	9/4.21
Tailings Treatment	32,723 $\frac{1}{2}$	6/2.26	7/9.93	13,078	6/7.88	9/6.72
Slime Treatment	6,246 $\frac{1}{2}$	10/10.27	9/0.04	6,089	12/4.08	9/6.10
Tin Treatment	3,340	7/10.65	4/6.60	8,032	5/5.12	4/1.78

REVENUE AND EXPENDITURE, 1914.

Operation.	Tonnage.	Revenue.	Expenditure.	Profit.	Loss.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.
Milling	56,570 $\frac{1}{2}$	26,153 5 7	35,566 19 8	..	9,413 14 1
Sand Treatment	6,218 $\frac{3}{4}$	3,029 8 7	2,614 2 8	415 5 11	..
Tailings Treatment	32,723 $\frac{1}{2}$	12,913 8 10	10,126 11 6	2,786 17 4	..
Slime Treatment	6,246 $\frac{1}{2}$	2,812 10 1	3,390 14 2	..	578 4 1
Tin Treatment	3,340	759 19 4	1,317 9 1	..	557 9 9
	105,099 $\frac{1}{4}$	£45,668 12 5	£53,015 17 1	£3,202 3 3	10,549 7 11
			Less Profit .. .. .	..	3,202 3 3
			Loss .. .. .	..	7,347 4 8
			Additions and Equipment .. .. .	..	71 7 7
			Gross Loss .. .. .	..	£7,418 12 3

GROSS WORKING EXPENDITURE.

The total expenditure incurred for all operations was £53,087 4s. 8d., including additions and equipment. The gross tonnage treated in all departments was 105,099 $\frac{1}{4}$ tons, the cost per ton being 10/1.22.

During 1913, the total expenditure was £55,702 4s. 4d., including additions and equipment, and the gross tonnage treated was 106,071 $\frac{3}{4}$, the cost per ton being 10/6.03.

The gross tonnage treated showed a falling off of 972 $\frac{1}{2}$ tons, as compared with the tonnage treated during 1913, and it is therefore pleasing to note that the cost per ton was reduced no less than 4.81 pence during 1914, equal to a direct saving on the gross tonnage treated of £2,106.

Milling operations account for 67 per cent. of the gross expenditure. In view of the fact that the tonnage milled during the year showed a decline of

4,002¼ tons, and that costly boiler repairs were effected at four old plants, in addition to the great advance in prices of almost every commodity used during the latter half of the year, it stands to the credit of managers that they have, in these circumstances, held the cost of milling so firmly, whilst reducing the cost of "Slime" and Tailings" Treatment.

Note.—The items "Expenditure" against the five operations in the "Comparative Synopsis," and in Schedules 8 to 11 include all Head Office Administration, Inspection, Managerial and Incidental expenses.

GROSS WORKING REVENUE.

The total Revenue amounted to £45,668 12s. 5d. from 105,099¼ tons treated, equal to 8/8.28 per ton.

During 1913 the total Revenue was £47,990 12s. 6d. from 106,071¾ tons treated, equal to 9/0.57 per ton.

The decrease in revenue during 1914 of 4.29 pence per ton as compared with the revenue for 1913, was due principally to the lower grade of the ore treated (see Schedule 5) on account of a lesser revenue from "Tailings Treatment" and "Milling," and to a slight extent to the smaller gross tonnage treated.

The decrease in total expenditure of 4.81 pence per ton fortunately more than compensated for the decrease in total revenue per ton.

Appended are two diagrams showing curves representing the total tonnage treated and total Working Profit or Loss at all State Batteries since inception to the close of 1914.

TAILINGS PURCHASE.

Nett payments to customers, amounting to £20,901 19s. 1d., were made on account of 33,967 tons of tailings purchased; 382½ tons of slime were purchased for £150 11s. 9d. The above payments represent Treasury Returns and were actually effected during the year. (Schedule 7.)

1,228 tons of tailings were also purchased by contractors for £1,161 9s. 8d. nett to customers, making a grand total of £22,214 0s. 6d. paid for tailings.

46,567¾ tons of tailings were produced from 56,570½ tons milled, equal to 82.3 per cent.

30,487 tons of tailings, having values of over 3dwts. fine gold per ton, and containing 11,797 ozs. 2dwts. 16grs. fine gold, were produced, the net price payable to customers for purchase being £21,674.

Of this total (30,487 tons), only 1,567¼ tons, containing 560 ozs. 0dwts. 6¾grs. fine gold, were not purchased.

16,080¾ tons of tailings, worth under 3dwts. fine gold per ton and containing 1,523ozs. 13dwts. 18¾grs. fine gold, reverted to the Department under Regulation 11.

RECOVERY OBTAINED FROM ORE TREATED.

56,550½ tons of gold bearing ore were milled at batteries under departmental management. The recovery by amalgamation was 45,262.51ozs. bullion, valued at £162,941.

The gross value of the tailings was £56,585, and the gross value of the ore £219,526. (Schedule 5.)

Milling charges amounted to £25,740, leaving a net return to customers from amalgamation of £137,201. (Schedule 8.)

The net amount paid to customers for tailings was £22,214.

The net return received by customers from the treatment of their ore was £159,415, equal to 72.6 per cent. of the gross value (1913—72.1 per cent.).

The average value of the ore per ton was 78s. 11d., as compared with an average value of 85s. 3d. during 1913; a decrease of 6s. 4d. per ton. In view of this decrease it is pleasing to note that the net return to customers increased 0.5 per cent.

NEW PLANTS.

No new batteries were erected during the year. During 1912 and 1913 no less than eight new batteries were put into commission. At the close of the year it was decided to proceed with the erection of a new 5-head battery and tailings plant at 20-mile Sandy Creek, to replace an old and worn-out plant which has done duty for many years past.

The Boogardie plant, which had been leased for two years, reverted to the Department. It was renovated and converted from a 10-head to a 5-head battery, the old steam plant being replaced by a gas engine and charcoal producer, previously used at Nannine.

A slimes plant, an addition to the Wiluna battery, was designed, the material and machinery necessary for construction being ordered and despatched. The plant, when completed, will consist of a 16ft. tube mill, 5 agitating vats, Ridgeway filter, and all accessories, and will be supplied with motive power from a 165 h.p. (wood fuel) producer and 110 b.h.p. gas engine.

Tailings treatment plants were erected at Norseman, Coolgardie, Quinns, Mt. Keith, Black Range, and Bamboo Creek, whilst similar plants for Meekatharra, Ora Banda, Laverton, Yarri, and Burtville were authorised, the necessary material being ordered. (Schedule 6.)

PLANTS CLOSED.

On account of some of the old districts in which State Batteries were operating having come upon hard times, or being able to progress without the assistance of local State plants, several mills were closed.

The plants closed were Lennonville, Mt. Jackson, Nannine, Pigwell, Widgiemooltha, and Wodgina (tin dressing plant).

The Mt. Jackson and Wodgina plants were temporarily leased by this Department from private owners, and, having served their purpose, the leases were not renewed.

The Lennonville plant, which had been leased for several years to a party, reverted to the Department and was closed, there being no ore available for treatment.

Battery.	No. of Stamps.	Date closed.	Remarks.
Lennonville ...	10 ...	24/9/14	
Mt. Jackson ...	10 ...	25/10/14	Lease expired
Nannine ...	5 ...	5/3/14	Removed
Pigwell...	10 ...	22/8/14	Sold by tender
Widgiemooltha	10 ...	5/6/14	do.
Wodgina ...	Huntington Mill, etc.	31/12/14	Lease expired

OUTPUT SINCE INCEPTION.

From inception to the end of 1914, gold and tin to the value of £4,395,008.69 have been recovered at the State Plants; 1,017,559.94 tons of gold ore were

treated and produced £3,693,760.47 worth of gold by amalgamation.

£507,315.02 worth by cyanidation, £105,990.05 from slimes treatment, £3,316.11 from residues, and 68,259.75 tons of tin ore produced tin to the value of £84,627.04. (Schedules 2, 3, and 4.)

THE STAFF.

At the close of the year there were 33 plants in all being operated by the Department.

The managerial staff was reduced to 15 managers and one acting manager at the close of the year, as compared with 17 managers and two acting managers

at the close of 1913, when the Department was operating 37 plants.

One engineer was kept employed with construction work.

Head Office staff was reduced by two clerks and consisted of the Inspector, Engineer and Draftsman, Assayer, Clerk-in-Charge, and five clerks.

It gives me pleasure to place on record the conscientious and efficient services rendered by the whole staff during the year.

I have, etc.,

A. M. HOWE,
Superintendent State Batteries.

SCHEDULE I.

Return showing the number of Tons Crushed, Gold Yield, Average per Ton in Shillings, and Total Value for Year ending 31st December, 1914.

Battery.	Tons crushed.	Gold Yield, Bullion.	Average per ton in shillings.	Total Value.
		ozs.		£
Bamboo Creek	1,428·25	1,611·16	81·23	5,800·18
Black Range	3,819·50	3,263·96	61·52	11,750·25
Boogardie	1,582·00	2,605·72	118·58	9,380·59
Burtville	1,313·50	3,319·15	181·94	11,948·94
Coolgardie	5,476·25	4,010·50	52·60	14,437·80
Darlot	165·75	145·80	63·20	524·88
Laverton	313·50	388·25	89·00	1,397·70
Leonora	849·00	1,696·65	143·89	6,107·94
Linden	1,689·00	1,724·17	73·50	6,207·13
Meekatharra	2,343·25	1,799·02	55·20	6,476·47
Menzies				
Marble Bar	752·50	829·95	79·40	2,987·82
Mt. Egerton	1,139·25	867·24	54·80	3,122·06
Mt. Ida	1,456·00	1,368·05	67·60	4,924·96
Mt. Jackson	560·00	790·26	101·60	2,844·93
Mt. Keith	1,135·00	1,058·15	67·12	3,809·34
Mt. Sir Samuel	281·60	443·70	113·40	1,597·32
Mulline	1,253·75	1,362·67	78·00	4,905·61
Mulwarrie	1,176·75	1,256·60	76·80	4,523·76
Niagara	1,754·75	1,528·50	62·70	5,502·60
Norseman	1,184·50	1,417·30	86·00	5,102·28
Ora Banda	3,863·25	1,564·32	29·00	5,631·55
Payne's Find	2,513·60	3,023·24	86·60	10,883·66
Pinjin	268·50	168·95	45·20	608·22
Quinn's	1,565·25	950·55	43·72	3,421·98
20-Mile Sandy	1,348·25	1,047·20	58·00	3,999·52
Siberia	643·50	566·60	63·38	2,039·76
Wiluna	8,536·00	1,627·75	13·72	5,858·02
Yarri	2,413·60	920·20	27·40	3,312·72
Yerilla	2,649·75	1,948·00	52·80	7,013·80
Youanmi	1,935·00	320·00	11·80	1,152·00
Tuckanarra	20·00	378·50	1,362·60	1,362·60
Ravelstone	1,140·00	1,638·90	103·40	5,898·60
	56,570·50	45,641·01	58·00	164,534·99

TIN PLANTS.

	Tons.	Yield Tons, Blk. Tin.
Greenbushes—B. End	2,162·00	17·478
Do. S. W. G.	864·00	10·766
Marble Bar .. .. .	.. .. .	.. .. .
Wodgina	314·00	11·669
	3,340·00	39·913

SCHEDULE II.

Return showing the number of Tons Crushed, Gold Yield, Average per Ton, and Value since inception to 31st December, 1914.

Battery.	Tons crushed.	Gold Yield Bullion.	Average Gold per ton.	Value.
Bamboo Creek	2,157·25	2,669·66	1·24	9,610·78
Black Range	57,930·15	61,620·34	1·06	222,028·56
Boogardie	46,696·65	27,229·54	·58	99,420·53
Burtville	29,712·50	65,193·41	2·19	236,002·09
Coolgardie	61,373·00	51,680·97	·84	186,108·57
Darlot	33,121·00	37,592·79	1·13	138,762·83
Laverton	12,592·00	13,842·21	1·10	51,003·68
Leonora	51,068·45	54,304·54	1·06	198,976·67
Linden	14,333·25	14,961·46	1·04	53,861·36
Meekatharra	60,113·00	73,753·14	1·23	268,190·69
Menzies	54,574·25	44,199·67	·81	158,966·21
Marble Bar	6,828·50	8,114·10	1·19	29,210·71
Mt. Egerton	3,755·25	2,587·44	·69	8,581·61
Mt. Ida	37,130·90	51,324·21	1·38	188,069·33
Mt. Jackson	3,936·75	6,853·51	1·74	24,672·62
Mt. Keith	3,193·25	2,848·75	·89	10,255·50
Mt. Sir Samuel	7,120·75	5,742·10	·80	20,671·55
Mulline	73,678·45	95,603·52	1·30	343,352·81
Mulwarrie	30,293·15	35,098·96	1·16	129,612·95
Nannine	10,116·35	5,971·84	·59	21,498·59
Niagara	59,032·75	51,605·87	·87	187,969·33
Norseman	53,273·70	56,235·22	1·06	205,629·26
Ora Banda	6,704·25	2,691·04	·40	9,687·72
Payne's Find	7,766·00	9,222·79	1·19	33,202·04
Pigwell	16,666·50	16,712·73	1·03	60,165·81
Pinjin	17,088·65	12,912·63	·75	46,485·04
Quinn's	8,278·25	4,686·70	·56	16,872·12
20-Mile Sandy	10,536·15	17,357·22	1·65	62,815·56
Siberia	13,308·00	14,452·29	1·09	51,953·57
Wiluna	52,275·25	28,350·40	·54	102,206·61
Yarri	51,546·50	26,986·31	·53	97,150·54
Yerilla	13,968·25	12,830·40	·92	43,388·36
Youanmi	20,832·00	7,784·69	·37	28,024·88
Lennonville	30,496·39	34,578·09	1·14	12,537·86
Tukanarra	15,476·85	21,276·06	1·38	78,217·53
Widgiemootha	5,711·00	2,413·43	·43	8,949·40
Ravelstone	13,133·80	13,121·22	·99	48,407·63
Batteries Closed	31,740·80	22,859·76	·72	84,239·57
	1,017,559·94	1,017,269·01	·99	3,693,760·47

TIN PLANTS.

	Tons.	Yield Tons, Blk. Tin.
Greenbushes—B. End	48,593·50	666·254
Do. S. W. G.	3,862·00	35·026
Do. North End	15,026·00	163·827
Wodgina	14·25	·275
Marble Bar	764·00	24·429
	68,259·75	890·811

MILLING.			CYANIDING SANDS—continued.			Tons
	Tons.	ozs.	Up to 1909			
Up to 1901 (3 years)	68,791	75,533	1910	.. .. .	.. .. .	61,265
1902	39,517	57,255	1911	.. .. .	.. .. .	43,915
1903	49,233	58,305	1912	.. .. .	.. .. .	27,444
1904	71,616	78,309	1913	.. .. .	.. .. .	18,599
1905	85,018	92,327	1914	.. .. .	.. .. .	18,300
1906	95,831	94,187				6,219
1907	95,280	97,962				
1908	95,624	89,875			TAILINGS.	
1909	94,218	83,127	1913	.. .. .	.. .. .	13,078
1910	89,278	80,074	1914	.. .. .	.. .. .	32,723
1911	59,373	56,265				
1912	56,636	53,868			SLIMES TREATMENT.	
1913	60,573	52,515	Up to 1904	.. .. .	.. .. .	691
1914	56,570	45,641	1905	.. .. .	.. .. .	7,028
			1906	.. .. .	.. .. .	.. .. .
			1907	.. .. .	.. .. .	.. .. .
			1908	.. .. .	.. .. .	8,220
			1909	.. .. .	.. .. .	5,818
			1910	.. .. .	.. .. .	16,848
			1911	.. .. .	.. .. .	28,819
			1912	.. .. .	.. .. .	20,821
			1913	.. .. .	.. .. .	8,085
			1914	.. .. .	.. .. .	6,089
						6,246
Up to 1902		Tons.				
1903		29,255				
1904		32,369				
1905		42,559				
1906		54,420				
1907		60,422				
1908		63,778				
1909		62,081				

SCHEDULE 3.

Sands and Tailings Treatment for 1914.

Battery.	Tons.	Yield. Fine ozs.	Value—£.
Black Range	1,716	403·51	1,714·16
Boogardie .. ..	..	5·66	24·06
Coolgardie	5,400	635·35	2,698·92
Leonora	2,987	756·78	3,214·80
Linden	900	344·42	1,463·10
Mt. Keith	1,778	219·64	933·01
Mt. Sir Samuel	1,780	408·58	1,735·64
Mulline	348·50	143·66	610·23
Mulwarrie	713·75	216·87	920·24
Niagara	1,209	119·08	505·86
Norseman	900	176·62	750·28
Payne's Find	2,632	378·10	1,606·19
Quinn's	6,454	566·60	2,406·87
Sandy Creek	190	55·81	237·01
Wiluna	2,831	1,481·91	6,295·22
Yarri	3,060	347·09	1,474·38
Yerilla	4,120	452·39	1,921·76
Youanmi.. ..	568	98·90	420·12
	37,587·25	..	..
Plus Sandy Creek under treatment	707		
Plus Wiluna under treatment	532		
Plus Mt. Keith under treatment	480		
	1,719		
	39,306·25		
Less treated Dec., 1913: Black Range	280		
Wiluna	84		
	364		
	38,942·25	6,810·97	28,931·85

Slimes Treatment, 1914.

Battery.	Tons.	Yield. Fine ozs.	Value—£.
Yarri	630	77·04	327·26
Boogardie	882	141·72	602·01
Norseman	4,506·50	734·05	3,118·28
Mulline	228·00	..	..
	6,246·50	952·81	4,047·55
Menzies Residues	11,040	780·63	3,316·11
Lubra Queen	2,952	268·64	1,141·17

SCHEDULE 4.

Sands Treatment since Inception to 31st December, 1914.

Battery.	Tons.	Yield, Fine ozs.	Value—£.
Black Range	32,818	8,932·40	37,657·60
Boogardie	29,432	7,707·94	32,210·53
Burtville	15,558·75	5,142·94	21,429·25
Coolgardie	32,544	5,283·04	22,155·66
Darlot	23,654	2,699·17	11,042·16
Devon	261·50	120·44	511·64
Duketon	2,083·50	250·51	1,025·77
Laverton	9,350	1,091·14	4,439·24
Lennonville	24,309	6,592·43	26,653·23
Leonora	35,355·50	8,749·90	36,396·60
Linden	10,957	3,399·84	14,442·91
Meekatharra	34,190	7,019·82	29,200·54
Menzies	30,587·50	7,891·04	33,074·71
Mt. Ida	3,570	357·97	1,423·64
Mt. Keith	1,778	219·64	933·01
Mt. Sir Samuel	4,746	1,033·82	4,391·70
Mulline	41,804·50	11,704·27	47,497·17
Mulwarrie	23,585·25	4,608·11	18,933·69
Nannine	3,650	410·12	1,742·50
Niagara	38,126	6,060·04	25,162·52
Norseman	37,106·50	7,596·29	31,509·91
Payne's Find	5,437	729·02	3,096·92
Pig Well	11,379	2,373·25	9,962·50
Pinjin	11,718	1,243·07	5,256·01
Quinn's	6,454	566·60	2,406·87
Randalls	791	56·05	224·80
Sandy Creek	8,331·25	2,640·42	11,083·35
Siberia	5,550	1,201·56	5,105·20
Southern Cross	3,471	452·75	1,815·18
Wiluna	17,180	7,638·53	32,349·35
Yarri	33,940	3,148·18	13,109·56
Yerilla	12,920	1,558·95	6,622·28
Youanmi	8,367	2,481·15	10,539·77
Yundamindera	4,977	920·33	3,909·25
	565,982·25	121,880·73	507,315·02

Slimes Treatment since inception to 31st December, 1914.

Battery.	Tons.	Yield, Fine ozs.	Value—£.
Black Range	13,040	2,604·59	11,064·71
Boogardie	2,100	426·35	1,811·08
Burtville	1,643	519·00	2,204·71
Darlot	570	52·61	223·55
Laverton	273	45·24	192·19
Leonora	12,440	2,198·09	9,338·73
Linden	419	87·30	370·90
Meekatharra	1,980	462·78	1,966·08
Menzies	21,905·50	5,454·53	23,171·45
Mulline	21,576·75	6,833·05	24,557·11
Niagara	13,875	2,175·45	9,242·12
Norseman	16,177·50	3,577·15	15,195·06
Pig Well	340	64·65	274·57
Sandy Creek	293·50	75·00	318·68
Siberia	347	104·47	443·73
Wiluna	2,597	913·21	3,879·43
Yarri	3,792	364·06	1,546·62
Yerilla	424	44·55	189·33
	113,793·25	26,002·08	105,990·05

SCHEDULE 5.

Return showing Number of Parcels treated and Tons crushed at State Batteries for Year 1914.

Number of parcels crushed.	Name of Lease or Holding.	Tons.	Yield by Amalgamation Bullion.	Yield by Amalgamation Fine Gold.	Gross Contents of Tailings. Fine Gold.	Total Contents of Ore. Fine Gold	Average per ton. Fine Gold.	Gross Value of Ore. per ton.
			ozs.	ozs.	ozs.	ozs.	dwt. grs.	£ s. d.
28	Bamboo Creek	1,428.25	1,611.16	1,365.39	347.53	1,712.92	23 23	5 1 8
55	Black Range	3,819.50	3,263.96	2,766.07	768.31	3,534.38	18 15	3 19 0
35	Boogardie	1,582.00	2,605.72	2,208.24	1,065.06	3,273.30	41 9	8 15 8
19	Burtville	1,313.50	3,319.15	2,812.84	333.34	3,146.18	47 22	10 3 6
126	Coolgardie	5,476.25	4,010.50	3,398.73	803.16	4,201.89	15 8	3 5 1
5	Darlot	165.75	145.80	123.56	35.31	158.87	19 4	4 1 5
10	Laverton	313.50	388.25	329.03	165.43	494.46	31 13	6 13 10
26	Leonora	849.00	1,696.65	1,437.84	203.09	1,640.93	38 16	8 4 2
36	Linden	1,689.00	1,724.17	1,461.16	682.74	2,143.90	25 9	5 7 8
19	Marble Bar	759.50	829.95	703.35	93.44	796.79	20 23	4 8 11
38	Meekatharra	2,343.25	1,799.02	1,524.59	354.68	1,879.27	16 0	3 8 0
16	Mt. Egerton	1,204.25	867.24	734.95	389.06	1,124.01	18 16	3 19 2
18	Mt. Ida	1,456.00	1,368.05	1,159.36	311.83	1,471.19	20 5	4 5 9
10	Mt. Jackson	560.00	790.26	669.71	106.54	776.25	27 17	5 17 8
14	Mt. Keith	1,135.00	1,058.15	896.74	159.60	1,056.34	18 15	3 19 0
10	Mt. Sir Samuel	281.50	443.70	376.01	113.70	489.71	34 19	7 7 9
58	Mulline	1,378.75	1,362.67	1,154.80	284.23	1,439.03	20 20	4 8 5
41	Mulwarrie	1,176.75	1,256.60	1,064.91	360.81	1,425.72	24 5	5 2 10
36	Niagara	1,754.75	1,528.50	1,295.34	236.62	1,531.96	17 11	3 14 1
27	Norseman	1,184.50	1,417.30	1,201.10	291.35	1,492.45	25 5	5 7 0
52	Ora Banda	3,830.75	1,564.32	1,325.69	596.02	1,921.71	10 0	2 2 6
42	Payne's Find	2,513.50	3,023.24	2,562.06	364.20	2,926.26	23 7	4 18 10
5	Pinjin	268.50	168.95	143.18	36.92	180.10	13 10	2 16 11
24	Quinn's	1,545.25	950.55	805.55	228.18	1,033.73	13 9	2 16 9
32	Ravelstone	1,140.00	1,638.90	1,388.89	231.00	1,619.89	28 10	6 0 7
9	20-Mile Sandy Creek ..	1,348.25	1,047.20	887.45	312.38	1,199.83	17 19	3 15 6
10	Siberia	643.50	566.60	480.10	115.93	596.03	18 12	3 18 7
57	Wiluna	8,536.00	1,627.75	1,379.45	3,532.04	4,911.49	11 12	2 8 9
34	Yarri	2,413.50	920.20	779.83	232.46	1,012.29	8 9	1 15 6
19	Yerilla	2,649.75	1,948.00	1,650.85	338.26	1,989.11	15 0	3 3 9
9	Youanmi	1,935.00	320.00	271.19	227.48	498.67	5 4	1 1 11
920		56,695.00	45,262.51	38,357.96	13,320.70	51,678.66	18 14	3 18 11
1	Tuckanarra	20.00	378.50	320.76	..	320.76	320 18	68 2 5
921	Total Tonnage treated..	56,715.00						
	Less Estimated tonnage under treatment at 31st December, 1913	197.00						
		56,518.00						
	Estimated—Add tonnage under treatment 31st December, 1914 ..	52.50						
		56,570.50	45,641.01					

TIN PLANTS.

No. of Parcels.	Battery.	Yards of Tin ground treated.	Yield.	Average per yard.
50	Greenbushes, Bunbury end ..	2,162	Tons. 17.478	qrs. lbs. 0 18.00
24	Greenbushes, S. W. Gully..	864	10.766	0 27.77
17	Wodgina	314	11.669	2 27.00
		3,340	39.913	0 26.65

SCHEDULE 6.

Expenditure from Consolidated Revenue Vote and Loan Expenditure Funds on Erection of State Batteries for year ending 31st December, 1914, and Totals since Inception.

Battery.	From Revenue.			From Loan.			Total.		
	£	s.	d.	£	s.	d.	£	s.	d.
Mount Jackson, Battery Lease	350	0	0	350	0	0
Bamboo Creek, Battery Erection	234	12	5	234	12	5
Norseman, 5-Head Battery Erection	cr. 17	2	5	cr. 17	2	5
Norseman, Cyanide Plant Erection	39	13	4	39	13	4
Wodgina, Tin Lease	61	15	0	61	15	0
Greenbushes, Boring Operations	158	7	8	158	7	8
Coolgardie, Renovation and Purchase of Cyanide Plant	0	4	6	0	4	6
Quinn's, Cyanide Plant Erection	691	2	7	691	2	7
Mt. Keith, Cyanide Plant Erection	1,178	8	10	1,178	8	10
Menzies, Residues Treatment Plant..	752	7	9	752	7	9
Black Range, Tailings Treatment Plant	314	2	2	314	2	2
Wiluna, Slimes Plant Erection	4,523	0	8	4,523	0	8
Boogardie, General Overhaul..	1,095	15	9	1,095	15	9
Bamboo Creek, Tailings Plant Erection	958	12	1	958	12	1
Meekeatharra, Tailings Plant Erection	19	5	3	19	5	3
Ora Banda, Tailings Plant Erection	116	5	2	116	5	2
Laverton, Tailings Plant Erection	129	12	0	129	12	0
Yarri, Tailings Plant Erection	18	3	8	18	3	8
Burtville, Tailings Plant Erection	60	13	4	60	13	4
Youanmi, Battery Water Supply	148	13	11	148	13	11
..	10,833	13	8
..	10,833	13	8
Erection of State Batteries:—
Expenditure to 31st December, 1907	91,981	1	8	..	..	..	..	..	..
Loan Expenditure to 31st December, 1913	240,396	15	1	332,377	16	9
Grand Total	91,981	1	8	251,230	8	9	343,211	10	5

SCHEDULE 7.

Direct Purchases, 1914.

Battery.	TAILINGS.		SLIMES.	
	Tons.	Amount paid.	Tons.	Amount paid.
		£ s. d.		£ s. d.
Bamboo Creek	101.25	80 11 5	..	..
Black Range	2,967.50	1,271 17 7	..	..
Boogardie	290.75	732 10 2	..	..
Burtville	788.25	641 6 10	100.09	44 3 9
Coolgardie	1,745.25	858 3 11	..	..
Laverton	294.00	432 11 7	..	..
Leonora	841.00	625 18 9	..	..
Linden	1,462.50	1,805 17 6	..	..
Meekatharra	1,140.00	361 11 8	282.50	106 8 0
Menzies	178.00	42 3 0	..	..
Mt. Keith	1,648.00	202 10 2	..	..
Mt. Sir Samuel	4,309.00	1,151 19 5	..	..
Mulline	846.75	508 2 9	..	..
Mulwarrie	970.25	837 5 5	..	..
Niagara	1,033.25	351 11 5	..	..
Norseman	576.50	619 11 8	..	..
Ora Banda	2,307.75	910 1 5	..	..
Payne's Find	2,816.00	933 11 7	..	..
Pinjin	59.50	26 15 6	..	..
Quinn's	236.00	203 5 8	..	..
Sandy Creek	397.00	186 17 9	..	..
Siberia	368.00	327 13 0	..	..
Wiluna	6,450.50	7,302 8 6	..	..
Yarri	312.50	199 2 0	..	..
Yerilla	1,063.75	209 2 6	..	..
Youanmi	763.75	79 7 11	..	..
	33,967.00	20,901 19 1	382.59	150 11 9

SCHEDULE 8.

ANNUAL REPORT, 1914.

Statement of Receipts and Expenditure for year ending 31st December, 1914 (excluding additions and Equipment).

Plant.	MILLING AND TIN.																	
	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.
Bamboo Creek	1,428½	210 11 5	481 9 1	368 1 4	1,060 1 10	14 10-13	14 3 7	109 0 3	1,183 5 8	16 6-82	860 13 11	12 0-62	..	..	322 11 9	..	..	..
Black Range	3,819½	241 15 0	837 2 7	592 8 8	1,671 6 3	8 9-00	8 9-00	229 19 4	2,406 6 6	12 7-20	1,900 3 5	9 11-38	..	..	506 3 1	..	..	..
Boogardie	1,582	121 17 9	409 11 1	149 17 5	681 6 3	8 7-34	8 7-34	76 8 3	838 2 3	10 7-12	768 1 11	9 8-52	..	..	70 0 4	..	..	..
Burtville	1,313½	164 19 0	282 17 3	121 12 6	569 8 9	8 8-04	8 8-04	93 19 3	753 1 7	11 5-59	629 18 5	9 7-08	..	..	123 3 2	..	..	..
Coolgardie	5,476½	157 16 6	535 5 9	815 18 3	1,509 0 6	5 6-12	5 6-12	210 6 9	1,924 19 11	7 0-36	1,997 1 3	7 3-50	72 1 4	..	..	..	..	..
Darlot	165½	20 0 0	144 18 10	49 19 10	214 18 8	25 11-20	25 11-20	10 1 1	247 2 4	29 9-80	86 15 2	10 5-61	..	..	160 7 2	..	..	..
Laverton	313½	122 10 0	197 17 1	88 18 6	409 5 7	26 1-32	26 1-32	75 7 0	520 9 6	33 2-44	162 4 0	10 4-15	..	..	358 5 6	..	..	..
Leonora	849	97 4 2	195 12 10	173 11 2	466 8 2	10 11-83	10 11-83	77 13 4	598 5 1	14 1-10	456 2 0	10 8-92	..	..	142 3 1	..	..	..
Lindon	1,689	159 0 0	295 1 11	301 13 4	755 15 3	8 11-37	8 11-37	143 18 6	963 9 3	11 4-89	897 11 3	10 7-53	..	..	65 18 0	..	..	..
Marble Bar	752½	188 3 4	233 14 10	134 9 5	556 7 7	14 9-43	14 9-43	19 15 6	698 7 1	18 6-72	433 16 10	11 6-36	..	..	264 10 3	..	..	..
Meekatharra	2,343½	235 10 9	547 0 0	342 0 5	1,124 11 2	9 7-17	9 7-17	66 15 3	1,292 6 10	11 0-26	990 15 5	8 5-47	..	..	301 11 5	..	..	..
Menzies	..	6 10 0	35 7 2	4 15 10	46 13 0	..	..	..	69 4 8	..	..	..	..	..	69 4 8	..	..	..
Mt. Egerton	1,139½	232 0 0	244 8 7	241 19 10	718 8 5	12 7-34	12 7-34	15 13 6	790 10 11	13 10-53	593 13 0	10 5-05	..	..	196 17 11	..	..	..
Mt. Ida	1,456	169 0 0	405 8 3	187 15 2	762 3 5	10 5-61	10 5-61	19 12 2	840 6 8	11 6-50	696 11 3	9 6-81	..	..	143 15 5	..	..	..
Mt. Jackson	560	275 9 8	140 16 5	186 0 10	602 6 11	21 6-14	21 6-14	40 15 5	698 6 9	24 11-28	346 4 4	12 4-36	..	..	352 2 5	..	..	..
Mt. Keith	1,135	231 10 6	419 14 9	230 17 4	882 2 7	15 6-52	15 6-52	73 0 2	1,019 0 9	17 11-47	595 6 6	10 5-88	..	..	423 14 3	..	..	..
Mt. Sir Samuel	281½	108 0 1	164 7 0	69 5 8	341 12 9	24 3-26	24 3-26	45 18 1	432 3 7	30 8-44	156 14 5	11 1-60	..	..	275 9 2	..	..	..
Mulline	1,253½	193 11 7	384 7 9	318 16 4	896 15 8	14 3-64	14 3-64	46 14 2	1,025 2 4	16 4-22	673 1 11	10 8-83	..	..	352 0 5	..	..	..
Mulwarrie	1,176½	76 19 4	421 3 4	283 9 11	781 12 7	13 3-40	13 3-40	189 19 3	1,133 2 2	19 3-09	577 11 0	9 9-79	..	..	555 11 2	..	..	..
Nannine	..	..	30 13 1	5 1 6	35 14 7	..	..	..	39 18 5	..	..	..	..	..	39 18 5	..	..	..
Niagara	1,754½	76 0 0	485 6 7	357 10 8	918 17 3	10 5-66	10 5-66	221 19 4	1,363 9 5	15 6-48	881 11 0	10 0-55	..	..	481 18 5	..	..	..
Norseman	1,184½	56 0 0	371 4 0	298 14 10	725 18 10	12 3-07	12 3-07	66 8 11	907 5 8	15 3-81	612 8 1	10 4-03	..	..	294 17 7	..	..	..
Ora Banda	3,863½	338 6 5	859 8 9	601 18 11	1,799 14 1	9 3-79	9 3-79	137 2 2	2,138 17 11	11 0-86	1,352 0 7	6 11-97	..	..	786 17 4	..	..	..
Payne's Find	2,513½	247 0 0	790 1 0	500 6 9	1,537 7 9	12 2-78	12 2-78	284 11 9	1,969 17 7	15 8-08	1,334 6 2	10 7-39	..	..	635 11 5	..	..	..
Pig Well	..	..	..	3 10 1	3 10 1	..	..	..	19 13 10	..	..	..	..	..	19 13 10	..	..	..
Pinjin	268½	22 10 0	181 0 9	69 10 10	273 1 7	20 4-09	20 4-09	12 10 5	320 15 11	23 10-72	140 19 3	10 6-00	..	..	179 16 8	..	..	..
Quinn's	1,565½	114 7 5	489 15 2	223 2 3	827 4 10	10 6-84	10 6-84	77 3 5	993 5 2	12 8-28	823 10 2	10 6-26	..	..	169 15 0	..	..	..
Ravelstone	1,140	128 0 0	206 1 5	153 1 9	487 3 2	8 6-55	8 6-55	23 3 0	571 4 11	10 0-26	547 11 8	9 7-27	..	..	23 13 3	..	..	..
20-Mile Sandy	1,348½	152 14 9	452 1 9	665 11 7	1,270 8 1	18 10-12	18 10-12	122 10 8	1,524 19 5	22 7-45	812 11 0	12 0-62	..	..	712 8 5	..	..	..
Siberia	643½	36 2 11	240 10 9	101 18 9	378 12 5	11 9-19	11 9-19	0 17 10	426 3 5	13 2-92	367 6 10	11 4-99	..	..	58 16 7	..	..	..
Wiluna	8,536	317 13 10	1,887 10 1	772 6 7	2,977 10 6	6 11-71	6 11-71	218 9 0	3,572 4 3	8 4-41	2,859 17 9	6 8-40	..	..	712 6 6	..	..	..
Yarri	2,413½	155 4 2	425 19 10	397 16 3	979 0 3	8 1-34	8 1-34	206 0 2	1,306 12 4	10 9-91	1,234 8 5	10 2-73	..	..	72 3 11	..	..	..
Yerilla	2,649½	51 5 0	845 11 6	446 15 6	1,343 12 0	10 1-69	10 1-69	50 19 1	1,510 9 3	11 4-80	1,387 17 8	10 5-68	..	..	122 11 7	..	..	..
Youanmi	1,935	103 0 0	436 14 9	210 10 10	750 5 7	7 9-04	7 9-04	211 3 2	1,094 0 0	11 3-67	563 8 0	5 9-86	..	..	530 12 0	..	..	..
Tuckanarra	20	..	..	..	..	..	..	..	..	..	1 5 0	..	..	..	1 5 0	..	..	..
Burtville Sales	..	..	..	55 16 0	55 16 0	..	..	..	55 16 0	..	55 16 0	..	..	..	..	..	..	..
Laverton Sales	..	..	..	11 9 1	11 9 1	..	..	..	22 14 1	..	22 14 1	..	..	..	..	..	..	..
Lennonville Sales	..	..	..	..	..	..	..	..	..	..	11 15 4	..	..	..	11 15 4	..	..	..

Menzies Sales .. ..	..	..	..	..	..	..	..	..	1 1 0	1 1 0	..	1 1 0	..	..	..
Meekatharra Sales .. ..	..	..	..	60 10 0	60 10 0	..	..	..	..	60 10 0	..	60 10 0	..	..	..
Mt. Keith Sales .. ..	..	..	..	5 5 0	5 5 0	..	..	..	..	5 5 0	..	5 5 0	..	..	..
Mt. Ida Sales .. ..	..	..	..	10 0 0	10 0 0	..	..	..	..	10 0 0	..	10 0 0	..	..	..
Mt. Jackson Sales .. ..	..	..	..	15 0 0	15 0 0	..	..	..	..	15 0 0	..	15 0 0	..	..	..
Mt. Sir Samuel Sales .. ..	..	..	..	..	..	..	..	..	..	..	..	5 0 0	..	5 0 0	..
Mulline Sales .. ..	..	..	..	2 7 0	2 7 0	..	..	..	5 9 0	7 16 0	..	7 16 0	..	..	..
Payne's Find Sales .. ..	..	..	..	60 0 0	60 0 0	..	..	..	..	60 0 0	..	60 0 0	..	..	..
Pig Well Sales .. ..	..	..	..	..	..	..	..	..	2 3 9	2 3 9	..	22 18 1	..	20 14 4	..
Pinjin Sales .. ..	..	..	..	25 11 3	25 11 3	..	..	..	..	25 11 3	..	25 11 3	..	..	..
Ravelstone Sales .. ..	..	..	..	74 5 3	74 5 3	..	..	..	..	74 5 3	..	74 5 3	..	..	..
Siberia Sales .. ..	..	..	..	..	..	..	..	..	34 6 0	34 6 0	..	34 6 0	..	..	..
Totals	56,570½	4,810 13 7	14,078 3 11	9,789 12 5	28,678 9 11	10 1.65	3,362 0 7	3,526 9 2	35,566 19 8	12 6.88	26,153 5 7	9 2.95	110 16 0	9,524 10 1	
TIN PLANTS.															
Greenbushes, Bunbury End ..	2,162	180 0 0	146 1 3	120 0 8	446 1 11	4 1.51	74 13 3	62 12 11	583 8 1	5 4.75	375 14 10	3 5.71	..	207 13 3	
Do. S.W. ..	864	180 0 0	85 12 2	45 5 1	310 17 3	7 2.32	16 4 9	15 18 0	343 0 0	7 11.25	200 3 6	4 7.58	..	142 16 6	
Do. N.E. Sales ..	..	..	..	..	..	..	..	..	..	..	6 0 0	..	6 0 0	..	
Wodgina	314	246 18 4	36 6 7	45 2 9	328 7 8	20 10.99	2 12 2	44 17 2	375 17 0	23 11.25	162 17 0	10 4.46	..	213 0 0	
Do. Sales .. ..	..	..	..	15 4 0	15 4 0	..	..	..	15 4 0	..	15 4 0	..	..	..
Totals	59,910½	5,417 11 11	14,346 3 11	10,015 4 11	29,779 0 9	..	3,455 10 9	3,649 17 3	36,884 8 9	..	26,913 4 11	..	116 16 0	10,087 19 10	

SCHEDULE 9.
ANNUAL REPORT, 1914.

Statement of Receipts and Expenditure for twelve months ending 31st December, 1914 (excluding Additions and Equipment).

Plant.	CYANIDE AND SLIMES.															
	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.	
Black Range	1,436	£ s. d. 46 3 6	£ s. d. 170 14 10	£ s. d. 39 14 0	£ s. d. 119 2 10	£ s. d. 375 15 2	s. d. 5 2·78	£ s. d. 8 10 0	£ s. d. 57 8 1	£ s. d. 441 13 3	s. d. 6 1·80	£ s. d. 707 12 11	s. d. 9 10·24	£ s. d. 265 19 8	£ s. d.	
Burtville		10 0 0				10 0 0		17 9 8	2 16 3	30 5 11					30 5 11	
Coolgardie	5,400	94 3 6	677 12 7	28 11 3	361 9 5	1,161 16 9	4 3·62	8 6 7	273 5 4	1,443 8 8	5 4·15	1,846 1 4	6 10·03	402 12 8	1 13 4	
Laverton				1 13 4		1 13 4				1 13 4						
Leonora	2,987	127 0 0	452 15 6	40 14 10	214 10 2	835 0 6	5 7·08	21 16 8	150 16 7	1,007 13 9	6 8·95	1,520 8 5	10 2·16	512 14 8		
Linden	900	45 0 0	106 6 1	13 5 6	107 14 7	272 6 2	6 0·60		36 17 6	309 3 8	6 10·44	442 19 0	9 10·11	133 15 4		
Meekatharra		12 6 10	2 12 6	1 2 6		16 1 10				16 1 10					16 1 10	
Mt. Keith	2,258	97 2 6	273 11 0	24 11 4	153 18 1	549 2 11	4 10·36	13 0 7	87 9 11	649 13 5	5 9·04	1,019 1 8	9 0·31	369 8 3		
Mt. Sir Samuel	1,780	160 10 11	235 19 2	108 3 3	443 4 7	947 17 11	10 7·80	21 16 1	88 14 7	1,058 8 7	11 10·57	1,033 4 2	11 7·29		25 4 5	
Mulline	348½	25 4 3	84 4 0	23 15 1	57 15 7	190 18 11	10 11·49	9 9 10	26 16 9	227 5 6	13 0·50	169 7 1	9 8·61		57 18 5	
Mulwarrie	713½	43 8 9	127 16 2	38 3 2	98 14 4	308 2 5	8 7·58	5 5 5	48 15 8	362 3 6	10 1·77	216 10 11	6 0·79		145 12 7	
Niagara	1,209	15 10 0	149 6 8	22 2 11	64 4 8	251 4 3	4 1·84	0 13 4	60 6 8	312 4 3	5 1·96	476 1 5	7 10·48	163 17 2		
Norseman	900	36 5 8	103 13 3	12 1 8	86 1 11	238 2 6	5 3·48	31 13 10	66 6 5	336 2 9	7 5·61	573 2 6	12 8·83	236 19 9		
Ora Banda				2 12 5	1 1 10	3 14 3				3 14 3					3 14 3	
Payne's Find	2,632	98 0 0	504 7 7	63 0 1	224 16 4	890 4 0	6 9·16	1 4 4	140 14 5	1,032 2 9	7 10·10	1,127 9 0	8 6·79	95 6 3		
Quinns	6,454	75 15 0	693 3 4	220 11 1	326 1 11	1,315 11 4	4 0·91	23 0 11	232 14 7	1,571 6 10	4 10·41	1,571 6 10	4 10·41			
Siberia				1 3 9	0 10 0	1 13 9			0 6 3	2 0 0					2 0 0	
Wiluna	3,279	96 6 2	474 14 4	138 3 4	416 11 6	1,125 15 4	6 10·39	4 16 1	232 6 4	1,362 17 9	8 3·74	1,631 4 10	9 11·37	268 7 1		
Yarri	3,060	144 15 8	410 15 9	45 8 7	225 4 6	826 4 6	5 4·80	4 7 9	135 1 9	965 14 0	6 3·72	984 14 7	6 5·23	19 0 7		
Yerilla	4,120	47 5 0	498 4 10	92 19 3	231 0 11	869 10 0	4 2·64	8 16 8	163 6 3	1,041 12 11	5 0·67	1,816 17 1	8 9·81	775 4 2		
Youanmi	568	17 0 0	63 0 0	19 12 11	58 16 2	158 9 1	5 6·93	40 9 5	43 0 7	241 19 1	8 6·21	269 6 0	9 5·78	27 6 11		
20-Mile Sandy	897	55 5 9	120 18 9	18 18 4	54 19 8	250 2 6	5 6·91	35 1 6	38 4 2	323 8 2	7 2·52	434 17 8	9 8·35	111 9 6		
	38,942½	1,247 3 6	5,149 16 4	956 8 7	3,245 19 0	10,599 7 5	5 5·30	255 18 8	1,885 8 1	12,740 14 2	6 6·50	15,840 5 5	8 1·60	3,382 2 0	282 10 9	
SLIMES.																
Boogardie	882	24 0 0	234 16 5	67 0 11	131 19 4	457 16 8	10 4·57	3 1 10	76 13 10	537 12 4	12 2·28	537 12 4	12 2·28			
Mulline	228	10 16 1	47 18 1	30 12 3	24 11 0	113 17 5	9 11·85		20 18 9	134 16 2	11 9·04				134 16 2	
Norseman	4,506½	120 5 8	1,159 1 0	84 11 4	656 1 11	2,019 19 11	8 11·56	230 7 7	245 11 4	2,495 18 10	11 0·91	2,068 3 0	9 2·13		427 15 10	
Yarri	630	27 10 2	97 15 0	11 14 4	48 1 10	185 1 4	5 10·48	15 1 0	22 4 6	222 6 10	7 0·69	206 14 9	6 6·74		15 12 1	
	45,188½	1,429 15 5	6,689 6 10	1,150 7 5	4,106 13 1	13,376 2 9	5 11·04	504 9 1	2,250 16 6	16,131 8 4	7 1·65	18,652 15 6	8 3·04	3,382 2 0	860 14 10	
Menzies Residues	11,040	182 0 0	854 12 0	77 19 1	569 16 10	1,684 7 11	3 0·60	3 12 0	544 18 5	2,232 18 4	4 0·52	2,232 18 4	4 0·52			
Lubra Queen (Niagara)	2,052	23 0 0	329 0 3	35 1 1	139 14 3	526 15 7	5 1·60	81 7 0	73 11 1	681 13 8	6 7·72	784 5 8	7 7·72	102 12 0		
	58,280½	1,634 15 5	7,872 19 1	1,263 7 7	4,816 4 2	15,587 6 3	..	589 8 1	2,869 6 0	19,046 0 4	..	21,669 19 6	..	3,484 14 0	860 14 10	

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SCHEDULE 10.

WESTERN AUSTRALIA.

STATE BATTERIES.

Balance Sheet from Inception of Scheme to 31st December, 1914.

	£	s.	d.	£	s.	d.		£	s.	d.	£	s.	d.
To Capital Expenditure—							By Batteries Cyanide and						
From General Loan							Slimes Plants ..	343,211	10	5			
Fund	251,230	8	9				Less Depreciation..	231,637	8	3			
From Consolidated											111,514	2	2
Revenue	91,981	1	8				„ Stores				11,715	18	2
				343,211	10	5	„ Sundry Debtors ..				5,950	5	3
To Treasury				68,202	11	9	„ Profit and Loss Ac-				450,969	3	9
„ Interest and Sinking							count						
Fund													
„ Sundry Creditors ..													
				580,209	9	4					580,209	9	4

Profit and Loss Account.

	£	s.	d.	£	s.	d.		£	s.	d.	£	s.	d.
To Expenditure—							By Revenue	928,269	9	10			
Head Office and all							„ Loss on Working carried						
Batteries	982,250	4	0				down	54,014	13	0			
„ Bad Debts	33	18	10					982,284	2	10			
				982,284	2	10							
„ Loss on Working							„ Gross Loss				450,969	3	9
brought down ..	54,014	13	0										
„ Interest at 3½ per cent.													
and Sinking Fund													
at 1½ per cent. on													
Capital Expen-	165,317	2	6										
diture													
„ Depreciation	231,637	8	3										
				450,969	3	9							

SCHEDULE 11.

Working Profit and Loss Account for year ending 31st December, 1914.

	£	s.	d.	£	s.	d.		£	s.	d.	£	s.	d.
To Expenditure, as per							By Revenue as per at-						
attached state-							tached statements—						
ments—							Batteries and Tin						
Batteries and Tin							Plant charges ..	26,913	4	11			
Plants	36,884	8	9				Cyanide and Slimes..	21,669	19	6			
Cyanide and Slimes											48,583	4	5
Plants	19,046	0	4				„ Loss on working car-						
							ried down				7,347	4	8
				55,930	9	1							
											55,930	9	1
„ Loss on Working							„ Net Loss on Year's						
brought down ..	7,347	4	8				Operations				7,418	12	3
„ Additions and Equip-													
ment paid from													
Revenue	71	7	7										
				7,418	12	3							

APPENDIX "A."

[Extract from "Government Gazette" of 22nd January, 1909.]

2000/06.
Department of Mines,
Perth, 20th January, 1909.

HIS Excellency the Governor in Executive Council, under the powers conferred upon him by Section 29 of "The Mining Development Act, 1902," has been pleased to cancel the Regulations gazetted on the 3rd January, 1908, and in lieu thereof to make the following Regulations under which stone will be crushed and tailings purchased at the State Batteries.

H. GREGORY,
Minister for Mines.

(1.) All stone accepted for treatment at State Batteries shall be estimated at 22 cubic feet per ton, except where weighing machines are provided, when stone must pass over same to ascertain weight.

(2.) The manager of the Battery may refuse any stone considered too poor to pay crushing charges, unless a deposit is paid in advance.

(3.) The charge for crushing at each Battery, as determined from time to time by the Hon. the Minister for Mines, shall be posted up at each Battery and strictly adhered to while in force.

(4.) A minimum charge will be made for all parcels of less tonnage than will return five pounds on the rate charged per ton.

(5.) Payment for treatment shall be made to the Manager on completion of crushing, or sufficient gold will be retained to pay the amount due.

(6.) Where a cyanide plant has been erected at a Battery, tailings consisting of sands and slimes resulting from stone crushed at that Battery may be purchased, but the Manager may, in his discretion, refuse to purchase any tailings should he consider them unsuitable for treatment by cyanide.

(7.) The tailings (including slimes) produced from each parcel crushed may be purchased at such plants as may be approved and will be paid for by the Department within 14 days of the date of agreement of assays, at the rate of not more than seventy-five per cent. (75 per cent.) of the gold contents after deducting three (3) pennyweights per ton to cover loss and costs of cyanide treatment. (As amended 9th January, 1912.)

Gold to be paid for at the rate of 80s. per ounce.

(8.) The number of tons of tailings to be paid for from each parcel shall be determined by the Manager, whose decision shall be final, but the amount shall not be less than 80 per cent. nor more than 90 per cent. of the tons crushed.

(9.) The Manager shall take samples of the tailings as they pass through the battery or from the vats into which the tailings may be deposited. The sample collected shall be thoroughly mixed and divided into four samples, one for assay by the Manager, and one for the vendor; the other two shall be sealed, one being sent

to the Perth office of the Mines Department, and the other kept by the Manager for reference or umpire, if necessary.

(10.) Within three weeks of the completion of the crushing the vendor and Manager shall compare assays, and if these differ by not more than six grains per ton the mean of the assays shall be accepted as correct. If there should be a greater difference than six grains between the assays, the umpire sample shall be sent by the Manager to the Government Assayer at Perth, whose assay shall be accepted as final by both parties. The cost of the umpire's assay (10s.) shall be borne by the party whose assay differs most from the umpire's result. The Manager's assay shall not be made known to the vendor until he has produced his assay certificate for comparison of assays or has agreed in writing to accept the Manager's assay. If the vendor does not produce an assay certificate for comparison within 21 days of the completion of the crushing, the Manager's assay shall be final.

If the Manager considers any sample shows an abnormal assay value for the grade of ore producing the tailings, he may refer the matter to the Minister, whose decision as to the values to be paid on shall be indisputable and final.

(11.) All tailings assaying less than three (3) pennyweights per ton shall become the property of the Government.

(12.) Where no cyanide plant has been erected at a Battery, any person desirous of claiming tailings, the proceeds of his crushing, may remove them to a site clear of the settling area immediately the crushing is completed, and must notify the Manager of his intention to do so previous to commencement of the crushing. All tailings not so removed shall be deemed abandoned, and may be dealt with as the Minister may direct.

(13.) All stone will be delivered and received for treatment absolutely at the owner's risk, and the Government shall not be responsible for any suspension of operations, delays in treatment, or for any loss or damage arising from any cause whatsoever.

(14.) Any customer or his deputy may be present during the crushing of his parcel, but shall take no part in the treatment except by the express permission, and under the direction of the Manager.

(15.) At every Battery there shall be kept a book in which shall be recorded the number of tons in each parcel left for treatment, the name, locality, and number of the lease or holding from which it is obtained, and the name of the person for whom the stone is to be crushed.

(16.) A copy of the foregoing rules shall be inserted in the said book, and every person sending stone for treatment shall sign opposite the entry relating to the stone lodged by him, and such signature shall be sufficient evidence that he is cognisant of the foregoing rules and agrees to be bound by them.

APPENDIX "B."

Scale of Crushing Charges at State Batteries.

THE Hon. the Minister for Mines has authorised the following differential scale of crushing charges, and conditions attached to same, to take effect at the various State Batteries and Tin Dressing Plants on and after 1st September, 1914.

(1.)

Battery.	No. of Stamps.	Rate per ton.		Rate per hour 10-head.		Rate per hour 5-head.	
		s.	d.	s.	d.	s.	d.
Laverton, Leonora, Menzies, Niagara	10	10	0	16	0	8	6
Black Range, Coolgardie	10	10	0	16	6	8	6
Burtville, Darlot, Linden, Mulline, Mulwarrie, Wiluna, Yarri	10	10	6	16	6	8	6
20-Mile Sandy Creek	10	12	0	20	0	10	0
Boogardie, Meekatharra, Mt. Ida, Mt. Sir Samuel, Norseman, Pinjin, Quinns, Siberia, Yerilla	5	10	6	...	...	8	6
Mt. Keith, Ora Banda, Payne's Find, Ravelstone, Youanmi	5	10	6	...	...	9	0
Mt. Egerton	5	10	6	...	...	10	0
Bamboo Creek, Marble Bar	5	12	0	...	...	10	0

(2.) On all ore yielding two (2) ounces and over of gold per ton (including resultant tailings based on their agreed assay value, less 3dwts. per ton), add 5 per cent. to above charges; 3 ounces and over, 10 per cent.; 5 ounces and over, 15 per cent.

Bamboo Creek, Marble Bar, and 20-Mile Sandy Creek.

2 ounces to 3 ounces, add 5 per cent.; 3 ounces to 4 ounces, add 10 per cent.; over 4 ounces, add 15 per cent.

These increases apply to stone treated per hour or per ton.

(3.) One parcel of ore, not exceeding 25 tons, may be crushed per quarter from each lease at the minimum rate, provided the value of same, including tailings, is not over five ounces per ton.

(4.) When any small parcel of high-grade ore, not exceeding 25 tons, can be shown to have been obtained at great expense, the Superintendent of State Batteries may allow the same to be treated at the minimum charge.

(5.) In the event of any small parcel of exceptionally high-grade ore being treated, the Manager may make a special charge; but the customer may, if he considers he has been overcharged, appeal to the Superintendent of State Batteries, whose decision shall be final.

(6.) Batteries will be closed down until 500 tons of ore are available for crushing at 10-head mills and 300 tons at 5-head mills, but in the event of any prospector desiring to crush during such period, feeder's wages, in addition to above rates, will be charged. The employment and control of feeders in such cases shall be solely in the control of the Battery Manager.

(7.) *Tin Dressing Plants:—*

Plant.	Rate per hour.	Rate per ton.
Greenbushes, Bunbury End ..	6s. 3d. plus feeder's wages	..
Greenbushes, Salt Water Gully	8s. 6d.	..
Wodgina .. .. .	..	10s.

APPENDIX "C."

Reductions in Scale of Crushing Charges at State Batteries during the War Period.

THE Hon. the Minister for Mines has authorised the following reductions in the Scale of Crushing Charges, and conditions attached to same, to take effect at the various State Batteries on and after 1st October, 1914:—

1. The following substantial reductions in the crushing charges at all State Batteries will be made only during the War period, and may be determined at any time whatsoever by the Hon. Minister for Mines without notice.

2. The reductions outlined in Clause 4 relate only to "low grade ores." "Low grade ores" shall mean ores having a gross value of under 9dwts. per ton, including the return of bullion per ton, plus the agreed assay value of tailings less 3dwts. per ton.

3. No reduction in charges shall be allowed at any battery unless the following tonnages are crushed in one continuous run of a battery. The tonnage required can be made up of all ores crushed from any number of leases or areas, whether worth under or over 9dwts. per ton gross value:—

5-head batteries, 500 tons.
10-head batteries, 1,000 tons.

4. The following reductions will be allowed on all ores worth under 9dwts. per ton gross value, as outlined in Clause 2:—

Gross Value per ton.	Reduction in present charges.
(a.) 8dwts. and under 9dwts. ..	10 per cent.
(b.) 7dwts. and under 8dwts. ..	20 per cent.
(c.) 6dwts. and under 7dwts. ..	30 per cent.
(d.) Under 6dwts.	40 per cent.

Note.—In cases where delays occur in connection with agreement of tailings assays, full charges shall be paid. Rebates, in such cases, will be forwarded to customers entitled thereto through Battery Managers, after assay returns are received at Head Office.

In cases where customers elect to accept the Battery Manager's assays as final, those entitled to reductions will have such deducted from their accounts.

5. There shall be no reduction in charges for the purchase of tailings. Tailings from ores worth under 9dwts. per ton gross, which have an agreed assay value of more than 3dwts. per ton, will be purchased at ordinary rates.

6. No reduction in crushing charges shall be allowed on any ore having a gross value of 9dwts. per ton or over.

DIVISION IV.

ANNUAL PROGRESS REPORT

OF THE

GEOLOGICAL SURVEY

For the Year 1914.

WITH AN INDEX MAP.

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Map of Western Australia, showing the four miles per inch series of Geological Sketch Maps, etc., issued since 1896.

Annual Progress Report of the Geological Survey for the Year 1914.

The work of the Geological Survey Staff required to carry on the investigations during the calendar year 1914 did not differ in any essential detail from that which preceded it.

THE STAFF.

The work of the Survey has been carried out during the year by nineteen classified officers, and there has been no change in the personnel. The classified staff consisted at the close of the year of eight geologists, three chemists and assayers, one petrologist, one general assistant, two draftsmen, two clerks, and a messenger.

FIELD WORK.

The broad outlines of the geology of many parts of the State having already been determined, and an approximate idea of the extent of many of the formations defined, it became possible to make surveys in greater detail of several of the mineral belts of the State, about which there was very little information extant, more especially in regard to the occurrence and mode of association of the ore deposits and their possibilities. The work of the different field parties, therefore, was primarily planned with the view to the determination of (a) the areal distribution, (b) the mode of occurrence, (c) the geological relationships, and (d) the value of the mineral resources of the districts dealt with, and the study of the structural features of the formation in which they are contained.

The detailed geological survey of Meekatharra and surroundings which has been carried on continuously during the year has now been completed, and the results when published will make a very important contribution to our knowledge of the State.

The systematic underground work at the North End of Kalgoorlie is being proceeded with as expeditiously as is possible, and will be continued until the whole field has been covered. In addition a good deal of work in the outside districts in the vicinity of Kalgoorlie has been carried out, and such will throw a good deal of light upon the structural features of that field.

The mining centres of Niagara and Kookynie have been under detailed investigation for a considerable portion of the season of the year available for field work, and the work thereat is rapidly approaching completion.

The examination of the country to the southward of Nullagihé, lying between latitudes 22deg.-23deg. 30min. South and longitude 118deg. 52min.-122deg. 30min. East, was finally completed by Mr. Talbot in December last, but while valuable information as to the nature of the area has been obtained, no country which is likely to add materially to the mineral wealth of the State has been discovered. The lack

of maps confined Mr. Talbot's efforts to the methods of reconnaissance geology, whilst the cartography of such as were available proved to be miles wrong in many instances. A brief *aperçu* of the results of Mr. Talbot's explorations is given on a later page; it fails, however, to do justice to the value of the work which has been accomplished, considerable and noteworthy additions having been made not only to the geology but also to the geography of these latitudes.

The northern portion of the Yilgarn Goldfield, including the newly-opened-up centre of Westonia, has been mapped in detail, and investigations have been carried out as far north as Mt. Jackson and Marda. Work is now being carried out between the Corinthian and Golden Valley centres, and when this has been completed the whole of the Yilgarn Goldfield will have been surveyed in such detail as has been deemed necessary for the purpose of acquiring a complete knowledge of the whole field.

The ancient auriferous conglomerates discovered on the Yalgoo Goldfield have been cursorily examined during the year and will be more fully investigated shortly, as owing to the possibilities which they represent, it becomes necessary to have the limits of the formation as a whole more or less accurately defined and its geological characteristics studied. These gold-bearing conglomerates of Yalgoo bear a marked lithological resemblance to those occurring in South Africa and in the Pilbara District; details regarding the latter will be found fully set out in *Bulletin* 40.

The field work in connection with the lime and phosphate deposits in the Southern and Western Division, in the interests of the Agricultural Industry, has been now practically completed, and preparations are being made for writing the report thereon; a work which will naturally take some considerable time.

Attention has also been given during the year to the occurrence of raw materials in the State for the local manufacture of Artificial or Portland Cement.

Visits of brief duration have been made to different localities for the purpose of dealing with applications for State aid in connection with boring, etc., under the provisions of the Mining Development Act.

The resident officers, Messrs. Simpson and Farquharson, have been engaged, as usual, in chemical, physical, and petrological researches arising out of the field work, the care of the Survey Collection, and assisting in and meeting the various requirements of enquirers at the office of the Department.

Attached to this Report is a general map of Western Australia, showing the districts which have been examined and of which reports and geological maps are available, since the Survey was organised on its present basis in 1896.

The numbering of the new series of Geological Sketch Maps on the scale of four miles to the inch corresponds with that of the 300-chain series issued from the office of the Surveyor-General.

The four-mile series of geological maps are specially adapted for prospecting purposes, in that in addition to the geological features they show all roads, tracks, prominent landmarks, as well as known water supplies, and when used with knowledge and with judgment they tend to do away with the necessity for what may be called "departmental personally conducted" prospecting parties.

In so far as scientific assistance to prospecting is concerned (and such is the only legitimate method by which tangible results can be obtained) it has already been officially pointed out on page 10 of the Annual Report for 1910 that:—

Prospecting, when it takes the form of the equipment of a party for the investigation of a particular tract of country, if it is to be intelligently undertaken, must be carried out in a rational manner. One of the first requisites for this purpose is a properly executed geological map, which ought, among other things, to indicate those areas within which the strata possess economic potentialities. The knowledge thus acquired, when properly presented, tends to prevent the useless expenditure of time and money.

The plan attached shows the extent of this class of work accomplished up to the end of 1914.

In regard to the official reports, statements are often made and at times find their way into the public Press, that such are unintelligible, and, owing to their severely technical nature, are of little or no value to the public. This, however, is due rather to the individual than to the reports themselves, which with one or two unavoidable exceptions are invariably couched in the simplest of language consistent with making a technical subject intelligible. In most of the Survey's reports and maps it will be found that the results of the field, laboratory and museum observations are presented in such a way that the public may readily apply them to their respective requirements.

With the exception of the assay fees and sales of publications, the Geological Survey is not a direct revenue-producing branch of the Public Service; its real value lies in the collection and dissemination of authentic and reliable information regarding the mineral and allied resources of the State, chiefly through the medium of its publications, the presence of officers in the field imparting information in the course of their work and the answering of inquiries by the staff at headquarters, on the economic and scientific aspect of all matters submitted to it by the Government and the general public.

The *locale* of the field parties is fully set out in the attached table, which shows the distribution of the field work during the year.

Table showing the Distribution of Field Work for the year 1914.

Goldfield or Land Division.	H. P. Woodward.		T. Blatchford.		J. T. Jutson.		H. W. B. Talbot.		E. de C. Clarke.		F. R. Feldtmann.		C. S. Honman.	
	No. of days in the field.	Percent-age of working days.	No. of days in the field.	Percent-age of working days.	No. of days in the field.	Percent-age of working days.	No. of days in the field.	Percent-age of working days.	No. of days in the field.	Percent-age of working days.	No. of days in the field.	Percent-age of working days.	No. of days in the field.	Percent-age of working days.
Pilbara .. .. .	..	..	..	..	..	..	122	33.4	..	..	..	..	..	..
Peak Hill .. .. .	..	..	..	..	..	..	13	3.6	5	1.4	..	..	..	..
East Murchison .. .. .	..	..	..	..	..	..	..	..	2	.5	..	..	..	..
Murchison .. .. .	..	..	..	..	..	..	8	2.2	349	95.6	..	..	..	..
Yalgoo	10	2.7	..	..	..	..	..	..	..	..	..	..	..	..
North Coolgardie .. .. .	..	..	..	..	282	77.2	..	..	..	..	16	4.4	..	..
Broad Arrow .. .. .	..	..	..	..	3	.8	..	..	..	..	10	2.7	..	..
North-East Coolgardie .. .. .	..	..	..	..	..	..	..	..	..	..	5	1.4	..	..
East Coolgardie .. .. .	..	..	..	..	..	..	..	..	..	..	108	29.6	38	10.4
Yilgarn .. .. .	..	..	259	71.0	..	..	..	..	..	..	..	..	169	46.3
Eastern Division .. .. .	..	..	..	..	..	..	100	27.4	..	..	..	..	..	..
South-West Division	187	51.2	2	.5	..	..	19	5.2	..	..	14	3.8	..	..
Totals	197	53.9	261	71.5	285	78.0	262	71.8	356	97.5	153	41.9	207	56.7

As has been the case in the past few years, and for the same reasons administrative duties, prevented me carrying out very much systematic field work in person; nevertheless opportunity was afforded of visiting every member of the field staff in the districts in which these officers were engaged, and making some short reconnaissances in different districts which the preparation of the first issue of the Geological Map of the State necessitated.

The writing of reports, reading and revision of manuscripts, maps, proof-reading and other editorial duties occupied a considerable portion of my time: the latter labours have been considerably lightened owing to the assistance which the clerical members of the staff have been able to render.

The return hereunder shows in tabular form the volume of editorial work carried out during the calendar year under review.

Table showing Editorial Work, 1914.

Report.	Pages.		Figs.	Maps.
	M.S.	Type.		
Bulletin LVI.	125	83	31	2
Do. LVII.	158	103	50	5
Do. LIX.	390	252	50	23
Do. LXII.	82	64	19	6
Do. LXIII.	233	160	31	19
Annual Report, 1913	78	29	..	2
Total	1,066	691	181	57

The routine duty of imparting information to the public, personally and by correspondence, has been carried on as usual, with the assistance of the two resident officers, Messrs. Simpson and Farquharson, in the examination and determination of rock and mineral specimens brought or sent to the office by the general public.

On the 3rd of February I left Perth for Kalgoorlie and until the 13th inst., when I returned to Perth, was engaged in inspecting the work which had been carried out by Mr. Honman in the vicinity of Red Hill.

During the time intervening between the 1st and the 17th April, I traversed the country between Niagara and Meekatharra, travelling *via* Leonora, Lawlers, and Gabanintha, and the 18th to the 23rd of the month was devoted to inspection work with Mr. Clarke at Meekatharra.

The 26th of May to the 6th of June was spent with my colleague Mr. Feldtmann in the country between Kalgoorlie and Mulline in connection with suggestions as to State boring at the latter centre.

During parts of June and July I was absent in Queensland, attending officially the Second Interstate Conference on the Artesian Water Supplies of Australia.

The 27th of August to the 23rd of September was devoted to inspection work at Meekatharra and the country in the vicinity, in company with Mr. Clarke.

October 24th found me at Westonia with Messrs. Blatchford and Honman, and until the 6th of November the time was devoted to an examination of the

work carried out at Westonia, Mt. Jackson, Marda, and the country in the vicinity, in the Yilgarn Goldfield.

H. P. Woodward, Assistant Government Geologist :

The early portion of the year was devoted by Mr. Woodward to re-examination of the southern portion of the South-West Division in which it had been held that deposits of mineral oil occurred. This was followed by supplementary inspections of the Coastal Calcareous Lake Deposits during such dry time of the year as permitted of sampling being carried out. In the month of May this officer commenced field work in the Coastal Plain to the north of the Metropolitan Area, lying between the Midland Railway Line and the sea. This survey was continued northwards as far as Arrino, where it connected with that carried out by Mr. W. D. Campbell (Plate I, Sheets 1 and 2, *Bulletin* 38). Whilst this work was in progress Mr. Woodward was recalled to Perth and instructed to pay a flying visit to the scene of some new finds in the South-West corner of the Yalgoo Goldfield. Having completed the survey of the northern portion of the Coastal Plain in October, this officer resumed field work in November on the South Coast, in the country between the Gardiner and the Frankland Rivers.

In addition to the above, short visits were paid to the proposed site for a storage reservoir at the Canning River, with the Engineer-in-Charge of the Metropolitan Water Supply, and to Rockingham to inspect the calcareous deposits, with the Commissioners of Agriculture. The members of the British Association for the Advancement of Science visited Perth during the month of July, and, as my representative (during my absence from the State), Mr. Woodward accompanied the members of the Geological Section to the Stirling Range and to several places in the vicinity of Perth, and did all that lay in his power to make their brief stay in the State as agreeable and instructive as possible.

Mr. Woodward was engaged in the field for 197 days, of which 187 were spent in the South-West Division, and ten days upon the Yalgoo Field, the balance of the year being occupied with report writing and office administration during my absence from headquarters; between the 23rd of June and the 12th August this officer acted as Acting Government Geologist, during my absence in Queensland attending the Interstate Conference on the Artesian Water Supplies of Australia.

T. Blatchford, Assistant Geologist :

The detailed mapping of the southern portion of the Yilgarn Goldfield was continued until the 16th of August, when Mr. Blatchford returned to Perth, where he was engaged until the end of May in writing up the results of his field work, the preparation of maps, sections, and other duties incidental thereto.

At the end of May field work in the northern portion of the Yilgarn Goldfield was commenced at Westonia and continued with but a short interruption to the end of the year. A short break in the work was made in the month of August, when Mr. Blatchford paid a brief visit to Moora in connection with the boring for artesian water being carried out at that locality.

Mr. Blatchford was joined by his colleague, Mr. Honman, in July, and after consultation it was decided, owing to considerations of water and grass,

the latter should undertake general geological work in the outside districts in case the dry season continued, whilst Mr. Blatchford should confine his attention to the neighbourhood of Westonia and the country lying between the Rabbit-proof Fence and Bullfinch. The field work now stands practically completed except for detailed surveys of Bullfinch, Ennuin and Golden Valley.

The total number of days that Mr. Blatchford devoted to field work was 261.

J. T. Jutson, Field Geologist :

Resuming field work at Kookynie after his annual leave in January, Mr. Jutson continued his survey up to the 16th of April, when he returned to headquarters. From that date until the 9th of May he was engaged on work connected with the issue of *Bulletin* 61 (The Physiographical Geology of Western Australia). From the 11th of May until the 3rd of June Mr. Jutson was on special leave, necessitated by family reasons. Returning to duty, the period between the 4th and the 24th of June was spent in the office revising proofs and maps, on the reports of Kurnalpi and Yuin, appearing in *Bulletin* 59 (Miscellaneous Reports—Series III., Nos. 34, 39, 40, and 48). Between the 26th of June and the 6th of July Mr. Jutson was engaged on underground surveys at Kookynie and Niagara; thereafter, up to the 24th of the month at Yerilla. A few days at the end of the month and the early part of August were spent with Dr. Walther, Professor of Geology at Halle University, one of the visiting members of the British Association, in the neighbourhood of Kookynie and Niagara. The field work at Yerilla, which had been subjected to interruption in consequence, was completed on the 21st of August, and the preparation of the report having been completed, the detailed survey of Kookynie and Niagara was resumed and continued without interruption until the close of the year.

Mr. Jutson spent 285 working days during the year in the field.

H. W. B. Talbot, Field Geologist :

Up to the 15th of January Mr. Talbot was on recreation leave, and up to the 23rd of April was occupied with official work connected with his previous year's surveys. Short visits, however, were paid to Brookton *re* a reputed tin find, Narra Tarra *re* alienation of mineral lands, the slate quarry at Armadale, Smith's Mill, mapping the laterites of the Darling Range, and Swan View *re* the molybdenite discovery. Between the 23rd of April and 23rd December Mr. Talbot was engaged on a reconnaissance geological survey of the country lying between latitudes 22deg. and 23deg. 30min. South and longitudes 118deg. 52min. and 122deg. 30min. East.

During the year Mr. Talbot was engaged for 262 working days in the field.

E. de C. Clarke, Field Geologist :

The whole of the year 1914, with the exception of eight days spent in Perth on official business, was devoted to work in the field, 349 days having been spent in an investigation of the geology of Meekatharra and its vicinity; two days on the East Murchison, and five on the Peak Hill Goldfield. The total number of days devoted to field work amounted to 356.

F. R. Feldtmann, Field Geologist :

With the exception of a few days at Kalgoorlie and eight at Greenbushes, the months of January and February were spent at the head office in Perth. The time intervening between the 6th of March and the 25th of May was devoted to underground work at the North End of Kalgoorlie. From the 26th of May to the 25th of June Mr. Feldtmann spent with me on a brief visit to Mulline and on a reconnaissance survey of the country between there and Kalgoorlie. Returning to Kalgoorlie, underground work at the North End occupied Mr. Feldtmann's time up to the 17th of July. Between the 17th of August and the 30th of September his services were lent to the Military authorities to carry out a topographical survey of the country round Balcatta. The balance of the year was spent in the office on work connected with the preparation of reports and maps on the field work alluded to.

In all 153 days were spent on geological work in the field.

C. S. Honman, Field Geologist :

During the month of January and up to the 12th of February Mr. Honman was engaged in field work in the country lying to the south of Kalgoorlie. From that date until the 15th of July he was occupied on office duty consequent upon the extended field work of the previous season. This officer took the field again in July, and until the close of the year was engaged in geological survey work in the northern portion of the Yilgarn Goldfield, special attention being devoted to the vicinity of the mining centres of Mount Jackson and Koolyanobbing. The total area mapped by Mr. Honman amounted to about 4,500 square miles.

During the year 1914 Mr. Honman spent 207 days in the field.

PRINCIPAL RESULTS OF THE YEAR'S OPERATIONS. CEMENT-MAKING MATERIALS IN WESTERN AUSTRALIA.

Towards the latter end of the year the attention of the Government was directed to the difficulties which were being experienced in the State owing to the shortage of supplies of cement, and the following information connected with the occurrence of suitable raw materials for cement making and incidentally upon the possibility of the establishment of Cement Works in the State, was prepared:—

The possible curtailment of the importation of cement, owing to extra-Australian causes, added to the multiplication of the uses of artificial cement, are important factors which appear to have led up to the request to the Government to consider the possibility of the State being in a position to meet its own requirements in this direction.

Cements are of two kinds:—(a) Natural or Hydraulic and (b) Artificial or Portland.

Hydraulic Cement is made from natural or clayey limestones, which when burned and ground have the property of setting or becoming hard under water. Artificial or Portland Cement is of a somewhat similar character (consisting of a definite mixture of lime, silica, and alumina), but is made artificially by mixing limestone and clayey material in proper proportions.

Materials for Portland Cement are more abundant in nature than natural cement, and the product of

so much better quality as to render the natural cement a matter of comparatively small importance.

So far as the latest authentic information regarding the manufacture of Portland Cement goes, it would seem that the erection of a Cement Plant (even for such a small capacity as about 2,000 barrels per day) would hardly be justified unless (a) sufficient raw material was actually in sight to enable operations to be carried on for about 20 years, and (b) it was erected in a commanding geographical situation.

So far as official data at the command of this Department goes, it appears that the cost of a modern artificial cement-making plant (provided with the best up-to-date machinery and fire-proof buildings), with a total producing capacity of 2,000 barrels of cement per diem, amounts approximately to:—

	£
Power House	30,000
Raw Material Department ..	23,000
Kiln Department	23,600
Clinker Grinding Department	13,400
Warehouse and Equipment ..	6,600
General Equipment	14,000
	<hr/>
	£110,600

To this initial cost would have to be added sufficient working capital.

The most important ingredient in the manufacture of Portland cement is limestone.

Recognising the dependence of certain important industries upon limestones, etc., a more or less exhaustive examination of the limestone and allied deposits of the South-West Division has been in progress by the geological staff for more than twelve months past.

The geological map* resulting from the above work shows the distribution of such (and other cement materials), where sufficient official data is available.

In addition to the above information there have been made in the Survey Laboratory 138 chemical analyses of possible cement-making materials, viz.:— A. Limestones and Marls; B. Clays and Shales; C. Dolomites and Magnesian Limestones; and D. Aluminous Laterites.

The area of the only productive Coalfield (Collie) is also indicated on the geological map, and is important, since expenditure on fuel enters very largely into the cost of cement making. The shales of the Collie Coalfield have not yet been specially examined as to their suitability for cement making; it is possible that some of them might probably be adapted for the purpose. It is quite possible also that some of the Coastal Limestone, judiciously mixed with the mud of the Swan River, etc., might, after analytical investigation, be found suitable for cement making.

From such official information as is at present available it appears that the South-West Division of the State is rich in materials which, when the constituents are brought to the proper proportions by mixture, might be used in the manufacture of artificial cement. It yet, however, remains to be seen whether the materials occur in such quantities (in suitable situations) as would justify economic development.

So far as may be judged by the Survey analyses (many of which, however, have not been made with

special reference to the suitability of the materials for cement making) it is quite clear that there are at Gingin limestones well suited for the manufacture of artificial cement, though it is more than doubtful whether they occur in quantities sufficient to justify the erection of a plant.

Before, however, it can be said that the existing information is complete, it is advisable for the Government to ascertain from:—

- (a) The Department of Works and Industries, the Railway Department, and the Water Supply and Sewerage Department, a statement of the possible future cement requirements of the State;
- (b) The Government Laboratory, the results of any analyses (or reports) which may have been made in that Department in connection with cement making; and
- (c) The Laboratory at the Midland Junction Railway Workshops, the results of any analyses or tests on the raw material used in cement making.

It is proposed in the report on the South-West Division of the State, which is being prepared, to deal exhaustively with the geological aspects of the cement-making materials. In those portions of the State in which geological mapping is fairly well advanced, it will be possible for a more or less detailed report of the cement resources to be made; in others, the information must of necessity be less complete.

Summarising the existing departmental information, it appears that:—

- (a) The State contains extensive deposits of limestone capable of furnishing raw material for cement manufacture, as well as clays, shales, and aluminous laterites necessary to form cement mixtures.
- (b) The erection of an up-to-date plant, of small capacity, involves heavy initial expenditure as well as the addition of sufficient working capital.
- (c) The possible future cement requirements of the State are not known to the Geological Survey.

THE POSSIBILITY OF THE OCCURRENCE OF POTASH DEPOSITS IN THE SALT LAKE AREAS AND ELSEWHERE IN WESTERN AUSTRALIA.

As Germany possesses, virtually, a monopoly of the industry in potash salts, and as at the present time the markets of the world are closed to her, attention has not unnaturally been directed to other countries with the object of ascertaining whether geological conditions prevailing are favourable to the presence of potash salts in commercially exploitable quantities.

The Department of Agriculture pointed out in December of last year that (a) a considerable amount of potash is used by the local fruit-growers, and that (b) the supply came from Germany and has now ceased, and asked whether there was any possibility of potash deposits lying at a depth under some of the salt lakes of Western Australia, which might be exploited with profit.

The Government Analyst asked through the Department of Mines whether there is any geological reason for supposing that deposits of potash will be found in the State, and, further, if any rewards have been offered for the discovery of such deposits in other countries. He also pointed out that potash salts have been used as (a.) fertilisers, and (b.) in the formation of saltpetre (potassium nitrate) for explosives and other purposes.

The possibility of the occurrence of "Potash Salts" in the Salt or Dry Lake Area (*i.e.*, the Central Division) of the State is governed by:—

- (a.) the rocks and soils, exposed to drainage waters flowing over them, being of such a composition as would yield potash salts easily and rapidly;
- (b.) the concentration of such owing to evaporation in the enclosed lakes, and
- (c.) whether the process of concentration would result in the potash salts being sufficiently segregated to form commercially exploitable deposits.

Consideration of these aspects, *viz.*, accumulation, is essentially one of physiography and areal geology.

The lakes are merely shallow depressions sometimes many miles in length; very often they are practically rock-floored, though cases do occur in which they are filled with varying thicknesses of detrital material.

Up to the present time a good deal of geological investigation has been carried out in the Central Division without there being any evidence of the occurrence of potash deposits, though for a complete and comprehensive investigation almost every known saline deposit occurring in the dry lakes would have to be chemically analysed. It is only in the larger lakes with much detrital material that potash deposits of exploitable value may be expected.

Lake Cowan, near Norseman, is the only one so far known in which erosional waste has been accumulating to any great extent. Boring operations have been carried down to a depth of 377 feet, the floor of the lake having been reached at about 337 feet below the ground surface. These operations have proved the presence of a considerable thickness of mechanical sediments more or less impregnated with various salts.

Though some of the rocks in the vicinity of Lake Cowan contain from 1.40 to 5.75 per cent. of potash, the surface waters flowing into the lake would not be expected to contain commercially extractable potash salts. The water (or brine) from Lake Cowan has been found by analysis in the Survey Laboratory to contain from .0513 to .0738 per cent. of potassium chloride.

In addition to the occurrence of potash salts in the lake deposits of the State it may be pointed out that the coarse granite or pegmatite dykes which are common in many parts of the State, and to which reference is made in the Survey Bulletins, contain relatively large quantities of the potash feldspars (orthoclase and microcline) as some of their essential constituents. Potash is also found in many other varieties of igneous rocks, but the potash occurring both in them and the dykes referred to cannot as yet be liberated by any known cheap commercial process, though experiments are being made with a view to this end.

Summarising the evidence at present available it appears that (a.) potash salts have not yet been found in the dry lakes of Western Australia, and (b.) rocks occur into the composition of which potash-bearing minerals enter and which might become valuable if it ever becomes possible to extract the potash on a commercial scale.

As opportunity offers the saline deposits in the Dry Lake Area will be investigated with the view to determining the presence of potash salts therein.

INTERSTATE CONFERENCE ON ARTESIAN WATER SUPPLIES.

I attended, as one of the representatives of Western Australia, the Second Interstate Conference on Artesian Water, which sat in Brisbane, Queensland, between the 2nd and 4th of July, and again from the 21st to the 23rd of July, the period intervening being occupied in travelling through the Western Downs for the purpose of enabling some of the members to obtain a personal acquaintance with the water-bearing strata and of taking evidence from the pastoralists in connection with their objections to the closing down of the bores temporarily for official observational purposes.

The members attending the Conference were the same as those enumerated in the account of the Sydney Conference in 1912, and referred to on pp. 10-11 of the Annual Progress Report of the Geological Survey for the year 1912. In addition to its Government Geologist, Mr. L. Keith Ward, South Australia, was represented by Mr. Graham Stewart, the Engineer-in-Chief. Victoria appointed as an additional representative its Government Geologist, Mr. H. Herman, who, however, was unavoidably detained in Melbourne on urgent official duties and could not take part in the meetings.

On the 23rd of July a report upon the results of the deliberations of the Conference was signed by the members and submitted to the Hon. the Premier and Chief Secretary of Queensland, for transmission to the various States of the Commonwealth.

Amongst the more important facts elicited, chiefly in connection with the Great Australian Basin, during the course of the deliberations of the Conference were:—

- (a.) Definite action, in regard to the recommendations made in the report of the First Conference, held in Sydney, had been taken by all the States on the mainland, with the exception of the Northern Territory; though very much still remained to be done before it can be said that full effect has been given in systematising the observations and measurements necessary to a proper understanding of the conditions under which the artesian water supplies of Australia occur, and arriving at even an approximate estimate of the effective available supply both present and future.
- (b.) The marked diminution, both in flow and pressure, of the artesian wells under Government supervision, alluded to in the report of the First Conference, has been confirmed by official observations made in New South Wales, where for the decennial period—1903-13—the average annual decrease in flow amounted to 3.8 per cent., whilst for the year 1912-13, observations carried out on 202 bores showed the annual decrease to be 7.7 per cent.

In Queensland of 977 flowing bores 124 have been remeasured, and these show that during the last 15 years there has been a decrease of 40 per cent. in the aggregate flow.

No measurements having yet been made in South Australia, no conclusions in regard to diminution of flow in that State can be arrived at.

- (c.) The primary cause of the diminution in flow in two of the States appears to be due to the overdraught made upon the accumulated supply of the Great Australian Basin by the undue multiplication of uncontrolled bores.
- (d.) The results of the investigations into the corrosion of bore casings commenced at the First Conference have been continued, and up to date these indicate that in no case has there been any metal tested of such a composition as it would be practicable to use for bore casings, which has resisted the action of corrosive bore water, whilst the coatings experimented upon have also proved to be ineffective. Microscopic examination of iron and steel suitable for bore casings has been commenced, but it has not yet been possible for any definite results to be arrived at.
- (e.) There is so far no evidence that the artesian water stored in the Great Australian Basin comes from any geological horizon which is lower than the Trias-Jura sandstones.
- (f.) The members of the Conference unanimously recommended that investigations along the following lines should be carried out in the Artesian Areas of the Commonwealth:—
1. Influence of thickness of water-bearing beds upon pressure and flow.
 2. Comparison of pressures and flows in bores where the potentials are apparently the same.
 3. Correlation of temperatures, pressures, and flow.
 4. Range of increase in pressure when bores are closed and the time required to attain maximum pressure.
 5. Rate of diminution of flows, with details of any special interest.
 6. Variation in water level in non-flowing bores.
 7. Correlation of depths and temperatures.
 8. Expansion of water column with varying temperatures.
 9. Comparison of analyses where practicable from each flow in the same bore.
 10. Comparison of original with later analyses.
 11. Comparison of temperatures and saline constituents.
 12. Qualitative and quantitative examination of gases evolved from bore waters.
 13. Volume of gas per unit of flow and its relation to discharge.
 14. Influence of gas on pressure.
 15. Influences of gases on corrosion and casing.
 16. Porosity and texture of water-bearing rocks.
 17. The source of the saline constituents of the water.
 18. Locating of mud springs and gauging their flows.

19. Results obtained from bores cleaned out but not deepened.

20. Detailed investigation of all phenomena in bores in which corrosion of casing has been detected.

21. Mutual interference of bores.

22. Results obtained by the use of air lifts for increasing discharge of bores.

23. Distribution of losses in bore drains.

(g.) It was proposed to hold the next meeting of the Conference in South Australia some time during the winter of 1916.

REPUTED TIN FIND AT BROOKTON.

A find of Tin at Brookton was reported in the *Daily News* of the 24th February in the following terms:—

Mr. Charles Greenwood has telegraphed to Perth that he is leaving Brookton, and has most important news to communicate. The wire briefly but clearly states that lode tin has been traced in large quantities for upwards of a mile in length. Leases are being pegged out in all directions. It is stated that a North Fremantle resident stands to win largely on this discovery.

It may be recalled that in 1907 samples of tin ore assaying 65.5 per cent., said to have been obtained from the neighbourhood of Brookton, were received at this office. An account of this appears in the Annual Report of the Survey for the year 1907, p. 7. No tin was found by the officer who officially visited and sampled the spot. Mr. Talbot, Field Geologist, was instructed to visit the locality referred to in the excerpt from the *Daily News*, which proved to be on C.P. 4391, about thirteen miles in a westerly direction from that alluded to in the official report of 1907.

On his return, Mr. Talbot submitted the following report:—

In accordance with instructions I proceeded to Brookton on the 25th inst. to inspect the new find of tin reported in the *Daily News* of the 20th inst.

From inquiries made at Brookton I learned that the supposed find was situated on Mr. Matthews' farm thirteen miles W.S.W. from Brookton in a direct line, but about seventeen miles distant by road.

I drove out to the farm on the morning of the 26th, and Mr. Matthews, who was at home, showed me the ground which had been pegged out by a man named Charles Greenwood. The datum peg is about 100 yards to the north of Mr. Matthews' house on C.P. 4391 (Lands Department Litho. 379/80).

It is difficult to understand what justification Mr. Greenwood can find for the sensational report published in the *Daily News*. Beyond a little knapping, no work of any kind has been done. The area pegged out is situated in a field of stubble, and on it a coarse-grained aplite dyke outcrops for some distance on a bearing of 70 degrees. I was informed that it is this dyke which Mr. Greenwood asserts carries the tin, but although I searched carefully I could find no trace of tin or its accessory minerals such as tourmaline. From the side of the dyke I got some small particles of ilmenite (titaniferous iron ore), and it is possible that this was mistaken for tin by Mr. Greenwood.

From Mr. Talbot's observations it appears that there is nothing whatever to justify the statements which are calculated not only to mislead the public, but are also detrimental to the best interests of Western Australian mining. It is much to be regretted that a salutary lesson cannot be given to the originators of such misrepresentations.

GEOLOGY OF THE TRANSCONTINENTAL RAILWAY LINE.

Since the publication of Bulletin 37 on the Geological Features of the Country lying along the route of the proposed Transcontinental Railway Line by Mr. Gibson in 1909, some additional evidence in regard to the constitution of the country to the east-

ward of Jumania Rock Holes, on Loc. 2656/102,* has been brought under the notice of the Survey. Included in the area in the vicinity of the Railway Line originally mapped as being made up of granitic rocks, there now appears to be a fairly extensive patch of highly-inclined quartzose conglomerate, having a general strike of north-west and south-east. These beds may represent the southern extension of the old sedimentary rocks which occur to the westward of Kurnalpi and to the south-eastward of the Pinnacles. As these beds have not as yet been officially examined, no details are available at present regarding them. It is proposed to have an inspection made of this formation at a suitable time during the early part of the coming field season.

Conglomerates of somewhat similar lithological character are known to occur in the country east of that chain of lakes which lies to the west of Bulong and Kurnalpi. It might be that those now referred to in this preliminary note form part of the same series occurring in great force between Longs. 121deg.-123deg. East and Lats. 30deg.-31deg. South. These very old sediments occupy a very large area of the Eastern Division of the State, and have an important bearing upon the structure of the goldfields, and that of Kalgoorlie in particular.

BORING FOR WATER ON THE TRANS-CONTINENTAL RAILWAY LINE.

In the Annual Report of the Geological Survey for the year 1900, pp. 28 *et seq.*, a full account of the geological conditions in the Nullabor Plains governing the possibility of obtaining artesian water in this portion of the State was fully set out, and it was pointed out (p. 31) that:—

I am, however, not very sanguine of success in obtaining anything but a sub-artesian supply of water anywhere towards the northern edge of the Tertiary Basin. Any such supply would be expected to be at least brackish, though, no doubt, suitable for stock. Should the supply

be copious there should be no difficulty in condensing it. Since that time a good deal of boring has been carried out along the route traversed by the Transcontinental Railway Line.

A bore (No. 3) was put down at the 337 miles 61 chains along the surveyed route of the line at an altitude of 576 feet above sea-level. This bore-hole was carried down to a depth of 1,372 feet, and passed through:—

Eucla limestone	603 feet.
Shales	667 "
Fine and coarse sand with hard bands and granite boulders ..	74 "
Granite	28 "

The cores from this bore contained some well recognisable fossils which enabled a definite opinion to be formed as to the age of infra-Eucla Limestone beds and their position on the geological time scale.

Two of the most characteristic fossils, *Aucella hughendensis* and *MacCoyella corbiensis*, found in the Lower Cretaceous strata of South Australia and Queensland, were met with, which indicated beds equivalent in age to the Rolling Down Series as developed in Eastern Australia. In this bore-hole sub-artesian water was met with in the sandy beds at the base of the formation, and rose to a height of 420 feet from the surface; the bore is estimated to yield a pumping supply of 100,000 gallons per diem of 24 hours.

Since this bore was put down a good deal further light has been thrown on the plateau by the boring which has been carried out as the construction of the Transcontinental Railway Line proceeded.

Bore No. 4 was put down at 419 miles 72 chains from Kalgoorlie, at an altitude of about 504 feet above sea-level; the bore was carried down to a depth of 996 feet. Cores were forwarded to this office for examination, and from them the following section of the strata pierced has been constructed:—

No. 4 Bore.

Nature of Strata.			Thickness in feet.	Depth in feet.
Eucla Limestone, 434 feet	{	Hard limestone (? fossiliferous)	32	6-38
		Soft limestone (non-fossiliferous)	89	38-127
		Limestone (fossiliferous)	39	127-166
		White limestone (fossiliferous)	230	166-396
Shales, 467 feet	{	" " " " " " " " " " " " " " " "	44	396-440
		Sandy shale	249	440-689
		Shale	79	689-768
		Shale	63	768-831
		Hard limestone with black patches (probably shale) ...	3	831-834
		Shale and sandy shale	73	834-907
Sandstone (?), 33 feet	{	Coarse and fine sand	33	907-940
		Coarse sand grains (not water worn, probably decomposed granite)	2	940-942
Granite, 56 feet	{	Grains of sand and felspar (decomposed granite) ...	51	942-993
		Biotite granite	3	993-996

The principal water-bearing bed is the coarse sand at 940 feet. The water rose to 401 feet from the surface. With a suitable pumping plant the supply is estimated to yield 250,000 gallons per diem of 24 hours.

Analysis of the waters from these two wells have been made, and the results are as follows:—

No. of Bore.	Depth of Bore.	Depth where Samples taken in feet.	Grains per gallon.								
			Total Solids.	Silica.	Alumina and iron.	Carbonates.		Chlorides.		Sulphates.	
						Calcium.	Magnesia.	Sodium.	Magnesium.	Calcium.	Magnesium.
3	1,372	1,300	223.78	0.35	0.56	6.06	5.59	143.51	..	..	..
4	996	996	378.66	1.61	..	13.09	3.44	277.20	11.26	36.06	36.06

In addition to the above, cores have been examined from two other bores put down further to the west, on the railway line at B280 mile peg and at A310 miles.

* 300 chain Lithograph 26, issued by the Department of Lands and Surveys.

Bore B at 280 miles is situated at an altitude of about 545 feet above sea level; this bore was carried down to a depth of 884 feet. The cores have been examined in this office, and the section of the strata pierced appears to be as follows:—

Bore B.

Nature of Strata.		Thickness in feet.	Depth in feet.
Eucla Limestone 485ft.	Yellow - brown fine - grained pebbly limestone conglomerate	35	0-35
	Soft reddish puggy, in places calcareous, clay with white fragments of limestone (shelly)	9	35-44
	Light yellow gritty limestone	58	44-102
	Hard pinkish-grey limestone with protozoan remains	44	102-146
	White fine-grained granular limestone	339	146-485
Shales 399ft.	Fine-grained puggy shale or mud stone	399	485-884

The Bore A at 310 miles is situated at an altitude of about 508 feet above sea level, and was carried down to a depth of 1,371 feet. In this bore it appears that the bottom was struck at a depth of 1,220 feet below the surface, in the coarse quartz fragments (sand), which may represent a bed of sandstone. The drillings from this bore have been examined in this office, and from them it has been found possible to construct a section of the strata pierced which is as follows:—

Bore A.

Nature of Strata.		Thickness in feet.	Depth in feet.
Eucla Limestone 535ft.	White friable loose limestone	27	0-27
	Red clay with white particles and fragments of limestone	23	27-50
	Hard yellow-white, impure limestone with shell impressions	15	50-65
	Impure yellow porous limestone apparently with shell fragments	35	65-100
	Porous reddish-brown limestone, somewhat gritty	290	100-390
	White uncompacted limestone sand, consisting in part at least of organic fragments	5	390-395
	Hard white limestone	140	395-535
	Compact earthy black mudstone or shale, partly carbonaceous	25	535-560
	Porous soft blackish mudstone or shale with some hard calcareous portions "Hard band" not present in sample	654	560-1214
	Coarse quartz fragments (sand) with fragments of limestone and black mudstone and a few of felspar	2	1214-1216
Shales and Sandstones, 815ft.	Rather compact, earthy, dark grey sediment (grauwacke) with portions of a greenish calcareous character	6	1216-1222
	Hard blackish gritty mudstone	13	1222-1235
	Hard blackish gritty mudstone	73	1235-1308
	Coarse incoherent quartz sand with limestone, etc., fragments as at 1216-1222	2	1308-1310
	Blackish loose, fine-grained gritty mudstone	14	1310-1324
	Fragments of hard compact blackish mudstone, looser and more friable mudstone, fragments of quartz and rarely of limestone	25	1325-1350

Nature of Strata.	Thickness in feet.	Depth in Feet.	
Granite (?) 21ft. 9in.	Kaolinised felspar (probably) and decomposed greenish chloritic material with pieces of gritty mudstone odd crystals of quartz, etc.	14	1350-1364
	Small, mostly angular quartz fragments and felspar fragments from a granitic rock	5	1364-1369
	Finer-grained material, a quartz felspar sand, similar to above, but finer in grain. Derived also from a granitic rock	2ft. 9in.	1369-1371ft. 9in.

The boring which has been carried out since the report of 1900, referred to above, was written, has furnished ample proof that in this portion of the artesian area of the Eucla Division the water obtained will not rise to the surface, but has to be pumped.

The Eucla (Eocene ?) Limestone maintains a fairly uniform lithological character over its whole area though it varies in thickness, as of course would only be expected.

The shaley beds beneath the limestone would seem also to be getting much more sandy in character, as the west rim of the basin is approached.

An extensive series of fossils has been obtained from the Eucla Limestone which yet await palæontological examination; the results should throw a good deal of light as to the precise geological horizon of the series.

DEEP BORING AT MOORA IN ITS GEOLOGICAL RELATIONSHIPS.

Cores from the bore which is being put down at Moora in search of artesian water have been examined. The bore has attained a depth of 2,230 feet below the ground surface which is 606 feet above sea level, and has as yet not met with any water. The beds underlying the Coastal Plain to the west of Moora consist of sandstones and shales which are occasionally glauconitic, overlaid in certain places with limestones. These beds which contain fragments of *Ostrea* and *Inoceramus* are apparently of the same geological age as the Gingin strata (Cretaceous), with which they are probably coterminous.

The geological importance of this bore lies in the fact that it is the only one in this latitude which has been carried down in the Jurassic beds; several abortive efforts have been made to reach these by means of deep bores beneath the Cretaceous rocks of the metropolitan area. The importance of these Jurassic rocks from the hydro-geological standpoint is their permeability which lends itself to the absorption and transmission of water, whilst the thickness of the formation gives it a large storage capacity.

The cores from the Moora bore, from 800 and 900 feet (shales), contained impressions of a fern leaflet (*Taeniopteris*) and portion of a cycad frond, which appears to possess the characters of the genus *Otozamites* and others too indefinite to be certain about. These clearly indicate a Jurassic age for the series, and serve to connect them with those from Mingenew.* The cores above 1,100 feet from the surface weather very rapidly on exposure to the atmosphere. The greenish colour of the rock is due to the presence of glauconite.

* Some Fossil Plants from Western Australia; E. A. Newell Arber, Bull. Geol. Sur., W.A., No. 36, p.p. 25-28. Perth: By Authority, 1910.

The following is a record of the strata pierced in so far as may be arrived at from a careful examination of the core samples supplied.

Nature of Strata.	Thickness in feet.	Depth in feet.	
Jurassic.	Grit	172	172
	Greenish drift sand	96	268
	Dark angular grit	20	288
	Coarse grey sand	69	357
	Grey shale	5	352
	Coarse grey drift sand	48	410
	Shale	179	589
	Grey grit	22	611
	Shale (with plant remains)	400	1,011
	Grey grit	9	1,013
	Shale (with plant remains and two thin seams of lignite)	134	1,147
	Coarse green grit	24	1,169
	Grey sandy micaceous shale	26	1,195
	Grit with rounded quartzite pebbles	105	1,300
Pyrites nodules	4	1,304	
Limestone	66	1,370	
Micaceous shale	120	1,490	
Grit	28	1,518	
Micaceous shale	191	1,709	
Limestone	3	1,712	
Mudstone	21	1,733	
Sandy mica shale	21	1,754	
Fine-grained mudstone	86	1,840	
Earthy fine-grained and carbonaceous granular limestone	37	1,876	
Fine-grained grey micaceous muddy grit	32	1,907	
Hard quartzose calcareous gritty conglomerate	8	1,916	
Micaceous shales (quartzose and carbonaceous)	58	1,974	
Calcareous grit	7	1,981	
Soft sandstone or grit	47	2,028	
Soft shaley mudstone	22	2,050	
Sandstone or grit	66	2,116	
Grey calcareous sandstone	2	2,118	
Sandstone or grit	84	2,202	
Grey micaceous mudstone	5	2,207	
Soft muddy sandstone or grit	23	2,230	

It is possible that the beds below 1,100 feet may represent the Carboniferous series as exposed to the northwards in the Irwin River Valley.

It is to be hoped that boring operations will be continued until the base of the formation has been unequivocally reached, as the results to be expected from this bore have more than local significance.

THE GEOLOGY AND MINERAL AND ALLIED RESOURCES OF THE COASTAL PLAINS OF THE SOUTH-WEST DIVISION.

(H. P. WOODWARD.)

During the field season of 1914 two sections of this work have been completed, the first being that which lies between the Metropolitan Area reported on last year, and the Irwin District examined by Mr. Campbell some years ago, and the second the section lying to the south of Mr. Saint-Smith's survey which terminated at the Margaret and Blackwood Rivers, from which point an examination was made as far as the Franklin River upon the South Coast.

Section I.—This area lies to the northwards of Perth, extending from Wanneroo and Gingin to the Arrowsmith River and Arrino and between the coast to a short distance east of the Midland, or between 115deg. and 116deg. East longitude and 29deg. 20 min. and 31deg. 30 min. South latitude, being 135 miles in length with an average width of 45 miles or covering an area of 6,075 square miles.

This piece of work was conducted under the most disadvantageous conditions owing to the severe drought from which this State has recently suffered, and which was particularly acute over this district.

In travelling in a northerly direction from Perth this strip of country at first consists of a wide sandy plain with numerous swamps, bounded upon the west by the calcareous sandstone coastal hills, and upon the east by the bold Darling Range scarp, the rocks of which are gneissic intersected by numerous dolerite dykes and usually capped with laterite.

Upon approaching Gingin, however, all trace of the crystalline series is lost sight of along the range, which is here composed entirely of sand with laterite-capped ridges. Upon making a series of eastern traverses, however, the gneissic rocks were met with outcropping along a line which leaves the scarp near Muchea and runs in a northerly direction towards Mogumber and Moora.

A few miles north of Mogumber the hitherto well-defined bare gneissic escarpment becomes less marked, its place being taken by a series of low-rounded hills, which are often soil-covered even to their summits, while at the base of these hills there is a belt which varies in width from a few chains to a mile of a banded carbonated chert-rock. This latter to the northward of Moora for some distance takes the place of the gneissic range rising in one almost continuous scarp line along the western margin of the upper or inland plateau, but northward of Watheroo this also loses its continuity only outcropping here and there as isolated hill ridges as far north as Coorow, beyond which it is not met with. This formation clearly represents a shear line, its banded appearance being probably due to the metasomatic replacement of other mineral matter by silica. One striking feature of this belt of carbonated chert is the caverns and subsidences which are met with throughout its entire length, some such as Jingie-Mia, near Watheroo, being of very considerable dimensions. These often contain guano deposits, but the quantity is limited and the quality very variable.

The chert belt is associated in one or two localities with irregular deposits of hard crystalline limestone, but much more frequently with travertine deposits; this would suggest its origin in part at least as a siliceous replacement of carbonate of lime, and if this was the case it would furnish a simple solution of the origin of the caves and other subsidences since these could be brought about by the subsequent removal of unaltered portions of the calcareous rock by percolating meteoric water.

Between Watheroo and Coorow an elevated tract of sand country almost completely conceals the crystalline rocks which only outcrop here and there, while the sand plains extend for a considerable distance inland.

To the northward of Coorow a more or less continuous exposure of the gneissic series outcrops in the form of low rolling hills usually soil covered. They do not, however, follow that markedly straight line so noticeable further south, neither do they present a steep face to the lower plateau. Between the outcrop of the crystalline rocks and the face of the Darling Range is a tract of elevated sandy country, the highest portions of which are usually capped with laterite. This lower plateau extends from Muchea northward in a gradually widening form to Cockleshell Gully, a distance of about 100 miles, starting at the south from nothing and attaining its maximum width of 50 miles between Marchagee on

the Midland Railway and Cockleshell Gully near the coast. This plateau in fact lies between two faults, or more correctly speaking, the bifurcation of the great Darling Range fault, one branch of which splits off and runs in a north-westerly direction from Muchea and the other continues its more northerly course to Watheroo.

To the northward of Cockleshell and Watheroo all evidence of the presence of the fault is lost, the outcrop of the crystalline rocks becoming more irregular but assuming a general direction more north-westerly, while the edge of the lower plateau recedes from the coast; consequently the width of this latter is only 20 miles on the Arrowsmith River.

In the southern section of this area the surface is undulating, the lower portions being sandy, while the more elevated are capped with laterite.

It is intersected by the Moore and Hill Rivers which flow across it in deep valleys, the banks of the former being often practically vertical and the channel cañon-like. In these banks practically horizontally bedded fine-grained sandstones and sandy shales of various colours are exposed, but no limestone beds or indications of fossils were observed.

Many heavy springs of exceptionally pure water break out along the course of these streams, the discharge of which in the Moore River valley being particularly large.

Northward of the Hill River the surface of this plateau is more broken, it being intersected by numerous valleys in which swampy flats often exist, while the remnants of the original surface now consist of flat-topped or conical hills similar to those in the country around Dongara and Geraldton.

In the neighbourhood of Gingin the face of the Darling Range is broken by a series of valleys, the intervening spurs between which are capped by a deposit of chalky limestone containing Cretaceous fossils, while in the beds of the valleys and on their sides there are extensive deposits of diatomaceous rock.

These valleys rise rapidly on to a sandy plateau, which extends in an easterly direction for about 10 miles, or to the base of the outcropping crystalline series.

Numerous heavy springs break out in these valleys at the base of the sandstone, which would appear to indicate the presence of an impervious bed such as clay or shale lying beneath it, but no outcrop is visible since it is masked by the diatomaceous beds.

The water from these springs is not calcareous, which leads one to the conclusion that the chalky limestone beds do extend inland beneath the sandy plateau, but are only isolated deposits of a more recent age. Capping the spurs, which supposition is supported by the evidence afforded by a series of bores and shafts sunk upon one of these cappings with the object of testing the quantity of rock available for cement manufacturing purposes. The sections afforded by this work prove conclusively that the chalky limestone is a deposit of very irregular thickness resting unconformably upon a clay bottom, having no relationship to the series forming the plateau, which latter can be traced in one continuous belt in a northward direction to the Irwin district, where fossiliferous beds have been discovered, the age of which was determined as Jurassic.

Northward of Gingin the Darling Range scarp presents a bold unbroken face of laterite-capped

sandstone to the Coastal Plain for a distance of 20 miles, or to that point at which the Moore River debouches, while from this point northward, although the hill face is more broken, the sandstone range continues to run in practically a straight line for a distance of 60 miles or to the mouth of Cockleshell Gully, where the Darling Range may be said to terminate, since northward of this the scarp is non-existent.

At Yatheroo and Dandaragan two extensive basins occur in which the low hills are capped by a similar chalky limestone to that of Gingin, while the bed of the valleys is composed for the most part of diatomaceous rock similar to that at Gingin which, as there, yields a highly fertile soil.

Here, as at Gingin, numerous springs break out, but these, like those previously referred to, are not highly charged with lime, proving that they have no connection with the calcareous beds, no trace of which can be discovered in a deep valley which extends eastward from Dandaragan in the direction of Moora. It is therefore assumed that these basins in the Jurassic plateau existed prior to the deposition of the Cretaceous limestone.

Upon the tops of several of the hills on the plateau surrounding Dandaragan there are deposits of iron phosphates associated with the laterite cappings. These deposits consist of bone beds in which teeth and other Saurian remains are found, but these are too fragmentary to admit of determination. The fact, however, remains that Saurians existed here probably during the Cretaceous period, when in all probability shallow water conditions pertained above the surface of which these small laterite hills rose as islands, upon which the reptiles rested or basked in the rays of the Mesozoic sun.

Between the base of the lower plateau and the coastal hills lies a tract of undulating sand plain country, which averages about 13 miles in width for a length of 110 miles. This plain terminates a little to the northward of the Hill River, at which point the Jurassic formation impinges upon the coastal hills, but northward of this the plain again forms and attains a width of 10 miles on the Arrowsmith River.

In the areas of depression on this plain calcareous deposits of a marly character are common. These in all probability represent old lake beds which at one time existed in the depression, caused by the subsidence that took place upon the western side of the Darling Range fault, the down-throw being greater along this line than nearer the ocean. Consequently the coastal hills still remained above the sea level, thus forming a barrier which impounded the water brought down by the rivers.

These calcareous deposits are fairly well developed at Bulls Brook on the Midland Railway line, but are also of frequent occurrence along the valleys of the Moore River and Gingin Brook, and in several other localities further to the northward. The geological age of these plain deposits has as yet been undetermined; all we know for certain is that they are post-Cretaceous, but probably comparatively Recent, since at other points on these coastal plains where the calcareous marls are still in the process of formation from comminuted shell beds, some specimens of the latter prove to be of recent marine and estuarine types.

The entire stretch of this coast line is formed by a belt of calcareous sand hills, which in places nearly

approach limestones. It is often covered by recent sand drifts, which sometimes are of considerable extent, and have sometimes traversed the entire width of the belt which varies from three to 10 miles.

These hills have only been breached by the Hill and Moore Rivers, the remaining streams discharging their water into lakes or swamps upon the plain behind them.

In elevation these hills exceed 400 feet, while where sections are exposed they are found to be composed of false-bedded calcareous sandstones. In those localities where the carbonate of lime predominates over the sand, large caverns often festooned with stalactites are of common occurrence, and are often also of considerable extent, while in some instances they contain guano deposits, resulting from the accumulation of bat, bird, and animal excreta. This deposit has considerable manurial value, but it is in too limited quantities and frequently contains too high a percentage of sand to be of any commercial value except in the immediate vicinity of its occurrence.

Section II.—This section starts at Nannup, on the Blackwood River, which is situated upon the Darling Range scarp, 162 miles south from Muchea, from which point this fault line has been described in the preceding section.

From the Blackwood River the boundary of the crystalline rocks is not generally very pronounced, since the range does not present such a bold escarpment as it does further to the northward, rock outcrops as a rule being only met with in the valleys, since the spurs are always covered by lateritic gravels, which overlie the junction of the gneissic rocks with the Donnybrook series.

This boundary can, however, be usually traced with a considerable degree of accuracy by the presence of rounded quartzose boulders in the laterite which are derived from the disintegration of conglomerate beds belonging to the newer group.

At places along this range face, such as Scott's upon the Donnelly River, massive dykes of quartz-porphry may be observed, while further south on the old oil leases situated on the Warren River hornblende schists and amphibolites are exposed.

From Calcup Ford on the Warren River to the south coast no crystalline rocks outcrop, the whole surface being covered by extensive sand drifts and calcareous sandstones, which latter at Calcup Hill attain an elevation of 750 feet above the sea level. At Black Head, however, a hornblende-gneiss outcrops, having a defined strike of a little east of north and dip of 45° in a westerly direction. This may be accepted as the southern extremity of the Darling Range fault. Lying upon the western flank of the Darling Range is a more broken but elevated strip of country which is the southern extension of the Donnybrook series. In this area all the hills are capped with laterite gravel while the intervening flats are for the most part sandy. In some places extensive deposits of sandy shingle are exposed, particularly near the edge of the crystalline rocks. This apparently results from the disintegration of conglomerate beds, the pebbles and boulders in which are of the usual flattened oval form common to shingle, while they usually consist of a granular white quartz, similar beds of which occur at Collie, Greenbushes, and Donnybrook, and at various points between these places.

In one or two places in the beds of the Blackwood and Donnelly Rivers, and also on Fly Brook, a branch

of the latter, beds of a black, lustrous lignite outcrop, which when tested in the last-mentioned locality by a number of shallow bores, proved to consist of a number of fair-sized seams interbedded with dark micaceous shales and sandstones, which rocks are identical with those associated with the carbonaceous deposits met with in the bores further north at Mill Brook—a branch of the St. John's Brook—and at Busselton and Newtown, also in Murphy's Shaft at Donnybrook. Since, however, only a hand drill was employed no cores were obtained which could yield plant remains, consequently their age is still undetermined.

This belt is narrow at the south end on the Warren River, where the beds referable to this series are exposed only for a width of 1½ miles, but northward it gradually widens to the head of Barlee Brook (the north branch of the Donnelly River) from which point it spreads out in a westerly direction along the Blackwood valley until it strikes the granite of the Cape Leeuwin-Naturaliste ridge.

This formation in all probability extends in a southerly direction to the coast, but it is here covered by more recent formations. Lying immediately to the southward of the last-mentioned is a tract of low-lying open swampy flats, which evidently represents the bed of an old lagoon, into which the Donnelly and Blackwood Rivers discharged prior to the breaching of the coastal hills. This plain is densely covered by low scrub or rushes, and is 45 miles in length by an average width of six miles, but it is much narrower at both the eastern and western ends.

Between this swampy tract and the coast, and extending from Black Head on the east to Flinders Bay on the west, is a range of calcareous sand hills, of which the highest peaks often attain an elevation of from 300 to 750 feet.

This belt, which averages about four miles in width in places, presents a bold cliff face to the seaward, but this section of the coast is more usually fringed by a wide, often steep, sandy beach, drifts from which are often piled up over the sandstone hills to a considerable elevation, and often of great extent. In section these sandstones are always seen to be false-bedded, the layers of sand grains varying considerably in size while some portions are much more highly calcareous than the others. Basaltic rocks outcrop at several points and good exposures may be seen at Black Point, the Donnelly mouth, and a little northward of Silver Mount, while patches of a peculiar deep red clay observed in several localities probably indicate the presence of these rocks beneath the surface.

At Darradup, about 15 miles down the Blackwood River, and just below its junction with the St. John's Brook, an outcrop of porphyritic basalt occurs in the river bed, while it is highly probable that a more detailed survey will reveal many others in the river valleys.

The entire area lying between the Blackwood River on the north, the coast on the south, the Darling Range on the east, and the Cape Leeuwin-Naturaliste ridge on the west, forms the reputed Donnelly-Warren Petroliferous basin; a careful examination, however, has failed to disclose any evidence of such, the entire foundation for the assumption that oil exists in this district being built upon the occurrence of very high grade asphaltum washed up along the coast.

Upon the western side of this area the crystalline rocks again make their appearance along a line hav-

ing an average width of seven miles, which extends from Cape Naturaliste on the north to Cape Leeuwin on the south, a distance of 56 miles; but upon this side of the basin there is no scarp or other evidence that would suggest the presence of a fault line.

The straightness of the line of outcrop as mapped may suggest a fault, but this is in reality only approximate, being arrived at by connecting the only three points to which surveys have been carried out; the balance of the country being very rough and thickly timbered, the accurate mapping of this line would necessitate the expenditure of more time than its importance warrants, particularly as the junction is very obscure owing to the covering of lateritic gravel.

That no faulting exists on this margin of the basin is demonstrated by certain bore sections obtained in the search for coal eastward of Cape Naturaliste, which proves the granite bed to gradually rise from beneath the Donnybrook series (*vide* Bulletin No. 44).

Along the western face of the granite belt and resting directly upon it are a series of false-bedded calcareous sandstones, which average about one mile in width. These often rise to a considerable elevation (from 550 to 750 feet), and vary greatly in composition, portions closely approaching a high-class limestone, and when such is the case numerous caves are met with, the majority of which are richly festooned with stalactites, some of which are of exceptional beauty and variety. In some of these caverns recently many bones of extinct marsupial types have been discovered; this indicates both their great antiquity and a difference in climatic conditions since at the present time the natural vegetation will only support a limited number of the smaller types of marsupials. These sandstones as a rule present bold cliffs to the seaward at the base of which the crystalline rocks form ledges and islets.

At several points sand drifts have been piled up from the beach over the sandstone hills, one near Hamelin Bay having travelled inland as far as Karri-dale, a distance of over two miles, and was only checked there by grass planting and bushing.

Eastward of Black Head and the Darling Range fault and onward to the Frankland River there is a marked change in the country owing to the absence of the Donnybrook Series.

The southern edge of the gneissic plateau can be traced in an easterly direction from Calcup Ford, on the Warren River, to the Shannon River, a distance of 30 miles, but beyond the boundary is lost sight of beneath an elevated swampy plain, upon which there are numerous lakes and swamps, the largest of which is Lake Muir, which measures six miles by three miles, but this only contains water after heavy rains. Southward of the gneissic plateau the country is more broken, high gravel capped and karri-clad hills being interspersed with sandy valleys, in which there are streams or swamps.

On the sides of the hills porphyritic granites and dolerites outcrop, and this belt of country extends for a width of 20 miles, after which it is covered by the coastal sandstones.

The sandstones of this section are not often highly calcareous, very little of it except the capstone being of good enough quality to burn for lime, but otherwise they are identical with those of the western coast.

At Point D'Entrecasteaux the false-bedding of the sandstone series is well exposed in a cliff face, which rises sheer from the granite foundation to a height of 400 feet. Eastward of this point, however, for a distance of 10 miles this series is represented only by a low, narrow belt of parallel sandstone ridges, about one mile in width. From here to Brooke Inlet this formation broadens considerably, while individual hills often attain to a considerable elevation. The coast line of this entire section eastward of D'Entrecasteaux is often fringed by a sandy beach backed in places by low sandstone cliffs against which sand drifts are often piled, while ledges and islets of granite are of common occurrence.

Between Brooke and Nornalup Inlets the crystalline fringe comes into greater prominence, bold masses like Chatham Island, Clifly Head, Long Point, Point Nuyts, and Rocky Head rising to heights exceeding 600 feet, and dominating the sandstone series which lie behind them.

These sandstones occur in the form of a series of more or less parallel ridges having a north-easterly direction, and present a steep face to the eastward, while that to the westward is a gradual slope, which clearly demonstrates their aeolian origin; their arrangement being at right angles to the direction of the prevailing winds (westerly), which agrees with the prevailing direction of the dip of the false-bedded sandstones of D'Entrecasteaux and further westward.

In the rear of these coastal hills are numerous extensive but shallow sheets of water, which are known as inlets. These are invariably fed by rivers which discharge themselves into them, and since the discharge passage is quickly blocked by sand either thrown up by the sea or piled up by the wind directly the heavy scour ceases, these lakes are as a rule perfectly fresh. Very often this bar is built up to such a great height as to cause a very considerable rise in the water level of the inlet, when, unless assisted by man, the water is unable to break through; consequently a large area of land may be flooded. But when once given a start the water rapidly scours a deep and wide channel, which it will keep open until a state of equilibrium is established.

Around these inlets deposits of brown coal are often discovered which are often accepted as indications of coal, but they are in reality only bog deposits, and often carry a large percentage of sand.

WESTONIA AND SURROUNDING DISTRICT.

(T. BLATCHFORD.)

The area embraced in this *interim* report is bounded by the Rabbit-proof Fence on the west, the Bullfinch-Hope's Hill belt on the east, Perth-Kalgoorlie Railway on the south, and extends northward to a line drawn west from Golden Valley.

TOPOGRAPHY.—The topographical features are very similar to those of the southern portion of the Yilgarn Goldfield, already described in a previous report.*

Briefly, the surface consists of low-lying ridges running in a general north-west and south-east direction, between which the country is flat or undulating, and for the most part covered with sandy soils and thick scrub, though small belts of good mining timber are by no means scarce. The ridges are insignificant as landmarks, the maximum elevation of their crests being not more than 200 feet above the intervening

* G.S.W.A., Bulletin No. 63.

country. By far the most prominent landmarks are isolated granite knobs rising abruptly above the surface, which may be seen for considerable distances, and in consequence have been used for trigonometrical survey stations. A large line of dry lakes, lying to the west of Golden Valley, breaks the monotony of the landscape.

GEOLOGICAL CHARACTERISTICS.—For the most part the rock-mass in the area under consideration is massive granite, in which occur limited and isolated areas of greenstone with one known very small area of rocks of sedimentary origin. The most important of the greenstone belts is one which extends from Bodallin Railway Station to some few miles west of Boodalin Soak. The sedimentary series occur at the Comstock group of leases.

Referring briefly to the rocks of the district, they can therefore be classified under three main headings:—(1) Granitic, (2) Basic or Intermediate, (3) Sedimentary.

(1) *Granitic Rocks.*—Of the first class, the following varieties are met with in the field:—

A.—Massive granite which is the staple rock of the prevailing granite knobs. This rock is often coarse-grained and pegmatitic in structure. At the junctions with the greenstones it is sometimes found to be distinctly gneissic, and as such may be different from the next class.

B.—Isolated gneissic granite. This class may be a derivative of the first class, but such has not yet been proved.

C.—Dyke intrusions of granite which may be fine grained or pegmatitic. Both varieties are extremely common.

(2) *Basic or Intermediate Rocks.*—Numerous variations of this important class of rocks are to be found in the field, and though apparently they represent different types, it is doubtful whether they are not modifications only of the same rock-mass.

A temporary classification made with reference to their composition and texture resolves itself into three main divisions:—(A) Diorites, (B) Amphibolites, (C) Peridotites.

Of these the first has numerous variations:—

- (a) Normal diorites: a rock in which the hornblende and plagioclase are in approximately equal proportions.
- (b) Fine-grained felspathic diorites in which the felspar predominates.
- (c) Fine-grained hornblende diorites in which the hornblende is excessive.
- (d) A distinctly gneissic variety.

This particular class has been isolated in the mapping fairly conclusively. It has been found impossible to map individually the variations owing partly to the lack of outcrops and underground workings, and largely on account of the gradual change of one variety into another.

The mapping, however, is practically complete, for the various granite types and certain of the basic members have also been more or less isolated by definite boundaries.

Sufficient petrological and chemical work has been done to prove a gradual change, in certain instances, from one rock type to another, and it is to be desired that further investigations on the type specimens collected in the field and on the core samples from

four bores put down by the Edna May Company and given to the writer by their manager, Mr. M. Williams, will throw still further light on this subject.

Studying the rocks from an economic point of view, two types only have been found containing lodes in which gold or the base metals occur in commercial quantities, viz.:—

- (1) The greenstones,
- (2) the isolated gneissic granite.

(1) Throughout the main greenstone belt there is every probability of payable gold being found, though perhaps only in small veins similar to those in the vicinity of Marvel Loch. In the vicinity of Boodalin Soak two veins containing highly payable gold contents are at present being worked, which have been discovered quite recently, while other prospectors have been working at various points in the same vicinity for some considerable time.

(2) Of the second series of rock containing payable lodes, only one area has so far been discovered, and is practically confined within the areas embraced by G.M.Ls. 2238, 2180, 2291, 2570 at the surface and probably extending at depth into G.M.Ls. 2168, 2585, 2615, and possibly 2644. This limited belt, which is without doubt a microcline granite gneiss, occurs in the form of a lens and is completely surrounded with the basic rocks. The planes of foliation in the gneiss run approximately parallel with its western boundary, *i.e.*, North 40deg.-60deg. West, and dip to the north-east at a variable angle.

The footwall rock of the gneiss is an extremely basic rock (43.6 per cent. silica), and is probably a peridotite. There is little doubt that it is of a later age than and has intruded the gneiss.

Throughout the gneiss are innumerable quartz veins varying in thickness from mere threads to quartz reefs with a maximum thickness in places of 40 feet. A rough classification of the quartz veins seems to point to two varieties: (a) veins occurring in fissures across the foliation planes (the principal gold-bearing veins), (b) smaller and less regular veins following more or less the planes of foliation.

Of the former class the Edna May reef embracing its continuation, the Edna May Central reef, is by far the most important.

Minor ones, such as in G.M.L. 2570, No. 2 reef Edna May Gold Mine, a vein in No. 2 Shaft (G.M.L. 2238) is shown on the geological map.

The Edna May Central reef presents one or two striking features.

First, the strike is out of the ordinary, and varies from one of North 73deg. East in the Central ground to North 30deg. East in the Edna May ground where encased by gneissic rock, but eventually to one of North 70deg. West where the footwall is greenstone. Thus the lode is almost horseshoe in shape, or rather more resembling a hook.

When in the gneissic rock the underlie is to the north-west, whilst that of the south-western end of the reef is to the north-east. Both these underlies are variable, but in each case the angle is greater below the 75ft. levels than above.

The lode itself consists partly of quartz through which are bands of kaolinised material, though the eastern portion may better be described as a succession of lenses and bands of quartz mixed with kaolin and country rock.

Fragments and remains of felspar crystals also occur in the solid quartz itself, which incline one to ascribe the origin of the lode to metasomatic replacement in a partially closed fissure.

Narrow granitic dykes are frequent in the gneissic rock, and in several instances may be seen passing through the lode. They are distinctly of later age than the lode and have had practically no effect on the latter except to pass through the vein. In one instance a slight displacement of the lode has occurred on one of these granitic dykes, but is scarcely worthy of notice. Much more detail will be given regarding these lodes in the final report on the field.

In conclusion, it should be sufficient to state, without going into details at this juncture, that there is no geological reason why the Edna May and Central line of reef should not last until considerable depth is attained.

YERILLA.

(J. T. JUTSON.)

Yerilla is the centre of a small mining belt about 21 miles east-south-east of Kookynie. Most of the country is flat, but occasionally rather higher ridges occur, the most elevated belt being between four and five miles to the south-east of the township of Yerilla. This is known as the Catherine Range and possesses a Trig. Station on one of the high points. This "range" is really the remains of an elevated plateau, now dissected into steep rocky ridges and gullies.

The general geology is simple. There are three chief series of rocks; basic, intermediate, and acid. The basic are the oldest, and the other two series may be approximately contemporaneous with one another. The basic series consists of massive and schistose rocks, to all of which the general field name of "greenstones" has been given, none of the rocks having yet been microscopically examined. The massive greenstones are divided into fine-grained, porphyritic, and coarse-grained. The relations between these three groups have not been determined, but it is probable that the porphyritic is merely a variation of the fine-grained. The coarse-grained group may be either a variation of or a rock mass distinct from the fine-grained group. If the second alternative be correct, its age relative to the fine-grained is unknown, but probably it will be found to be intrusive into and therefore younger than the fine-grained series.

The schistose rocks are in part derived from some of the massive greenstones, and even when this is not clear they belong to rocks of the greenstone type. They have, therefore, provisionally been termed schistose greenstones or merely schists without, however, necessarily implying that they have been derived from the massive greenstones. Some of the schists may be quite distinct in origin and age from all the massive greenstones. The dominant strike of the schists is a few degrees west of north, although there is much variation in the ill-defined belts.

The intermediate series consists of a rock provisionally termed a syenite. It is intrusive into the greenstones, and is apparently non-auriferous. Its outcrop is at about six miles to the east of Yerilla.

The acid rocks form a series of small intrusions into the greenstones, and consist of a granite and of a number of dykes evidently genetically related to the granite. These dykes comprise aplites, quartz, and

felspar porphyries, probably granite-porphyry and felsite.

The lodes of the district are practically all quartz of varying thickness, but usually on the thin side and with blanks. They mostly occur in the schists, but some, as noted below, occur close to the junction of the granite and the greenstone. They vary in their strike and dip, but the strike of the lodes of the most defined belt as a rule is, roughly, north and south with a prevailing dip usually to the east. Generally they are parallel in strike and dip to the planes of the schists, but some reefs cross these planes. Others, which comprise some of the most important of the district, dip to the west or to the north. Examples of the former are the Yerilla King and Melba reefs, and of the latter, the Viola reef. The Yerilla King has been worked to a little over 200 feet in vertical depth, and this, so far as known, is the greatest depth on the field. This reef has also to date been the largest gold producer.

The most important reefs (including the Yerilla King) are just west of the town, and are associated with granite and greenstone. Whether this association is anything more than a mere coincidence has not been demonstrated; but in view of the actual occurrence and also of the fact that junctions of granite and greenstone in Western Australia are frequently fruitful prospecting grounds, other similar areas which exist in the district may be worthy of examination.

Doubtless most of the quartz reefs in the area have been prospected, and many have probably been found to be unpayable, as practically no work on such has been done. In view, however, of the comparatively low costs of working, a re-examination might result in some payable proposition being obtained.

A deep lead runs west from the Yerilla King Mine, but the results have, so far as could be ascertained, been poor on the whole, while little surface alluvial gold has been found.

GOLDEN BUTTERFLY GOLD MINE, BUTTERFLY, NEAR KOOKYNIÉ.

(J. T. JUTSON.)

This mine is situated about five miles to the west of the Butterfly (late Dingo Creek) Railway Station, and about 14 miles north-west of Kookynie.

The rocks as observed at the surface in the vicinity of the mine are, when undecomposed, of a grey colour, fine-grained, homogeneous, and of a basic character, belonging to the common "greenstone" type. Two acid dykes cut the greenstone near the mine, but no dykes have been observed in the underground workings, the greenstone being the only rock known there.

The lode belongs to the lode-formation class, that is, it forms a band of altered and mineralised country, the latter having been largely replaced by silica pyrites and gold. Running through the lode in various directions are numerous quartz veins and veinlets from 1/16 of an inch to 10 or 12 inches thick. The lode in places appears to have been brecciated and the fragments to have been cemented by quartz. Much of the ore in the upper levels has been oxidised, but there is no sharp line of division between the sulphide and oxidised ore.

The lode strikes about N. 10° to 15° W. as a rule, but there are variations from this. It dips flatly to

the east, the average dip being between 30° and 35°. Two lodes have been worked in places, but it is probable that they merely form a loop or bifurcation of the one lode. The thickness of the lode varies considerably, its most common width probably being about six or eight feet, but reaching 10 and 12 feet; in others being reduced to about four feet and less, and in places practically disappearing. One of the loop lodes attains a thickness of about 20 feet.

The principal workings consist of an open cut, a main underlay shaft sunk for about 350 feet (measured on the underlay), and five levels. Much stoping has been done.

The gold was stated to be free as far down as the mine was worked and the ore is low grade.

NIAGARA.

(J. T. JUTSON.)

As the survey of this district has not been finally completed and certain rocks await microscopical examination, the following statements must in some cases be regarded as tentative, and as subject to qualification when the full report comes to be written.

TOPOGRAPHY, ETC.—The country embraced by the detailed survey so far carried out on the scale of 10 chains to the inch comprises the mining belt lying to the west of the old Niagara township, extending short distances north of the railway and south of the large dam constructed for the Government.

Most of the country is an extensive plain—forming portion of the vast plateau of Western Australia—which in some places is traversed by water-courses having definite but very shallow channels. Other portions are simply wide level areas without any distinct drainage lines. Rising to a varying height of from about 20 to 50 feet above this plain is a tableland of very changing width. This tableland is connected with the plain either by steep cliffs ("break-aways") or by long, gentle slopes, the former being more numerous than the latter. These cliffs form very sinuous lines.

The surface of the tableland, except at its edges, is covered with an ironstone cement which hides all the underlying rocks (and probably some lodes) and permits the scanty growth only of stunted vegetation. On the plain rocks frequently outcrop, and the vegetation is much more abundant and varied. Salmon gums flourished at one time, but they have been mostly cut out for mining timber.

GENERAL GEOLOGY.—The rocks of the area are believed to be almost wholly of igneous origin of both basic and acid character. The basic rocks comprise amphibolites and possibly chlorite and talcose schists derived from gabbros and dolerites. All these rocks are for the present grouped under the general field term of greenstones. They are both massive and schistose in structure, and fine-grained to medium-grained in texture. They occur in all stages of decomposition, from fairly fresh rocks to ferruginous clays and kaolin. It is possible that there are two distinct series of basic rocks—one intrusive into the other—but this has not been proved. The greenstones have a wide distribution occurring mostly along the northern half of the area. They contain the principal lodes, but the latter are often close to or at the junction of the granite.

Another rock series is akin to a quartz-diorite type, free silica being fairly abundant. This rock probably belongs to the same mass as the hornblende granite series, but was perhaps the earliest intrusion

of that magma. Both rocks appear to be intrusive into the normal greenstone.

The more acid rocks comprise hornblende granite, hornblende and biotite gneiss and gneissose granite, graphic granite, aplite, pegmatite, and quartz-porphry or porphyrite. The hornblende granite occupies the largest area amongst the more acid rocks, being widely developed in the southern half of the country under consideration, and as small masses and dykes in the north-eastern portion. It is intrusive into the greenstones, although some of the latter appear to intrude the granite. This, however, is probably deceptive, but if true, a later series of greenstones exists, having, however, little areal extent. Associated with the hornblende granite are the gneissose granites, which form a substantial portion of the granitic areas. This type of rock in hand specimens might be regarded as either a metamorphosed granite or sediment, but its mode of occurrence and association with the massive granite in the field strongly suggest that it is merely a derivative of such massive granite, the foliation and difference in mineralogical composition being doubtless due to dynamic metamorphism. At the same time, it must be remembered that certain rocks in the area look very like altered sediments, and hence the gneissose rocks may be their metamorphic representatives. On the other hand, the possible sediments may be merely the weathered gneiss. "Islands" of various size of the greenstone occur in the granitic rocks.

Intrusive into both the greenstone and granitic groups, as very numerous dykes, is a series of aplites, pegmatites and graphic granites. They are apparently contemporaneous with one another, as gradations between them can be observed. Associated with but later than these rocks (yet earlier than the porphyry dykes mentioned below) are thin irregular quartz veins, which do not appear to carry any gold. No minerals of any value have been noticed in these rocks.

Another series of dykes, also very numerous, consists of fine-grained quartz-porphry or porphyrite. They occur both in the greenstones and the granitic rocks, and cut through the aplite-pegmatite group. Apparently later than the porphyries are the auriferous quartz reefs.

So far as present observations go, the Niagara district presents a clear illustration of what is sometimes termed the law of decreasing basicity. Thus beginning with the oldest rocks and following in succession, we have the basic non-quartzose gabbros and dolerites (now altered to amphibolites, etc.), then the quartz-diorite type and the hornblende-biotite granites and gneisses, then the highly siliceous pegmatites, aplites, and graphic granites, and then the quartz veins in the latter series, these veins evidently being the residue of the magma. The latest rocks, the quartz-porphryes or porphyrites, are less acid than the aplite-pegmatite group.

It may here be noted that neither the aplite-pegmatite group nor the porphyries appear to have had any influence in the distribution of the gold, the auriferous reefs not as a rule being associated with them.

THE LODES.—Almost all the lodes are quartz reefs which occur both in the greenstones and the granitic rocks and frequently close to the junction of the two series.

The reefs vary much in thicknesses from the prominent "blows," perhaps 10 or 15 feet thick, to

a few inches. They strike in various directions, the most usual being between east and north-east, and almost all trending between east and north. At the north-eastern corner of the area, near the Niagara railway station, the reefs swing round from east-north-east to north-north-east. The underlie of the more east-striking reefs is generally to the south, and that of the more north-striking to the east. A fairly continuous line of reefs for about 1½ miles runs from the south-west of Niagara township westerly and west-south-westerly. This line contains by far the deepest workings, viz., those of the Orion Mine, which reach a depth of over 600 feet. This mine is in greenstone country. Another shorter line lies to the north of and parallel to that just mentioned, commencing a little to the west of the Niagara railway station and passing through the old Kathleen, May, and Sandhurst leases. Most of the other lines are short, and there is a tendency to an *en echelon* arrangement.

The reefs frequently, if not generally, cut across the strike and dip of the rocks where the latter are foliated. The main fissures and the accompanying reefs are strong and likely to live to reasonable depths.

As regards the distribution of the gold, it is very often almost wholly confined to a thin portion (perhaps six or nine inches) of the reef, this thin portion being locally termed a "scab." The latter occurs, according to my information, sometimes on the foot-wall, sometimes on the hanging wall, and sometimes right in the reef, but its origin is not clear. The gold in such "scab" is frequently associated with bismuth minerals, the latter at Niagara being regarded generally as a good indication of gold. Such shoots as are known to exist pitch to the east.

Not much alluvial gold appears to have been found at Niagara.

Finally it might be mentioned that judging by the number of old workings that exist, a large belt must have been payably gold-bearing near the surface. Little work has been done below the water level, so that values below that level have not been ascertained to any extent.

THE COUNTRY SOUTH OF NULLAGINE.

(H. W. B. TALBOT.)

Leaving Meekatharra on April 30th, we travelled along the Peak Hill-Nullagine Stock Route as far as No. 42 Well, where work terminated at the end of the year 1913. Starting from this point, work was continuously carried on until December 9th, on which date we arrived at Marble Bar in the Pilbara Goldfield.

The area examined and mapped this year lies approximately between latitude 22deg.-23deg. 30min. south and between longitude 118deg. 52min.-122deg. 30 min. east.

The major portion of this area is occupied by rocks of the Nullagine Series, which consist of sandstones, shales, and conglomerates. To the north of latitude 22deg. 30min. and west of the Rabbit-proof Fence these sedimentary rocks are associated with lavas which in some localities reach a thickness of 400 feet.

In many places the rocks forming the Nullagine series have been invaded by dykes, bosses, and sills of quartz-dolerite which usually tilt the beds into

highly inclined folds, and indurate the enclosing strata to a considerable extent.

In localities where the Nullagine beds have been removed by denudation the underlying rocks are seen to consist of granitic rocks or greenstones, the former being the newer formation. Wherever the contact of these is seen, veins and dykes from the granites invariably extend for some distance into the greenstones.

Starting from the southern end of the Throssell Range, a belt of granitic rocks consisting of granite, quartz- and mica-schists with some felspar-porphry extends south-eastwards down the valley of the Rudall River for about seventy miles. The width of the belt is about twenty-five miles, and it is flanked on both sides by rocks of the Nullagine Series. On the south side these consist of sandstones, but on the north side grits and coarse conglomerates are associated with the sandstones.

All the rocks of this belt have been subjected to a considerable amount of crushing and shearing which has occurred at a later date than the sedimentary rocks were deposited, as the latter have undergone the same pressure that caused the foliation in the granitic rocks, and in addition to being tilted into folds with a high angle of inclination they have been much crushed and sheared. The granitic rocks are traversed by innumerable quartz reefs of all sizes which invariably conform to the strike of the schists, *i.e.*, south-east and north-west. The reefs, however, have a hungry appearance, and do not give much promise of being auriferous.

Several other granite areas of various sizes were seen and mapped during the course of the season's work. In most of the areas the granite was more or less foliated, but nowhere had it undergone the same amount of crushing as that which forms the Rudall belt.

Three greenstone areas were seen during the year, but part of two of these are already shown on the Geological Sketch Map of the Pilbara Goldfield.* These were, however, traversed to their southern extremities, and in both cases they were found to disappear under the sedimentary rocks of the Nullagine Series. The more westerly of these belts extends southwards from Western Shaw for about fifteen miles, at which point it is overlaid by sandstones and volcanic rocks. The eastern belt runs almost parallel with the Coongan River, on its western side, nearly as far south as latitude 22deg., where it, too, is lost to view beneath the Nullagine beds. Both of these belts have already been fully described in Bulletin 40, so that further mention of them in these notes is not required.

The third greenstone belt extends from near Coobina Soak at the 188 mile post on the Peak Hill-Nullagine Telegraph line in a westerly direction along the foot of the southern face of the Ophthalmia Range to a point about ten miles west of Mount Newman. The belt consists of greenstones and greenstone schists of various types, and in places there are numerous newer greenstone dykes. About twelve miles to the north-east of Coobina Soak there are some old gold workings from which some alluvial gold appears to have been won. No record, however, is available to show the amount of gold obtained from this locality, but judging by the limited extent of the workings the amount is probably inconsiderable.

* Bulletin 40. Frontispiece; Perth: By Authority, 1908.

There are several places on this greenstone area which seem to me to be worth further prospecting, but that could only be undertaken after heavy rains, as there is no permanent water and the surface water would dry up very quickly. From an economic point of view the country examined this year is decidedly disappointing, as none of it is likely to add materially to the mineral wealth of the State. The Western Shaw belt and the Coongan belt appear to have been prospected in a fairly thorough manner, so that little can be looked for from them. The Coobina belt may yield some gold in the future, but I am of the opinion that anything that may be found will be very limited in value and extent.

In addition to the gold obtained from the three greenstone belts referred to, small alluvial workings were seen in a few localities at the base of hills formed of conglomerates of the Nullagine Series. As there is a fairly large area occupied by this formation between the tributaries which flow into the head of the Oakover River, there appears to be no reason why further discoveries should not be made, and there are sound reasons for thinking that systematic prospecting in that vicinity would have a reasonable chance of being successful.

MOLYBDENITE AT SWAN VIEW.

(H. W. B. TALBOT.)

The existence of molybdenite in the Darling Range has been known to some of the old residents of the State for many years, and at one time a little work was done on a deposit of that mineral near Swan View. A hole ten feet long by five feet wide by six feet deep was excavated, but apparently no attempt was made to treat the ore raised.

The present high price of molybdenum has drawn the attention of prospectors and mining investors to that metal, with the result that several deposits of molybdenite have been pegged out in this State, that mentioned above being included in the number. A Reward Lease 211H called the Rock of Ages has been taken up, the old workings being in the centre of the block. The Reward Lease is situated on the National Park, Reserve 7537, a mile and a half to the north-north-east of Swan View Railway Station and about 200 yards to the east of the Eastern boundary of Location 1114. Hereabouts the country rock consists of coarse-grained granite traversed by numerous greenstone dykes. The molybdenite occurs in splashes in solid granite, and in the hole previously referred to, which constitutes the only working, there is no sign of any lode or reef. The granite is traversed by numerous joints which run in all directions. Molybdenite can be seen in the sides, ends, and bottom of the hole, and also in most of the stone which has been taken from it and is now lying on the surface.

In all the rock containing molybdenite which I saw, iron pyrites was associated with that mineral. In some of the specimens broken there is only a small amount of the pyrites, but in other pieces it forms a large proportion of the rock. The presence of this pyrites may cause some trouble in the treatment of the ore.

Outside of this hole I saw no molybdenite *in situ*, but at a point about two chains to the north I saw a good deal of the mineral in pieces of granite lying about on the surface. At first I thought this was another occurrence of molybdenite, but on examina-

tion I found that the stone containing the molybdenite was quite unlike the weathered surface granite, but was identical with the rock from the hole. These pieces of rock containing the mineral have been in their present position for many years, and some of them are embedded in the soil, and I mention the fact so that casual observers may not be misled and think that molybdenite occurs here as well as in the hole.

The amount of molybdenite contained in the granite appears to be greater towards the bottom of the hole. Owing to the nature of the occurrence of the mineral and the limited amount of work done. I do not feel justified in expressing a definite opinion regarding the value of this deposit, but I would advise the present owners to take out a bulk sample and to have it treated. This is really the only way to prove whether or not it will pay to work the mine.

MEEKATHARRA AND SURROUNDING COUNTRY.

(E. de C. CLARKE.)

This succinct account of Meekatharra and the surrounding country may require modification when full results of petrological and other work are available.

BROADER GEOLOGICAL FEATURES.—A sketch map, based on the Lands Department map (scale 300 chains to one inch) has been prepared of a block of country of about 2,000 square miles, extending from just north of Nannine in the south to Abbots in the north, of which Meekatharra township is approximately the centre. The geological formations distinguished are merely "Granite," "Greenstone," and "Horizontal Sedimentaries," and the boundaries between them have not been accurately mapped. The observations made show clearly enough, however, that the granites form the predominating rock in this block of country; that surrounded by this granite are two large and several small "islands" of greenstone; and that the sedimentaries occupy small areas near the eastern margin of the block.

Further remarks on granites and greenstones will be made in describing the geology of the chief mining centres.

The most important occurrences of the horizontal sedimentaries occur at Mt. Yagahong, near Gaban-intha, and at Table Top Hill. The rocks are sandstones and shales, lying horizontally, or very nearly so. No direct evidence as to their geological age is as yet available. They are seen, however, to lie on the denuded surface of the granites, and cannot therefore be correlated with the sedimentary members of the greenstones, which will be mentioned below. They form probably a southern extension of the sediments which attain a large development to the north.

GEOLOGY OF SPECIAL AREA.—The area over which more detailed field work together with the examination of abandoned "shows" and mines in process of development has been carried out, covers about 120 square miles, extending from Garden Gully in the north to Yaloginda in the south.

The following brief description of the more obvious features in the geology of the three mining centres of this area—Garden Gully, Meekatharra, and Yaloginda—will include most features of interest in the area.

Garden Gully Centre lies on the northern of the two large "greenstone islands" mentioned above, which is separated from the southern "island" by a "strait" of granite three or four miles wide. The western part of this centre is a plain covered with surface *débris* and almost entirely without outcrops. The eastern part is somewhat undulating and has occasional outcrops both of quartz and of "country" rocks, but the latter are usually so altered, often by surface silicification, that their original character is lost.

The Garden Gully Centre appears to be built up of "greenstones" of two ages. The older are basic schists, probably sheared igneous rocks, which are usually rather coarse in texture. In these rocks the quartz veins—the gold-bearing bodies of the centre—occur. The younger greenstones are basic igneous rocks, apparently of the gabbro type, which have been intruded into the older greenstones, and which carry no auriferous quartz veins. The quartz veins of the eastern portion of this area usually follow an extremely sinuous course. Those of the western portion, on the other hand, are straight, running nearly north and south. The absence of Jasper Bars from this centre may be noted.

A fuller account of the Garden Gully Centre having been given in the Annual Report for 1913, further reference thereto is unnecessary in this place.

Meekatharra Centre.—This centre lies at the northern point of the southern "greenstone island." The most important mines of the district are situated close to Meekatharra along a more or less continuous zone of fractured and mineralised country. This zone will, following the local usage, be referred to as the "Paddy's Flat" line, Paddy's Flat being the name given to that portion (the site of the Fenian G.M. and its neighbours) on which the original prospector (Paddy Donovan) of the line worked. Two other less important groups of leases are located near Meekatharra, both like the Paddy's Flat line, being characterised by the presence of acidic dykes.

The chief kinds of rock found in this centre may be tentatively classified thus:—

A.—ACID ROCKS:

1. *Granite*.—Possibly two varieties of this rock occur:

(a) Gneissic granite generally, but little decomposed. Its foliation planes run north-east and south-west, *i.e.*, parallel to the main lines of shearing in the adjoining greenstones. Large "blows" of quartz are found in this granite, but rarely if ever carry more than traces of gold.

(b) Highly decomposed, kaolinised granite, showing in hand specimens an approach to graphic structure. This granite is found in places along the margin of, and again occasionally surrounded by the gneissic granite—of which indeed it may be merely more highly weathered portions, though if this be the case the difference in structure, the greater degree of alteration of the greenstones in the neighbourhood, and its occasional auriferous content seem difficult to account for. It is possible that this rock rather than (a) is the parent mass of the porphyry dykes next mentioned.

2. *Porphyry*.—At least four acidic dykes can be recognised in the Meekatharra Centre.

(i) Paddy's Flat Bar.—A dyke of a felspathic and quartzose rock which above water level is completely

kaolinised—can be traced in underground workings for a distance of about $1\frac{1}{4}$ miles. When mapped it is seen to have a course roughly parallel to the main shearing lines of the schists, *i.e.*, north-east and south-west, but has many twists and considerable variation in width. Followed vertically it shows very many variations in direction and amount of dip. In the Fenian and Ingliston Extended Mines this bar is broken probably by shearing movements subsequent to its intrusion into a number of disconnected lenticular bodies.

(ii) Savage's Bar.—This bar can be traced from Savage's (G.M.L. 93x), where it has a width of 6 or 7 chains, to a point just west of the Pioneer G.M.L. It is thus shorter and wider than the Paddy's Flat Bar, and will probably be found to differ from it somewhat petrologically. The gold-bearing formations connected with this bar are quartz veins running diagonally out of the porphyry into the country where they carry the best values, but they are payable only for a short distance.

(iii) Beverley Bar.—A third dyke of acidic rock is disclosed in the shallow workings on and near the old Beverley G.M.L. just west of Meekatharra township. Possible continuations of this bar are to be found both to the north and south. Gold occurs in connection with this bar in transverse quartz stringers.

(iv) Haveluck and Ralph's Patch Bars.—A number of small dykes of kaolinised acidic rock occur in and near the Haveluck G.M.L. and carry values which are fairly evenly distributed throughout the rock and are not confined to the quartz stringers with which it is seamed.

B.—BASIC ROCKS:

1. *Dolerite*.—A dyke of basaltic dolerite forms a marked feature in the eastern workings of the Ingliston Extended G.M. Its extension for nearly a mile to the north has now been proved with fair certainty. Southward dolerite has also been found, but in such isolated places that the existence of a continuous bar in this direction cannot be proved. Recent petrological work has confirmed the view that this rock has not been subjected to any of the shearing forces which have affected the country rocks, and that it is subsequent to and cuts through the auriferous bodies.

2. *Gabbro, etc.*—Several occurrences of rocks of the holocrystalline basic type are found more particularly to the east and south of the Paddy's Flat line. Their relation to the schists (to be next described) is similar to that between the older and younger greenstones of the Garden Gully centre.

C.—METAMORPHIC ROCKS:

It appears that some of the metamorphic rocks of this centre have originally been basic and ultrabasic volcanics, both fragmental and effusive; others have been basic or ultrabasic intrusives; others again have been fine-grained sedimentaries. The latter have but a small extent, and except for the development of cleavage, do not in hand specimens appear to have been greatly altered. They occupy a narrow belt immediately to the west of the Paddy's Flat line.

The fragmental volcanics have in some parts of the field retained much of their characteristic structure, but in others have been so excessively sheared and altered as to be indistinguishable in hand speci-

mens from the sheared basic and ultrabasic intrusives, which also occur in the centre. In other places, notably close to the main Paddy's Flat Channel, the alteration appears to have been of thermo-metamorphic character with much metasomatism and injection by auriferous solutions. The proper classification of the metamorphic rocks will prove to be a difficult task.

Jasper Bars.—These well-known features need not be described here. Those occurring in the Meekatharra centre may be of the same type as those which have been examined at Sandstone, and referred to in *Bulletin* No. 62, but there is little evidence as to their character at depth, only one bar having been followed below water level, and there in an exceptionally mineralized part.

Periods of Ore formation.—It appears that injection with auriferous solutions took place first as a final phase of the intrusion of the porphyry dykes, but that a second more important ore-filling took place after the porphyry had solidified, and that on this second enrichment the porphyry had no influence.

Yaloginda Centre.—Two divisions may be recognised in this part of the area—an eastern, characterised by the presence of large very low grade "formations," which are probably acidic dykes, and a western, in which the gold occurs in long parallel quartz reefs of the "Kidney," *i.e.*, moniliform type, none of which are of any great size, but which have in places yielded short shoots of great richness, the most noted of which were the Revenue and Black Jack shoots.

The following is a brief account of the principal rocks of this centre:—

A.—ACID ROCKS:

1. *Granite.*—The granite in the Yaloginda centre lies well to the west of all known ore deposits, and is solely of the coarse gneissic variety.

2. *Porphyry.*—Several occurrences of acidic rocks may with some uncertainty be linked up into continuous dykes running in a general north and south direction:—

(a) *Western Bar.*—This dyke can be traced (at the surface almost exclusively) from the southern limit of the area northwards past Yaloginda Railway Station to the neighbourhood of the Criterion G.M.L. Practically no prospecting has yet been done to ascertain whether there are any payable ore bodies in connection with this bar, although a rich alluvial deposit has been made near its margin.

(b) *Romsey Bar.*—This bar is exposed in the workings of the Romsey G.M.L., where rich cross leaders have been worked in it. Its possible continuation has been traced for some distance both to the north and south.

(c) *Gibraltar Bar.*—The lode in which the workings of the Gibraltar G.M.L. lie, appears to be most probably an acidic dyke abundantly netted with quartz stringers. This dyke probably extends for some distance to the south, but hardly any systematic work has been done to prove it.

(d) *Maranui Bar.*—This dyke is found outcropping for a considerable distance to the west of the Maranui G.M.L., but judging by the complete absence of workings in its neighbourhood, no enrichment has taken place as a consequence of its intrusions.

B.—METAMORPHIC ROCKS:

The Yaloginda centre differs from the Meekatharra in the much greater development of fine-grained schists and in the comparative absence of those of coarser grain. The majority of these fine-grained schists will probably prove to be sheared basic igneous rocks and not altered sediments.

Jasper Bars.—The Jasper bars of this centre differ from those of Meekatharra centre in that they show no contortion or brecciation and appear to originate from the impregnation of fine-grained seams of schist with iron oxide.

GREENBUSHES.

(F. R. FELDTMANN.)

A brief visit was paid to Greenbushes during the month of January in connection with an examination of the main ore body on the Kapanga Mine, and the opportunity was taken, so far as the limited time permitted, of briefly examining the general geological features of the district.

The results of these observations in general confirm the views of the former investigators, and tend to show that the oldest and most widely distributed rock of the district is a gneissic granite, which has been intruded by dykes of greenstone—in places of considerable width.

The greenstones are amphibolitic in character and consist of:—

- (a) Amphibolised dolerite, and
- (b) Hornblende schist, commonly biotitic and probably representing sheared and somewhat metamorphosed portions of the dolerite; the meagre evidence available favouring this view.

These amphibolitic rocks appear to occupy the greater portion of the belt in which the tin deposits occur.

The primary tin-bearing rocks, which possess pegmatitic affinities, are later than and intrusive into the greenstones and occur as dyke-like bodies of varying width. They consist chiefly of quartz, albite feldspar and muscovite mica in widely varying proportions; tourmaline is seldom absent and is usually present in large proportions. These rocks appear to represent the final products of a granitic magma.

The surface of the rocks is largely obscured by laterite and other superficial deposits, as well as by a fairly dense growth of jarrah, red gum, and smaller timber.

The Kapanga Mine, which lies on the south-eastern side of the main stanniferous belt, was examined in considerable detail. The main tin-bearing formation as shown by the least weathered specimens, consists chiefly of albite and quartz with much tourmaline, and occurs as a dyke-like mass in biotitic hornblende schist. The cassiterite usually occurs in well-formed octahedral crystals of fair size. The tin contents are usually highest near the walls of the formation. The surface of the mine was largely obscured by laterite, but in places fragments of quartz and tourmaline and flakes of mica indicate the presence of other probable tin-bearing formations.

It is evident that the district will bear further careful prospecting.

THE COUNTRY BETWEEN KALGOORLIE AND MULLINE.

(F. R. FELDTMANN.)

The following description was compiled from notes taken when accompanying the Government Geologist on a flying trip to Mulline.

The rocks of the area under consideration may be roughly classified under two main headings, viz.:

- (1.) Greenstones, and
- (2.) Granites.

The Greenstones.—The greenstones consist for the most part of amphibolites and epidorites (derived from dolerites or gabbros), in places altered to hornblende schists, and, further, to chloritic rocks; hornblendite (derived from pyroxenites)—this type is less common; and serpentines, talc-chlorite, and carbonate rocks. The original forms of the three last are rather obscure; the serpentines may have been derived from peridotites, but their structure and general appearance, as shown in section, point rather to their derivation (with the possible exception of the Gordon rock) from rocks rich in hornblende or augite, such as hornblendites or pyroxenites; the talc-chlorite rocks may have been derived either from serpentines or more directly from hornblendites, most probably from both, whilst the carbonate rocks may have originated by more complete alteration from any of the other types.

For convenience the greenstone series may be divided into:—

- (a) The Kanowna-Mulgarrie Belt;
- (b) The Bardoc Belt;
- (c) The Ora Banda Belt; and
- (d) The Davyhurst-Mulline Belt.

The term belt is used merely for convenience, the greenstone masses occurring rather as islands, sometimes lenticular, but often irregular in outline, in the granite.

(a) The Kanowna-Mulgarrie Belt, which includes the Six-Mile group of leases to the west of Kanowna, runs west of north from the latter place, past the Gordon and beyond Mulgarrie. The northern and eastern boundaries of this belt have not been encountered. It includes amphibolites and quartz-carbonate-fuchsite rocks at Kanowna; rocks ranging probably from amphibolite to serpentine and carbonate rocks near the Gordon; and amphibolite and talc-chlorite rocks at Mulgarrie.

(b) The Bardoc Belt has not been mapped south of Paddington; going south it joins the Ora Banda Belt about 4 miles south of west from Broad Arrow and possibly links up with either or both of the Kalgoorlie and Kanowna series. It runs about north-north-west from Paddington through Broad Arrow, Bardoc, and Vetersburg, averaging about 7 miles in width; its further continuation to the north has not been mapped. It includes serpentines, amphibolites and talc-schists at Paddington; amphibolites at Broad Arrow and Bardoc; serpentine and carbonate rocks at Vetersburg.

(c) The eastern boundary of the third belt has been roughly mapped from its junction with the Bardoc Belt to where it crosses the Canegrass-Waverley road: the only point where its western boundary has been mapped is on the Waverley-Wangine Soak road. It includes amphibolites, serpentine and por-

phyrite at Ora Banda, the Waverley rocks have not been examined in detail. This belt appears to run as far south as Kunanalling, and may possibly join up with the Coolgardie Belt.

(d) The Davyhurst-Mulline Belt has been mapped in greater detail than the others. The centres of Davyhurst, Mulwarrie, Ularring, and Riverina are on this belt, which does not appear to be so highly basic as the others, consisting as it does almost entirely of amphibolite with occasional small areas of hornblende schist.

The Granites.—The granite areas may be divided into:—

- (a) The Reserve 3092—Split Rocks Belt;
- (b) The Canegrass Belt;
- (c) The Wangine-Ularring Belt.

All probably consist for the most part of biotite-microcline granite. At Reserve 3092 the rock is much coarser in grain than usual with very large felspar phenocrysts, and may be of different age. Areas of quartz or felspar porphyry also occur. The southern boundary of the first belt has not been traced, but probably does not run far south of the chain of dry lakes running between the 39-mile peg on the Kalgoorlie-Broad Arrow road and the 44-mile peg on the Kanowna-Mulgarrie road. The second belt appears to tail out to the west of Broad Arrow; its boundaries have not been mapped north of Canegrass. The Wangine-Ularring Belt probably forms part of the large granite area shown on Plate II. of *Bulletin* No. 45 of the Survey.

MULLINE, RIVERINA AND ULARRING.

(F. R. FELDTMANN.)

These centres are situated in the northern portion of the belt of amphibolite, which also contains the centres of Mulwarrie and Davyhurst. Near Mulline this belt has a maximum width of about ten miles.

The amphibolite is usually fine in grain, though exceptions to this occur, and is composed chiefly of hornblende and labradorite felspar. Along certain defined lines of shearing the amphibolite has been altered to hornblende schist, occurring in bands a few feet in width and surrounding the auriferous quartz reefs. In places further alteration has resulted in the formation of biotite at the expense of some of the hornblende; this is probably due to contact with acid intrusives.

The amphibolite belt is surrounded on all sides by granite, which, on the available evidence, is of later origin, and appears to be of the normal biotite-microcline type.

Intruding the amphibolite are numerous dykes of granite-porphyry, quartz-porphyry, and pegmatite, varying somewhat in strike and dip, and in width from a few inches up to about 60 feet. The granite-porphyries appear to be closely connected with the main granite mass from which they are probably apophyses. Both the granite and quartz-porphyries appear to be older than the auriferous quartz veins, but some, at least, of the pegmatites are probably younger than the latter. The pegmatites usually consist of quartz, felspar, and mica, but the relative proportions of these minerals vary greatly.

One example of a later basic intrusive dyke—a basaltic dolerite—was seen cutting across both hornblende schist and granite-porphry.

Auriferous quartz reefs, occurring as irregular lenses in zones of hornblende schist seldom more than four feet in width, form the chief source of the gold of the district. They vary greatly in strike, and in direction and extent of dip, those at Mulline being usually very flat, averaging probably between 20 and 30 degrees, whilst those of Ularring average between 50 and 60 degrees. The values are said to be practically entirely in the quartz, which is usually fairly glassy in appearance. The average value of these reefs works out to about 1.30 fine ozs. per ton.

Reefs of the white "buck" type occur, they are usually much larger than those of the auriferous type, and seldom carry values.

The only lode formations seen by the writer were at Riverina; they do not appear to be common in the district. They occupy zones of intense shearing in the amphibolite and are practically vertical in dip.

The best example is the main lode running through the Riverina and Riverina South mines. A good deal of work has been done on this lode. The complete metasomatism of the zone of most intense shearing and the chloritisation and carbonation of the adjacent

country, characteristic of the Kalgoorlie lodes, are absent from the Riverina type. Values in these lodes are said to follow the pyrites which is disseminated in small quantities throughout the shear zone. The average value of the ore treated is not so high as that from the quartz reefs, being about 0.66 fine ozs. per ton. The lodes, however, are in all probability of deep-seated origin, and may be expected to maintain their values at depth.

THE NORTH END (KALGOORLIE).

(F. R. FELDTMANN.)

The following is a brief description of the main geological features of that portion of the North End which lies to the south of the Kanowna railway line, which is coterminous with that area referred to in the Annual Report of 1913, and the detailed account included in *Bulletin* No. 51.

THE ROCKS.

As the petrological examination of specimens from this section of the field has not been completed, a final classification of the rocks has yet to be made, but it will probably not differ widely from the following provisional one.

	Original Rocks.	Present form of Rocks.
Older Greenstones ..	Possibly lavas and tuffs ..	Fine-grained Amphibolites. Fine-grained Greenstones. Calc-schists.
Younger or intrusive Greenstones	Quartz-Dolerites or .. Quartz-Gabbros .. and Dolerites or .. Gabbros .. Pyroxenites (possibly with Peridotites?)	Amphibolised quartz dolerites. Epidiorites. Amphibolites. Chloritised amphibolites. Bleached amphibolites. Hornblendites. Talc-chlorite rocks. Fuchsite carbonate rocks.
Later Intrusives ..	.. .. .	Albite-porphyrites. "Jaspers" and graphitic schists.
Recent Deposits ..	.. .. .	Laterite, sand, loam, etc.

Older Greenstones.—Within this area the fine-grained greenstones are the only important members of the older greenstone series, the fine-grained amphibolites and the calc-schists occurring only in small patches. The fine-grained greenstones differ from the corresponding amphibolites chiefly in the presence of chlorite in place of the hornblende in the latter rocks, and from the calc-schists in the smaller development of carbonates; the calc-schists also contain a little or no chlorite. The fine-grained greenstones, which occupy the eastern portion of the area examined, are greenish-gray rocks, composed chiefly of chlorite and carbonates. When decomposed they usually develop a schistose structure, giving them a slaty appearance; in the unoxidised state they are commonly massive, but show a considerable amount of jointing; veins of carbonate or flinty quartz are common. These rocks correspond to those grouped by Thomson* under the same title. Gibson,† however, classifies them, together with the more highly carbonated rocks to which the term "calc-schist" is here restricted, under the general heading of calc-schists, which is, at any rate, a convenient field name, now sanctioned by local usage. The curious variety containing paler spheroidal patches, composed chiefly of carbonates, mentioned by both the above writers, is to be found on dumps between the Parkestown

and Bulong roads, also on a dump near the south-west corner of M.L. 104E.

Whilst in the area under consideration, owing to the absence of underground workings which might expose unoxidised contacts between the older and younger greenstone series, there is little evidence as to which of the two, if either, is intrusive into the other; nevertheless, the greater degree of alteration, the more marked schistosity and absence of internal structure shown by the fine-grained series, as well as its positions relative to the coarse-grained doleritic or gabbroid series, point to the conclusion that it is the older, and that the latter is intrusive into it.

The writer found the western boundary of the older greenstones to agree very closely with the position shown on Mr. Gibson's map,‡ but on the whole it runs slightly further to the west. It passes through the Lone Hand 4229E, Triumph 4188E, and Colleen Bawn 4369E leases, and runs very close to the eastern wall of the North End Mine's main lode, if not actually forming its eastern wall. It then passes through the northern portion of the Fair Play Extended 4063E, and slightly east of the western boundary of the Isabel 933E, thence through the Creswick and A.W.A. United. On leaving the last-named it turns in a south-westerly direction to reach

* Quarterly Journal, Geological Society, vol. LXIX., p. 634. † G.S.W.A., Bulletin No. 42, p. 17, ‡ loc. cit., Plate II.

the Brownhill railway line about 200 feet north of the south corner of G.M.L. 4401E Conundrum.

Younger or Intrusive Greenstones.—The rocks comprising this series occupy by far the greater portion of this area. They are probably all members of the one magma, though whether intruded as one dyke, the central portion of which was more basic than the external portions, or as separate dykes, there is little evidence to show, though from their occurrence in the field, the writer is at present inclined to the former view. In general the western members of the series are less basic than the central and eastern; the central, which are on the whole the most highly altered, being practically ultrabasic in composition.

A broad band of amphibolised quartz-dolerite forms the westernmost member of the series. It can be seen on dumps to the north-west of the Cunard Mine (G.M.L. 4412E Gordon), also outcropping in a few places between that mine and the Warden's residence. Thence it runs in a southerly direction along the Boulder railway line. At the southern end of this section it is found on G.M.L. 4470E, Hannan's Find. A smaller band of this rock is found on the eastern side of the area, along the western side of the North End Mine's main lode.

Epidiorites occur chiefly as local varieties of the amphibolised quartz-dolerite.

Somewhat more basic amphibolites occur in places to the east of the main quartz-dolerite belt. Some of these rocks are particularly coarse in grain, such being found on dumps on the south-western slope of Mt. Gledden. Similar rocks also occur on the northern slope of Mt. Charlotte.

The chloritised amphibolites cover a large area to the east of the amphibolised quartz-dolerite, and have been formed by the chloritisation of the former ferro-magnesian constituents of a belt of rock composed probably in part of quartz-dolerite, in part of slightly more basic dolerites. The main belt of these chloritic rocks, which in the northernmost portion of the field form the country rock of the Golden Zone line of lode, forms the chief hills of this area, including Mt. Charlotte, Hannan's Hill, Cassidy Hill, and Mt. Gledden. In this section there are no lodes of importance in this rock, but the innumerable cross quartz veins worked on the Hannan's Reward-Mt. Charlotte and Cassidy Hill Mines have proved highly auriferous.

Bleached varieties of the amphibolites representing a still further stage of alteration occur only to a very slight extent, chiefly as narrow bands outside the auriferous quartz veins in the chloritised amphibolite.

East of the belt of chloritised amphibolite is a broad belt of much more basic rocks, covering the central portion of this area. It is most probable, on the evidence, that the rocks from which the various highly altered rocks forming this belt were derived were chiefly pyroxenites, though it is possible that small areas may have approached peridotites in composition—on this point there is but little evidence. Fairly fresh hornblendite occurs on the Bonnie Play lease associated with a highly carbonated rock, probably derived from it. It also occurs to the west of the dolerite band west of the North End Mine's lode.

The greater portion of the central belt is composed of talcose, chloritic rocks, often highly carbonated. These are the southerly continuation of the broad band of talc-chlorite rocks in the northernmost section of the field.

Fuchsite-carbonate rocks occur chiefly as more highly altered zones in the talc-chlorite-carbonate rocks. One of these zones runs about a hundred feet east of the Hidden Secret lode. The chrome-bearing mineral referred to fuchsite occurs usually as small scales on the walls of the innumerable quartz veins in these rocks.

Several dykes of albite-porphyrite, apparently the latest intrusive rock of this area, occur in this section of the field. In most instances their boundaries are completely obscured, and the dumps in the vicinity display only highly decomposed rock, so that mapping is a matter of some difficulty. The dykes occur chiefly intruding the talc-chlorite rocks and other highly altered members of the younger greenstone series.

Lateritic deposits are not so common in this section as in that to the north. They appear to be confined almost entirely to the more highly altered members both of the younger and of the older greenstones. The highest hills of the area, which are in the chloritised amphibolite, are not capped by laterite.

Other recent superficial deposits such as the sand, loam, clay, etc., found on the lower-lying ground and partly of alluvial, partly of eluvial origin, need not be discussed here.

At this point it is convenient to mention the "jaspers" (ferruginous quartz rocks), or "slates," common in this area, and passing, as a rule, into graphitic schists at depth. They are highly laminated rocks occurring in the oxidised zone as lenses of flinty quartz, more or less ferruginous, separated by finely laminated bands of slaty appearance showing marked contortion in places. The whole formation sometimes reaches a width of fifty feet. Some of the jaspers are very persistent in length, extending for miles. In this section they appear to be confined to the more basic varieties of the younger greenstones. Neither in this nor in the northern section was the writer able to make a satisfactory examination at depth, but it is possible that much of the quartz in the oxidised zone is due to secondary silicification. Nodules of pyrites, of the size and shape of marbles are characteristic of the graphitic schists.

Thomson* has noted the frequent association of these rocks with dykes of the albite-porphyrite; this agrees with the writer's experience. In connection with this the frequent association of the albite-porphyrite with the fuchsite-carbonate rocks may also be mentioned.

THE ORE DEPOSITS.

A scientific classification of the ore deposits, particularly as investigations were, in many instances, confined to the oxidised zone, is no easy matter in this area. There is a mergence of the different types into each other. On the whole the country rock appears to be one of the most important factors and figures largely in the following classification:—

- | | | | | |
|---------------------|-------------------------------------|-------------------------------------|---|-----------------------------------|
| I.—Primary | { | (1) Quartzose lode formations | { | (a.) In the dolerite derivatives. |
| | (2) Schistose lode formations | (b.) In the pyroxenite derivatives. | | |
| | (3) Contact lode formations | (c.) In the older greenstones. | | |
| | | | (d.) At the junction of the albite-porphyrites and the younger greenstones. | |
| | | | (e.) At the junction of the older and younger greenstones. | |
| II.—Secondary | { | (4) Cross Quartz veins | | |
| | (5) Impregnations. | | | |
| | (6) Elluvial and Alluvial Deposits. | | | |

* loc. cit. p. 660.

1. *The Quartzose Lode Formations.*—This type appears to be confined to the more highly altered derivatives of the quartz-dolerite, *i.e.*, the chloritised amphibolites. In it the metasomatic alteration of the country rock has been carried to a greater degree than in the schistose types, resulting in the complete replacement of the original minerals along the centre of the shear lines by flinty quartz, the change into the more normal country being a gradual one. This type is, perhaps, on the whole more regular as regards values than the schistose types. It is but poorly represented in this section, the best example in the North End of the field being the Golden Zone line of lode.

2. (a.) *Schistose formations in the doleritic rocks* are also poorly represented. They sometimes carry good values in the oxidised zone, but as to how far this is due to secondary impregnation is hard to say as but little work has been done below the zone of oxidation. The lode on the Maritana lease may be quoted as an example of this type, which, also, is chiefly confined to the chloritic rocks. Formations of this type do occur in the amphibolised quartz-dolerite, but their gold contents are seldom above 3 or 4 dwts., and from an economic point of view they may be disregarded.

(b.) *Schistose formations in the pyroxenite derivatives.*—In these the chief form of alteration of the country along the ore channels is that of carbonation. Veins of carbonates are common and quartz veins also occur. The Hidden Secret lode, probably the richest at this end of the field, is of this type. In this mine the richest ore, carrying much telluride below the oxidised zone, is commonly described as occurring in the form of a pipe; in the writer's opinion it is really one of the lenticular shoots common to the Kalgoorlie lodes.

(c.) *Schistose formations in the older greenstones.*—In their general characteristics these resemble the corresponding formations in the younger greenstones, but are more irregular in extent and values, and taken as a whole are much poorer, although occasional rich shoots occur. The main lodes of the Mt. Ferrum Consols and Isabel leases are of this type.

3. (d.) *Formations at the junctions of the albite-porphyrates and the younger greenstones.*—These occur chiefly in the more basic rocks, usually the talc-chlorite rocks. Here again the most typical representatives occur in the northern section—the Mystery lode being a good example. Insufficient work has been done at depth to enable one to determine their chief characteristics with accuracy. They appear to be commonly associated with the fuchsite-carbonate rocks.

(e.) *Formations at the junction of the older and younger greenstones.*—These vary considerably in character. It is probable that the North End Mine's main lode is at, or very close to, the junction between these rocks. This lode is of considerable length and the sheared zone is pretty wide. In appearance the lode somewhat resembles the schistose lodes, but some big lenses of flinty quartz occur. The best ore occurs in lenticular shoots, some of which in the upper levels have proved to contain high values and to be of fair length.

South of the Bulong road a peculiar and very persistent formation closely follows the boundary between the older and younger greenstones, running through the Isabel, Creswick and A.W.A. United leases. The main body consists of quartz of varying

thickness, in places fairly ferruginous, and probably containing some manganese; it sometimes shows a peculiar flow-like structure, round, almond-shaped white patches. There is some schistose matter on the footwall. It does not appear to carry good values, although such have been obtained in spurs running from it into the older greenstones.

4. *Cross quartz veins.*—These are common throughout the North End of the field, particularly on the western side, in the chloritised amphibolite. They have proved highly auriferous and have been the chief source of the gold obtained from the Hannan's Reward-Mt. Charlotte, the Cassidy Hill, and the Cunard Mines. There are two series of veins; one with nearly vertical dip, and striking about east-north-east, the other dipping at a shallow angle to the north and striking more nearly east and west.

5. *Impregnations.*—These occur chiefly in the oxidised zone, and have been formed through the leaching of gold out of the lodes and quartz veins by vadose solutions, with subsequent deposition over a wide area in the decomposed country rock near the surface. A typical example is found in the Hannan's Reward-Mt. Charlotte Mine. Others occur in the Cunard and Devon Consols Mines.

6. *Elluvial and Alluvial deposits* have been discussed in previous reports and need not be enlarged on here.

Later Shear Zones.—Later shear zones of great length occur on the western side of the younger greenstone belt, chiefly in the chloritised amphibolite. Their strike is nearly north and south—thus differing from that of the true lodes—and they dip to the west at a fairly steep angle. They are found to fault the cross quartz veins, which, in the oxidised zone are usually poorer near those shear zones. In the oxidised zone these shear zones resemble lodes of the schistose type, but examination in the unoxidised zone shows an absence of the marked metasomatism characteristic of the true lodes. The best examples of these shear zones occur in the Hannan's Reward-Mt. Charlotte Mine.

THE GEOLOGY OF THE MOUNT JACKSON AND KOOLYANOBING DISTRICTS.

(C. S. HONMAN.)

The area geologically mapped during the season of 1914 covers about 4,500 square miles; it includes the country between the Mt. Jackson-Southern Cross road and the Rabbit-proof Fence from the 35 to 126-Mile post on the latter; the Jackson, Marda, Koolyanobing, and Yarbu mining centres, the Die Harty Ranges, Pigeon Rock, and Koolyanobing Range.

TOPOGRAPHY.—The area may be described in a general way as a flat surface from which isolated ranges of hills protrude, forming landmarks of the greenstone belts separated by large tracts of level, sandy country. The granite areas are, as a rule, entirely represented by flat country, with occasional gentle undulations from which rise granite bosses, typical instances of which are Pigeon Rock, Elach-butting, Geeranning, and Barcooting Rocks. The ranges and hills exclusively belong to the greenstone belts, which, however, sometimes cover wide strips of flat country. In these flat areas the greenstone can invariably be distinguished from granite by its red, loamy soil and salmon gum, gimlet wood, and morrell gum forests, whereas the granite is characterised by sand covered with thick scrub and pines. The highest land occurs around Pigeon Rock, at

Mount Jackson and Bungalbin Range. Koolyanobbing is also a relatively high range, but is surrounded by lake country, and therefore occurs in a depressed area. The Koolyanobbing lakes branch into two arms, one connecting with Lake Deborah, near Golden Valley, and the other with Lake Koorkoordine, at Southern Cross. These lakes are about 1,000 to 1,100 feet above sea level, and Koolyanobbing Peak is about 400 feet above the lakes. Mount Jackson trigonometrical station is by aneroid 2,156 feet above sea level and the Marda Dam 1,700 to 1,800 feet. Therefore from Mount Jackson the country falls southwards towards Koolyanobbing and Golden Valley. West of Mount Jackson there is a gradual fall towards Lake Moore; eastwards the country is fairly level; and to the north a rise takes place to Pigeon Rock and the Die Harty Ranges, of which Mount King is the highest point.

GENERAL GEOLOGY.—The rocks represented in this area belong to two distinct formations. A younger sedimentary series of rocks resting unconformably on the older Pre-Cambrian rocks. This younger series may probably be of the same age as the Nullagine Series of the North-West of Western Australia.

The younger series occur only as outliers or remnants, and have been extensively reduced by denudation, leaving the underlying Pre-Cambrian series exposed at the surface. The rocks may therefore be divided into two ages:—

- (1.) Cambrian-Nullagine provisionally;
- (2.) Pre-Cambrian.

The younger series are composed of conglomerates, sandstones, slates, and siliceous limestones. In the latter some interesting nodules occur which have not yet been thoroughly examined. These are interesting owing to their peculiar internal structure and their external symmetry of form. Some of the specimens in fact might easily be mistaken for the internal casts of certain fossil shells. They appear to be concretions formed by the deposition of calcite about a nucleus.

Proofs of unconformity are ample, such as the correlation of pebbles of the conglomerates of the younger rocks with those of the Pre-Cambrian series, and the fact that the younger rocks rest on the upturned edges of the older series with marked differences in the strike and dip of the beds of each series.

The old series is composed of:—

Amphibolites
Dolerites
Dolomite
Chlorite schist
Quartzite
Hæmatite quartzite
Ferruginous quartzite
Rhyolite.
Volcanic tuffs and lavas
Porphyry
Porphyrite
Gneiss.

These are all tentatively included in the greenstone series and mapped as such, the rhyolites, porphyries, and porphyrites being indicated on the maps wherever possible.

The greenstones which are of most economic importance from one continuous belt, which, starting from the Die Harty Ranges is about 20 miles wide and trends southwards to Mount Jackson townsite,

at which the belt forms an elbow and extends to east-south-eastwards connecting with the Bungalbin Range, where it is 13 miles wide, and seems to be getting narrower. The Jackson greenstone belt if extended on its normal strike east of Jackson would connect with the Coolgardie belt at Bulla Bulling and Gibraltar. The mapping of the country between Southern Cross and Coolgardie will do much to settle this point.

Koolyanobbing Range represents a distinct belt of greenstone, which runs parallel with the Southern Cross-Bullfinch belt for 30 miles.

Along the boundaries of the greenstone narrow belts of gneiss occur, which are continuous with the greenstone series and may represent metamorphosed sediments. All the quartzites met with in this area are undoubtedly of sedimentary origin as can be seen at Victoria Trig. at Jackson. Here occurs a prominent band of quartzite derived from a pure sandstone with original current bedding still visible. This passes gradually into a typical banded quartzite.

Outside the narrow fringe of gneiss that skirts the greenstone, massive plutonic granite occurs. The massive granite has probably eaten its way into the gneiss by absorption or subcrustal fusion of the latter.

Evidence of the sedimentary character of the gneiss is to be had at Koolyanobbing, where conglomerate gneiss occurs along the contact with greenstone.

At Pigeon Rock the granite forms an inlier, and is surrounded by ridges of quartzite dipping away from the rock on all sides.

The Die Harty Ranges are composed of banded quartzites, which connect with the Athlone quartzites, hence through Buddarning dipping east, through Curragibbin, Mount Jackson, and finally forming a continuous ridge to Bungalbin, where they turn abruptly north and are cut off by the granite to the north. These quartzites are 70 miles long in the area mapped. Granite occupies the whole of the country outside the Mount Jackson-Bungalbin belt and the Koolyanobbing belt.

ECONOMIC GEOLOGY.—*Marda*: This centre is situated about three miles north of the Mount Jackson Trigonometrical Station, and ten miles east of the old Jackson townsite.

The ore deposits can be placed into two classes:—

- (1) Quartz Reefs.
- (2) Lode Formations of ferruginous quartzite.

(1) *The Quartz Reefs* are irregularly distributed in the fine-grained greenstones and strike in almost any direction. There are, however, roughly three directions in which they occur most commonly, viz:—

- (1) North-west and south-east dipping to north-east.
- (2) North-east and south-west dipping to north-west.
- (3) North and south dipping to west.

These probably represent three directions of fissuring in a massive rock due to strain induced by great earth movements.

This field is distinct from any other goldfield owing to the irregular trend of the reefs. This is owing to the rocks being massive and not fissured and sheared in the usual north-north-westerly direction. The reason for this is obviously because the series strikes almost east and west, namely at right angles to the

great lateral pressures to which they have been subjected in common with all the rocks of the Eastern Goldfields.

The result is contorted quartzites and irregularly fissured rocks, with an absence of schistose structure and regular shear zones; hence the irregular form and distribution of the quartz reefs. The gold occurs in the reefs as short rich shoots, generally at the intersection of another reef, or alongside a brecciated pipe or zone in the ore channel. In most cases the reefs are short and lens-shaped, and some difficulty is entailed in locating fresh chutes of gold, sometimes necessitating a great amount of dead work which eats up the profit earned from the last chute.

(2) *The Lode Formations* are unimportant and are composed of banded quartzite crushed and riddled with quartz veinlets. The gold occurs exclusively in the quartz; and the formations are all low-grade with an irregular distribution of gold owing to sporadic arrangement of the quartz veinlets. Typical examples are the Mount Bacon and the Burgoose leases.

The principal mines are:—

- Allen's Find.
- The Great Unknown.
- The Butcher Bird.
- The Standard.

Allen's Find occurs in a much decomposed kaolinised rock which is probably of sedimentary origin and possibly belongs to the younger series. In hand specimen the country rock is a decomposed feldspathic or calcareous grit, and is associated with conglomerates, slates, and sandstones. The reef is strong with a dark seam on the footwall and strikes north and south with a shallow dip of 29deg. to the east. It is associated with a series of parallel reefs striking north-west and south-east, which also have a shallow dip. At the intersection of the main reef and one of the latter series there is a big body of stone, and the gold seems to be in both reefs at either side of the intersection. This stone averages in value an ounce per ton, and has been worked down to 175 feet on the underlie.

The Great Unknown (Chas. Jones and party).—This reef occurs in massive carbonate rock in a narrow shear zone of chlorite schist. It strikes north-west and dips 80deg. to the north-east. A band of quartzite occurs in massive rock and is cut by the reef and shear zone. The shear has formed subsequent to the quartzite and has brecciated it at the intersection. The reef which was formed last follows a fissure in the shear zone and splits on striking the brecciated quartzite, passing round either side of it and forming again on the other side, thus enclosing the quartzite breccia as a horse of mullock. This reef has been stoped irregularly down to 140 feet, and has so far three distinct chutes of gold pitching vertically downwards. In places it is very rich, and crushings of the picked reef average 4 ozs. to the ton; about 500 tons having been crushed. There is a large quantity of lower grade stone at grass. The reef averages from 12 inches to 18 inches wide and the shear zone 4 feet wide. There is a very good chance of this reef extending into the South Unknown lease.

The Butcher Bird.—Atkinson's show: a quartz reef occurring in a decomposed dolerite striking north-east and dipping 30deg. to the north-west. It rolls a bit, but generally has an average strike to the

north-east. At the north-east end a fault plane cuts it off, though not altogether, as the fissure can be seen on the other side of it. A winze has been sunk on the fault plane in search of water to a depth of 90 feet from the 75ft. level. The water level at the time of my visit was 135 feet from the surface. In the south-west end of the drive on the 75ft. level the reef is still big and strong, but is said to be poor in value. At the north end of the lease the country changes to an acid rock unfavourable for the continuation of the reef. Southwards the reef may live indefinitely. The ore chute is pitching to the north-east.

This mine is equipped with a five-head mill subsidised by the Government, but it has been hung up for the want of water for some considerable time. An adequate supply could be assured by further sinking, which I understand is being done. It is to be hoped for the future good of the district that the mill will be in full swing soon and available to the prospectors for crushing the parcels of stone they now have at grass.

The Standard is situated east of the Marda Dam.

This mine was worked by Garrett and party, who won a good deal of gold from it, though subsequently Don and Saunders worked the property. The main reef strikes north-west and dips to the south-west. This is cut by a reef striking east and west with no definite dip and having a curved course which takes the form of a series of waves. There is also a north and south reef which dips gently to the west. Near the main shaft the different reefs seem to come up in the form of a dome. The reefs are most erratic and cut each other clean off. The values are apparently governed by the intersections. There are a number of other shows in the early prospecting stage. They all belong to the same class of stone and carry plenty of mineral such as galena, pyrites, and blende. No alluvial gold has been found at Marda.

Jackson:—The Mount Jackson Centre is now deserted, but has in the past produced a great deal of gold. The Mining Statistics show 30,148 tons treated for 19,658 ozs. of gold.

The rocks of the field are essentially amphibolites of fine and coarse grain, associated with hematite quartzites and quartzites. The granite contact is within half a mile of the mines.

Only one type of ore deposit has been worked here, namely, quartz reefs. The reefs, unlike those at Marda, have a regular trend parallel with the granite contact in a north-north-west direction. The amphibolites have probably been formed from older greenstones similar to those at Marda by metamorphism induced by the neighbouring plutonic granite. The water level in the abandoned mines is 130 feet below the surface, and consequently only the upper levels could be examined.

There should be better opportunities here for working the reefs on a large scale than at Marda, as there are persistent bodies of quartz which should be of fair value judging by the returns from the old mines.

Koolyanobbing:—The rocks of this district are mainly fine-grained greenstone and ferruginous quartzites also, associated with these near the granite contact, amphibolites, porphyrites, and granite dykes. The centre of the belt is not of a promising character from an auriferous point of view, but near the contact with the granite there are abundant gran-

itic intrusions and payable contact deposits should be found here. Near the north-east contact the old Rainbow leases are located. These are now being worked by Clarke's Syndicate. The deposit is essentially a contact deposit, and occurs in a dark greenstone schist alongside a granite dyke. The reefs have a persistent outcrop for some hundred feet and an average width as far as opened up of 12 inches to 18 inches; to the east parallel reefs occur of a similar nature. If the values come up to expectation—and there is no geological reason why they should not—there should be sufficient stone to keep a small battery going long enough to make a profit. I should, however, advise thorough sampling before any money is spent on a plant. There is an ample supply of salt water within two miles of the mine and 35 chains west of the old battery, which is about $1\frac{1}{4}$ miles west-south-west of the mine.

Between the Rainbow Leases and the Range is a large body of quartz outcrops carrying galena and zinc blende. This should be worth sampling.

Chadwick's Reward (now abandoned) is south of the range and about $1\frac{1}{2}$ miles from the south-west granite contact. This is a narrow quartz reef in decomposed fine-grained greenstone, but values are reported to be on the low side.

On the south-western contact there is a large quartz blow which outcrops for miles. At one place the quartz has narrowed and carries copper carbonates on one wall, but not rich enough to form copper ore.

Yarbu.—This centre is situated about eight miles slightly north of west of Pigeon Rock. The rocks of this centre are metamorphosed slates and sandstones belonging to the younger series of the strata exposed in the district. The reefs are flat, narrow, and of glassy unpromising nature. This locality does not offer much inducement to prospectors for the reasons that:—

- (1) The sedimentary rocks are as a rule unfavourable to the formation of auriferous deposits, and
- (2) Scarcity of quartz outcrops of a favourable nature.

CONCLUSIONS.

In the area mapped during the year 1914 there are:—

- (1) Two series of rocks represented and separated by an unconformity.
- (2) Marda, as a prospecting mining field, offers great inducements to small parties of prospectors, provided continuous crushing facilities are available. An adequate supply of water for crushing purposes should be secured on sinking the winze on the Butcher Bird property.

There is a possibility that the larger shows may be opened up favourably enough to offer inducements to capitalists and large companies. Of these the Great Unknown and Allen's Find are most promising, especially the former on account of the possibility of the reef extending through the South Unknown lease.

- (3) The old Jackson centre, though now deserted, is worthy of the attention of capitalists and large companies on account of the persistent nature of the reefs and their regular trend.

(4) Koolyanobbing is well worth further prospecting. Its extension northwards appears to have been practically untouched by prospecting parties.

(5) East of Marda there is a large tract of country which deserves more attention from the prospector. From Marda Dam to Bungalbin Range there is a continuous belt of greenstone country 25 miles long and 10 to 15 miles wide. The intervening country and that around Bungalbin appears to be practically untouched, and new finds will probably be made here as the result of further and more extensive prospecting, if carried out with knowledge and with judgment.

This belt shows every indication of connecting with the Coolgardie belt at about Bulla Bulling and Londonderry.

(6) Yarbu is a centre that is not particularly attractive from a mining point of view.

LABORATORY WORK.

ROUTINE WORK.—During 1914 the routine work of the Laboratory has been continued under the general direction of Mr. Simpson, on the lines of that of previous years. Mr. Simpson reports:—That part of the work, which is capable of numerical statement, has been tabulated in detail and appears to have been of much the same volume and nature as during the past few years. It is to be noted, however, that there has been an increase of no less than 50 per cent. in the number of complete analyses made for the Field Officers of the Survey. This work is almost the most difficult and lengthy of all the practical work done in the laboratory, and frequently calls for much research in the interpretation of results. Reference to the table shows also a temporary interest in molybdenum deposits due to the altogether unprecedented market for that ore, prices reaching as high as £675 per ton of molybdenite of 95 per cent. grade. In the absence of completely satisfactory methods of estimating molybdenum in the presence of tungsten, the receipt of such ores for assay necessitated a research into the methods of estimating those two metals, both when occurring separately and in conjunction.

PUBLICATIONS.—The work of the Laboratory which is of most lasting value, is undoubtedly that which is placed on record in the various official Bulletins and other publications in the form of descriptions of physical and chemical properties of local minerals and of their occurrence, and discussions of their economic development and utilisation. During the year 1914, the following articles were prepared for publication:—

By E. S. Simpson:

Notes on Minerals collected at Niagara by Mr. J. T. Jutson.

On Chloritoid and its Congeners, with special reference to the Chloritoid of Yampi Sound. (Bulletin 64.)

Notes on a Garnet from Marvel Loch. (Bulletin 63.)

Notes on the Andalusite occurring in a Micaphyllite at Marvel Loch. (Bulletin 63.)

Asphaltum from the Southern Coast of Australia. (Bulletin 65.)

Preliminary Note on the Mount Edith Meteorite. (Bulletin 59.)

Revised Edition of Paper entitled "The Rare Metals and their Distribution in Western Australia." (Bulletin 59.)

By E. S. Simpson and H. Bowley:

Premier Downs II.: A new Meteorite from Western Australia. (Bulletin 59.)

By A. J. Robertson:

Notes on the Nature of the Sulphide (Marcasite) occurring in the lode material of the Great Victoria Mine near Marvel Loch. (Bulletin 63.)

Concentration Tests of a Tungsten-Molybdenum Ore from Callie Soak. (Bulletin 64.)

SPECIAL INVESTIGATIONS.—Amongst subjects of special investigation which have either been completed but do not form the subject of detailed reports, or which have not yet been carried through to the report stage, are:—

1. *Donnybrook Freestone*.—The sandstones or freestones of Donnybrook, which have already been used to such a large extent for building purposes in Perth, and which appear destined in the future to form the main structural material for all important buildings in the city, have not previously been subjected to any serious scientific investigation. In view, however, of the large sum about to be spent on the new General Post Office, in which this stone is to be used freely above the foundations, I have been instructed to carry out a series of investigations into the composition, physical properties, and wearing qualities of typical stones collected from the various quarries scattered over an area of about 25 square miles at Donnybrook, in the South-Western Division. The results of this preliminary investigation, which it is hoped to supplement as new quarries are opened and greater depths reached in existing quarries, should prove of the highest practical value to architects and builders in Perth and the South-West generally.

2. *Clays of the South-West Division*.—This investigation, commenced in 1911, is still being continued as opportunity offers, and has already given results of great economic importance. The results obtained are still, however, so disconnected that some time must necessarily elapse and many further tests be made, and much information collected, before any consecutive account of these clays can be published.

3. *Underground Waters of the Murchison Division*.—Interest in the curious nitrate-bearing waters of the area lying between latitudes 25° and 29° South and longitudes 115° and 123° East and referred to in my Report for 1905, has been rekindled by the collection by Mr. E. de C. Clarke of a number of such waters at Meekatharra. No satisfactory proof of the causes which have led to the presence of such unusually large quantities of nitrates in these waters has yet been advanced.

4. *Lake and Swamp Deposits of the South-West*.—Scattered over the sandy Coastal Plain of the South-West Division and lying between the ridges of Coastal Limestone are innumerable lakes and swamps, some containing water all the year round, others dry for a greater or less period of the year. The various deposits filling the beds of these lakes and swamps have been the subject of enquiry for many years past, and reference to them has been made in several publications of the Department. During the past year the study of them has been revived owing to the demand for natural lime deposits for agricultural purposes, and samples from the beds of many of them have been collected by Mr. H. P. Woodward. The following is a tentative classification of the materials filling the lake beds, of which specimens have been collected and examined:—

(A.) *Siliceous. Infusorial Earths*.—

Type (a.) Mainly diatom remains.

(b.) Diatoms with calcareous matter.

(c.) Mainly fresh water sponge remains.

(B.) *Calcareous. Marl*.—

Type (a.) Granular calcium carbonate with much infusorial earth.

(b.) Fairly pure calcium carbonate.

(c.) Calcium carbonate with much magnesium carbonate.

(C.) *Ferruginous*.—Type (a.) Bog iron ore.

(D.) *Saline*.—

Type (a.) Salt.

(b.) Gypsum.

The complete investigation of these deposits, many of which are of economic importance, will take many years to complete.

5. *Metallurgical Products from the Phillips River Smelter*.—On behalf of the State Mining Engineer detailed analyses have been made of the slag, matte, and blister copper produced at the State Smelter at Ravensthorpe. The crude copper proves to be of high quality, containing 99.02 per cent. of pure metal, the only other constituents exceeding 0.1 per cent. being nickel, 0.25 per cent, and sulphur, 0.38 per cent. The matte is chiefly interesting on account of the quantity of finely granular magnetite—5.54 per cent.—entangled in it and a somewhat unusual proportion of cobalt, viz., 0.18 per cent., associated with 0.20 per cent. of nickel.

COLLIE COAL COMMISSION.—In April evidence was given before the Collie Coal Commission on the properties of the various types of coal mined at Collie. In this evidence, amongst other things, certain suggestions were made for reducing the prevalent deterioration of the coal during transportation and storage.

NEW MINERAL RECORDS.—During the year an unusually large number of specimens of economic or scientific importance were submitted to me for report as to their exact classification, quality, and commercial importance. Of these the following are worthy of record:—

Copper Ore, Water Point, Kimberley Division.—The ore from this new find contained masses of the rich copper sulphide, Chalcocite, associated with Malachite, Cuprite, Atacamite (copper oxychloride) and Brochantite (basic copper sulphate). The last named mineral has not previously been recorded from this State, though known to occur in New South Wales.

Wolfram, Mount Singleton, Murchison Division.—Several samples of high-grade wolfram ore have been received from this locality. They appeared to be quite free from all deleterious associates.

Wolfram, Westonia, South-West Division.—Wolfram from the quartz reef in the Edna May Gold Mine contained in some cases inclusions of coarse, free gold, a somewhat unusual combination.

Chrome-ochre, Westonia, South-West Division.—From the Edna May Central Mine specimens were received of a bright green clayey material, studded thickly with flake gold. The green matrix agrees closely with descriptions of "Chrome-ochre" from France and Germany. A somewhat similar mineral is known in Victoria.

Supposed Indications of Oil, Yalgoo Goldfield and elsewhere.—Specimens of various materials popularly supposed to be indications of the presence of petroleum, continue to be sent in for examination. Of all these, one only, viz., the asphaltum found on the South Coast, has any claim for serious consideration. The fragments of this are, however, almost certainly ocean drift, and therefore of no local significance. This matter has been dealt with at length in the previously mentioned article on "Asphaltum from the

Southern Coast of Australia." The other "petroleum indicators" are:—

- (a.) Chalybeate spring waters coated with an iridescent film of iron hydrate, wrongly thought to be a film of oil;
- (b.) Various natural vegetable products of recent origin, usually resins;
- (c.) Coorongite ("mineral" rubber), a substance presumably, but not certainly, of vegetable (algal) origin;
- (d.) Brown coals and lignites;
- (e.) "Pseudo-bitumen" or "Dung Bitumen," a curious substance of black or dark brown colour, met with in or near caves. It is almost wholly soluble in water, which at once proclaims its lack of affinity with any petroleum product. It is known to be the result of inspissation of aqueous solutions of the soluble constituents of beds of bat or marsupial guano, formed by percolating rain water. It is somewhat widely distributed in Western and South Australia.

Andalusite, South Yülgarn, Central Division.—This mineral, a silicate of aluminium, so characteristic of highly altered clay beds, has been found abundantly at Marvel Loch, Nevoria, and elsewhere in the South Yülgarn Area. The importance of its discovery by Mr. Blatchford lies in the definite evidence it gives of the presence of ancient sediments amongst the gold-bearing rocks of our Eastern Goldfields.

Spinel, Chittering Brook, South-West Division.—This aluminate of magnesia was found to form the chief component of a greenish black concentrate from alluvial material. Though known to be not uncommon in New South Wales and Tasmania, this is the first record of its occurrence in this State.

Molybdenite, Gullewa, Murchison Division.—Several samples of quartz containing scales of this highly valuable mineral were forwarded from this locality. Four typical samples yielded on assay, 2.60, 1.32, 1.04, 0.64 per cent. molybdenum sulphide. It is probable that ore containing not less than one per cent. would pay to treat if obtainable in sufficient quantity.

Tetradymite, Niagara, Central Division.—This telluride of bismuth was found to be moderately plenti-

ful in the auriferous quartz from several mines at Niagara. It is associated with the sulphide of bismuth, Bismuthinite.

Chloritoid, Yampi, Kimberley Division.—A description of the occurrence of this uncommon silicate of aluminium and iron at Yampi Sound has been prepared for publication. The first known occurrence in Australia was that at Kalgoorlie, described by me in the Annual Report for 1910 and *Bulletin* 42 under the varietal name of Ottrelite. The mineral is of importance in unravelling the past history and original condition of the rock masses in which it occurs.

Meteorite, Mount Edith, North-West Division.—Two years ago a large metallic meteorite was obtained at Mount Edith and unhappily exported to the United States. Recently there has been received in Perth a small fragment said to be from a second large meteorite in the same neighbourhood. The following meagre particulars are available with regard to this iron, which may fittingly be known as Mount Edith II.:—

Siderite of the class of Medium Octahedrites (Om). Found in 1914 by Jas. Bourke, two miles from Mount Edith I. Approximate weight 380lbs. Fairly soft to cut. Etches moderately rapidly, less so than Mount Edith I. Structure octahedral, regular, with much eutectic. Width of primary kamacite, 0.4 to 0.8 mm. average 0.6 mm; secondary kamacite, 0.02 to 0.06 mm, average 0.03 mm. Fair amount of schreibersite present.

The complete list of meteorites so far recorded in Western Australia is:—

- Broadest Octahedrite: Mooranoppin, 1893.
 Broad Octahedrites: Youndegin I., II., etc., 1884 to 1891. (Numerous large and small fragments.)
 Mount Stirling, 1892.
 Medium Octahedrites: Hamersley Range, 1892.
 Nuleri, 1902.
 Mount Dooling, 1910.
 Premier Downs I. and II., 1911.
 Mount Edith, I., 1913.
 Mount Edith II., 1914.
 Finest Octahedrite: Ballinee, 1892.

Table showing Routine Work of the Geological Survey Laboratory during 1914.

Classification.	Public		G.S.W.A.	Other Departments.	Totals.
	Pay.	Free.			
Samples	54	315	83	1,130	1,582
Gold	42	198	13	1,062	1,315
Silver .. .. .	..	32	4	30	66
Copper	6	31	..	20	57
Tin	1	20	..	..	21
Lead .. .. .	..	9	4	26	39
Molybdenum	1	10	..	..	11
Tungsten	1	6	..	..	7
Titanium .. .. .	..	2	..	..	2
Platinum .. .. .	..	2	..	..	2
Chromium .. .. .	..	..	4	..	4
Manganese .. .. .	..	1	..	..	1
Nickel .. .. .	..	..	1	..	1
Lime	1	1	..	..	2
Arsenic .. .. .	..	1	..	2	3
Phosphoric oxide .. .. .	..	8	..	1	9
Sulphur .. .. .	..	2	1	..	3
Analyses, Complete	1	5	43	17	66
Analyses, Partial	1	8	6	20	35
Analyses, Proximate	1	7	5	1	14
Metallurgical Tests	1	1	1	1	4
Clay Tests .. .. .	..	6	5	1	12
Building Stone Tests .. .. .	..	..	..	14	14
Mineral determinations *	1	90	29	13	133
Miscellaneous .. .. .	..	1	1	3	5
Totals	57	441	117	1,211	1,826

* Figures under this heading are incomplete, since many rapid determinations of minerals, made for Field Officers and others, are never formally recorded in the register of samples received.

PETROLOGICAL WORK.

The work performed by Mr. Farquharson (the Petrologist), during the past year falls under the following heads:—

(I.)—Determinations and Reports for the Geological Survey Staff.

(II.) Determinations and Reports for the Mines and other State Departments.

(III.) Determinations and Reports for prospectors and for the mining and general public.

During the course of the work an endeavour has been made to maintain a close connection between the petrographical observations and the work of the officers in the field. The results of many of Mr. Farquharson's observations will, in several instances, be found embodied in the field descriptions given at length in the various *Bulletins*.

Reporting upon his work, Mr. Farquharson gives the following particulars:—

1.—DETERMINATIONS AND REPORTS FOR THE GEOLOGICAL SURVEY STAFF.—Apart from the various suites of rocks that will be considered later, there have been in all forty individual identifications made for the various officers, including those of particular rocks to facilitate mapping. These include specimens from Meekatharra, specimens from Marda, from the Corinthian Mine at Southern Cross, from the Peak Hill and Nullagine districts, from the Warren River, and other localities. Most interesting of those were the determinations of rocks from the Ingliston Extended Mine at Meekatharra, which established the relationship between the black basaltic-dolerite encountered in the mine, and the sheared soft schists contiguous to it. It was shown that in all probability the dolerite is not sheared at the margins, but has been intruded in to the soft chloritic rocks subsequent to the shearing, or its introduction may have been responsible for the shearing. In any case the shearing does not appear to have affected the dyke. This fact is held to have an important bearing on the development of the mine.

Various reports of 1913 have been corrected and finally completed for publication in *Bulletin* form, notably that on the Petrology of Sandstone, and that on the Binduli Area. Several series of microphotographs of important rocks in the various suites have been taken, and several minor reports have been prepared. Amongst these are the Petrography of the Greenbushes Tinfield, and a report on the probability of the Hannahmore emeralds becoming clearer and freer from flaws with depths.

The suites of rocks examined include those from:—

1. *Feysville and the Bremer Range*.—The rocks collected by Mr. Honman from this area may be grouped as follows:—

A.—Igneous:

- (1.) Granite.
- (2.) Quartz-porphyrines, foliated and unfoliated.
- (3.) Porphyrites (a) Quartz-porphyrines; (b) Hornblende-porphyrines.
- (4.) Gabbros and Dolerites.
- (5.) Amphibolitic rocks (a) foliated; (b) unfoliated.
- (6.) Serpentine.
- (7.) Chloritic and Tale schists.

B.—Clastic Rocks:

- (1.) Apparent Breccias.
- (2.) Clay-slate.
- (3.) Detrital.

C.—Rocks of somewhat doubtful origin:

- (1.) Graphitic rocks.
- (2.) Rocks much weathered.

Full accounts of these types are given in the *Bulletin* on the area, now in the press.

2. *Ularring, Mulline, Vettorsburg, etc.*—The rocks collected from this area by Mr. Feldtmann may be classified as follows:—

- (1.) Amphibolites.
- (2.) Granite.
- (3.) Acid intrusives (a) Granite-Porphry; (b) Quartz-Porphry; (c) Pegmatites.
- (4.) Basic intrusives.

A description of the rocks appears in the *Miscellaneous Bulletin*, No. 62, now in the press, but the following remarks may be made here:—

In the area, the greenstones have been found to consist for the most part of amphibolites and epidiorites (derived from dolerites and gabbros), in places altered to hornblende schists and to chloritic rocks, of hornblendites and serpentines, tale-chlorite rocks and carbonate rocks of which the original forms, owing to obliteration of their former characters, are somewhat obscure.

The serpentines may have been derived either from peridotites or, more probably perhaps, from hornblendites or pyroxenites. The tale-chlorite rocks may have been derived from hornblendites and the carbonate rocks from any of the other types.

The granites are mostly of the biotite-microcline type. A hornblende diorite-porphryite occurs in the area. The pegmatites vary from nearly pure felspar to nearly pure quartz, and a noteworthy feature is the fact that in one specimen collected some years ago by Mr. Gibson, the presence of molybdenite, fluor-spar and garnet was proved. In view of the present high price of molybdenite, the occurrence is worth prospecting.

3. *Warren River and South-West Coast*.—The rocks from this area, descriptions of which will appear in Mr. Woodward's *Bulletin* shortly to be issued, include—

- (a) Ferruginous sedimentary sandstone.
- (b) Ophitic dolerites, in places porphyritic, in places basaltic, and occasionally apparently passing into porphyritic fine-grained basalts in all respects identical with the basaltic flows at Bunbury.
- (c) Finely foliated garnet amphibolite.
- (d) Coarse-grained granites, and a biotite-granite mechanically altered by dynamic stresses.

4. *Kookynie, Niagara, etc.*—The geological survey of this area is still not quite completed, but various specimens have been examined to facilitate the field work. These include:—

- (a) Coarse amphibolite.
- (b) Graphitic granites with much microcline.
- (c) White granular ophitic granites.
- (d) Coarse microcline pegmatites.
- (e) Biotite-gneiss with imperfect foliation, and a biotite-hornblende gneiss.
- (f) Moscovite granite.
- (g) Finely foliated mica-gneiss, resembling the pelite gneiss of Rosenbusch.

The biotite-gneiss is worthy of remark in that it appears to afford evidence of primary foliation, *i.e.*, a foliation that has not been induced subsequent to the consolidation of the granitic magma, but has originated before or during solidification.

5. *South Yilgarn*.—In the Annual Report for 1913, mention was made of various rocks determined from this area. In the present year additional specimens have been examined and found to include:—

- (a) Fibrous hornblende, coarse amphibolite, actinolitic and schistose amphibolites.
- (b) Garnetiferous quartz-biotite schist probably of metamorphic sedimentary origin.
- (c) Garnetiferous silvery mica-schist of sedimentary origin.
- (d) Phyllitic slates with disseminated carbon particles.
- (e) Phyllitic slates with minute andalusite crystals.
- (f) Carbonaceous micaceous andalusite schists produced by contact metamorphism from shales or claystones.
- (g) Microcline-albite-granite.
- (h) Coarse-grained dolerite.

The importance of these rocks lies in the fact that many of them are most probably derived by contact or thermo-dynamic metamorphism from original clays and shales, and the delimitation of their boundaries by mapping indicates the areas least favourable for prospecting.

6. *Greenbushes Tinfield*.—The rocks examined from this area were collected by Mr. H. G. Stokes and Mr. F. R. Feldtmann. Their petrography is fully dealt with in Bulletin 59, Miscellaneous Reports, Series III., and it will suffice to remark here that they fall into the following groups:—

- (a) Pegmatites.
- (b) Dolerites.
- (c) Amphibolite and Hornblende-schist.

II.—DETERMINATIONS AND REPORTS FOR THE MINES AND OTHER STATE DEPARTMENTS.

1. *Boring at Fraser's Mine, Southern Cross*:

Last year—1913—five bores were put down and 3,885 feet of core examined. During 1914 a sixth bore was put down to a depth of 1,020 feet, and 70 assays were made of the core. The material of the core was essentially the same as in the previous cores and the results of the assays were equally unfavourable to exploitation. Of the 70 assays only two returned even appreciable values, one from depths 381ft.—385ft. 6in., giving a return of 3dwts. 6 grains per ton, and the other from depths 734ft. 6in.—738ft. 6in., giving 6dwts. 13 grains per ton. The vast majority of the others gave not even a trace of gold and only a few returned any trace at all.

The total depth attained in the six bores was 4,905 feet, and the total number of assays made reached 234.

Sections of the six bores showing depths in feet, rock determinations, depths at which the various assays were made, and the results of the assays, have also been prepared for the Mines Department.

2. *Boring at Holden's Find: No. 6 Bore*:

The cores from 52ft. to 390ft. from No. 6 Bore, Holden's Find, have been examined and assays made. The results of petrological determinations of the rock—from hand specimens only—are as follows:—

Depth.	Nature of Rock.	Assay.
ft. in.		
52 0	Soft weathered chloritic greenstone, almost a clay	
62 0	Soft weathered chloritic greenstone, almost a clay.	
75 0	Kaolinic greenstone	
90 0	Kaolinic greenstone	
95 0	White quartz.	
102 0	Kaolinic, much sheared, soft, chloritic greenstone.	
114 0	Greenstone, much weathered and of somewhat vesicular appearance.	
123 0	Weathered, kaolinised and chloritised.	
156 0	Greenstone of almost brecciated appearance.	
156 0	Weathered chloritised greenstone.	
164 0	Weathered chloritised greenstone.	
173 6	Weathered hard chloritic greenstone (amphibolite).	
192 0	Much weathered almost clayey greenstone.	
215 0	Much weathered almost clayey greenstone.	
225 0	Much weathered almost clayey greenstone.	
237 0	White quartz and chloritic hornblende.	
245 0	Chloritic amphibolite.	
254 0	Quartz and chloritised hornblende, with oxidised iron.	
264 0	Chloritic amphibolite.	
274 0	Chloritic carbonated, soft chloritic, and sheared.	
284 6	Much weathered chloritic amphibolite.	
288 0	White quartz.	
293 0	Chloritic amphibolite with carbonate vein.	
298 0	White quartz, carbonate and chlorite rock.	
302 0	Much weathered quartzose and somewhat pyritic chloritised amphibolite.	
312 0	Mostly white quartz.	
328 0	Soft chloritic greenstone.	
332 0	Highly carbonated, chloritic rock sheared.	
342 0	Chloritic schist with quartz veins.	
353-354ft.	Quartz and chloritic material with a little oxidised iron and copper pyrites.	
357 0	White quartz and chloritised amphibolite.	} Gold trace.
358 6	Quartz and fuchsitic material with pyritic ore.	
361 0	White quartz and copper pyrites	} Gold, trace.
361 0	White quartz	
365 0	Quartz and oxidised pyritic ore with some greenish mineral in scales	
365 0	White quartz	} Gold, Nil.
369 0	Quartz with oxidised iron, copper pyrites, galena and malachite	
372 6	Quartz, copper pyrites, etc. . .	} Gold, 13gr. per ton.
372 6	Quartz, copper pyrites, etc. . .	
376 0	Crystallised quartz, and copper pyrites, both oxidised and fresh	} Gold, 9grs. per ton.
376 0	Crystallised quartz, and copper pyrites, both oxidised and fresh	
380 0	Crystallised quartz, and copper pyrites, both oxidised and fresh	} Gold, trace
380 0	Crystallised quartz, and copper pyrites, both oxidised and fresh	

NOTE.—The pyritic ore is mostly copper pyrites and there appears to be some fine scaly fuchsitic material as well as malachite.

The assay results were decidedly unfavourable, only two of the six assays returning more than a trace of gold, and these two attaining only 13 grains and 9 grains per ton respectively.

3. Boring at Moora:

Portions of the bore-core at Moora from 1,754ft. to 2,230ft. were examined by me and proved to consist of:—

Mudstone
Micaceous shale
Carbonaceous granular limestone
Fissile gritty shale
Hard quartzite
Calcareous conglomerates
Compacted calcareous grit
Soft sandstone
Gray calcareous sandstone.

4. Boring on the Transcontinental Railway:

Two bore cores have been examined for the Public Works Department, and proved to consist largely of fine-grained friable limestone.

5. Report on four specimens from the Harbour View Mine, Kundip, for the State Mining Engineer:

The examination of these was undertaken to see if any light could be thrown on the origin of the gold, but owing to the advanced state of decomposition of the rocks—which were in reality only clays—very little of a definite nature could be established. The discovery, however, of an apparent pseudomorph after pyrites suggested an origin from the oxidation and decomposition of pyrites.

6. Examination of various rocks collected by the State Mining Engineer from Peak Hill, Nullagine, Meekatharra, and Cue districts:

These included:—A glauconitic sandstone proving the existence of fluviatile marine conditions to the north of Peak Hill; a biotitic schist—the matrix of the Poona emeralds—derived from a pyroxenite or gabbro by the contact metamorphic action of an albite pegmatite dyke through the agency of potash-bearing solutions; some dolomitic limestones; a black andesitic dolerite or basalt from Cue; and some greenstones, of which two may have a sedimentary origin.

7. Report on several samples of building stone from Donnybrook for the Public Works Department:

These all proved to be fine-grained, reddish, yellowish, or white, somewhat friable felspathic sandstones.

8. Examination of the junction between the black diorite-porphyrite and the granite from the Elverdton Mine, Phillips River, to discover which of the two rocks intruded the other:

It was found very clearly that the black porphyrite was the intrusive, a perfect microscopic dyke of it being found in sections penetrating the granitic mass.

9. Reports on specimens sent in through the Minister for Works from Wyndham, and from Yalgoo by the Minister for Mines:

III.—DETERMINATIONS AND REPORTS FOR PROSPECTORS AND FOR THE GENERAL AND MINING PUBLIC.

In all, there have been 320 determinations of rocks and minerals made during the year under the above heading. Included in these and worthy of special mention are:—

- (a.) The Galena crystals from the Baddera Mine, Northampton, presented by Mr. W. G. Sutherland, of Fremantle.
- (b.) Graphite from Kendenup, presented by Messrs. McCarthy, Parker & Co.

There have been in addition:—

- (1.) Reports on Mica as to suitability for commercial purposes.
- (2.) Reports on Building Stones from Tambellup, Toolbrunup, etc.
- (3.) Report on cores from the Mararoa Gold Mine at Norseman.
- (4.) Classification of the Kalgoorlie Rocks for the Chamber of Mines in an article published in the Journal of the Chamber, and in *Miscellaneous Bulletin*, No. 64.
- (5.) Preparation of collections of rocks and minerals for schools, etc., and correction of labels of collections.

General.—The article on the Petrology of the North End, Kalgoorlie, appearing in *Bulletin* 51, was republished during the year with some slight alterations in the *London Geological Magazine*.

Finally, mention must be made of the installation of a grinding and slicing machine driven by electricity. The employment of this has not only done away with the obsolete, laborious, and inefficient method of hand grinding, but, by enabling sections to be cut in any desired direction with much greater speed than was formerly ever possible, has already allowed, and in the future will to a great extent allow the field work to be facilitated.

PALÆONTOLOGICAL WORK.

It has already been pointed out "the necessity for a correct knowledge of the fossils occurring in the different formations, and even in the different beds of the same formation, is as absolute for the correct determination of certain economic relations as any other branch in the Science of Geology," and as at present a palæontologist does not form part of the geological staff, advantage has had to be taken, as has been the case in the past, of outside assistance.

Mr. R. Etheridge, of the Australian Museum, again took up the study of the Carboniferous Fossils, chiefly from Mount Marmion, Lennard River, West Kimberley. This work has been completed and his full report, which supplements some of the descriptions contained in the previous papers by Mr. Etheridge and confirms a few doubtful determinations, will appear in due course as Series V., No. X., of *Palæontological Contributions to the Geology of Western Australia*.

Determinations of a further series of Carboniferous Fossils from several localities in the valleys of the Mimilya, the Gascoyne, the Wooramel, and the Irwin Rivers are included.

The following is a list of the fossils and their localities:—

	Lennard River, Kimber- ley.	Minilya River, N.W.	Wooramel River (Byro Station), N.W.	Irwin River, S.W.
<i>Palaeachyla gigas</i> , sp. nov.	*
<i>Calceolispongia</i> , gen. nov.	*
<i>Pleurophyllum australe</i> , Hinde	*
<i>Favostites marmionensis</i> , sp. nov.	*
<i>Monilopora nicholsoni</i> , sp. nov.	*
<i>Evactinopora crucialis</i> , Hudl.
<i>Stenopora</i> , sp.	*
<i>a.</i>	*
<i>b.</i>
<i>c.</i>	*
<i>Cleiothyris macleayana</i> , Eth. fil.	*
<i>Spirifera musakheylenis</i> , Davidson	*
<i>Spirifera marcoui</i> , Waagen	*	*
<i>Spirifera byroensis</i> , Glauert	*	..	*	..
<i>Spirifera</i> , internal casts	*	*
<i>Spiriferella australasica</i> , Eth. fil.	*	*
<i>Spiriferella garance</i> , de Verneuil	*
<i>Reticularia</i> , sp.	*
<i>Aulosteges baracoodensis</i> , Eth. fil.	*	..
<i>Strophalosia</i> , sp.	*	*
<i>Derbya</i> , sp.	*
<i>Deltopecten subquincelneatus</i> , McCoy	*	..
<i>Ptychomphalina maitlandi</i> , Eth. fil.	*
<i>Bellerophon costatus</i> , J. de C. Sby.	*

GEOLOGICAL SURVEY MUSEUM AND COLLECTIONS.

MUSEUM.—The operations of the Department have been hampered and its utility very seriously impaired through no proper provision having yet been made regarding the Museum accommodation, to which attention has frequently been directed in previous annual reports, more especially in that for 1909, p. 9, *q.v.* It is much to be regretted that some definite steps cannot be taken to remedy this state of affairs, for until it is done the Survey cannot fulfil its highest functions. The proper housing of the Survey staff, its laboratory and collections, forms one of the most pressing needs of the Department, and one which merits serious and early consideration at the hands of the Government.

COLLECTIONS.—The additions to the Survey collection during the year amounted to 509, bringing the total number of specimens registered up to 13,984. The accessions comprised 496 rocks, 38 minerals, 2 fossils. The number of microsections cut during the year amounted to 504, bringing the total number of microslides in the possession of the Survey up to 2,719.

The Staff of the Survey (both resident and field officers) have in the ordinary course of their duties taken 124 photographs of geological, mining, and microscopic subjects, bringing the total number of negatives registered, up to the end of December, 1914, to 1,316.

The work of collecting records and core samples of boring carried on in the State has been prosecuted as opportunity offered. Samples have been received from the bore holes put down at Westonia, Yilgarn Goldfield; Golden Ridge, East Coolgardie Goldfield; Fraser's Mine, Southern Cross, Yilgarn Goldfield; Transcontinental Railway Line east of Kalgoorlie; Moora, South-West Division; and the Canning River Damsite, Metropolitan Area. These have been examined and carefully registered for future reference.

The value of systematically collecting bore records, illustrated by complete sets of samples of the strata pierced, and recording and interpreting the data they disclose, needs no emphasis, but it is necessarily slow and can under present conditions only be carried out successfully by the mutual co-operation of those engaged in the boring operations and the Geological Survey. Much important geological information of the utmost value to the State may be irretrievably lost unless active steps are taken as the boring operations proceed. There are cores of 290 bores now stored in the Survey Collection.

LIBRARY.

The Survey Library received during 1914, 811 publications from the Geological Surveys and cognate departments throughout the world; in addition 161 volumes were added by purchase, and 103 volumes bound. The distribution of the official publications of the Survey issued during the year amounted to 7,760, as against 5,219 of the previous year.

PUBLICATIONS.

The publications for the year 1914 have been as follow:—

Annual Progress Report for the year 1913.

Bulletin 52.—The Mineral Resources of the North-West Division—Investigations in 1912: by T. Blatchford.

Bulletin 53.—Geological Investigations in the area embracing the Burbanks and Londonderry Mining Centres, with special reference to the Ore Deposits and their future prospects: by T. Blatchford.

Bulletin 54.—The Mining Geology of Ora Banda, Broad Arrow Goldfield: by J. T. Jutson.

Bulletin 56.—The Geology of the Country between Kalgoorlie and Coolgardie: by C. S. Honman.

Bulletin 57.—A Geological Reconnaissance of a portion of the Murchison Goldfield: by H. P. Woodward.

Bulletin 59.—Miscellaneous Reports, Series IV., Nos. 33-51—Boring for Coal upon the Murchison Railway Line between Eradu and Mullewa; Kurnalpi, North-East Coolgardie Goldfield; The Rare Metals and their Distribution in Western Australia; The Mining Centre of Ruby Well, Peak Hill Goldfield; Geological Report on Mikhaburra (Holden's Find), Peak Hill Goldfield; The Mount Keith District, East Murchison Goldfield; Geological Observations and Remarks on the present state of Mining in the Districts of Mt. Magnet, Lennonville, and Boogardie, Murchison Goldfield; Notes on the Geology of Yuin, Yalgoo Goldfield; The Woodline Rush, six miles North of Bulong, North-East Coolgardie Goldfield; The Ore Occurrences of the Kapanga Mine, Greenbushes Tinfield; Petrographical Notes on some Specimens from Greenbushes; The Economic Geology of the Golden Ridge Gold Mine, East Coolgardie Goldfield; The Ilgarere Mineral Leases and Humphry's Copper Find; The Bremer Range Country, Dundas Goldfield; Some Western Australian Meteorites; Further Notes on the Mining Geology of Kanowna; On the Ore Occurrence at Narra Tarra Mines, Victoria District; The King's Sound Tin Mine, West Kimberley; On some Rocks from the Phillips River.

Bulletin 61.—An Outline of the Physiographical Geology (Physiography) of Western Australia: by J. T. Jutson.

There are now in the hands of the Government Printing Office:—

Bulletin 58.—Palæontological Contributions to the Geology of Western Australia, V.: by R. Etheridge, jun.

Bulletin 60.—General Index to Reports 1870-1910.

Bulletin 62.—Notes on the Geology and Mining at Sandstone and Hancock's, East Murchison Goldfield: by E. de C. Clarke.

Bulletin 63.—The Geology and Mineral Resources of the Yilgarn Goldfield, Part II. The Gold Belt South of Southern Cross: by T. Blatchford.

The following will, it is hoped, be shortly ready for the press:—

The Reputed Petroliferous Area of the Warren River, South-Western District: by H. P. Woodward.

The Geology and Ore Deposits of Meekatharra: by E. de C. Clarke.

The Artesian Water Resources of Western Australia: by A. Gibb Maitland.

The Geology and Mineral Resources of the Maritime Districts of the South-West Division (Lime, Cements, Clays, etc.): by H. P. Woodward.

Contributions to the Study of the Geology and Ore Deposits of Kalgoorlie, Part III.; The North End of Kalgoorlie: by F. R. Feldtmann.

The Geology and Mineral Resources of the Yilgarn Goldfield, Part III.; The Mount Jackson District: by C. S. Honman.

The Geology and Mineral Resources of the Country South of Nullagine: by H. W. B. Talbot.

Analyses of Rocks, Minerals, and Waters from the Geological Survey Laboratory, 1896-1914: by E. S. Simpson.

The Western Australian Mining Handbook: edited by A. Gibb Maitland.



Government Geologist.

Geological Survey Office, Perth,
15th February, 1915.

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DIVISION V.

SCHOOL OF MINES OF WESTERN AUSTRALIA.

School of Mines,
Kalgoorlie, 8th April, 1915.

The Under Secretary for Mines.

I beg to forward, for the information of the Hon. the Minister, my report for the year 1914.

The position of Lecturer in Mathematics and Assistant in Engineering subjects, rendered vacant at the beginning of 1914 by Mr. Tomlinson's appointment to the University staff, remained unfilled during the whole year. The lectureship was advertised during the summer vacation, but possibly owing to the short notice during the holiday season, the response was disappointing and no satisfactory applications were received. Later on, the school was fortunate in securing for the Mathematics section of the work the services of Mr. E. Parry, B.A., a graduate of the Melbourne University. To deal with the remainder of the classwork, Mr. A. Getty, a former senior scholar of the school, was appointed Assistant in Engineering. This arrangement worked satisfactorily until the end of the first term, when Mr. Parry left, to take up an appointment as Science Master at the Scotch College. A temporary Instructor, Mr. J. B. Conway, was then placed in charge of the evening classes, and the Lecturers in Mining and Chemistry gave assistance with the day classes in Mathematics. Mr. Conway, who was called away on military duty during the third term, was succeeded by Mr. L. V. Halliwell, M.A. Although each Lecturer performed his duties satisfactorily, the steady progress of the class in Mathematics was retarded by the changes in the methods of instruction.

The vacancy was advertised throughout the Commonwealth during October. Several excellent applications were received and Mr. A. C. Lloyd, B.A., a graduate of Sydney University, then engaged as Lecturer at the Broken Hill Technical College, was appointed to commence duty in February, 1915.

Mr. C. Birchér, who had been absent on leave in Europe, returned to duty at the beginning of 1914, under altered conditions, his part-time position at the school being supplemented by an appointment as Electrical Adviser in connection with the Mines Department.

Mr. Butement, who had been on long service leave from December, 1913, returned to the school on 27th May, 1914. During his absence, Mr. Butement's surveying classwork had been conducted satisfactorily by Mr. Halliwell, and the duties of acting Assistant Director were discharged in a competent manner by Mr. Moore.

During the last two or three years, steps have been taken to bridge over the gap which formerly existed

between the State schools and the School of Mines. Facilities have been provided for continuous and progressive study, so that students who pass out from the State schools or the Continuation Classes or possess an equivalent qualification are able to attend preparatory classes in Science leading up to the regular courses of the school. Those who have received a training at the High School are given opportunities of proceeding to more advanced instruction in Science subjects at the School of Mines, and the regular students of the school are provided with set courses in Mining, Metallurgy, and Engineering which will qualify them to gain good positions in after life.

The question of the affiliation of the School of Mines and the relation which it will bear to the University will be brought up for consideration during 1915. In the meantime, the Professorial Board of the University has agreed to give recognition to certain work done by students prior to matriculation in March, 1917. This is expressed in a resolution passed by the Professorial Board early in 1914, as follows:—

“That up to and including March, 1917, students of the Perth Technical School and the Kalgoorlie School of Mines will be given credit for such subjects prescribed for the 1st and 2nd year courses at the Faculty of Engineering and are taught in those institutions, provided that (i) they pass the University examinations in such subjects, (ii) matriculate at the University before enrolling as students in the Faculty of Engineering.”

The School of Mines of Western Australia continues to create a favourable impression upon visitors who have had opportunities of seeing other institutions. During his visit with the British Association in August, Mr. Buekmaster, an inspector of the London Board of Education, who has had many years' experience of English Schools of Mines, expressed a high opinion of the local school and its equipment.

The work of the school during 1914 has been maintained at a high standard, and notwithstanding that, from August onwards, the distractions due to the war exercised a disturbing influence on all the classes, the examination results at the end of the year were satisfactory.

The Engineering classes have continued to attract a considerable number of students to the school, and it has not been possible to find places for all the

intending students who made application to join the Gas Engine classes. The small plant erected at the school has been the means of imparting a large amount of useful information to engine-drivers and others engaged in gas plants and has greatly increased their efficiency. The installation of a down-draught producer would enable the usefulness of this department to be considerably extended. Additional equipment is also required for the Physics and Electrical Engineering classes, and a milling machine would prove a welcome addition in the Fitting and Turning Workshops.

From the beginning of 1914, tuition at the School of Mines has been free for lecture work. There has been a registration fee of 5s. per annum and students have been required to pay laboratory fees for certain practical classes. The effect of free tuition has been to attract an increased number of students to the school, especially in the preparatory classes of Chemistry, Physics, Geology, Drawing, and Mathematics. The influence on the more advanced classes has been comparatively slight.

Students generally have taken a higher proportion of classes than formerly. The attendance, which was fairly well maintained during the first and second terms, fell away during the third term. The demands of military drill were found to be a heavy tax upon students who wished to attend classes on several evenings per week, and the outbreak of war at the end of the second term no doubt was responsible for many of the absences that occurred from then onwards. During the third week in October, a number of the best students in the school were called away to Perth on military duty, and were unable to return in time for the examinations. In consideration of the excellent progress which the majority of these students had made up to the time of their mobilisation, passes were awarded to them, on their year's work, without examination, the grade of pass being determined in each case by the respective lecturers. In addition, authority has been granted for a supplementary Senior Scholarship examination to be held in February, 1915.

Free tuition has enabled a number of youths to obtain instruction who would not have attended the school under the system of payment of class fees, and it is anticipated that as time goes on the concession will become more and more appreciated.

During the year 318 free assays and mineral determinations were made for prospectors of material obtained from Crown lands not held under lease for mining purposes:—

Assays for gold and silver	229
Assays for copper, lead, and tin ..	20
Assays for lime	4
Determinations of rocks, minerals, etc	65
Total	318

A large amount of valuable information has been given to prospectors, and the assays and determinations, which have all been performed in a careful manner, have entailed considerable labour on the members of the staff in the departments concerned.

Many of those who have completed full or partial courses at the school now hold responsible positions in various parts of the world, and the frequent requests asking the staff to recommend students for vacant positions is an indication that the school training qualifies students to give satisfaction to

their employers. The majority of the students are engaged in work in connection with the mines, and not having completed their course of study are reluctant to leave the district. As a consequence the supply of students available for engagement outside Kalgoorlie is generally considerably below the demand.

The following are some of the positions gained by students during 1914:—

- Anderson, A. F. S.—Assayer, Penang (late of Zeehan S.M.)
- Bradley, W. S.—Chemist, Sons of Gwalia Mine, Leonora.
- Cameron, A. R.—Engineer's Branch, Telegraphs, Perth.
- Chauncey, A. P.—Assistant Assayer, Ivanhoe Gold Mine.
- Edmondson, F. C.—Motor Attendant, Horseshoe Mine.
- Gabel, J.—Surveyor, Lead Mines, near Leon, North Spain (now Manager).
- Graham, L.—Assayer, Great Fingall Mine.
- Lang, J. H.—Electrician, Associated Gold Mines.
- Mundle, E. B.—Assistant, Survey Office, Bewick, Moreing & Co.
- McCleery, E.—Assistant Assayer, Great Fingall Mine.
- Pond, C.—Assistant Assayer, Ivanhoe G.M.
- Rosenberg, J. M.—Assistant Electrician, Great Boulder Perseverance Gold Mine.
- Stuart, C.—Electrician, Lancefield Gold Mine.
- Peat, J.—(Head Surveyor, Ivanhoe) has received a commission as Captain in the Expeditionary Forces and has gone to the front.

The annual demonstration was held on Thursday, 19th February. The Director gave a résumé of the year's work and made mention that the members of the staff had been placed on the general Committee of Management to assist in welcoming members of the British Association who would visit Kalgoorlie in August, 1914. Two School of Mines students were among the four West Australian candidates who succeeded in passing the Commonwealth Postal Examination for Junior Electrical Engineers. At the school examinations in November one of the students, J. H. Lang, had qualified for a diploma in Electrical Engineering—the first of its kind to be awarded by the school.

The museum, laboratories, and class rooms were open for the inspection of visitors up to a late hour in the evening, and lectures were given in several departments of the school work.

The eleventh annual dinner of the Students' Association was held on Saturday, 5th December, 1914. The President, Mr. Jos. Grigg, occupied the chair, and amongst those present were:—The Mayor of Kalgoorlie (Mr. H. W. Davidson), the Minister for Mines (Mr. P. Collier), Mr. A. E. Green, M.L.A., the Acting Stipendiary Magistrate (Mr. J. E. Geary), the President of the Chamber of Mines (Mr. R. Hamilton), the General Manager of the Golden Horseshoe (Mr. J. W. Sutherland), the General Secretary, Chamber of Mines (Mr. C. A. Bolton), Messrs. E. H. Irving, M.A., J. H. Johnston (Ora Banda), Curle-Smith, W. T. Leever (Perseverance), and the Director and staff of the school.

Apologies were received from the Secretary for Mines (Mr. H. S. King) and others.

During the evening several interesting speeches were made, from which the following extracts relating to the School of Mines may be quoted:—

The Hon. the Minister for Mines, who was warmly welcomed by Mr. J. W. Sutherland on behalf of the students, stated that there was not another town, mining or otherwise, throughout Australia, better equipped with educational facilities than Boulder and Kalgoorlie. Since the establishment of the High School at Boulder a few months ago, they lacked nothing but the University itself. The School of Mines had done more to lay the foundations of a scientific and practical training of the youthful mind than any other institution. We lived in an industrial age, and in order to hold our own with the progressive nations of the world it was essential we should be equipped with the latest scientific knowledge. He wished the school every success and hoped that he would have an opportunity of attending many similar gatherings.

Mr. LeEVERS said that the material being turned out was a standing testimony to the excellence of the institution. The knowledge students acquired in both scientific and practical studies had fitted them to enter at once upon a useful career.

Mr. GREEN, in a vigorous speech, appealed for a greater recognition of the value of the mining industry. The School of Mines was an important part of this industry, as it produced Australian managers who had the best development of Australian mining at heart. He hoped the University of Western Australia would recognise the work done by the School of Mines, the students of which should be able to finish their education at the University and be credited with the work done and the passes received for subjects taken at the school.

Mr. HAMILTON expressed his opinion that students of the school would be the future officers of the industry, and they would have difficult problems to solve to keep the industry up to its present importance. In the years to come they would be faced with the problem of low grade ore and the industrial difficulties brought about by the fact that in the past their mines had had the richest average in the world. He had faith in the ability of the scholars to grapple with every difficulty. The mine managers had an opportunity of judging of the practical value of the students turned out by the school, and he could endorse the remarks of the previous speakers as to the excellency of its work. As a result of its existence, they had less difficulty to-day in getting important work done quicker and more skilfully than before its inception.

Mr. IRVING said that wherever there was a gold mining centre, there would be found ex-students of the school filling responsible positions and doing their work well. Several students had answered the call to join the Expeditionary Forces and had subordinated personal interests, business affairs, and all other things to the call of duty and patriotism. He was sure that the students who went to the front would play their part like men.

THE WORK OF THE SCHOOL.

The School of Mines was established in the first place to give instruction to those engaged in mining occupations. Laboratories have been equipped, and the classes arranged so as to give a thorough technical and practical training in Mining, Metallurgy, and Engineering.

In addition, the school offers to youths who do not intend to engage in mining pursuits many opportunities of gaining some secondary education before they enter upon the serious business of life. The Preparatory Classes are very suitable for boys of 14 years and upwards who have just left the State schools, and afford an introduction to Science, which will be of great value to these youths whatever may be their future occupations. The advanced classes will enable students to obtain a training in the earlier portions of a University Course, and when by affiliation of the School of Mines with the University of Western Australia work done at the School of Mines receives recognition, considerable benefit will result to the students resident on the Goldfields.

The general work of the School embraces Courses in Mining, Metallurgy, and Engineering, in each of which students may gain an Associateship. Mathematics, Chemistry, and Physics, which enter into each of the courses, form the foundation upon which the work of the School is built, and the departments of Mining and of Metallurgy, the ones first inaugurated, possess very complete equipments in laboratories and apparatus. A thorough training in theory and practice has thus been provided, which has enabled students to qualify themselves to occupy responsible positions.

In Preparatory Physics the student acquires skill in handling various kinds of apparatus and in making accurate measurements. He gains further experience in more delicate experiments during his second year, and gathers together a valuable fund of information concerning natural phenomena. In a more advanced course, the higher work in sound, light, and electricity receives a more specialised mathematical treatment. The Department is well equipped with apparatus for the demonstration of the lectures and for the conduct of laboratory experiments in all sections of the work. The Mathematical Department is divided into two main sections—(a.) Pure Mathematics; (b.) Practical Mathematics. In the former, students who intend to proceed with their science work and qualify for an Associateship or for entrance to the University are given a thorough training from the preparatory stages upwards. In the latter section, the work is arranged to suit the special requirements of artisans and those who desire to obtain a practical knowledge of the subject which shall be immediately useful to them in their daily work. Special attention is devoted to problems in mensuration, the use of squared paper, logarithmic tables, the manipulation of pocket book formulae and the calculations connected with everyday problems in mining and engineering.

Students in the advanced class are taught the applications of the differential and the integral calculus.

In addition to the determination of large numbers of assay and mineral samples for *bona fide* prospectors, the work of the Department of Metallurgy embraces instruction in Chemistry, Assaying, and Metallurgy. A thorough training in the theoretical portions is given by means of lectures, but students are required to spend a considerable time in the Laboratories. The courses are made as practical as possible, the aim being to so equip students that they may speedily become competent to fill responsible positions.

In addition to the preparatory course, the work in Chemistry covers three years. One section deals with

physical and engineering chemistry, and in the final stages practical instruction is given in advanced inorganic analysis. This includes the analysis of ores and metallurgical products of iron and steel, of natural waters, fluid gases, etc., the methods of examination of lubricating oils and fuels and the determination of calorific power.

In Assaying, the student makes tests as to the most suitable mode of treatment of various classes of ore and gains experience in the technical methods of analysis of ores and metallurgical products. The well equipped laboratories afford students excellent opportunities of gaining a thorough practical acquaintance with the technical methods used in outside practice.

The two years' course in Metallurgy deals generally with the metallurgy of the common metals and particularly with the metallurgy of gold. Students, before obtaining their Associateship in this course, are required to write a thesis on some phase of metallurgical practice and to have 12 months' experience in an approved metallurgical works.

The Engineering Classes, developed at a later date, are now well organised and form a very important section of the school work. A practical course of instruction has been arranged in Electrical Engineering. The rapidly increasing demand for the electrical driving of sections of mining and manufacturing plants and for the reduction of maintenance costs, requires that the student should be thoroughly familiar with the various classes of machines and their operation under all conditions of load, and tests dealing with the efficiency, regulation and registration of the machines and instruments used in the electrical distribution of power are regularly conducted by the students as part of their course work.

In addition, classes of a more elementary nature are conducted in Practical Electricity for the benefit of electrical workers who are concerned more particularly with mechanical operations.

Three years ago a Mechanical Engineering Laboratory was erected and equipped with an experimental engine, a boiler, a surface condenser, an absorption dynamometer, steam engine indicators, a carpenter's calorimeter and all the necessary appliances for the determination of steam consumption, mechanical efficiency and the conditions for maximum economy. In all large mining centres the question of economy in power production, leading to the reduction of working costs, is receiving increased attention, and it is of the highest importance that the Mining Engineer should possess thorough knowledge of all questions bearing upon the economical running of the engines under his charge, and also that he should be able to locate and remedy defective conditions which lead to losses in actual practice. Students of the school are given practice in taking indicator diagrams, in testing the quality of the steam by means of the steam calorimeter, and in carrying out actual working tests on efficiency, which, together with periodical visits to the engine rooms of the mines, will give the students a thorough grounding in the fundamental principles of Mechanical Engineering.

At the end of 1911 a Gas Producer Plant was installed and special classes dealing with the theory and practice of gas producer plants now form a feature of the school work. Instruction is first given in the operation and management of the various types—the ordinary updraft and downdraft and the larger

pressure producers. The lecture work is supplemented by numerous experimental tests and each student is afforded an opportunity of actually operating the producer in the School Experimental Plant.

The second term is devoted to Gas and Oil Engines. In the series of lectures dealing with the erection, operation, and management of the suction gas engine, special attention is directed to the precautions necessary to prevent breakdowns and to the conditions requisite for obtaining economy in working.

In the Engineering Laboratory, the students take part in the practical demonstrations and learn to start and stop the gas engine and to manipulate the various appliances used in testing for efficiency.

During the first year of the Mining Course, the principles and methods of mining are dealt with from a broad standpoint. In the more advanced instruction of the second year, special attention is devoted to Mine Sampling, Mine Accounts, Mine Administration, and Ore Dressing. In Surveying, during the first year of the course, the student becomes acquainted with instrumental work and the calculations, tabulations, plotting, etc., connected with the more common types of mine surveying problems. In the second year, he is instructed in the measurement of stope work under various conditions and gains a working knowledge of plane table, tacheometric and topographical work, roads, dams and quantity work. In fact all the ordinary engineering problems likely to be met with by a mine surveyor.

Instruction is also given in sun and star observations for latitude, meridian, time, etc. Each student has regular practice with the instruments, of which the school possesses a good supply, and at the end of his course, he is required to make a mine survey, construct a plan and hand in all field notes and calculations connected therewith.

Surveying students taking certain other classes laid down in the syllabus are able to qualify for a mine surveyor's certificate, the course for which is intended to equip the student with a sound knowledge of modern requirements. On the completion of his course a student is able to do reliable work, and his value will rapidly increase with experience. Not only should he be able to conduct all the instrumental work connected with the plumbing of shafts, the taking of the surface meridian underground, the making of connections, the laying out of work for the guidance of miners, the measurement of stopes, tacheometric and contour work and the laying out of roads, cuttings and embankments, but he should be competent to conduct the survey of a large area involving some knowledge of astronomical work. Possessing a fair working knowledge of general and mining geology and mine sampling, he will be able to distinguish the common rocks and minerals, to determine faults and their influences, to record variations in the ore bodies and the enclosing rock masses, to plot mining and geological plans, to measure, sample, and value ore bodies, make assay plans, direct exploratory work and generally supply the management with timely and reliable data in connection with underground workings.

The classes in Geology, Mineralogy, and Petrology which form an essential part of the course in Mining and Metallurgy, have been suitably provided with apparatus and material and there is a preparatory course for beginners. The department is of especial value to those interested in the application of geology to mining problems.

The district affords excellent examples of the main features of mining geology and the school possesses numerous rock sections and hand specimens illustrative of local conditions. Practical instruction in the preparation of maps, in the methods of mining and geological examination of properties and in the general principles of field geology, forms an essential portion of the course. The Museum contains representative collections of rocks and minerals which are set out in such a way as to be of educational value to the students and a source of interest and instruction to prospectors and the general public.

To meet the requirements of those who are unable to undertake a full course for an Associateship, partial courses have been arranged in several sections of the school work.

The Scholarships offered by the Mines Department fully meet the requirements of the local students, and also afford youths resident outside of the Kalgoorlie district facilities for attending the school and obtaining a training in School of Mines subjects. The school has been fortunate in securing valuable gifts of prizes and scholarships from those interested in the work of the institution, and the mine managers have afforded students every opportunity of gaining practical experience in the Mines and Batteries, and have shown their appreciation of the work of the school by their readiness in giving employment to the students.

The students continue to secure responsible positions, which in many cases have been obtained directly as a consequence of the technical training given at the school, and the fact that the students who have been through a set course of study at the local School of Mines are so well able to take their place in outside practice is encouraging to the younger students, and is a good criterion of the standard of instruction maintained in all the courses.

The students have an active Students' Association, a Science Society, a School Magazine, and several Sports Clubs, all of which have been instrumental in binding together students who otherwise do not often come into very close contact with one another.

Practical Classes.—As far as possible, prominence has been given to practical work in connection with school classes. Students have excellent opportunities of gaining practical experience in Chemistry, Assaying, Metallurgy, and Engineering in the well equip-

ped laboratories. Models for the Mechanics, Engineering, and Mining Classes, suitable collections of rocks and minerals for the Geology and Mineralogy classes, and instruments for the Surveying Class, enable the lecture work to be thoroughly well demonstrated. A special testing room has been set aside for Practical Electricity, while increased accommodation has been provided for the practical classes in Physics. Field practice in Surveying is regularly carried on throughout the year, and in Geology the students make periodical excursions into the country and so gain a fuller understanding of the class work as well as an intimate knowledge of the geology of the district.

Examinations.—The examinations held annually in connection with the diplomas and certificates issued by the Mines Department have, in the past, been conducted by co-examiners appointed by the Minister for Mines, but were, this year, conducted by members of the Staff. The appointment of outside examiners for the written papers has tended to maintain a high standard of work at the School. The practical examinations, covering the whole work of the students throughout the year, as well as the final test questions, are left in the hands of the staff.

Under the system by which the school makes Free Assays of material obtained from Crown lands not held under lease for mining purposes, a considerable amount of useful information has been given to prospectors. The assays and mineral determinations have all been made by responsible members of the staff, who have spared no pains to insure accuracy in the results and to give full information to the prospectors.

A demonstration of students' work takes place usually at the commencement of the first term, and the annual dinner is held by the Students' Association regularly at the close of the school year.

Throughout the year the Assistant Director and the members of the School Staff have rendered excellent service, and the thanks of the Director are due to them for their cordial co-operation in the proper conduct of the work of the School.

I have, etc.,

F. B. ALLEN,
Director, School of Mines.

14th April, 1915.

SCHOOL OF MINES OF WESTERN AUSTRALIA.

EXAMINERS.

The following Examiners conducted the Examinations in November, 1914:—

Subject.	Examiners.
Preparatory Mathematics ..	F. B. Allen, M.A., B.Sc.
Preparatory Chemistry	D. McDougall, A.I.E.E.
Preparatory Physics	D. McDougall, A.I.E.E.
Preparatory Geology	C. O. G. Larcombe, F.S.T.C., F.G.S.
Preparatory Mechanical Drawing	D. McDougall, A.I.E.E.
Mathematics I.	L. V. Halliwell, M.A.
Mechanics—Theoretical	H. W. Sanders, B.A., B.Sc.
Physics I.	H. W. Sanders, B.A., B.Sc.
Chemistry I.	D. McDougall, A.I.E.E.
Chemistry II.	B. H. Moore, B.E., F.S.A.S.M.
Chemistry III.	R. R. Baxter, B.Sc.
Assaying I. and II.	B. H. Moore, B.E., F.S.A.S.M.
Metallurgy I. and II.	B. H. Moore, B.E., F.S.A.S.M.
Petrology	R. R. Baxter, B.Sc.
Mineralogy	F. C. Stockwell, A.S.A.S.M.
Geology	B. H. Moore, B.E., F.S.A.S.M.
Mining Geology	F. C. Stockwell, A.S.A.S.M.
Practical Mathematics	C. O. G. Larcombe, F.S.T.C., F.G.S.
Mechanical Drawing I. and II.	C. O. G. Larcombe, F.S.T.C., F.G.S.
Machine Design	C. O. G. Larcombe, F.S.T.C., F.G.S.
Applied Mechanics	L. V. Halliwell, M.A.
Building Construction	M. Copland, B.M.E.
Mechanical Engineering I. and II.	H. J. Clucas, B.C.E.
Surveying I. and II.	M. Copland, B.M.E.
Mining I. and II.	T. Butement, A.O.U.S.M.
Practical Electricity	C. H. Bircher.
Electrical Engineering I. and II.	C. H. Bircher.
Fitting and Turning I. and II.	J. Murray.
Engine Driving I. and II. ..	C. H. Bircher.
Gas Engine	M. Copland, B.M.E.
Indicator	

JUNIOR SCHOLARSHIP.

Subject.	Examiners.
English	B. H. Moore, B.Sc., F.S.A.S.M.
Physical Geography	C. O. G. Larcombe, F.S.T.C., F.G.S.
Mathematics	F. B. Allen, M.A., B.Sc.

WESTERN AUSTRALIAN SCHOOL OF MINES, KALGOORLIE.

ATTENDANCES, 1914.

Subject.	Total Enrolment.		
	1st Term.	2nd Term.	3rd Term.
Preparatory Mathematics	79	59	38
Preparatory Drawing	36	27	22
Preparatory Physics	30	25	22
Preparatory Chemistry	35	22	21
Preparatory Geology	22	15	12
Mathematics I.	20	13	8
Theoretical Mechanics	4	4	3
Practical Mathematics	9	8	7
Physics I. (Lectures)	11	9	9
Physics I. (Practice)	11	9	9
Chemistry I. (Lectures)	21	18	14
Chemistry I. (Practice)	18	16	13
Chemistry II. (Lectures)	4	4	3
Chemistry II. (Practice)	4	4	3
Chemistry III. (Lectures and Practice)	1	1	1
Assaying I. (Lectures)	4	4	3
Assaying I. (Practice)	2	4	4
Assaying II.	7	5	2
Metallurgy II.	2	2	1
Geology	2	2	2
Mineralogy	3	2	2
Petrology	4	5	4
Mining I. .. .. .	..	2	2
Mining II. (Mine sampling) .. .. .	..	5	..
Surveying I. (Lectures)	20	13	7
Surveying I. (Practice)	11	9	7
Surveying II. (Lectures)	7	7	7
Surveying II. (Practice)	2	5	6
Mechanical Drawing I.	15	15	13
Mechanical Drawing II.	5	5	2
Mechanical Engineering I.	16	13	12
Mechanical Engineering I. (Practical)	29	28	23
Engine Driving I.	18	12	5
Engine Driving II.	5	7	5
Practical Electricity	23	18	16
Electrical Engineering I. (Lectures)	16	16	12
Electrical Engineering I. (Practice)	16	16	11
Electrical Engineering II. (Lectures)	8	7	7
Electrical Engineering II. (Practice)	7	7	7
Fitting and Turning I. (Lectures)	16	18	12
Fitting and Turning I. (Practice)	18	26	21
Fitting and Turning II. (Lectures)	3	..	..
Fitting and Turning II. (Practice)	7	7	6
Machine Design	9	8	8
Building Construction	5	5	5
Applied Mechanics	9	7	6
	594	514	403

	1913.			1914.		
	1st Term.	2nd Term.	3rd Term.	1st Term.	2nd Term.	3rd Term.
Total Enrolment.. ..	387	377	295	594	514	403
Individual Students	179	179	140	236	212	164

EXAMINATION RESULTS, 1914.

The following table shows the passes obtained by students of the West Australian School of Mines, Kalgoorlie, at the Annual Examinations held in November, 1914 :—

Subject.	1st Class.	2nd Class.	3rd Class.	Total.
Preparatory Chemistry	1	3	3	7
Preparatory Drawing	3	5	1	9
Preparatory Physics .. ..	..	3	5	8
Preparatory Geology	1	1	3	5
Preparatory Mathematics	2	..	..	2
Arithmetic	3	3	7	13
Geometry .. ..	..	1	4	5
Mathematics I.	1	3	1	5
Theoretical Mechanics	1	1	..	2
Physics I. .. ..	..	3	1	4
Chemistry I.	2	2	3	7
Chemistry II.	2	..	1	3
Chemistry III.	1	..	..	1
Assaying I. .. ..	..	1	..	1
Assaying II.	1	..	..	1
Metallurgy II.	1	..	..	1
Geology .. ..	..	2	..	2
Mineralogy .. ..	..	1	..	1
Petrology	1	2	..	3
Mining I. .. ..	..	1	1	2
Mining II. (Mine Sampling)	1	2	1	4
Surveying I.	3	..	1	4
Surveying II.	1	1	2	4
Mechanical Drawing I.	2	2	8	12
Mechanical Drawing II. .. ..	..	..	1	1
Applied Mechanics .. ..	..	2	3	5
Mechanical Engineering I.	1	..	4	5
Mechanical Engineering I. (Gas Engine)	3	6	3	12
Mechanical Engineering I. (Indicator)	1	4	6	11
Building Construction	2	..	2	4
Engine-driving I.	1	1	1	3
Engine-driving II. .. ..	..	1	..	1
Practical Electricity	1	5	1	7
Electrical Engineering I. .. ..	..	3	6	9
Electrical Engineering II. .. ..	..	3	4	7
Fitting and Turning I. .. ..	..	5	7	12
Fitting and Turning II. .. ..	..	1	..	1
Machine Design	1	2	5	8
Practical Mathematics	2	1	3	6
	39	71	88	198

EXAMINATION RESULTS, 1914.

The following table shows the Passes obtained by Students of the Western Australian School of Mines, Kalgoorlie, at the Annual Examinations held in November, 1914 :—

Subject.	1st Class.	2nd Class.	3rd Class.	Total.
Mathematics (Preparatory) ..	3	..	1	4
Chemistry do. ..	1	3	3	7
Physics do. ..	..	3	5	8
Geology do. ..	1	1	2	4
Mechanical Drawing do. ..	4	5	1	10
Arithmetic	2	4	6	12
Geometry .. ..	..	1	5	6
Mathematics I. ..	1	2	1	4
Theoretical Mechanics ..	1	1	..	2
Practical Mathematics ..	2	1	3	6
Physics I. ..	..	3	1	4
Chemistry I. ..	2	2	3	7
Chemistry II. ..	2	..	1	3
Assaying I. ..	..	1	..	1
Assaying II. ..	1	..	..	1
Metallurgy II. ..	1	..	..	1
Geology .. ..	..	2	..	2
Mineralogy .. ..	..	1	..	1
Petrology	1	2	..	3
Mining I. ..	..	1	1	2
Mining II. (Mine sampling) ..	1	2	1	4
Surveying I. ..	3	..	1	4
Surveying II. ..	1	1	2	4
Mechanical Engineering I. ..	1	..	4	5
Mechanical Drawing I. ..	2	2	8	12
Mechanical Drawing II. ..	..	..	1	1
Machine Design	1	2	5	8
Applied Mechanics I. ..	..	2	3	5
Building Construction	2	..	2	4
Practical Electricity	1	5	1	7
Fitting and Turning I. ..	..	5	7	12
Fitting and Turning II. ..	..	1	..	1
Electrical Engineering I. ..	..	3	6	9
Electrical Engineering II. ..	..	3	4	7
Engine-driving I. ..	1	1	1	3
Engine-driving II. ..	..	1	..	1
Mechanical Engineering I. (Gas Engine) ..	3	6	3	12
Mechanical Engineering I. (Indicator) ..	1	4	6	11
	39	71	88	198

ASSAYERS' CERTIFICATES.

The following have gained Certificates, as under :—

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.
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.
Kurth, E. E.	.. .. .	K.S.M.	.. ..	November, 1913.

MINE SURVEYORS' 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.

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.

SCHOLARSHIP EXAMINATIONS, 1914.

JUNIOR SCHOLARSHIP.

Candidates (in order of merit).	District.	
Nairn, T. W.	Kalgoorlie.
LeMesurier, A.	Kalgoorlie.

T. W. Nairn gains the Junior Scholarship.

ENTRANCE SCHOLARSHIP.

Candidates (in order of merit).	District.	
Eddy, J. T.	Kalgoorlie.
Edmands, H. G. (did not compete)	Kalgoorlie.

J. T. Eddy gains the Entrance Scholarship.

SENIOR SCHOLARSHIP.

Candidate.	District.	
Rose, L. A.	Kalgoorlie.
McBeth, R. A. (did not compete)	Kalgoorlie.

Scholarship not awarded.

CHAMBER OF MINES SCHOLARSHIPS.

The following have been recommended :—

R. A. McBeth Mechanical Drawing Scholarship, £20.
H. G. Edmands Metallurgy Scholarship, £15.

The following have been recommended for the Prizes offered by Critchley Parker, Esq., Melbourne :—

J. C. Leavers Australian Mining Standard for 1915.
F. C. Edmondson : Australian Mining Standard for 1915.

KALGOORLIE MINERS' INSTITUTE PRIZES.

The following have been recommended for Free Membership of the Institute for 1915 :—

J. Noall ; R. A. McBeth ; H. C. Bicknell ; C. Pond.

NEIL McNEIL SCHOLARSHIP—£15.

Owing to the mobilization of Students, no competition was held in Nov. 1914.

The following School of Mine Students who were called out on Military Service and were unable to sit for examination have been awarded passes on their year's work. The grades of passes are those recommended by the respective Lecturers :—

Subject.	Name.	Pass.
Preparatory Chemistry ..	H. G. Edmands ..	Second Class.
Preparatory Drawing ..	H. G. Edmands ..	First Class.
Preparatory Physics ..	H. G. Edmands ..	Second Class.
Preparatory Geology ..	H. G. Edmands ..	Second Class.
Preparatory Mathematics	H. G. Edmands ..	First Class.
	L. O. Geldard ..	Third Class.
Mathematics I. ..	R. A. McBeth ..	First Class.
	H. B. Kyle ..	Second Class.
Theoretical Mechanics	C. R. LeMesurier ..	First Class.
	W. Davies ..	Second Class.
Physics I. ..	H. B. Kyle ..	Second Class.
	H. J. Ingle ..	Second Class.
	R. A. McBeth ..	Second Class.
Chemistry I. ..	R. A. McBeth ..	First Class.
	H. B. Kyle ..	Second Class.
	W. Davies ..	Third Class.
Chemistry II. ..	H. J. Ingle ..	Third Class.
	W. Galt ..	First Class.
Chemistry III. ..	C. R. LeMesurier ..	First Class.
Assaying II. ..	E. E. Kurth ..	First Class.
Metallurgy II. ..	E. E. Kurth ..	First Class.
Geology ..	C. R. LeMesurier ..	Second Class.
Mineralogy ..	C. R. LeMesurier ..	Second Class.
Petrology ..	E. E. Kurth ..	First Class.
Mining I. ..	C. R. LeMesurier ..	Second Class.
Surveying I. ..	W. Galt ..	First Class.
	C. R. LeMesurier ..	First Class.
Applied Mechanics ..	W. Galt ..	Second Class.
	E. E. Kurth ..	Second Class.
	J. M. Rosenberg ..	Third Class.
Mechanical Engineering I.	C. R. LeMesurier ..	First Class.
	W. Davies ..	Third Class.
Building Construction	W. Galt ..	First Class.
Electrical Engineering I.	E. E. Kurth ..	First Class.
Electrical Engineering II.	T. C. Fairley ..	Second Class.
	W. Galt ..	Second Class.
	J. M. Rosenberg ..	Second Class.
Fitting and Turning I.	H. Kelly ..	Third Class.
	L. O. Geldard ..	Second Class.
	H. B. Kyle ..	Second Class.
	R. A. McBeth ..	Second Class.
Machine Design ..	H. B. Newman ..	Third Class.
Practical Mathematics	W. Galt ..	First Class.
	R. A. Macbeth ..	First Class.
Practical Electricity ..	W. Davies ..	Second Class.
	H. B. Newman ..	Second Class.

ANNUAL EXAMINATIONS, W.A., SCHOOL OF MINES, 1914.

K.S.M. denotes Kalgoorlie School of Mines.
P.T.S. denotes Perth Technical School.

1.—PREPARATORY CHEMISTRY.

Name.	School.	Result.
Eddy, J. T.	K.S.M.	First Class
Terrell, J.	K.S.M.	Second Class
McGhie, C.	K.S.M.	Second Class
Tindal, R. T.	K.S.M.	Third Class
McLeod, P.	K.S.M.	Third Class
Powell, T.	K.S.M.	Third Class
Hamilton, A. V.	K.S.M.	(Incomplete.)

2.—PREPARATORY DRAWING.

Terrell, J.	K.S.M.	First Class
Dunstan, G. T.	K.S.M.	First Class
Kirkaldy, R. W.	K.S.M.	First Class
Scadden, J. F.	K.S.M.	Second Class
McCaskill, V.	K.S.M.	Second Class
Heerey, F.	K.S.M.	Second Class
Midgley, F. M.	K.S.M.	Second Class
Eddy, J. T.	K.S.M.	Second Class
Barnett, R. R.	K.S.M.	Third Class

3.—PREPARATORY PHYSICS.

Terrell, J.	K.S.M.	Second Class
Eddy, J. T.	K.S.M.	Second Class
Cliff, W. E.	K.S.M.	Third Class
Teasdale, R. G.	K.S.M.	Third Class
Roberts, T. G.	K.S.M.	Third Class
McCaskill, V.	K.S.M.	Third Class
Small, H. G.	K.S.M.	Third Class

4.—PREPARATORY GEOLOGY.

Noall, J.	K.S.M.	First Class
Eddy, J. T.	K.S.M.	Third Class
Grigg, J.	K.S.M.	Third Class

5.—PREPARATORY MATHEMATICS.

Name.	School.	Result.
Preston, R.	P.T.S.	First Class
Eddy, J. T.	K.S.M.	First Class
Terrell, J.	K.S.M.	First Class
Spangenberg, O.	P.T.S.	Second Class
Breuer, J. H.	P.T.S.	Second Class
Simon, M.	P.T.S.	Pass
Creed, T.	P.T.S.	Second Class
Smith, G. P.	P.T.S.	Second Class
Fairbanks, P. J.	P.T.S.	Second Class
Haydock, J.	P.T.S.	Second Class
Gale, G. H.	P.T.S.	Third Class

5a.—PREPARATORY MATHEMATICS (Sectional Passes only).

ARITHMETIC.

Kirkaldy, R.	K.S.M.	First Class
McCaskill, V.	K.S.M.	First Class
Cliff, W. E.	K.S.M.	Second Class
Beilby, A. H.	P.T.S.	Pass.
Kelly, E.	P.T.S.	Second Class
Okely, E. J.	K.S.M.	Second Class
Cummins, J. B.	K.S.M.	Second Class
Sims, H.	K.S.M.	Second Class
McLeod, P.	K.S.M.	Third Class
Small, R. G.	K.S.M.	Third Class
Leevers, A. C.	K.S.M.	Third Class
Mills, D.	K.S.M.	Third Class
Abbott, K.	K.S.M.	Third Class
Scaddan, J.	K.S.M.	Third Class

5c.—GEOMETRY.

Roeder, F.	..	..	..	P.T.S.	..	..	Pass
Leevers, A. C...	..	..	..	K.S.M.	..	..	Second Class
Kirkaldy, R. W.	..	..	..	K.S.M.	..	..	Third Class
Midgley, F. M.	..	..	..	K.S.M.	..	..	Third Class
Wahlsten, R.	..	..	..	P.T.S.	..	..	Third Class
Small, H. G.	..	..	..	K.S.M.	..	..	Third Class
Barnett, R. R.	..	..	..	K.S.M.	..	..	Third Class

6.—MATHEMATICS I.

Rose, L. A.	..	..	..	K.S.M.	..	..	Second Class
Tulloch, J.	..	..	..	P.T.S.	..	..	Second Class
Illidge, E. H.	..	..	..	P.T.S.	..	..	Third Class
Kahan, H.	..	..	..	P.T.S.	..	..	Pass
Holloway, R.	..	..	..	P.T.S.	..	..	Third Class
Townsend, C. J.	..	..	..	P.T.S.	..	..	Third Class
Godden, F. W. R.	..	..	..	K.S.M.	..	..	Third Class
Hayman, J.	..	..	..	P.T.S.	..	..	Pass

7.—THEORETICAL MECHANICS.

Name.	School.	Result.
Kahan, H.	.. .. P.T.S.	.. .. Second Class

8.—PHYSICS I.

Kahan, H.	..	..	..	P.T.S.	..	..	Second Class
Illidge, E. H.	..	..	..	P.T.S.	..	..	Second Class
Jaeschke, A. F.	..	..	..	P.T.S.	..	..	Third Class
Stockdill, H.	P.T.S.	Third Class
Rose, L. A.	K.S.M.	Third Class

9.—GEOLOGY I.

Mundle, E. B...	K.S.M.	Second Class
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10.—CHEMISTRY I.

Esdale, A. N...	K.S.M.	First Class
Illidge, E. H.	P.T.S.	First Class
Pond, C.	K.S.M.	Second Class
Kahan, H.	..	..	..	P.T.S.	..	..	Third Class
Hill, H. E.	..	..	..	P.T.S.	..	..	Third Class
Rose, L. A.	..	..	..	K.S.M.	..	..	Third Class

11.—CHEMISTRY II.

Abbott, H. E...	..	..	..	P.T.S.	..	..	Second Class
Roberts, T. J...	..	..	..	K.S.M.	..	..	Third Class

12.—CHEMISTRY III.

Grace, J. N. A.	..	..	..	P.T.S.	..	..	Second Class
Lapsley, R. G.	..	..	..	P.T.S.	..	..	Second Class

13.—ASSAYING I.

Marr, H. V.	..	..	..	P.T.S.	..	..	First Class
Pond, C.	..	..	..	K.S.M.	..	..	Second Class
Abbott, H. E.	..	..	..	P.T.S.	..	..	Second Class
Kinneen, W. P.	..	..	..	P.T.S.	..	..	Third Class
Sawyer, S.	..	..	..	P.T.S.	..	..	Third Class

19.—PETROLOGY.

Name.	School.	Result.
Turrell, S. G.	K.S.M.	Second Class
Leevers, J. C.	K.S.M.	Second Class

21.—MINING I.

Harrison, P. H.	K.S.M.	Third Class
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22.—MINE SAMPLING.

Leevers, J. C.	K.S.M.	First Class
Chauncey, A. P.	K.S.M.	Second Class
Shaw, C. C.	K.S.M.	Second Class
Mundle, E. R.	K.S.M.	Third Class

23.—SURVEYING I.

Noall, J.	K.S.M.	First Class
Shaw, C. C.	K.S.M.	Third Class

24.—SURVEYING II. (Provisional Passes).

Leevers, J. C.	K.S.M.	First Class
Godden, F. W.	K.S.M.	Second Class
Davies, C. H.	K.S.M.	Third Class
Grigg, J.	K.S.M.	Third Class

25.—MECHANICAL DRAWING I.

Macbeth, R.	K.S.M.	First Class
Kyle, H. B.	K.S.M.	First Class
Cameron, A. R.	K.S.M.	Second Class
Edmondson, E.	K.S.M.	Second Class
Hardeman, J.	K.S.M.	Third Class
Rose, L. A.	K.S.M.	Third Class
Anderson, A. F.	K.S.M.	Third Class
Pond, C.	K.S.M.	Third Class
Bicknell, H. C.	K.S.M.	Third Class
Rundle, H.	K.S.M.	Third Class
Smith, J. E.	K.S.M.	Third Class
Murphy, J.	K.S.M.	Third Class

26.—MECHANICAL DRAWING II.

Leevers, A. C.	K.S.M.	Third Class
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27.—APPLIED MECHANICS I.

Name.	School.	Result.
Hayman, W. G.	P.T.S.	First Class
Stronach, K. W.	P.T.S.	Second Class
Fry, M. L.	P.T.S.	Second Class
Lewis, L. J.	P.T.S.	Second Class
Ffarrington, P.	P.T.S.	Second Class
Edmondson, F. C.	K.S.M.	Third Class
Spangenberg, C.	P.T.S.	Third Class
Mundle, E. B.	K.S.M.	Third Class
Parry, R. E.	P.T.S.	Pass

28.—MECHANICAL ENGINEERING I.

Name.	School.	Result.
Williams, M. L.	P.T.S.	Third Class
Marsh, H. H.	P.T.S.	Third Class
Mundle, E. B.	K.S.M.	Third Class
Ffarrington, P.	P.T.S.	Third Class
Cunningham, P. F.	P.T.S.	Third Class
McLennan, B.	K.S.M.	Third Class
Holmes, A. W.	P.T.S.	Third Class
Troup, W. J.	P.T.S.	Third Class
Midgley, F. M.	K.S.M.	Third Class
Fry, M. L.	P.T.S.	Third Class

28B.—MECHANICAL ENGINEERING I.—GAS ENGINE.

Bosustow, A.	K.S.M.	.. ..	First Class
White, A. S.	K.S.M.	.. ..	First Class
Modra, F. A.	K.S.M.	.. ..	First Class
Mason, G.	K.S.M.	.. ..	Second Class
Bicknell, H. C.	K.S.M.	.. ..	Second Class
Scott, L. C.	K.S.M.	.. ..	Second Class
Barnett, W.	K.S.M.	.. ..	Second Class
Cairns, M. R.	K.S.M.	.. ..	Second Class
Faull, G. R.	K.S.M.	.. ..	Second Class
Williams, W. H.	K.S.M.	.. ..	Third Class
Curran, F.	K.S.M.	.. ..	Third Class
McLennan, B.	K.S.M.	.. ..	Third Class

28C.—MECHANICAL ENGINEERING I.—INDICATOR.

Bosustow, A.	K.S.M.	.. ..	First Class
White, A. S.	K.S.M.	.. ..	Second Class
Scott, T. C.	K.S.M.	.. ..	Second Class
McLennan, B.	K.S.M.	.. ..	Second Class
Bicknell, H. C.	K.S.M.	.. ..	Second Class
Curran, F.	K.S.M.	.. ..	Third Class
Williams, W. H.	K.S.M.	.. ..	Third Class
Cairns, M. R.	K.S.M.	.. ..	Third Class
McGill, A.	K.S.M.	.. ..	Third Class
Faull, G. R.	K.S.M.	.. ..	Third Class
Mason, G.	K.S.M.	.. ..	Third Class

29.—BUILDING CONSTRUCTION.

Name.	School.	Result.
Lewis, L. J.	P.T.S.	.. .. Third Class
Stephen, C. J.	P.T.S.	.. .. Third Class
Grace, J. N. A.	P.T.S.	.. .. Third Class
Edmondson, F. C.	K.S.M.	.. .. Third Class
Wesermann, C.	K.S.M.	.. .. Third Class

30.—ENGINE DRIVING I.

Tschamper, J. C.	K.S.M.	.. .. First Class
Fenton, E. F.	K.S.M.	.. .. Second Class
Wilkinson, G. E.	K.S.M. Third Class

31.—ENGINE DRIVING II.

Chatteris, W. A.	K.S.M. Second Class
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32.—PRACTICAL ELECTRICITY.

Godfrey, P. H.	K.S.M. First Class
Patterson, J.	K.S.M. Second Class
Boardley, A.	K.S.M.	.. .. Second Class
Munro, W.	K.S.M.	.. .. Second Class
Cooke, C. E. A.	K.S.M.	.. .. Second Class
Kinross, J.	K.S.M.	.. .. Third Class

33.—ELECTRICAL ENGINEERING I.

Cameron, A.	K.S.M.	.. .. Second Class
Murphy, J.	K.S.M.	.. .. Second Class
Powell, T.	K.S.M.	.. .. Third Class
Sampson, T. W.	K.S.M.	.. .. Third Class
Midgley, F.	K.S.M.	.. .. Third Class
Cairns, M. R.	K.S.M.	.. .. Third Class
Heerey, F.	K.S.M.	.. .. Third Class
Dawe, E.	K.S.M.	.. .. Third Class

(Theory only.)

34.—ELECTRICAL ENGINEERING II.

Edmondson, F. C.	K.S.M.	.. .. Second Class
Thompson, E.	K.S.M.	.. .. Third Class
Butement, J.	K.S.M.	.. .. Third Class
Parker, O.	K.S.M.	.. .. Third Class

35.—FITTING AND TURNING I.

Name.	School.	Result.
Wilks, H.	K.S.M.	Second Class
Modra, F. A.	K.S.M.	Second Class
Rose, L. A.	K.S.M.	Third Class
Hodgson, A.	K.S.M.	Third Class
Robertson, W. J.	K.S.M.	Third Class
Davey, W.	K.S.M.	Third Class
Paterson, J.	K.S.M.	Third Class
Kirkaldy, R. W.	K.S.M.	Third Class

36.—FITTING AND TURNING II.

Weselman, C.	K.S.M.	Second Class
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38.—MACHINE DESIGN.

Butement, J.	K.S.M.	Second Class
Shepherd, J. P.	K.S.M.	Second Class
Grigg, J.	K.S.M.	Third Class
Edmondson, F. C.	K.S.M.	Third Class
Head, B.	K.S.M.	Third Class
Weselman, C.	K.S.M.	Third Class
Parker, O.	K.S.M.	Third Class

89.—PRACTICAL MATHEMATICS.

Murphy, J.	K.S.M.	First Class
Weselman, C.	K.S.M.	Third Class
Shepherd, J. P.	K.S.M.	Third Class
Cameron, A. R.	K.S.M.	Third Class

DIVISION VI.

OPERATIONS OF THE "INSPECTION OF MACHINERY ACT, 1904."

Office of the Chief Inspector of Machinery,
Treasury Buildings,
Perth, 30th March, 1915.

Annual Report of the Chief Inspector of Machinery and Chairman of the Board of Examiners for Engine-Drivers for the Year ending 31st December, 1914, with Statistics.

The Under Secretary for Mines, Perth.

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, 1904," in the districts proclaimed thereunder, together with statistical tables for the year ending 31st December, 1914.

For convenience of reference, 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.
- (8.) Extracts from Inspectors' Reports.

DIVISION I.

Inspection of Boilers.

The number of boilers useful as steam generators on the registers at the end of the year was 3,039, as against 2,980 in 1913, showing an increase of fifty-nine (59). As in previous years several boilers have been written off as permanently condemned, and these, of course, are not included in the preceding figures. There were ninety-nine (99) new registrations during the year. Thirty-eight (38) were permanently condemned, one (1) was converted into a tank, two (2) were transferred to other States, and two (2) were handed over to the jurisdiction of the Commissioner of Railways.

New Boilers Registered.

Ninety-nine (99) boilers were registered during the year, made up as follows:—Water tube, eleven (11); Locomotive, fifteen (15); Locomotive Portable, six (6); Locomotive Stationary, five (5); Cornish, three (3); Return Multitubular Stationary Under-

fired, three (3); Return Multitubular Stationary Internally fired, three (3); Gas Fired Cylindrical Dish-ended, four (4); Vertical Stationary, fourteen (14); Vertical Multitubular Stationary, one (1); Vertical Portable, three (3); Semi-Cornish, three (3); Digesters, twenty-seven (27), and Turnbull Steamer, one (1).

Thirty-nine (39) of these new boilers were imported from the United Kingdom, two (2) from Germany, nine (9) from Norway, fifteen (15) from the Eastern States, eight (8) from the United States, and three (3) from an unknown source.

Twenty-three (23) were made in this State, the types of which are three (3) Locomotives, one (1) Vertical Stationary, three (3) Gas-fired Cylindrical Dish-ended, three (3) Return Multitubular Stationary Under-fired, and thirteen (13) Digesters.

Boilers constructed in this State.

There has been a satisfactory increase in the number of boilers manufactured in this State during the year. Twenty-three "boilers" out of ninety-nine new registrations are of local production. The local product amounts, therefore, to 23.3 per cent. of the total number of boilers registered during the year. This numerical result is decidedly more satisfactory than of late years. It is, however, somewhat discounted on analysis. Out of the twenty-three, thirteen were digesters (a very simple form of construction) and three were very small gas-fired boilers. The remaining seven only were normal boilers, so there is still ample room for improvement in the local output.

The number of useful boilers out of use at the end of the year shows an increase of sixty (60) as compared with 1913. This result is not astonishing considering the fact that the Empire is at war, and that the recent drought has been very severe. This increase in "out of use" boilers seems largely in the agricultural areas and, as will be seen from remarks

later on, does not imply any diminution in the work done by the Department.

There has been a slight decrease of twenty-three (23) "thorough" inspections made as compared with the previous year, and a decrease of fifty-four (54) "working" inspections.

During the year one of the South-Western Inspectors was absent on long service leave for a period of over six months, which amply accounts for the decrease.

The total number of inspections, working and thorough, in all districts was 1,744, of which 1,033, or 59 per cent. of the whole number, were made in the South-Western district. Eighty-five out of the ninety-nine new boiler registrations were located in the same district.

The total number of certificates granted in all districts during 1914 shows an increase of 84, as against previous year. In the South-Western district there was an increase of 85, Coolgardie and Yilgarn, East Coolgardie, Dundas, and North-East Coolgardie (grouped), show a decrease of 37, Mount Margaret and North Coolgardie show an increase of 18, and East Murchison, Murchison, and Yalgoo also an increase of 18.

The revenue received from boiler inspections during the year was £3,537 17s., being £138 4s. more than the previous year—a very satisfactory result considering the bad season.

The following return shows the operations in the proclaimed districts in connection with boilers for the past year as compared with the year 1913:—

Return showing Operations in the Proclaimed Districts (Boilers only) during year ending 31st December, 1914.

	TOTALS.	
	1914.	1913.
Total number of Boilers registered and capable of being used as Steam Generators ...	3,039	2,980
New Boilers registered during the year	102	46
Inspections for year—Thorough	1,641	1,664
" " Working	103	187
Boilers condemned during the year—Temporarily	52	49
" " " Permanently	38	45
Boilers converted into tanks, air receivers, etc., during the year	1	2
Boilers sent to other States during the year	4	11
No. of Notices for repairs issued during the year	325	365
No. of Certificates issued (including those issued under Section 30) during the year...	1,673	1,589
	£ s. d.	£ s. d.
Total amount of Fees for 1914	3,537 17 0	...
Total amount of Fees for 1913 ... ..	...	3,399 13 0

Boilers Temporarily and Permanently Condemned.

Thirty-eight (38) boilers were written off the Registers during the year as being no longer safe as steam generators. This number is again rather high, but the majority of the boilers thus permanently condemned were weeded out from the ranks of the "out of use" boilers.

Since, and including, the year 1899, four hundred and sixty-seven (467) boilers in this State have been relegated to the scrap heap.

The number temporarily condemned is again low, viz., fifty-two (52), pointing to a fairly satisfactory condition of those boilers in active use.

The following return shows the permanently and temporarily condemned boilers as a percentage of the inspections made:—

Number of Temporarily and Permanently Condemned Boilers per 100 Inspections made during 1914.

Year.	Temporarily.	Permanently.
1899	2.64 per cent. ...	1.42 per cent.
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 " ...	1.178 "

DIVISION II.

Explosions and Interesting Defects.

It gives me considerable satisfaction to be able to again report that there has been no explosion during the year. Many of the boilers in the State are becoming somewhat aged, but fortunately the majority of those now left are of *known* age, and their history is complete. Careful attention is given to all such boilers, pressures are reduced where necessary, and in some cases short certificates issued, so as to insure more frequent inspection than if the full term of one year were allowed. I am satisfied that the good work done by inspectors has contributed largely to the continued immunity from explosions which this State enjoys.

Two interesting cases of second-hand boilers imported from other States occurred during the year:—

- (1.) A second-hand Cornish boiler was imported from New South Wales at the end of 1913, carrying a "Licensed Engineer's" certificate, stating that it was "in good condition" and fit for a "working pressure of one hundred pounds." This certificate was forwarded to me "to endorse" which, needless to say, I could not do.

An Inspector was instructed to examine the boiler. This was done in April, 1914. The front end plate was found grooved for 5 feet in circumference, and to a depth of 5/16in., and a width of 1 1/4in. at the worst place. The original thickness was 5/8in., so that the grooving was just half way through the plate in places. Various other less important defects were found. The blow-off elbow pipe was of cast iron and unstrengthened by any ribs. The

staying of ends was inadequate, and the design of the longitudinal seams of shell about as bad as it could be—the resistance to tearing along this seam was 73 per cent. of the strength of the plate, but the resistance to shearing of the rivets on the seam was only 47.5 per cent. The vast difference between these figures at once points to ignorance of design. A pressure of only 80lbs. could be granted, and even then a certificate was issued for three months only. After three months' work it was found that the front end plate showed signs of bulging, owing to the inefficient staying above referred to. The working pressure was still further reduced, and for the present stands at 70lbs. A notice was issued that, in all probability, a new front end plate would be required on the expiration of present certificate.

- (2.) A second case occurred during the year of an imported second-hand boiler failing to pass our West Australian standard. In this instance the boiler, which was a portable locomotive type, came from Victoria. The certificate was signed by _____, "Consulting Boiler Inspector." It was endorsed "This is not a Government Certificate." The certified working pressure was 110lbs. per square inch. On being examined by one of this Department's Inspectors the boiler was found to be in fair condition, with the exception of slight general deterioration and certain evidences of over-heating in the firebox which had been patched. The owners informed this Department that the boiler was about six years old. Being doubtful on this point, the makers were written to; their reply, and copy of their test certificate showed that the boiler was eighteen years old, and that its *original* maximum working pressure was 90lbs. The pressure in this case also was considerably reduced. The boiler was branded by the Victorian Inspector—"Working Pressure, 110lbs."

I think these two cases show conclusively that there is urgent need for uniformity throughout the Commonwealth in the methods of dealing with steam boilers.

DIVISION III.

Inspection of Machinery.

The appended return shows a classification of the power-driven machinery in the proclaimed districts. It will be seen that the number of electrically-driven groups now easily holds the first place. Last year these were 24 in excess of plant directly driven by steam engines; this year the excess has jumped to 142, with an increase during the year of 112. Groups driven by oil engines again hold the third place with 653 as against 541 in 1913. Suction Gas Engines come forth with 192 as against 163 in 1913, showing an increase of 29 plants installed during the year. This considerable increase no doubt accounts for several "out of use" boilers. Comparing the above figures with last years, the principal points of interest

are, that there was, for the first time, a decrease (six) in the number of steam-driven groups, and that the increase during the year of plants driven by oil engines and suction gas engines is not so great as during 1913. Considering all the circumstances, however, I think the table shows a satisfactory state of things.

Classification of Various Sources of Power, Driving Machinery in use or likely to be used again, in Proclaimed Districts for the Year ending 31st December, 1914.

	Totals.	
	1914.	1913.
No. of groups driven by steam engines ...	1,303	1309
No. of groups driven by oil engines ...	653	541
No. of groups driven by ordinary gas engines ...	34	37
No. of groups driven by suction gas engines ...	192	163
No. of groups driven by compressed air ...	35	27
No. of groups driven by electric motors ...	1,445	1,333
No. of groups driven by hydraulic pressure ...	12	12

The number of lifts in use in the State is rapidly increasing, and the types being installed are a great improvement on those in general use before the inception of this Act. The passenger lifts, which are all in Perth and electrically-driven, with one exception, are in most cases so arranged that the fastenings of the doors of the lift shaft are included in the electric circuit, making it impossible for a cage to leave any particular floor until the door is closed and properly secured.

Several of the passenger lifts are "automatics," worked on the press-button system. Lifts arranged on this principle and properly installed are almost fool-proof, and once their advantages are better understood, are bound to come into more prominent use.

Of the 93 goods lifts in the State, all but six are in Perth or Fremantle. The following table shows the number and description of all the lifts in the State:—

<i>Passenger Lifts—</i>		
Electrically-driven .. ..	..	52
Hydraulically-driven .. ..	..	1
<i>Goods Lifts—</i>		
Electrically-driven .. ..	..	73
Hydraulically-driven .. ..	..	10
Belt-driven from a countershaft driving other machinery .. ..	..	9
Total .. ..	..	145

The work attached to the inspection of these lifts is considerable. Every detail, such as doors and their fastenings, safety appliances, shaft skids, winding gear, motors and ropes, has to be minutely inspected. Almost every lift has, at least, two ropes on both cage and balance weights (many have four) and several of the buildings have four storeys. It is easily seen that there are several *miles* of wire rope to inspect, to say nothing of the other work. The number of passengers carried per day on some of the lifts in the large warehouses and shops is very great, and the importance of the work being efficiently carried out is obvious.

I am strongly of the opinion that the statutory *yearly* inspection is not sufficient, and that at least a six-monthly inspection should be insisted on. Pro-

vision for this, and other matters, was made in certain suggested amendments to the Act submitted to the Hon. Minister some time ago. I regret that, as yet, it has not been found possible to take action in the matter.

As a matter of fact it is not possible to trust to a yearly inspection, and, thanks to the kindly co-operation of several electrical firms and others in charge of the maintenance of lifts, the Department often hears of defects and troubles necessitating sometimes three or four visits per year instead of one.

The following return shows the work done in connection with machinery inspections:—

Return showing operations in the Proclaimed Districts (Machinery only) during Year ending 31st December, 1914.

	Totals.	
	1914.	1913.
	No.	No.
Total Registrations Useful Machinery	3,674	3,425
Total Inspections made	2,430	2,137
Certificates (bearing fees)	1,715	1,470
Certificates, Steam (without fees)	713	667
Notices issued "Machinery Dangerous"	307	327
	£ s. d.	£ s. d.
Total Amount of Fees for 1914 ...	760 15 6	...
" " 1913 ...	...	646 3 0
	No.	No.
Number of Inspectors	7	7

On examining the above return the following are the most noteworthy points:—

- The total number of new registrations show an increase of 249 on last year's figures, and 223 of these were in the South-Western district.
- The increase in the total number of inspections made during the year was 293. In the South-Western district the increase was 324. In the Kalgoorlie group there was a decrease of 101. In Mount Margaret and North Coolgardie an increase of 32, and in East Murchison, Murchison and Yalgoo an increase of 38.
- The Revenue derived from Machinery fees was £760 15s. 6d., showing a satisfactory increase of £114 12s. 6d.

Dangerous Machinery.

The number of notices issued (307) to provide efficient guards was again high and amounted to rather over 12 per cent. of the total number of inspections made. This is, however, not abnormal, when it is remembered that many of such notices are *pro forma*, and were issued mostly in case of new registrations or addition to old plants. It very frequently occurs that notification of the erection of new plants is sent in before the job is properly complete. This is often done by owners in order to secure the advice of inspectors as to the best method of guarding, and so avoiding the chance of alterations afterwards.

No particular case of seriously dangerous machinery has come under my notice during the year, and I note there is a tendency among manufacturers to pay much more attention to the proper guarding of

dangerous parts of machines than was thought necessary a few years ago.

DIVISION IV.

Prosecutions under the Act.

There were three prosecutions for breaches of the Act during the year—all connected with the same case, viz., the employment of uncertificated drivers on the Youanmi Gold Mines, Ltd. The Mine Manager was charged with employing uncertificated drivers. The drivers were charged with taking charge of engines, not being the holders of certificates as required by the Act.

The defendants all pleaded guilty and were fined as follows:—

The Manager .. £2 and 18s. 4d. costs.

One driver .. £2 and 7s. 6d. costs.

The other driver .. £1 and 7s. 6d. costs.

I am pleased to be able to report that in no other case was it found necessary to take legal action in order to enforce the conditions set forth in the Act.

DIVISION V.

Accidents to persons caused by Machinery.

The total number of accidents reported to the Department and inquired into by Inspectors during the year was 102, of which 6 were fatal. The number of accidents as compared with 1913 shows a decrease of 25, but this is discounted by the fact that this year there were 6 fatal accidents as against 4 last year. The fatal accidents were as follows:—

No. 1.—The deceased was working a circular saw at the Victorious Mine, Ora Banda. He was cutting short pieces of salmon gum to act as packing pieces between shaft timbers and the walls of shaft. The piece he was working on at the time of accident was about 15in. long, with a pointed end. The piece of wood in some way unknown slipped from the operator's grip, and was thrown back by the saw, striking him on the left breast and under the chin, the collar bone and upper four left ribs were fractured, and death resulted in about three quarters of an hour. The verdict of the jury was that "deceased met his death accidentally; no blame being attachable to anybody." The deceased was a skilled sawyer.

No. 2.—This accident occurred at the factory of Wunderlich's, Ltd., in Perth. The deceased was engaged in adjusting a new and very heavy die for stamping sheet metal. The top die became detached from the drop hammer and struck deceased, who was stooping over the bottom die, on the head. Death was instantaneous. The verdict of the jury was "Accidental death; and no blame attachable to any person."

The deceased was an expert at his work, and prepared and secured the die in question himself. He appears to have committed two errors of judgment, viz.—

(a.) In not providing a larger attachment area (the die being an unusually heavy one).

(b.) In placing his head in such a position as to render it possible to be struck in case die became detached.

With regard to (b.) it is only fair to say that, as far as can be ascertained, no previous case of a die having become detached is known to have occurred in this industry.

No. 3.—This accident occurred in connection with a goods lift at the Perth warehouse of Messrs. Geo.

P. Harris, Scarfe & Co., Ltd. Deceased was requested by the lift attendant to give him a hand to shift a heavy case from the lift cage, then standing at top floor of the building. He walked behind the case, which was a very large one, and in trying to push it over slipped, and fell between the edge of the cage platform and the wall of the building into the basement—a distance of 52 feet. He was unconscious when picked up, and death occurred in a very short time. The lift in question is purely a goods lift, and the cage, or platform, has no back or front to it, having to load and discharge both at back and front at the ground floor level. At the basement, and up to ground floor, the cage is tight against the wall, but owing to two "set offs" the wall at top floor is 11 in. from back of platform. It was through this space deceased fell. The front of lift shaft is fitted with good doors at each floor, and there is only just clearance between edge of platform and the various floors.

The lift has been working for eight years, and no previous accident has happened. From position of control gear, the lift attendant was perfectly safe at all times, and it was not contemplated that any danger could occur to any person assisting to unload the lift while cage was stationary.

The comments of the jury were somewhat drastic, and were as follows:—"We consider that the lift in its present state is dangerous and a menace to life and limb, and the well-hole should be cased in from top to bottom, so as to allow the lift only to have free working space."

Prior to the accident the "well-hole" was cased in, in the manner described, except at the back. Since the accident this has also been done.

No. 4.—The deceased in this case was oiling a chaff-cutter while at work. Part of his clothing was caught between the spur and pinion wheels of the feed gear, his arm was drawn in and torn off above the elbow. The accident occurred on the 8th October and death ensued on the 17th.

At all previous inspections the geared wheels were found properly protected by a sheet iron guard. This guard was absent when the accident occurred, and it is presumed that deceased, who was also owner of the machine, removed the guard to facilitate oiling. Of course he should not have done so if he intended oiling while in motion. The verdict of the jury in this case was not procured.

No. 5.—This accident occurred at the Battery of the Menzies Consols Gold Mine, Ltd., Woolgar, in connection with a stone breaker. Deceased was relieving the regular attendant and had been acting in this capacity for about ten days, and had been similarly employed off and on for about twelve months. Part of his duty was to take the belt off the breaker pulley and countershaft pulley, and hang it up clear of the shafting, and for this purpose definite orders had been given by the management that the engine was to be slowed down during the operation. The deceased apparently had given the usual signal to the engine-driver, and the engine was accordingly "slowed down dead slow." No signal was received to start up again, and men were seen running to the breaker. The driver then stopped the engine.

The deceased was found entangled in the belt, which was off the pulley, and wrapped round the shaft. He was very severely injured, both femurs being fractured and the left elbow had sustained a compound comminuted fracture.

The arm was amputated. The patient, however, died on the same night from internal hæmorrhage. No one actually witnessed the accident, and it can only be surmised that, through some inadvertence, the unfortunate man got caught while removing the belt.

The verdict of the jury was—"The accident was purely accidental, and we find no blame being attached to anyone."

No. 6.—The deceased in this case was employed as engine-driver on the Black Range Mining Co. at Sandstone. He had not been in good health, and had seen a medical man on 11th and 12th of December. He was advised to discontinue work. This he did, but feeling better, returned to duty on the 14th. The fireman having heard several "knocks" for the cage to be lowered, and seeing no response was made, went into the engine-room and found deceased with his head jammed between the revolving fly wheel of the compressor and the side of fly wheel pit. The body was cold when discovered, and no one could give any direct evidence as to the cause of the accident. From the condition of the oil cups, which were all filled, it was presumed that deceased had finished oiling and had stooped to place his oilcan, etc., on the floor, and in the act either fainted, or got a sudden dizzy attack, and had fallen under the guard rail of the fly wheel, and so came to his untimely end.

The verdict of the jury was—"Accidental death; no blame being attachable to anyone."

On examining into the classes of machinery causing accidents I find that ore-treating machinery again tops the list, and circular saws come to a close second. The following table shows at a glance the percentage of the total number of accidents caused by that class of machinery which has resulted in the largest number of accidents during the year.

Ore Treating, etc.	16.6 per cent.
Circular Saws	15.6 "
Belting	11.7 "
Winding Engines	5.9 "
Buzzers	3.9 "
Steam Engines	3.9 "

All other sources of accidents vary from 1 to 2 per cent. each. This year the largest number of accidents occurred in the East Coolgardie district, viz., 46 accidents, which amounts to over 45 per cent. of the total number; South-Western follows with 40 accidents or 39 per cent. of the total.

The South-Western accidents, however, amount to only 1.84 per cent. of the total number of registrations in that district, while East Coolgardie out of its total registrations provides 8.66 per cent. of accidents.

DIVISION VI.

Engine-drivers' Examinations and Kindred Matters.

During the year 1914, four (4) examinations were held in Perth, two (2) in Bunbury, two (2) in Kalgoorlie, one (1) in Albany, one (1) in Southern Cross, and one (1) in Leonora.

Examinations were advertised to be held at Cue and Sandstone, but as the required number of candidates were not forthcoming, these examinations did not eventuate.

The personnel of the Board remains as in the past several years, viz., Messrs. H. L. Gill, J. Breydon, and myself as Chairman.

Twenty-four (24) days were spent on actual examinations at the various centres above-mentioned,

by the travelling Board, twelve (12) days were occupied in Perth dealing with applications, marking examination papers, inquiries into various matters connected with engine-drivers and other Board matters, and thirty (30) days were occupied in travelling, and looking into matters connected with engine-drivers in the various outside districts.

A total of two hundred and twenty-three (223) applications were dealt with, and one hundred and eighty (180) certificates were granted during the year.

Owing to the Secretary to the Board, Mr. H. Gover, joining the West Australian contingent, Mr. Geddes was appointed in his place. Mr. Geddes in his turn joined the forces, and Mr. Smith was appointed, and is at present the Acting Secretary. In spite of the above changes the work of the Board has gone on smoothly and without interruption.

The following table shows the number of certificates granted and their classification:—

Return showing total number of Engine-drivers' Certificates (all classes) granted in 1914.

Class of Certificate.	Number Granted.	
	1914.	1913.
First Class Competency (including Certificates issued under Regulation 27 and Section 63 of the Act)	20	15
Second Class Competency (including Certificates issued under Regulation 27 and Section 63 of the Act)	33	34
Third Class Competency (including Certificates issued under Regulation 27 and Section 63 of the Act)	57	45
Locomotive Competency... ..	18	8
Traction Competency	9	19
Interim	27	18
Copies	16	24
Totals	180	163

The total number of certificates granted up to December 31st, 1914, since March 1st, 1905, the date on which "The Inspection of Machinery Act, 1904," came into force, is now two thousand two hundred and ninety-two (2,292), as follows:—

No. of Certificates granted in—

1905 ...	459, of which 359 were Service Certificates.
1906 ...	313, " 143 " "
1907 ...	211, " 34 " "
1908 ...	205
1909 ...	225
1910 ...	162
1911 ...	197
1912 ...	177
1913 ...	163
1914 ...	180

Total ... 2,292, of which 536 were Service Certificates.

Neglecting the "Service" Certificates, 1,756 Competency Certificates have been issued, or on an average 175.6 per year. The percentage of successful candidates as against "applicants" during 1914, was 80.7. In connection with this aspect, it is very noticeable that in the districts where there are Schools of Mines or Technical Schools available, the standard of candidates is much higher than in less fortunate localities.

The Revenue derived from Engine-drivers' fees during 1914 was £207 3s. 3d., as against £199 9s. in 1913.

Inquiries, Prosecutions, etc.

I am pleased to be able to report that there have been no prosecutions, and no official inquiries were necessary in connection with any engine-drivers.

There have been a few overwinds, but none involving any serious injury to persons, or other severe damage.

DIVISION VII.

GENERAL.

Amendment to Inspection of Machinery Act, 1904.

An amending Bill has been drafted, but has not yet been brought before Parliament. I trust the Government will give this matter early consideration, as there are many very necessary amendments required to the existing statute.

Work done for other Departments.

During the year the services of the Department have been requisitioned on several occasions in connection with specifications for boilers, valuations, and special inspections.

New Installations.

During the year comparatively few new plants have been installed in the Goldfields, though several have been modified and increased.

At Frenchman's Bay a considerable sized plant has been erected in connection with the whaling industry.

In the South-West district several small spot mills have been erected and coal mining plants added to and improved.

The new State Saw Mills at Wuraming, Big Brook, and Manjimup are now in full swing.

Many new suction gas plants have been installed throughout the country, amongst which were a duplex cylinder engine of 350 h.p. at Chaffer's Gold Mine, and a tandem engine of 660 h.p. at the Gwalia Gold Mine. The latter is probably the largest engine of the kind in the State.

Carbonic Oxide Poisoning.

Owing to the marked increase in the number of suction gas plants, a few remarks on the subject of carbonic oxide poisoning may not be out of place in this report. In all producer gas there is a considerable percentage of carbonic oxide (carbon monoxide, CO), the gas is extremely poisonous if breathed, and it has little or no smell. The greatest care should, therefore, be taken to prevent any possible source of leakage from joints or cocks on engines, or from pipes conveying the gas. Care should also be exercised when cleaning and repairing engines, opening up scrubbers, etc., and a sufficient time should be allowed for all gas to escape before working near any possible source of danger. Perfect ventilation should be provided in all engine-rooms and in premises where producers are erected.

Many manufacturers send out routine instructions with a view of minimising danger. These are usually worded as follows:—

- (1) *Starting.*—The main stop valve must be shut and the chimney valve opened, otherwise the gas will escape into the room owing to the pressure set up by the fan.
- (2) *Stopping.*—As soon as the stop valve of the engine is shut the chimney valve must be opened at once so as to allow the gas to escape into the open air. (This chimney

should be carried well up and outside the building, and should be so placed as to avoid the chance of gas being blown through windows of factories or adjacent dwellings.)

- (3) *Charging*.—The head must *never* be placed immediately above the hopper opening.
- (4) *Testing*.—All air must be drawn out of the scrubbers and pipe before any light is applied, so as to avoid risk of explosion; the cock, which should be protected with fine wire gauze, should always be kept closed between tests.
- (5) *Cleaning and Repairing*.—After the fire is quite out air must be blown through by the fan and generator doors left open; the plant must be then left for several hours before any cleaning is done. Cleaning should be performed by daylight, and no fire, naked light, or smoking should be allowed near the plant.

No person should be allowed to work single handed where exposure to poisonous gas is anticipated, and, in case of accident, rescue of work should be done by a man round whose waist a rope is attached, the other end of which is held by a mate.

The symptoms of carbonic oxide poisoning begin with throbbing of the blood-vessels of the head, giddiness, palpitation of the heart and weakness of the limbs. These become greatly aggravated after *any exertion*. Owing to their insidious onset, and the cumulative effect of the gas, the weakness of the limbs may come on without attracting notice, so that the person affected may not be able to make his escape.

Headache, anæmia, and defective nutrition may result from the long-continued breathing of this gas in quantities too small to produce immediate effect.

The remedies are fresh air, artificial breathing, administration of oxygen, and application of warmth. They should be applied without delay. Efficient first aid is, therefore, of the greatest importance.

Inspectorial Staff.

No change has occurred in the staff of Inspectors. The work in connection with North Coolgardie, Mt. Margaret, and part of East Murchison districts is now carried out from Kalgoorlie, and the Inspector working these districts is able to materially assist in the districts forming the Kalgoorlie group. This arrangement has given satisfactory results during the past year.

One of the former Kalgoorlie Inspectors was transferred at the beginning of the year to the South-Western district, with head-quarters in Perth. This arrangement made it possible for Inspector Stone to be absent on six months' long service leave after fourteen years' service, and has also resulted in the work in the South-Western district being brought more up to date than for several years past.

The Geraldton office was closed early in the year, and this Inspector's head-quarters are now in Perth, the office work for the district being performed by the Head Office staff. By this change a good deal of the Inspector's time is saved, and he is consequently available as an additional Inspector in the South-Western district for several weeks in the year.

The above re-arrangements have left Inspector Gill available to a greater extent than was before possible for Engine-drivers' Board work, and techni-

cal work in the Head Office in connection with work for other Departments, and other routine matters, and relieving me during my absence on official visits to other districts. The work in connection with the Department has now reached that stage when it is at all times necessary to have a responsible technical officer to attend to the technical demands of the public during my absences.

Clerical Staff.

The Chief Clerk, Mr. Gover, has been temporarily replaced by Mr. Lorden, formerly of the Water Supply Department, and he and the rest of the staff have loyally assisted in keeping down the extra work which has fallen to their lot.

Revenue.

The amount of Revenue produced from all sources during the year was £4,598 1s. 9d., showing an increase of £222 17s. 8d. as against the Revenue for 1913.

During the year ten amounts, totalling £14 15s., were written off as bad debts, which small amount, considering the stressful nature of the year, is, I think, very satisfactory, amounting as it does to only .32 per cent. of the Revenue collected.

Mileage.

The distance travelled by the Inspectors during 1914 was 47,323 miles, being a decrease of 850 miles, as against the previous year.

Conclusion.

In concluding I desire to tender my thanks to Officers of other Departments who have rendered assistance in matters pertaining to the Act, and to record my appreciation of the efforts of the staff during a rather strenuous year's work.

I have, etc.,

C. J. MATHEWS, M.Inst.C.E.,

Chief Inspector of Machinery
and Chairman of the Board of Examiners.

EXTRACTS FROM INSPECTORS' REPORTS.

Mr. B. P. Jones, Inspector of Machinery in charge of Coolgardie and Yilgarn, Dundas, East Coolgardie, and Broad Arrow districts, remarks:—

Inspection of Boilers.—As in past years, boiler inspection has been my chief objective, and by the end of the year only four remained to be done. The number of useful boilers on the registers had crept up from 925 to 930 by the end of the year, the increase being mainly due to a number of locomotives brought in by the Commonwealth Railways.

New Boilers constructed.—No new boilers were constructed during the year, although two large ones of Cornish type were nearly ready for registration and inspection by the end of December. We were not asked to superintend their construction, which I consider a pity, because for a ridiculously small fee the makers might have reaped the advantage of additional superintendence of their workmen and a further guarantee to place before purchasers. They have been built from designs approved by the Department, and that is something.

Boilers temporarily and permanently condemned.—Two boilers were condemned temporarily pending certain repairs being carried out, while two were condemned as being of no use as steam generators.

Maintenance and care of Boilers.—Maintenance on the whole remains good, especially on the Golden Mile. Mine or well water is still used at Higginville, Kunanalling, Carbine, Carnage, Waverley, Nevoria, Parker's Range, and Mt. Jackson, but in no case can the feed water be considered very bad except perhaps for locomotives, which do not get the advantage of having condensed exhaust steam returned. Most of the boilers on the Golden Mile are in excellent condition, many showing very little sign of their twelve and fifteen years' service. This is, of course, mainly due to the use of the Coolgardie water scheme, which is very good quality for the purpose.

As the question of using "Smooth-on" for filling up pits and grooves in boilers has cropped up during the year, I might mention that a case of such having been done came under my notice a few years ago; after it had been in twelve months it was easily detectable. It was, however, wise on your part to prohibit its use unless notice is first given, because it could be used to hoodwink an Inspector and perhaps lead to accidents. To prevent pitting from getting worse in certain parts of a boiler, such as shell bottom in vicinity of the blow-off hole, a cement wash is just as good, and equivalent to, the very old fashion among the marine engineers of using a little sea water in new boilers until a thin scale was formed.

Explosions or interesting defects.—There is nothing to chronicle under this heading.

Prosecutions.—Nil. There have been a few minor violations of the Act due to ignorance or carelessness, and those offending are not likely to do so again.

Machinery Inspections.—The number of registered groups stands slightly higher than last year, but the increase is set off by decrease in the number of groups working. There were one hundred fewer certificates issued, but over seventy groups remained to be inspected by the end of the year. This number would have been less had I not gone on recreation leave about the middle of December. I am convinced that there are still some groups unregistered, and shall bring them in early in the new year because, although at first sight it appears useless to look for new work when one cannot cope with that already in hand, it is better to inspect once than not at all, and certain groups which are known to be safe may, under such circumstances, be allowed to stand over.

Great care is always taken to fence or guard machinery and belts as well as possible, but opinions vary so much that the greatest care has to be exercised before issuing final instructions. Many a belt and small collection of gearing have taken longer to deal with than many a boiler.

Accidents.—There has been one fatal accident and forty-eight (48) more or less serious accidents during the year, the figures being slightly less than during 1913.

The fatal accident took place in Ora Banda, and was caused by a circular saw. The case was fully reported on at the time, and is only brought up to mention that since then I have discussed and inquired into various schemes for minimising the danger incurred in cutting short lengths of rough timber at circular saws. Three benches are already fitted, and I hope by the end of the year to have other users following their example.

Mishaps to Machinery.—A few of these have occurred and been already reported on.

In the case of the fracture of drum lagging flanges at the Lake View Consols Mine shaft winding engine,

it might be interesting to know that new drums of cast steel were ordered from Melbourne, and are now on the mine ready to go in. The quality and appearance of the castings are clear evidence that there is no necessity to go out of the Commonwealth for work of this class.

Engine-drivers' Misdemeanours.—There is nothing to report under this heading.

Interesting Developments, etc.—Only one new plant was erected during the year, but the Chaffers, Oroya Links, and Associated Northern mines have been augmenting and re-arranging their works, and a few new friction hoists have been started.

On the Chaffers Gold Mine the old tandem compound battery engine was retained to drive ball mills, rockbreaker, and some conveyors, while a duplex producer gas engine of 350 h.p. was installed to drive eleven large grinding pans, three Edwards duplex roasters, a Ridgway filter, belt conveyors, power pumps, etc.

The Oroya Links Co. have been re-arranging their plant during the year. Most of the boilers from their South Block, and the large direct acting winding engine from Waddington shaft, have been moved to their Cræsus proprietary shaft, about one and a half miles north of the old positions. The half duplex Walker air compressor has had the other cylinder fitted and will soon be working duplex, while the Cornish mine pump is now worked from a different direction. A small Orenstein and Koppel locomotive has superseded horse traction from the Eclipse shaft to the Brown Hill plant, and the line will soon be extended to the Cræsus Proprietary shaft.

Ora Banda has also witnessed some re-arrangement and augmentation of plant.

A development, which I am watching with great interest, is the trial of a lead-lined steel feed water pipe at the Power Station of the Kalgoorlie Electric Power and Lighting Co. The pipes have now been in use 12 months and are not showing any sign of deterioration.

A peculiar mishap occurred at the above power house to a cross compound engine fitted with lenz drop valves. A loud bump was heard in the high pressure cylinder and the engine was stopped. On examination it was found that one of the bars of the back inlet valve chamber was broken. The piston rod was bent slightly and other slight defects noticed. These were remedied and an attempt made to start. This resulted in further examination disclosing the fact that the low pressure crank was about 70 degrees ahead of its normal position. As the crank disc could not be moved, the valve gear was adjusted to suit the altered conditions, with the result that engines have worked quite satisfactorily. The great importance of running machinery properly balanced was illustrated on one of the large dry crushing plants recently. A light pulley about 8ft. in diameter with 5in. rim was attached to a 4in. shaft suspended between bearings about 4ft. apart, and had been working perfectly true for a long period. One morning the engineer noticed that it was running very erratically and concluded that the shaft was bent. Another shaft was prepared, but in the meantime the original shaft was found to be running perfectly true. The explanation was that a large quantity of heavy dust had collected at one side of the inner circumference of the pulley during a stoppage, thus causing the eccentricity. At a subsequent stoppage this dust hap-

pened to come in the top side and fell out, thus restoring the balance of the pulley.

The war has taxed the ingenuity of some of the Golden Mile engineers, but has found them ready to meet all troubles cheerfully. One, who found himself running short of balls for Krupp mills, got the manager to buy up a large quantity of scrapped mild steel shafts from neighbouring mines and then had them cut up and forged into balls under the steam hammer. He claims that his articles are just as good as Krupps, and £3 per ton cheaper.

The past year has been rather more strenuous than usual. Inspector McCulloch has assisted me in his spare time and, considering that his own district has gone ahead and given more work than in the previous year, also that three weeks of the year were taken up by his recreation leave, the result for this district will, I hope, be considered satisfactory.

Mr. H. L. Gill, Inspector of Machinery in the South-Western district (metropolitan area) remarks:—

During the year I have granted certificates on 171 boilers. Thirty-six Repair Notices were issued, sixty-six certificates on steam driven machinery, and 493 on machinery driven other than by steam were issued, and eighty-five notices *re* guarding machinery were sent out.

No explosion has occurred in the case of any boiler I have had to inspect during the year, and no serious or interesting defects were discovered, with the exception of a few cases of external wasting through leakage, which necessitated patches.

Twenty-two out of the total ninety-nine new boilers were registered by me, and one hundred and five new groups of machinery fell to my lot.

With regard to the latter there are, I am sure, hundreds of small plants still unregistered. Most of these occur in the outlying districts, and one only hears of them accidentally. In one case where I attended to inspect I was asked, "Why have I to register when so and so goes scot free?" This conversation ended in my securing nine more groups, all of which were unregistered, and in every case the owners apparently knew nothing of the existence of the "Inspection of Machinery Act." All of these plants were driven by small internal combustion engines and consisted of chaff-cutters and pumping plants.

The inspection of machinery during the year has been mostly of a routine nature, nothing very new or sufficiently interesting to remark upon having occurred.

Owners generally are becoming more and more ready to fall in with suggestions as to guarding danger points.

The inspection of lifts has taken up a good deal of my time during the year. There are now 145 lifts registered in the State, and all of them except six goods lifts are in Perth and Fremantle.

One point has been rather forcibly brought under my notice during the year, viz., the folly of running wire ropes over pulleys of comparatively small diameter. Given a small pulley plus fairly high speed, and no rope will stand for much more than a year. On the other hand with moderate speeds, and extra large pulleys, it is difficult to say what the life of a rope might be. None of the ordinary rules for sizes of pulleys, that I know of, provide a sufficiently large diameter for lift pulleys. Prospective owners of lifts would save themselves much annoyance and expense

if they would specify all pulleys to be of very ample diameter. "Jockey" pulleys should be avoided wherever possible, and where their use is unavoidable they should, wherever possible, be the same size as the largest in the system. There are several cases in Perth where the only difference between the running of the cage and the balance weight ropes is the fact that a jockey pulley is introduced on the balance weight side. These ropes *invariably* wear out long before the cage ropes.

About the usual time has been taken up in connection with the Engine-drivers' Board of Examiners, and in connection with this work I am pleased to report that I have not found a single case during the year where an engine has been in charge of an uncertificated driver, and no case where any charge of neglect of duty or carelessness has been preferred.

The year on the whole has been uneventful. There has been a steady increase in new registrations, both of boilers and machinery, and a decrease in the number of accidents in that part of the district where my work lies.

The new boilers registered by me amounted to nearly 13 per cent. of the total number of boilers inspected by me during the year, and the new machinery registrations to over 21 per cent. of my total machinery inspections.

Generally I consider that the results of the year's work have been satisfactory, and that there is a decided tendency towards better guarding of machinery and better upkeep of boilers.

Mr. G. P. McCulloch, Inspector of Machinery in charge of the North Coolgardie, Mt. Margaret, and part of the East Murchison districts, remarks:—

Two new boilers were registered during the year.

One hundred and eighty-two thorough inspections were made, that is twenty-six more than last year. This increase is largely due to the number of short certificates granted owing to the deterioration of the boilers.

The maintenance and care of boilers remains as last year, and I have nothing to add to my last report.

I am again glad to say that I have no explosion to report.

With regard to accidents to persons, there have been eight in my districts, all of which were apparently either due to carelessness or unavoidable in their nature.

No mishaps to machinery worthy of special comment have occurred, with the exception of the rather peculiar fracture of a suction gas engine cylinder at Comet Vale. The owners state that the morning of the accident was a very cold frosty one, and that it is possible the load was put on the engine too soon after starting. The fracture was repaired by straps and longitudinal stays, and is running satisfactorily.

Re Engine-drivers.—Nothing worthy of comment has occurred during the year.

New Installations.—Only one of any importance has been erected.

General.—One gratifying feature of the year's work is, the total revenue shows a good increase, which is accounted for by the greater number of thorough inspections made. Another is, that in spite of increase in revenue and number of inspections made, there has been a marked decrease in mileage travelled.

In addition to the work done in my own districts, I have spent about one-third of the year assisting in Kalgoorlie, in which districts I have made ninety thorough inspections of boilers, eighty-one machinery

inspections, and several inquiries into winding engines—entailing travelling to the extent of 784 miles. After a year's trial I find, as the above figures will amply testify, that the removal of the head-quarters to Kalgoorlie has thrown a very great amount of extra work on my shoulders. During the latter part of the year my work has in addition been greatly hampered by continual floods, which have occurred in most of the districts in which I was engaged.

As regards winding engines, the experience of the year has amply demonstrated the correctness of the empirical formulæ, given in my report on the winding engines of the East Coolgardie field in 1909, as regards the strength of drum shells, and also the necessity of stiffening these shells when constructed of steel with a central tee or angle iron ring. As these formulæ have, therefore, had such a thorough testing over such a long period of time, it may not be out of place to put them on record here:—

For cast-iron shells:

$$t = \frac{1}{32} \sqrt{\frac{1.2S \times \sqrt{L}}{172}}$$

For steel shells:

$$t = \frac{1}{32} \sqrt{\frac{1.5S \times \sqrt{L}}{1000}}$$

Where t = thickness of drum shells in inches

$$S = n_x \frac{Q_1 + Q_2}{2L}$$

L = width of drum between flanges in inches.

n_x = the number of coils of rope on the drum.

Q_1 = the weight of ore and skip, 5 per cent. the weight of the full length of the rope.

Q_2 = the weight of ore and skip, 5 per cent.

In the above formulæ the cast-iron shells are considered as being adequately supported by lateral ribs, and preferably also by a central circumferential flange, and the steel shells by a central tee or angle iron stiffening ring, as stated above.

The year's work has also still further demonstrated the value of the rule that a winding engine hauling from many different levels should be capable of starting its load at any position of the cranks, as in a great many cases where this requirement has not been fulfilled trouble has occurred, and in some cases serious accidents.

In conclusion I have only to bear tribute to the uniform courtesy and willingness to meet me "half way" shown as heretofore by the various mine managers and officials with whom I have to deal, and to express my thanks to the clerical staff and my other colleagues for their continued co-operation and assistance.

Mr. J. Stone, Inspector of Machinery in the South-West district, remarks:—

During the first half of the year 1914 I was on furlough, having been granted long service leave after fourteen years' continuous service.

I resumed duty in August, and found inspection work fairly well up to date in that part of the district where I have been engaged during the latter part of the year.

The number of plants is steadily increasing in this part of the district. Some of these additions are new, whilst others are second hand, and have previously been used in the goldfields districts. The season, which has been so disastrous in the Eastern districts, has been a good one in the South-West. Some of the farmers have splendid crops, which will probably mean additional plants in the near future. The great European war has somewhat affected the saw-milling industry, and some of the mills are tempor-

arily closed down, one of our largest mills, viz., Worsley, "cut out" during the year, and is permanently closed down. On the other hand the new State mills at Wuraming, Big Brook, and Manjimup are now in full swing, and the new band saw mill at Nanup has been completed, and will commence operations early in the new year. The result of this innovation in jarrah sawmilling is being eagerly awaited, it being the first complete band sawmill in the State. At Collie and Argyle the band saws, which were added to ordinary mills laid down for circular saws, have not been a success, and are not in use at present. Several "spot mills" have been erected and brought into use during the year. This type of mill is becoming popular, and I am of opinion that a number of others will be established in the near future in some of our so-called "cut out" forests.

The war and fluctuation in market values have greatly affected the tin mining industry during the past few months, so much so, that in the whole of the Greenbushes district only one plant has continued working throughout the year. I am pleased to state that the present outlook is much brighter, and several plants will resume operations early in the new year.

Steady progress is being made with the coal mining industry, and plants are being improved generally. Some high class plant is now in course of erection, and others are on order.

Owing to the extent of the district it is practically impossible to keep inspection work well in hand with the ordinary facilities for travelling, so many changes are taking place, new plants being erected, and alterations and additions to existing ones. I know that, in many cases, new or remodelled plants are worked for months before an inspection can be made. In addition to this, there are a number of small units in the agricultural districts which have not been registered, and with the ever-increasing volume of inspection work to be done, I see no prospect of bringing the district up to date unless some assistance is provided. There has been a fair increase in the number of boilers in the district, the majority of which have been transferred from other parts of the State; others are new. Unfortunately only one was built locally. This is to be regretted, as boilers of local manufacture have proved to be equally as good as anything imported.

The inspection of boilers has been carried out as usual, and as many surprise visits, or working inspections, as possible have been made. One very glaring case of neglect, necessitating heavy repairs, occurred, and has been fully reported on. One of the new importations, a locomotive boiler, leaked so badly under test that fairly extensive repairs were required before a certificate could be issued. On the whole the maintenance of boilers has been very fair.

The repair list has again been very heavy, and is likely to continue so, owing to the large percentage of very old boilers in this portion of the State.

The workmen engaged in this line of business are keeping well up to date. Pneumatic tools have been in use for some years, and the "Oxy-Acetylene" plant for cutting and welding has now made its appearance, and fairly good work is being done. When further experience is gained with this class of tool, I anticipate great results for this mode of repairing.

Several accidents have occurred, some minor, others of a serious nature, but fortunately none fatal. All have been inquired into and full reports furnished as soon as possible after the accident occurred. I find, however, that some of the accidents are not reported promptly, and have every

reason to believe that many are not reported at all. Considering the numbers employed in the various industries in this portion of the State, the percentage of accidents is very small.

With engine-drivers everything has worked smoothly. The regulations have been strictly observed, and there have been practically no complaints. The popularity of this employment still continues, and many of the firemen are qualifying for examination, and will present themselves in due course.

It should not be forgotten that many engine-drivers, especially the locomotive men engaged with private companies, are well advanced in years, and some have held certificates for a number of years, and, so far as I know, they have never been examined by a qualified medical man since the granting of certificate. I am of opinion that some system should be adopted of having these drivers examined periodically, as it is essential that at least their eyesight and hearing should be good.

As usual, I have had to work much overtime, and on several holidays, in the endeavour to keep my work up to date, and to avoid serious dislocation of the various industries and the loss of time to employees and owners, and to generally further the interests of this Department.

The prospect for future development in this portion of the State is fairly bright, and I believe the steady increase in all industries will be maintained, and that many additional plants will shortly be required.

Mr. D. F. Booth, Inspector of Machinery in the South-Western district, remarks:—

Inspection of Boilers.—The boilers in the Great Southern Railway district are mostly of the portable type, and are used for farming purposes. I am pleased to say that the owners are getting to be more careful each year that I inspect there. The great fault used to be that, when their chaff-cutting and threshing season was over, the boiler was blown off but not opened up and dried; a little water was usually left in the bottom. Standing in this condition from four to eight months caused very considerable corrosion. Now they have learned to thoroughly dry each boiler, with the result that the useful life has been about doubled. The water in the greater part of this district, Great Southern, is good for boiler purposes, though many of the dams carry a large quantity of suspended clay for weeks after a heavy rain, and when boilers of the locomotive type are not blown down often enough, mud accumulates in the bottom and at the fire-box end of the tubes. This causes fire-box plates to become overheated and bulge, and the tubes to leak. Twenty new boilers were registered by me during the year, and I permanently condemned five boilers, nearly all of which have been out of use for several years and been left out in the weather until they have corroded so much as to become unsafe.

Inspection of Machinery.—I registered 106 new groups, made 486 inspections, and issued Notices regarding to the number of 131. Fully 80 per cent. of new registrations are farmers' chaff-cutting, threshing, and sheep-shearing plants. In several country towns electric light has been installed during the year, a fact which always marks increasing prosperity.

Dangerous Machinery and Accidents to Persons.—The most generally dangerous machine is the chaff cutter. The newer plants are nearly all adequately protected, but many of those which are now being

registered and inspected for the first time are old, and have been in use for several years. Many are not fitted with any kind of guard in front of the feed rollers, and their stopping and reversing gear is so awkwardly placed as to be more a source of danger than of protection. Also in many cases the gear-wheels, which actuate the feed rolls, are not covered or only partially covered. Due to the first of these faults, a young man near Wagin had the whole of his left arm cut up in chaff lengths to within four inches of the shoulder. The plant was unregistered, and therefore had never been inspected. The owners had no knowledge of the law respecting notice of ownership to be sent to this Department. They wish now that they had known, for, besides the painful experience of having such an accident on their farm, the cost of it, under the Employers' Liability Act, was about £300.

Another very sad accident occurred near Greenhills. The chaff cutter was registered and well protected, but the owner, who had great experience as a chaff cutter, and was usually a very careful man, tried to oil the feed gear while the machine was in motion, and in order to do so he took off the gear protector. His shirt sleeve got caught between the gears, drew his arm in, and crushed it off above the elbow. He died of the shock eight days later.

Engine-drivers.—No misdemeanours of engine-drivers have been reported.

I would like to see the Act amended, so that any person in charge of a gas engine of more than 15 h.p. would require to have a special certificate. The ignorance of many who are at present driving such engines is colossal and highly dangerous.

The advertisements in local papers have been the means of bringing in a considerable number of new registrations, but there is still a very large number which I have only heard of in a vague sort of way, and I often find after I come in from a long drive that I have passed close by unregistered plants.

I have travelled by rail 7,853 miles; by road, 2,438 miles; by boat, 336 miles; totalling 10,627 miles. Total number of inspections, 707. Average miles per inspection, 15.03.

Mr. W. Churchill, Inspector of Machinery for Murchison and Yalgoo, Sandstone, and portions of the South-Western district, remarks:—

Inspection of Boilers.—During the year I have carried out 196 thorough inspections of boilers, curiously enough exactly 98 in Murchison and Yalgoo and East Murchison districts and 98 in South-Western district. Fifteen working inspections have been made, fourteen of which were in Murchison and Yalgoo, and one in South-West. In addition many other working inspections have been made when boilers were not steamed up to their authorised working pressure, and consequently no special reports were furnished, as these are not complete working inspections. Hydraulic tests have been made whenever any important repairs or alterations have been effected, and generally every precaution which time at my disposal and remote positions of boilers would permit has been observed to ensure safe and proper working.

Conditions of Boilers and Steam Plant.—In this connection I wish to thank all those in charge of boilers and machinery in these districts for their assistance and co-operation, as it must be recognised that an Inspector's duties can only bring him in touch with boilers and machinery for, at the most, only a few days per year, and for the rest of the

year he must necessarily rely upon the co-operation of those immediately in charge of the plants to faithfully observe all necessary precautions during an Inspector's absence in other districts, and to assist in what must be considered a mutual duty to ensure the safety of all those who have to work where there is machinery.

New Boilers.—During the year 1914 no new boilers have been erected in Murchison and Yalgoo, and only one second-hand imported Cornish boiler erected in East Murchison district. In the South-Western district I have registered seven new boilers.

Operations in various districts.—The number of useful boilers upon the register for Murchison and Yalgoo district on 1st January, 1914, was 291. During the year there have been two boilers transferred outwards and two boilers transferred inwards, and three have been *permanently condemned*, which leaves a total of 288 useful boilers on 31st December, 1914. For East Murchison district (Sandstone locality) there were 56 useful boilers on register on 1st January, 1914, and during the year one imported boiler has been added to this number. There have been no transfers, so the total on register 31st December, 1914, is 57.

During the year my duties have taken me over the following localities: Meekatharra, Cue, Yalgoo, Field's Find, Sandstone, Youanme, Nannine, Midlands, and Suburban and Metropolitan. The total mileage covered was 10,397, being 6,819 by rail, 3,578 by road, practically all of latter upon motor-car, a mileage it would have been impossible to accomplish by horse and trap in anything like the same time, or at same cost, irrespective of saving in my own time when travelling.

Maintenance and Care of Boilers.—With few exceptions, maintenance has been generally good, and endeavours have always been made to impress upon owners the importance of properly caring for boilers when not in use equally as well as when they are in use, and if this precaution was always observed many repair bills would be avoided. Considering the improvised conditions under which some boilers have to work, and the uncertain quality of feed waters which have to be used, I am afraid this State would record some serious accidents if it were not for the system of inspection and the individual caution and advice of Inspectors, whose duties, under these circumstances, call for more than ordinary judgment when taking the responsibility of granting a certificate fixing a safe working pressure for a boiler for some months ahead.

Inspection of Machinery.—In Murchison and Yalgoo district there were 199 groups on register 1st December, 1914, and during the year 26 new groups have been added, whilst 25 groups have been dispersed, leaving total useful groups 200 on 31st December, 1914. In East Murchison district 64 useful groups were on register 1st January, 1914. During the year seven new groups were added, and five groups dispersed, leaving total now 66 on 31st December, 1914. In Murchison and Yalgoo and East Murchison districts 173 inspections have been made, and 173 certificates issued, with 14 notices *re* dangerous machinery. In the South-West I have inspected and issued certificates for 140 groups, have registered 18 new groups, and issued 18 notices concerning dangerous machinery.

It may be interesting to note that in Murchison and Yalgoo districts there are now 33 suction gas

plants of a total of about 2,200 horse-power, ranging in sizes from 17 h.p. to 220 h.p.

In East Murchison district there are now five suction gas plants, with a total of about 557 h.p., the largest of which is 180 h.p. single cylinder.

Of oil engines there are 39 in Murchison and Yalgoo district, with total horse-power of 229, and 19 in East Murchison district, with total 128 h.p. These are mostly in small sizes, from 2½ h.p. to 24 h.p.

Of electric motors there are only 18 in Murchison and Yalgoo district, total h.p. 272½, and only one 8 h.p. in East Murchison district.

So that total horse-power being dealt with in Murchison and Yalgoo and East Murchison districts is now about 3,387, irrespective of steam plants.

Prosecutions.—I have no prosecutions to record during year, as I find generally that owners are willing to give every facility for inspection, as they now recognise that it is for their own benefit, as well as for those employed about machinery, that the work of this Department is necessary.

Accidents.—Until middle of December there were only four accidents of anything like serious nature, and none of these were very serious, but about this time the only fatal accident for the year had to be recorded. Full particulars are not yet to hand, but it appears an engine-driver was on duty when not in a fit state of health, and during faintness he fell against a fly-wheel in some way and was killed.

Mishaps to Machinery.—One peculiar mishap on a winding engine, said to have been cause of an over-wind, was due to chain which drives indicator having jumped off the sprocket wheel and then run back on to wheel in course of a wind. After examination of drive it must be conceded such a thing was possible, but it is a peculiar coincidence this should have remained off just sufficiently long to show a false reading of about 50 feet, the distance by which the driver miscalculated his cage position.

One more case of broken crank shaft of 50 h.p. suction gas engine, which points again to fact that crank shafts usually supplied with this type of engine cannot be considered entirely satisfactory, but it is noticeable that on more recent engines of similar power to older type the dimensions of crank shafts are being increased.

New Plants.—During year again most notable feature has been number of additional suction gas plants erected on Goldfields, and this power is now considered the only power which can be utilised on large scale for mining machinery where quality of water and fuel enter seriously into working costs. Various types of gas producers are being used, and in all cases very great economy is being shown as regards fuel consumption, but in some cases there have been somewhat heavy repair bills which must form a charge against working costs; notwithstanding these, I do not know of any firm contemplating return to steam power. All later types of producers are for burning wood fuel direct, and the class of wood available is very suitable, being of good charcoal forming variety.

Generally the provisions of the Act, so far as these are applicable, have been well observed, but it must be recognised that an Act dealing with Machinery drafted in year 1904 cannot, in all cases, be applicable to machinery designed and erected in 1914, as engineering practice has advanced and changed very considerably in this period. To mention only one direction, I would refer to general adoption of internal

combustion engines as motive power, which are practically not mentioned in the Machinery Act, 1904, except under heading of other than steam power.

Mr. E. P. Lee, Inspector of Machinery in the South-Western district, remarks:—

I have carried out 360 thorough inspections of boilers, and 14 working inspections, for which I have issued 343 ordinary certificates, two working inspection certificates, whilst four certificates were issued under Section 30.

Two boilers were permanently condemned, being of no further use as steam generators, and unfit for repairs. There were 66 repair notices issued, and 30 new registrations, two of which were digesters. This is a very fair increase for the year, but I regret to have to inform you that nearly all these new registrations are not locally made, which I cannot understand, as good boilers can be, and have been, turned out in this State, both in the Metropolitan districts and in Kalgoorlie. It seems to me that the advantages gained by steam users by placing their orders locally cannot be over-estimated, as they are thus enabled to have them supervised by this Department whilst in course of construction by competent officers who, in any case, have to eventually inspect them and issue a certificate before they can be permitted to work under the Act.

The maintenance of boilers generally is still fairly good, with the exception of the agricultural districts, where the boilers are travelled a good deal, chaff-cutting, etc., the result being that they are subjected to various classes of feed water, many of which are detrimental to the life of the boilers. With regard to small boilers of the portable locomotive rectangular firebox type, I would like to draw your attention to the fact that some of these boilers are fitted with disc axles, studded or bolted to the sides of the firebox casing which, I consider, is bad practice for rough hilly country, such as Northam and district. One case of the evil effects of this style of axle has already come under my notice, where the boiler, in being transported from one place to another and while crossing a small creek or surface water drain, the jarr on the bottom of the axle disc drew the three bolts or studs clean away from the sides of the firebox casing, necessitating patches on the sides before boil-

ers could be again used. If buyers would insist on having properly constructed crank axles, they would often save themselves much subsequent trouble. It is somewhat surprising that makers do not adopt this type in the case of all portable boilers.

The inspection of machinery has been carried out as usual, and during the year I have issued certificates on 298 groups of machinery, 32 groups of which are new registrations and, wherever necessary, instructions have been issued to have same duly fenced and guarded.

With respect to the registration of machinery in outlying agricultural districts, etc., I do not think the Act is altogether being complied with, as one often hears of an oil engine, etc., so many miles out that it is altogether out of the question to drive out to these places on the off-chance of securing one or two registrations, the fees for which may amount to 10s. or 15s., and I consider a good solution of the difficulty would be to make it obligatory on machinery agents to advise this Department when they effect a sale.

During the year I have travelled altogether 7,614 miles, 6,247 of which have been by rail, and 1,367 by road; the large area of country I have been over during the year entails a heavy mileage, and the train service in the country districts causes a good deal of inconvenience, which could be overcome if one had a motor car.

There have been no prosecutions during the year, neither have there been any serious accidents for me to report upon. Everything in the districts I have been in having worked fairly smoothly.

With regard to engine-drivers, everything has been satisfactory. I have had several applications for forms from candidates for examination, which were duly supplied to them. With regard to suction gas and oil engine plants, where worked in fair sized units, I am of the opinion that the time has arrived when consideration should be given as to the necessity of drivers of same being duly proved competent by the Board of Examiners and certificated accordingly.

In conclusion, I wish to state that, owing to the bad season in the agricultural districts, there are a good few boilers due for inspection which have not been done this year. The owners, not having any work for them to do, have had the inspections deferred accordingly.

DIVISION VII.

**ANNUAL REPORT OF THE GOVERNMENT ANALYST, CHIEF INSPECTOR OF
EXPLOSIVES, AND AGRICULTURAL CHEMIST FOR 1914.**

To the Secretary for Mines, Perth.

Sir,

I have the honour to submit, for the information of the Hon. the Minister, my nineteenth Annual Report on the duties entrusted to me during the year 1914.

In a review of the year's work it is natural, perhaps, that prominence should be given in the first place to the matters engaging my attention during my visit to Europe, which commenced at the end of the previous year and extended to October last. My visit was unexpectedly prolonged for two months through the outbreak of the war.

The primary object of my visit was, of course, an inquiry into the question of standards for whisky, and as a special report has been issued dealing with this matter, it is not necessary for me to dwell on it at any length now. It engaged the greater part of the attention both of myself and my assistant, Mr. Geary (who accompanied me), during our absence from the State.

Incidentally I was able also to turn my attention to various other matters of importance concerning my work. Besides visiting Scotland and Ireland, I travelled considerably in England, and also spent about six or seven weeks in France, Germany, and Holland. These latter visits gave me an opportunity of inquiring into matters connected with the manufacture of brandy, gin, and wine, and these, again, have been made the subject of a special report to the Pure Foods Advisory Committee under the Health Act, who will deal with it in due course.

I need, therefore, only deal with those questions of interest which have not yet formed the subject of special communications.

EXPLOSIVES.

I had the great benefit after reaching England of meeting H.M. Inspectors of Explosives at the Home Office, and the Chief Inspector Major Cooper-Key, C.B.; R.A., extended to me the greatest courtesy and assistance, and I had the benefit of his advice on several matters connected with my work in this State. He was also good enough to allow me to accompany him on a visit of inspection to several important explosives factories, which proved of great interest and value. Altogether while in England I visited nine leading explosives factories and saw a great deal of various branches of the industry. While in Germany I also visited three large factories, besides paying a most interesting visit to the famous Centralstelle für Wissenschaftlich-technische Untersuchungen, at Neubabelsberg, near Berlin, under the direction of the celebrated Dr. Will. This is a large research establishment maintained in co-operation by a number of explosives factories for the investigation of scientific technical questions connected with their manufacture, and is full of interest. I was

particularly struck with the magnificent installation for experimentally investigating the question of protecting dangerous buildings from lightning, and with the apparatus for testing the burning rates of fuse and for determining velocities of detonation. The whole of the work, however, which was proceeding in this establishment, was fraught with the deepest interest to anyone connected with this important technical industry.

Both in Germany and Great Britain I made a special point of learning all that I could with regard to the methods of testing explosives as to their velocity of detonation and determining the composition of the gases caused by their explosion, and had conferences with the representatives of the principal manufacturing firms in relation to the proposals which I have made for the establishment of a testing station in this State. The object of such a testing station would be to test explosives not only with regard to their safety, but with regard to their efficiency. This is not done anywhere in the world, so far as I am aware, by official departments, but is generally left to private enterprise. I have, however, in previous reports discussed the circumstances which have rendered it advisable for the Government here to turn their attention to the matter, and had an opportunity of a good deal of exchange of views with manufacturers on the subject. Their attitude to the question was not one of opposition, but was rather based on the view that insufficient knowledge was as yet available. They expressed their courteous willingness to co-operate with me in making any investigation which I desired in further pursuing the subject, and I made arrangements for a supply of certain special preparations of explosives and for the conduct of series of tests in conjunction with my own, which would enable some finality to be arrived at.

Unfortunately, the outbreak of the war has seriously interfered with these arrangements, and they must, for the present, remain in abeyance. As soon as a favourable opportunity occurs, the matter will be taken up again and I hope will lead to very useful results.

While in London I also, at the request of the State Mining Engineer, made inquiries into certain proposals which have been made for increased safety in shot firing in mines and quarries, and was able to give him a report on the subject for his guidance.

PATENT MEDICINES.

At the request of the Government and through the courtesy of the Agent General, I was afforded an opportunity soon after my arrival in England to interview the Secretary of the Select Committee on Patent Medicines, which was then concluding its labours at Parliament House, Westminster.

This is a matter of peculiar interest in this State, which has produced the most advanced legislation on the subject as yet devised. The Committee had concluded the taking of evidence and was then preparing its report so that an opportunity could not be afforded me of giving personal testimony before it, but at the request of the Chairman I submitted a short memorandum detailing the progress of legislation which had been made in this State.

I found that the Committee were well informed as to what had been done here, and it was very gratifying at a later date when their report appeared to find that their recommendations followed exactly the lines laid down in Western Australia.

PETROLEUM.

Some time prior to my visit to England the question of the control of petroleum and the introduction of legislation to that end had formed the subject of correspondence between the Perth City Council and the Government, and I was commissioned to make inquiries also on this subject.

Through the courtesy of H.M. Chief Inspector of Explosives and the officers of the London County Council I was enabled to make exhaustive inquiries on the matter, and besides making myself acquainted with the legislation and method of control of kerosene, etc., in England, I was enabled to visit and personally inspect the large depôts for bulk storage of inflammable petroleum oils on the banks of the Thames, and there watch the method of handling and distributing these dangerous goods.

I also visited a large number of garages and depôts, where petrol was stored in populous parts of London, and was much struck by the details of administrative control. I also took advantage of opportunities afforded me of gaining information on this matter at Liverpool and in Hamburg. At the latter place, particularly, the port authorities were most courteous, and by placing a launch at my disposal enabled me to make a thorough inspection of the splendid arrangements which have been established for the storage and distribution of oil in that port.

As the result of my inquiries under this heading, I have been able to make suggestions to the Government for the drafting of a Petroleum Act, which can in itself be a very simple matter, and have also collected the necessary data which will enable me to advise as to the construction of the model by-laws which will be necessary for carrying out the detailed control of such dangerous liquids.

GOVERNMENT LABORATORIES.

I had the privilege while in London of meeting the technical officers of the Local Government Board at Whitehall, of visiting their laboratory, and of conferring with them on certain matters connected with food control, and I also spent two most interesting days inspecting the splendid Government laboratory at Clement's Inn Passage in the Strand.

On another occasion I visited the famous Lawes and Gilbert Experimental Farm at Rothamsted, in Hertfordshire, and saw the laboratories established in connection therewith, and while in Glasgow I saw the magnificent Technical Schools of that city.

There is an incalculable benefit to be derived from seeing establishments of such well-known character, but still more in coming in contact with the distinguished men who have control of these various institutions, and I felt that this was not by any means the

least important part of my visit, while I have in another report referred to the advantage which was derived from my being able to establish myself for chemical investigations in King's College in London, and I can gratefully acknowledge the courtesy and kindness shown to me by the authorities there.

Much of the information thus gleaned cannot be put into concrete form in reports, but will, I trust, gradually make its influence felt in various branches of the work of which I have the control.

At the same time I am very pleased to be able to say—and I am sure it must be very gratifying to the Department to know—that on the whole this State is not behindhand in the equipment of its laboratories or in the standard of the work performed therein.

During my absence in England this Department was conducted jointly by Messrs. C. E. Stacy, as Acting Government Analyst, and T. N. Kirton, as Acting Chief Inspector of Explosives, and I desire to express my appreciation of the way in which these two gentlemen conducted the affairs of the Department under circumstances of exceptional difficulty. Not only did they have an extremely busy time during my absence, but the outbreak of hostilities and the consequent dislocation of ordinary routine caused many unprecedented circumstances to arise in this as in other Departments, and I was very pleased on my return to find the way in which the matters had been dealt with under circumstances where no precedent existed for their guidance.

The dislocation of the explosives trade through the stoppage of all supplies from Germany, the necessity for specially guarding the depôts where large quantities of explosives were concentrated, and the special work entailed by the continual supervision of water supplies were some of the special ways in which the war made its influence felt on the work of my staff.

Throughout the year, too, the work has had to be carried on with a shorthanded staff. The absence of myself and Mr. Geary made a big difference in the working forces of the Department, while a further deprivation was felt through Mr. Southern being told off for special duty. This was in connection with the extended series of investigations which had to be carried out with regard to the preservation of timber by the

POWELLISING PROCESS.

Political controversy over this question and the inquiries arising therefrom have nothing to do with this report, but in connection therewith it was found necessary to establish a temporary laboratory connected with the powellising plant in the south-western parts of this State, and Mr. Southern was deputed to carry on the necessary chemical work.

He was altogether engaged upon these labours for six months, at the end of which time he was seconded for duty with the Australian Expeditionary Forces. The result of his work is embodied in a special report submitted by him before leaving the State, which reflects the highest credit upon him and is of very great importance.

Besides dealing with many questions of more or less technical interest and suggesting lines of future research, it should prove of commercial, as well as technical value. Mr. Southern was able to show such striking practical results in his work that he could claim to have reduced the cost of powellising timber from 16s. 10d. to 4s. per load, representing a credit

saving (on the turnover at the time) of £240 per week; at the same time the number of sleepers which could be treated was increased by 1,500 per week.

In the course of these investigations he carried through altogether 623 analyses of various materials.

PURE FOODS.

The amount of work arising from the enforcement of pure food standards under "The Public Health Act, 1911," has been and is still on the increase, and in fact I have been specially requested by the Commissioner of Public Health to make arrangements for dealing with a large volume of work during the present year.

During 1914, 458 samples were examined as against 308 for the previous year, and the Commissioner estimates that during the next twelve months 2,000 examinations will be necessary.

Each investigation which is carried out only discloses more clearly the necessity of pursuing these examinations with an increase of vigour, and now that all the preliminary work of establishing standards and forming a legal basis for operations has been completed, it has become necessary to institute an extensive campaign for testing.

The only difficulty which I anticipate in the way of fulfilling the wishes of the Health Department in this respect is due to the shortage of staff, but I trust that this need will be met as it arises.

My duties as a member of the Pure Foods Advisory Committee under the Health Act still continue and occupy considerable time and thought.

WORK FOR THE FEDERAL CUSTOMS.

The work performed for the W.A. Branch of the Commonwealth Customs shows a slight falling off as compared with the previous year, being 911 samples as against 1,081.

During the last few months preparations have been begun by the Customs Department for the establishment of a laboratory of their own in this State, and it seems probable that before the conclusion of another year analyses for the Commonwealth will no longer form part of the work of this Department.

I have for some time pointed out that the performance of this work by the State is not remunerative, and in view of the difficulty of obtaining any extension of staff at the present juncture I shall not altogether regret the removal of this branch of work, as it will enable me to turn the energies of the staff into more useful directions, such as the prosecution of analyses on behalf of the Health Department.

AGRICULTURAL WORK.

A falling off is to be reported in connection with this section of my duties; 177 analyses have been carried out as against 243 of the previous year.

It is difficult to account for this change altogether, but probably it is partly the result of modifications in the policy of the Agricultural Department. Doubtless, also, the drought from which the whole State has been suffering has had some considerable effect. A large proportion of the work indeed has been confined to that which is incidental to the exploitation of new water supplies and the determination of changes which have occurred in old sources of water through failure of the rainfall. It is always found that in times of scarcity and depression less use is made of scientific assistance than when money is plentiful and progressive development is proceeding apace.

The pot experiment installation in connection with this laboratory for the investigation of chemical problems connected with agriculture has been practically thrown out of commission during the year through the drought conditions. The practical value of these experiments depends upon their being conducted on a parallel system with those which are made in agricultural areas. The crops obtained by artificial watering at a time of drought like the present do not present any factors of real practical value. An attempt was made as usual to make experimental plantings but the plants all died.

POTASH SUPPLIES.

One very serious question which has arisen as a result of the war in connection with agriculture is the consequent cessation of the supplies of potash salts, these being for years imported almost entirely from Germany, which possesses the only large natural deposits of potash salts hitherto discovered, and thousands of tons have been imported annually into Australia for agricultural purposes.

So serious is the deprivation thus caused that it is a matter which is engaging attention in all parts of the world, but attempts are being made, especially in America, to discover other sources of supply which may replace the German mines. This is a matter of such urgency that shortly after my return from England I presented a memorandum to the Government drawing their attention to the difficulties to be anticipated and urging the necessity for Government action. I understand that partly as a consequence of this memorandum the Government Geologist is giving the matter his earnest attention.

Not only with regard to agriculture does this seriously affect the State but there are so many industries in which potash salts are of primary importance, that their lack cannot fail to be felt in other directions also. In some instances potash salts can be replaced by corresponding salts of sodium but not always with the same advantage.

A notable instance of the difficulties that may arise is to be found in connection with explosives, many of which contain Potassium Nitrate (saltpetre) as one of their principal ingredients. All the explosives used upon our gold mines, for instance, contain this ingredient, and if these mines are to be kept working it has been found necessary to authorise the replacement of Potassium Nitrate by Sodium Nitrate.

In a document published in 1911 entitled "The Composition of Gases caused by Blasting in Mines" I discussed the relative values of these two substances as ingredients for explosives and arrived at the conclusion that Potassium Nitrate was superior in some respects to Sodium Nitrate. Although explosive manufacturers, in some instances, differ from my views on this matter, they have not taken any steps to combat my conclusions, and consequently up to the present time Sodium Nitrate has not been used in the explosives imported into this State.

I have already, however, presented to you a memorandum recognising the necessity for a temporary permit for its employment here as the only alternative to the more serious difficulties which will arise in the gold mining industry, and in consequence the use of Sodium Nitrate will be allowed temporarily through the emergency of the war.

INSPECTION OF LIQUORS.

Examinations made for the State Hotels Department during the year amounted to 71, which is exactly the same as the previous year; but there is nothing in connection with this work which calls for special comment, any investigations beyond routine work having been associated with my visit to Europe,

which is dealt with elsewhere. The number of analyses carried out during this visit amounted to 241.

IMPORTATION OF EXPLOSIVES.

The following tables give full information with regard to the importation of Explosives into the State of Western Australia:—

Importations for 1914.

	Quantities.	Values.
	lbs	£
Gelignite	1,945,428	76,283
Dynamite	464,000	16,345
Blasting Gelatine	153,000	9,093
Gelatine Dynamite	119,500	6,462
Detonators (Number)	2,851,443	4,410
Fuse (Coils)	256,800	4,870
Powder, Blasting	285,740	6,359
Powder, Sporting	2,840	119
Fireworks .. .. .	..	252
Explosives, N.E.I. .. .. .	..	5,360
	..	£129,553

NOTE.—Cartridges and caps previously shown have been omitted from this report.

TABLE II.

Comparison of Importation for the last five years.

	1910.	1911.	1912.	1913.	1914.
	£	£	£	£	£
Nitro-Glycerine Compounds	170,363	143,608	135,006	110,306	108,183
Blasting Powder	7,026	4,090	10,862	5,699	6,359
Sporting Powder	142	546	235	116	119
Fuse	10,723	12,778	3,566	4,732	4,870
Fireworks	413	214	163	243	252
Detonators	5,870	4,796	4,983	2,973	4,410
Explosives, N.E.I.	200	159	84	755	5,360
	£ 194,737	166,191	154,899	124,824	129,553

NOTE.—Cartridges have not been included in this Report.

TABLE III.

Kinds and Quantities of Principal Industrial Explosives imported in 1913-14.

	1913.	1914.
	lbs.	lbs.
Gelignite	2,811,430	1,945,428
Blasting Gelatine	167,000	153,000
Gelatine Dynamite	65,000	119,500
Dynamite	8,000	464,000
Blasting Powder	256,500	285,740
Sporting Powder	1,075	2,840
Total	3,309,005	2,970,508

TABLE IV.

Comparison with other States.

Explosives, etc.	Western Australia.	New South Wales.	Victoria.	Queensland.	South Australia.	Proportion of total for Australia imported into W.A.
	lbs.	lbs.	lbs.	lbs.	lbs.	
Nitro-Glycerine Compounds	2,681,928	1,447,250	1,202,510	982,750	1,008,650	..
Blasting Powder	285,740	1,557,450	397,250	526,700	285,750	..
Sporting Powder	2,840	18,960	86,425	24,625	124,950	..
	2,970,508	3,023,660	1,686,185	1,534,075	1,419,350	27·9%
	£	£	£	£	£	
Fuse	4,870	Not given	2,030	5,475	5,630	..
Detonators	4,410	15,521	3,509	3,253	2,464	..
Explosives, N.E.I.	5,612	30,537	22,010	5,072	1,222	..
	14,892	46,058	27,549	13,800	9,316	13·34%
Total Value of Explosives enumerated	£129,553	144,765	97,692	68,018	60,619	25·87%

It will be seen from the above tables that there is a slight increase in importations as compared with last year, and in consequence the number of tests made of samples shows a corresponding increase, there being 1,873 against 1,655 last year.

TABLE V.

Tests made on Explosives.

	1913.	1914.
Gelignite	1,198	1,238
Fuse	295	347
Gelatine Dynamite	39	61
Blasting Powder	112	91
Dynamite	3	3
Miscellaneous	8	133
Total	1,655	1,873

STORAGE OF EXPLOSIVES.

There have been no new reserves declared, therefore the number and area remain the same as last year, *i.e.*, 49, with an area of 3,023 acres.

Year by year there has appeared in my report a note with regard to the projected removal of the Kalgoorlie Reserve. It seems now as if this item might almost be omitted from my report altogether, as no advancement has been made in connection with the matter.

Some three years ago a new railway line was made to connect with the proposed new site of the abattoirs, and this line still remains unused and without any explosives magazines at its termination. It has never been satisfactorily explained at whose instigation this line was constructed, as it was certainly not done at the request of this Department. It appears to have been put down without reference to any definite proposal for the establishment of the new depot, and neither with my knowledge nor at my request.

The changes which have gone on in the goldfields' population during the last few years are constantly making the possibility of the removal of the magazines more remote, and I think it would be well for some definite pronouncement to be made as to whether the transfer of the depot is seriously contemplated or not. If it is finally decided that the magazines shall remain in their present position, this line might well be raised and utilised in some other direction, as the capital cost of this work is at present quite unremunerative and the material used in construction can only be deteriorating with time.

Matters connected with the main depôt of this State at Fremantle are also not in a very satisfactory condition. It is now three years since first communications were received from the Commonwealth Government that it was intended to take over the area on which this depôt stands, and a portion of the reserve has actually been handed over to them for the purpose of making railway communications. Nothing further, however, of a definite character has

since transpired. No agreement or understanding has been entered into and no definite statement by the Commonwealth as to the area which they require has been made. As the works of the Naval dépôt, however, gradually proceed, it is evident that the time is steadily approaching when the magazines will have to be withdrawn from their present position, and meanwhile the establishment of works of various kinds in close proximity to dangerous buildings introduces a very undesirable element into the conditions under which they have to be controlled. Naturally some considerable notice is required before the removal can take place, as the difficulty of finding a new site is not inconsiderable. Possibly some co-operative scheme can be evolved by which the magazines connected with the Naval dépôt and those from our reserve can be combined upon one site, but all the details of this scheme require to be definitely laid down and accepted before we can proceed further.

In addition to this, the uncertainty interferes with the proper administration of the reserve. It is obviously undesirable to spend much money on maintenance and repairs if they are only to be utilised for a short period.

The difficulties in this direction have been lately increased through the discovery that the landing jetty at the reserve has become seriously damaged through the attacks of the teredo worm. So serious have been the inroads of this pest that I have been obliged to seriously restrict the size of the loads allowed upon the jetty and thus make the whole of the handling of explosives imported into this State more laborious and expensive. The jetty can only be repaired at considerable expense, which is not warranted until the intentions of the Commonwealth are clearly known.

On the reserves throughout the State there are erected 72 magazines, owned by private firms, with a total capacity of 959 tons, also three Government

magazines with a storage capacity of 90 tons, making a total of 1,049 tons storage in 75 magazines. Two of the Government magazines, namely those at Geraldton and Esperance, have been put out of commission during the year as they have been for some time empty and not further required in these districts. The Esperance magazine has already been sold, and endeavours are being made to dispose of that at Geraldton.

In addition to the buildings above enumerated there are 48 magazines, licensed on private property, with a storage capacity of 32 tons.

There has been considerable fluctuation with regard to these buildings during the year, some of the licenses for larger buildings having been cancelled and a number of smaller buildings having been erected.

STORES FOR THE SALE OF EXPLOSIVES.

There were during the year 125 licenses issued to persons for the sale of industrial or sporting explosives and 209 licenses for the sale of fireworks.

INSPECTION WORK.

The exceptional disposition of the staff during the year, through my absence from the State, necessarily caused a considerable restriction in the amount of inspection work which could be carried out, but nevertheless 110 inspections were made and the following centres visited:—Perth, Fremantle, Albany, Mt. Barker, Gnowangerup, Tambellup, Katanning, Kojonup, Wagin, Dumbleyung, Narrogin, Pingelly, Brookton, Darkan, Beverley, York, Northam, Kalgoorlie, Coolgardie, Menzies, Kookynie, Malcolm, Leonora, Morgans, Laverton, Meekatharra, Cue, Day Dawn, Magnet, Sandstone, Youanmi, Yalgoo, Geraldton, Northampton, and Moora. As a result of these inspections the following prosecutions were instituted:—

Date.	Offence.	Penalty.
March 18th, 1914	Storing without a license	Fined £1 19s. 6d. ; £3 13s. costs.
April 28th, 1914..	Overstocking explosives	Fined £2; £1 4s. costs.

It was found necessary to condemn and destroy the following explosives:—

Date.	Locality.	Kind and Quantity.	Remarks.
1914.			
January 22nd	Beenup	45lbs. dynamite	Exudation.
January 31st	Yarloop	25lbs. gunpowder	Wet.
February 2nd	Kirupp	50lbs. gelignite	Exudation and dampness.
March 16th	Albany	100 detonators	Dampness.
March 17th	Wickepin	5lbs. gelignite	Exudation.
March 27th	Fremantle	5lbs. gelignite	Left on railway premises and forwarded to Fremantle for destruction.
April 21st	Jarrahdale	45lbs. gelignite	Separation of Nitrate owing to having been stored in damp place.
April 18th	Greenmount	15lbs. blasting powder	Moisture.
April 16th	Fremantle	40lbs. amberite	Old stock.
May 16th	Sandstone	1,100lbs. gelignite (22 cases)	Low heat test.
May 19th	Youanmi	3,100lbs. gelignite (62 cases)	do.
Do.	do.	125lbs. powder	Damaged by water.
May 21st	Sandstone	200lbs. gelignite (4 cases)	Low heat test.
May 26th	Meekatharra	750lbs. gelignite (15 cases)	do.
August 28th	Fremantle	1,100lbs. gelignite	do.
June 29th	do.	50,000 detonators (lead azide)	At request of owners. Not placed on authorised list.

Once more during the year the amended Explosives Act, which has been in hand for some time, has had to be withheld from Parliament, owing doubtless to the exceptional condition of the session just concluded, but the Act is now complete and ready for presentation, and will be again submitted for the hon. Minister's action this year.

GENERAL ANALYTICAL WORK.

The following tables give a summary of the laboratory work carried out in the Department during the past twelve months:—

Table VI.

General Classification of Analyses.

Explosives	1,873
Spirits	236
Waters	1,233
Soils	32
Fertilisers	107
Rocks	8
Essences	28
Oils	136
Foodstuffs	199
Sewage	491
Wheats and Flours	53
Criminal Investigations	82
Lime	89
Fabrics	97
Vinegar	30
Medicinal Compounds	68
Milk	257
Kerosene, Benzine, Turpentine, etc.	85
Toilet Preparations	15
Hydrometers	13
Matches	2
Miscellaneous	292
Investigations as referred to in previous pages of report—	
Whisky	241
Powellising material	623
Total	6,290

Table VII.

Departments for which work was performed.

Explosives	1,873
Commonwealth—Customs	911
Other Departments	31
Health	700
Mines	5
Public Works	611
Railways	20
Water Supply	1,738
Agricultural	177
Police	92
Private	42
State Hotels and Inspection of	
Liquors	71
Miscellaneous	19
Total	6,290

These show an increase over last year of 1,313. Of course numbers alone do not convey an accurate account of the amount of work of a Department of this kind, but nevertheless the above show that the staff has been exceedingly active, and I should like to draw attention to the value of the work performed, which is not as a rule sufficiently taken into account.

We receive payment from the Commonwealth for the Customs' work performed on their behalf and the cost of the examinations of explosives is largely met by testing fees, etc., which are imposed, but apart from this all work in the above tables is done free of charge, and is quite unremunerative except for such slight returns by way of fines recovered in legal cases.

I have carefully dissected the tables above given and drawn up an estimate of the value of the analyses performed for different departments if they were charged for on a reasonable scale. In devising this scale I have only allowed for what I consider the actual cost of the analyses. The result is interesting. If all these analyses were paid for on a scale rate it would mean a revenue to this Department of over £2,000 per annum on the basis of last year. Of course I realise these only amount to book entries, but nevertheless this amount represents savings effected in the expenditure of other departments through the work performed.

STAFF.

The staff at present consists of one Assistant Government Analyst, one Assistant Inspector of Explosives, six Analysts, in addition to one seconded for military duty with the Expeditionary Forces, three Junior Analysts, three Clerical Staff, two Magazine Keepers, and two Watchmen.

I have already referred to the excellent manner in which my staff carried on the work of the Department during my absence in England, and their zeal and energy have been all that I could wish for.

I beg to acknowledge, with thanks, the assistance rendered to me, from time to time, by the Commissioner of Police and the State Mining Engineer and the officers under their control.

I have, etc.,

E. A. MANN,

Government Analyst, Chief Inspector of
Explosives, and Agricultural Chemist.

DIVISION VIII.

WOODS AND FORESTS DEPARTMENT.

Report by the Acting Inspector General of Forests.

Woods and Forests Department,

Perth, 21st June, 1915.

The Under Secretary for Mines.

Sir,—

I have the honour to submit, for the information of the Hon. the Minister for Mines, a report on the operations of the Woods and Forests Department for the six months ended the 31st December, 1914.

The report has been made out for this period in order that in the future it will be for the calendar year, the same as the Mines Report.

I have, etc.,

C. G. RICHARDSON,

Acting Inspector General of Forests.

REVENUE AND EXPENDITURE.

The following statement shows the revenue and expenditure of the Department since its inception in 1895:—

Year.	Revenue.	Expenditure.
	£ s. d.	£ s. d.
1st January to 31st December, 1895	3,175 5 2	1,108 5 5
1st January to 31st December, 1896	4,838 11 2	2,020 11 5
1st January to 31st December, 1897	12,320 6 4	3,489 14 4
1st January to 31st December, 1898	30,150 6 3	3,356 5 7
1st January to 31st December, 1899	16,999 11 3	2,438 7 5
1st January to 31st December, 1900	15,525 19 2	2,648 11 10
1st January to 31st December, 1901	18,477 16 2	2,747 6 3
1st January to 31st December, 1902	18,752 11 7	4,301 6 1
1st January to 31st December, 1903	20,478 9 1	3,789 3 4
1st January to 31st December, 1904	20,018 19 4	4,192 16 9
1st January to 31st December, 1905	18,479 18 6	5,089 18 6
6 months, 1st January to 30th June, 1906	10,973 18 4	3,385 1 9
1st July, 1906, to 30th June, 1907	22,783 1 5	6,207 15 2
1st July, 1907, to 30th June, 1908	23,498 13 3	8,801 14 3
1st July, 1908, to 30th June, 1909	29,484 3 8	9,030 12 6
1st July, 1909, to 30th June, 1910	31,549 6 11	8,531 0 9
1st July, 1910, to 30th June, 1911	37,477 3 5	8,862 16 8
1st July, 1911, to 30th June, 1912	44,560 10 10	10,469 4 10
1st July, 1912, to 30th June, 1913	48,236 14 0	11,463 2 11
1st July, 1913, to 30th June, 1914	53,038 16 0	12,092 15 3
6 months, 30th June to 31st December, 1914	22,906 0 0	5,468 14 0
	503,726 1 10	119,495 5 0

It will be seen from the above statement that to the 31st December, 1914, the revenue exceeded the expenditure by the large sum of £384,230 16s. 10d.

Revenue and Expenditure for the six months ended 31st December, 1914.

The revenue derived from the forests of the State for the six months ended the 31st December, 1914, amounted to £22,906.

The details of the revenue for the period mentioned are as follows:—

	£
Rents of Timber Leases	4,600
Timber licenses, royalty on timber and sandalwood	15,657
Timber inspection fees	2,649
	£22,906

The total expenditure for the six months ended the 31st December, 1914, amounted to £5,468 14s.

TIMBER IMPORTS.

Through the courtesy of the Collector of Customs, Fremantle, I am enabled to furnish the following return showing the oversea imports of timber for the six months ended the 31st December last:—

Return showing Quantity and Value of Timber imported from Oversea Countries during the Six Months ended 31st December, 1914.

Article and Country whence imported.	Quantity.	Value.
<i>Dressed Timber:</i>	Sup. ft.	£
United Kingdom	9,400	88
Norway	1,260,400	8,087
Sweden	232,800	1,877
Germany	30,400	231
United States of America	373,500	3,375
Total	1,906,500	£13,658
<i>Timber for Boxmaking:</i>		
United Kingdom	17,300	244
Singapore	200	6
Germany	1,000	33
Norway	3,500	31
Total	22,000	£314
<i>Undressed Timber:</i>		
United Kingdom	23,900	353
Norway	172,200	808
Sweden	38,000	312
Straits Settlements	50,200	826
United States of America	6,293,200	41,231
Total	6,577,500	£43,530
Grand Total	8,506,000	£57,502

No details of the inter-State imports for the above-mentioned period are available, but through the courtesy of the Government Statistician I am enabled to give the value of same, viz., £7,050. This sum, added to the oversea shipments, brings the value of the imports up to £64,552.

TIMBER EXPORTS.

The following return, supplied through the courtesy of the Collector of Customs, shows the quantity and value of the timber exported from Western Australia beyond the Commonwealth during the six months ended the 31st December, 1914:—

Return showing Quantity and Value of Timber Exported from Western Australia to Countries beyond the Commonwealth during the Six Months ended 31st December, 1914.

Article and Country to which exported.	Quantity.	Value.
<i>Timber—Undressed (Other):</i>	Sup. ft.	£
United Kingdom	10,360,976	69,308
Ceylon	286,678	1,952
Egypt	7,351	49
India	10,654,130	70,610
New Zealand	4,384,310	29,196
South Africa	22,016,475	151,571
Belgium	180,187	1,201
China	2,582,441	17,764
Germany	83,225	555
Uruguay	667,652	4,518
Total	51,223,425	£346,724
<i>Shafts, Poles, Bars:</i>		
India		£2,059
<i>Logs—Not Sawn, and Spars (Rough):</i>		
Nil.		
Grand Total	51,223,425	348,783

During the period mentioned above the inter-State exports of timber amounted to 25,967,288 super. feet, valued at £171,686, which, added to the oversea shipments, brings the total exports up to 77,190,713 super. feet, valued at £520,469.

MALLET BARK AND SANDALWOOD EXPORTS.

The following return, kindly supplied by the Collector of Customs, shows the quantity and value of the mallet bark and sandalwood exported from Western Australia during the six months ended the 31st December, 1914:—

Return showing Quantity and Value of Mallet Bark and Sandalwood Exported from Western Australia to Countries beyond the Commonwealth of Australia during the Six Months ended 31st December, 1914.

Article and Country to which exported.	Quantity.	Value.
<i>Mallet Bark:</i>	Cwts.	£
United Kingdom	113	46
Belgium	5,256	2,088
Germany	3,256	1,109
Total	8,625	£3,243
<i>Sandalwood:</i>		
Hong Kong	29,797	13,046
India	3,600	1,945
Singapore	3,947	2,471
China	20,993	8,495
Japan	240	162
Total	58,577	£26,119

For the above-mentioned period 3,038 cwt. of mallet bark, valued at £1,383, was shipped to the Eastern States; thus bringing the total value of the exports up to £4,626.

No sandalwood was shipped to the Eastern States during the period under review.

WESTERN



AUSTRALIA.

DEPARTMENT OF MINES.

MINING STATISTICS,

1914.

MINING STATISTICS TO 31st DECEMBER, 1914.

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EXPLANATIONS OF SIGNS AND ABBREVIATIONS.

Gf. Goldfield.
 Mf. Mineral field.
 D. District.
 G.M.L. Gold Mining Lease.
 M.L. Mineral Lease.
 Loc. Location.
 L.C. Lode Claim.
 Q.C. Quartz Claim.
 R.C. Reward Claim.

M.R.C. Mineral Reward Claim.
 M.A. Machinery Area.
 Mach. L. Machinery Lease.
 P.A. Prospecting Area.
 T.A. Tailings Area.
 T.L. Tailings Lease.
 W.R. Water Right.
 S.L. Special License

WESTERN AUSTRALIA.

SUMMARY OF MINERAL PRODUCTS.

GOLD AND OTHER MINERALS PRODUCED DURING 1914, AND THE ESTIMATED VALUE THEREOF, TOGETHER WITH A COMPARISON FOR PREVIOUS YEARS, AND THE TOTAL PRODUCTION TO DATE.

DESCRIPTION OF MINERAL.	1914.		1913.		1912.		1911.		PREVIOUS TO 1911.		TOTAL TO DATE.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
1. ANTIMONY (Exported) statute tons	..	£ ..	..	£ ..	..	£ ..	..	£ ..	47	£ 860	47	£ 860
2. ASBESTOS (Reported) do.	..	..	..	..	..	..	..	..	43	1,754	43	1,754
3. COAL (Reported) do.	319,210	148,684	313,818	153,614	295,079	135,857	249,899	111,154	1,778,158	822,424	2,956,164	1,371,733
4. COPPER { ORE ... (Exported) do.	3,913	33,654	4,339	136,472	9,536	58,688	9,825	33,709	37,767	488,340	65,380	750,863
	INGOT & MATTE (Exported) do.	183	4,520	82	5,891	28	1,136	828	44,409	7,813	486,067	8,934
5. GOLD (Exported and Minted) fine ounces	1,232,977	5,237,353	1,314,043	5,581,701	1,282,658	5,448,385	1,370,867	5,823,075	23,077,600	98,027,412	23,278,145	120,117,926
6. IRONSTONE (Reported) statute tons	..	..	..	..	..	..	..	..	57,830	36,695	57,830	36,695
7. LEAD ORE (Exported) do.	3,554	46,315	3,169	59,002	1,868	22,270	1,549	15,002	33,892	366,189	44,032	508,778
8. LIMESTONE (Reported) do.	..	..	..	..	..	..	..	..	93,706	18,290	93,706	18,290
9. MICA (Exported) do.	4	323	..	..	..	..	..	..	*	304	..	627
10. PIG LEAD (Exported) do.	..	..	..	..	..	..	..	..	684	13,306	684	13,306
11. PYRITIC ORE (Reported) do.	9,759	3,485	10,216	3,658	7,626	2,543	9,939	3,529	..	..	37,540	13,215
12. SCHEELITE (Exported) do.	..	..	..	..	..	..	..	..	4	140	4	140
13. SILVER (Exported) fine ounces	189,837	22,913	188,020	23,420	165,371	19,725	169,043	18,333	2,092,805	249,162	2,805,076	333,553
14. SILVER LEAD ORE ... (Exported) statute tons	..	..	..	..	..	..	..	..	940	8,071	940	8,071
15. TANTALITE (Exported) do.	..	..	..	..	..	..	..	..	18	6,129	18	6,129
16. TIN (ORE AND INGOT) (Exported) do.	363	35,649	484	72,142	651	79,738	495	55,220	11,013	925,357	13,006	1,168,106
17. WOLFRAM (Exported) do.	1	40	1	86	..	..	9	826	3	290	13	1,242
18. GODOLINITE (Reported) do.	..	..	1	112	..	..	..	..	..	..	1	112
19. ZINC (Exported) do.	22	379	..	..	14	217	12	189	115	3,879	163	4,664
20. BISMUTH (Exported) do.	9	635	..	..	..	..	..	..	..	..	9	635
UNENUMERATED ... (Exported)	7	40	..	17	..	8	..	407	..	5,781	..	6,253
TOTAL VALUES ... ..	..	£5,533,990	..	£6,036,115	..	£5,768,567	..	£6,105,853	..	£101,460,450	..	£124,904,975

* Weight not stated.

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 1914.

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.
Gold ... fine ounces	1,232,977	£ 5,237,353	124,507	£ 528,873	249,468	£ 1,059,674	409,706	£ 1,740,320	26,243	£ 111,475	6,258	£ 26,581	210,787	£ 895,367
Copper ... statute tons	183	4,520	6,607	274,671	18,436	1,118,648	..	..	7,509	477,361	6,881	417,487	..	..
Copper Ore ... do	3,913	33,654	..	..	..	..	..	..	3,288	18,680	..	..	..	..
Pyritic Ore ... do	9,759	3,485	..	..	..	..	..	..	..	..	..	..	..	..
Lead ... do	3,554	46,315	25,989	370,106	724	12,134	..	..	..	..	..	..	..	..
Manganese ... do	..	..	..	..	6	27	20	70	..	..	..	..	..	..
Platinum ... fine ounces	..	..	244	2,129	..	..	..	..	..	..	..	..	..	..
Silver ... do	189,837	22,913	2,871,559	307,198	253,964	26,506	13,460	1,540	..	..	3,006	314	599,162	62,085
Silver-Lead Ore ... statute tons	..	..	337,019	2,934,065	..	..	..	..	11,566	96,225	18	215	..	..
Tin ... do	..	..	..	..	2,085	176,197	..	..	..	..	..	..	..	..
Black Tin ... do	363	35,649	2,317	267,130	..	..	..	..	..	..	..	..	..	..
Tin Ore ... do	..	..	..	..	..	..	52	4,921	2,573	259,300	..	..	..	..
Scheelite ... do	..	..	57	5,852	..	..	..	..	..	..	..	..	204	21,498
Wolfram ... do	1/2	40	139	14,438	241	21,764	..	..	47	4,327	..	24	..	..
Zinc (Spelter and Concentrates) ... do	22	379	359,310	1,020,711	..	..	..	..	..	..	..	..	..	..
Antimony (Metal and Ore) ... do	..	..	3	464	..	..	7,600	29,350	..	..	..	..	..	..
Bismuth (Metal and Ore) ... do	9	635	15	2,837	1	282	..	..	6	1,666	..	..	..	..
Alunite ... do	..	..	3,040	12,160	..	..	..	..	..	..	20	40	..	..
Coal ... do	319,012	148,684	10,390,622	3,737,761	1,053,990	416,292	617,536	288,535	60,794	27,853	..	..	2,275,593	1,137,797
Coke ... do	..	..	304,800	213,069	..	..	..	..	..	..	..	..	..	..
Shale (Oil) ... do	..	..	50,049	27,372	..	..	..	..	75	75	..	..	..	..
Iron ... do	..	..	75,150	254,257	..	..	..	..	..	..	..	..	..	..
Iron "Oxide" ... do	..	..	3,144	5,584	..	..	..	..	..	..	..	..	..	..
Ironstone ... do	..	..	..	..	48,090	39,459	..	..	..	..	42,622	37,137	..	..
Lime ... do	..	..	36,207	46,700	..	..	..	..	..	..	..	..	..	..
Limestone ... do	..	..	51,852	11,674	119,805	32,581	..	..	..	..	54,054	16,892	..	..
Molybdenite ... do	..	..	61	11,451	78	38,190	..	..	..	..	6,083	6,691	..	..
Phosphate Rock ... do	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Precious Stones ... do	..	..	..	27,974	..	17,800	..	..	..	..	..	..	..	..
Mica ... do	4	323	..	..	..	..	..	..	..	..	..	..	..	..
N.E.I. ... do	7	40	..	423,244	..	16,726	..	6,482	..	10,076	..	94,974	..	505,284
Total Values ...	..	£5,533,990	..	£10,499,720	..	£2,976,280	..	£2,071,218	..	£1,007,038	..	£600,355	..	£2,622,031

PART I.—GOLD.

TABLE I.

MONTHLY PRODUCTION OF GOLD, IN FINE OUNCES, SHOWING THE QUANTITY REPORTED TO THE MINES DEPARTMENT DURING 1914.

GOLDFIELD.	DISTRICT.	JANUARY.		FEBRUARY.		MARCH.		APRIL.		MAY.		JUNE.		JULY.	
		District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.
Kimberley	...	...	300.00	...	...	...	...	...	...	...	...	...	...	...	...
Pilbara	Marble Bar	502.62	513.45	384.86	839.92	320.03	320.03	318.76	318.76	379.04	379.04	698.24	698.24	367.83	380.93
Do.	Nullagine	10.83	...	455.06	...	...	...	...	...	...	...	...	...	13.10	...
West Pilbara	...	...	135.65	...	90.92	...	75.91	...	...	...	272.23	...	126.42	...	20.74
Ashburton	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Gascoyne	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Peak Hill	...	...	51.37	...	342.29	...	7.48	...	111.96	...	289.50	...	44.19	...	46.69
East Murchison	Lawlers	412.41	...	155.70	...	331.90	...	318.73	...	...	...	...	...	...	...
Do.	Wiluna	506.57	7,176.91	313.26	6,168.87	309.91	5,671.77	206.21	5,713.69	280.66	5,577.90	321.81	4,627.49	372.55	4,163.02
Do.	Black Range	6,257.93	...	5,699.91	...	5,029.96	...	5,188.75	...	5,009.45	...	3,645.31	...	441.91	...
Murchison	Cue	173.47	...	469.50	...	588.90	...	41.77	...	587.25	...	103.52	...	197.74	...
Do.	Meekatharra	6,484.76	9,235.16	5,907.56	8,715.97	7,164.33	10,675.95	7,112.20	9,127.56	7,316.58	8,892.85	6,743.63	9,107.06	6,618.84	9,511.33
Do.	Day Dawn	1,635.01	...	1,383.98	...	1,460.86	...	981.66	...	203.36	...	1,532.02	...	1,816.49	...
Do.	Mt. Magnet	991.92	...	954.93	...	1,461.86	...	991.93	...	785.66	...	727.89	...	878.26	...
Yalgoo	...	...	360.31	...	206.20	...	414.44	...	521.92	...	664.26	...	126.85	...	1,055.00
Mt. Margaret	Mt. Morgans	496.50	...	396.19	...	310.12	...	547.87	...	...	...	...	...	...	...
Do.	Mt. Malcolm	5,262.16	7,327.24	5,061.33	7,041.73	5,576.84	9,059.40	5,059.88	7,388.13	6,212.36	8,074.56	4,936.06	7,124.72	5,936.11	7,654.58
Do.	Mt. Margaret	1,568.58	...	1,584.21	...	3,172.44	...	1,780.38	...	1,491.08	...	1,788.52	...	1,297.91	...
North Coolgardie	Menzies	3,976.66	...	5,019.73	...	4,396.38	...	4,370.91	...	4,701.63	...	4,559.00	...	4,822.02	...
Do.	Ularring	727.95	...	211.33	6,030.02	472.61	...	524.04	6,836.65	815.97	7,204.45	449.59	6,457.90	369.95	6,049.31
Do.	Niagara	596.88	...	458.79	...	399.46	...	937.09	...	543.25	...	652.80	...	560.13	...
Do.	Yerilla	493.74	...	340.17	...	577.36	...	1,004.61	...	1,143.60	...	796.51	...	297.21	...
Broad Arrow	...	...	2,018.17	...	709.62	...	370.04	...	432.58	...	932.90	...	659.21	...	462.96
N.E. Coolgardie	Kanowna	697.82	...	874.78	...	848.25	...	1,048.43	...	691.17	...	644.63	...	709.74	...
Do.	Kurnalpi	56.02	753.84	7.85	882.63	13.89	862.14	14.21	1,062.64	28.77	719.94	97.61	742.24	...	709.74
East Coolgardie	East Coolgardie	54,461.71	...	51,814.30	...	53,206.21	...	56,873.00	...	57,064.20	...	55,464.56	...	59,714.92	...
Do.	Bulong	...	54,461.71	3.75	51,818.05	...	53,206.21	...	56,873.00	374.21	57,438.41	491.72	55,956.28	...	59,714.92
Coolgardie	Coolgardie	1,876.91	...	598.47	...	2,090.10	...	1,543.05	...	971.62	...	972.21	1,378.94	1,313.99	1,394.29
Do.	Kunanalling	116.86	1,993.77	183.26	781.73	263.40	2,353.50	218.36	1,761.41	26.36	997.98	406.73	...	80.30	...
Yilgarn	...	...	6,953.00	...	7,198.36	...	6,859.04	...	9,063.62	...	7,062.97	...	6,886.39	...	6,609.81
Dundas	...	...	1,809.89	...	1,809.68	...	2,146.64	...	2,222.35	...	2,349.97	...	1,906.41	...	2,239.77
Phillips River	...	...	56.03	...	818.81	...	381.88	...	113.53	...	179.60	...	310.21	...	134.18
State generally	...	...	5.47	...	8.38	...	8.04	...	6.36	...	5.71	...	8.34	...	9.12
TOTAL	Fine ounces ...	...	98,997.20	...	93,463.18	...	98,258.28	...	101,554.16	...	101,042.27	...	96,254.96	...	100,156.39
	Sterling value	£420,513		£397,006		£417,375		£431,375		£429,200		£408,865		£425,437	

TABLE I.—Monthly Production of Gold, in Fine Ounces—continued.

GOLDFIELD.	DISTRICT.	AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL FOR 1914.	
		District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.
Kimberley ...	...	...	10·45	...	...	...	8·71	...	...	...	...	...	...
Pilbara ...	Marble Bar ...	37·28	85·91	61·82	154·29	49·03	667·62	71·81	267·81	113·62	551·46	3,304·94	5,177·46
Do. ...	Nullagine ...	48·63	...	92·47	...	618·59	...	196·00	...	437·84	...	1,872·52	1,022·70
West Pilbara ...	...	...	28·11	...	67·24	...	93·78	...	59·75	...	51·95	...	...
Ashburton ...	...	...	...	...	...	...	...	...	...	...	...	...	3·76
Gascoyne ...	...	...	3·76	...	...	...	...	...	...	...	...	...	2,662·62
Peak Hill ...	...	...	1·20	...	80·83	...	378·93	...	511·37	...	736·81	...	...
East Murchison ...	Lawlers ...	215·85	...	255·72	...	634·42	...	441·05	...	583·77	...	4,324·57	...
Do. ...	Wiluna ...	516·52	5,464·68	958·01	6,740·65	775·27	6,614·16	617·24	5,915·47	1,343·28	6,973·85	6,936·34	70,808·46
Do. ...	Black Range	4,732·31	...	5,526·92	...	5,204·47	...	4,857·18	...	5,046·80	...	59,547·55	...
Murchison ...	Cue ...	785·79	...	680·47	...	169·99	...	494·75	...	197·87	...	4,491·02	...
Do. ...	Meekatharra	7,231·87	11,036·87	6,141·33	9,422·54	7,120·01	10,260·64	6,515·86	10,605·82	6,043·10	9,080·67	80,400·07	115,722·42
Do. ...	Day Dawn ...	2,218·28	...	1,920·58	...	2,190·72	...	2,059·21	...	1,524·47	...	18,926·64	...
Do. ...	Mt. Magnet ...	800·93	...	680·16	...	779·92	...	1,536·00	...	1,315·23	...	11,904·69	...
Yalgoo ...	...	...	136·90	...	543·94	...	885·21	...	392·97	...	717·92	...	6,025·92
Mt. Margaret ...	Mt. Morgans	322·44	...	203·95	...	463·89	...	555·42	...	392·75	...	4,880·95	...
Do. ...	Mt. Malcolm	5,346·27	8,588·72	5,645·49	7,733·35	5,457·27	7,598·51	5,953·93	10,269·32	5,623·37	8,932·25	66,071·67	96,792·51
Do. ...	Mt. Margaret	2,920·01	...	1,883·91	...	1,677·35	...	3,759·97	...	2,916·13	...	25,840·49	...
North Coolgardie ...	Menzies ...	5,701·35	...	3,231·95	...	4,598·70	...	4,053·14	...	4,358·05	...	53,789·52	...
Do. ...	Ularring ...	246·57	6,816·76	471·01	4,784·35	429·88	5,655·56	74·55	5,012·57	232·64	5,699·44	5,026·09	72,188·15
Do. ...	Niagara ...	689·57	...	874·33	...	328·55	...	127·82	...	555·75	...	6,724·42	...
Do. ...	Yerilla ...	179·27	...	207·06	...	298·43	...	757·06	...	553·00	...	6,648·02	...
Broad Arrow ...	...	...	795·53	...	305·49	...	628·43	...	685·98	...	1,285·07	...	9,285·98
N.E. Coolgardie ...	Kanowna ...	794·45	842·35	823·49	823·49	524·58	736·87	840·43	880·68	1,062·25	1,117·54	9,560·02	10,134·10
Do. ...	Kurnalpi ...	47·90	...	...	...	212·29	...	40·25	...	55·29	...	574·08	...
East Coolgardie ...	East Coolgardie	60,028·26	60,617·27	57,985·99	58,263·91	59,879·15	59,963·33	58,587·43	58,930·06	55,414·88	55,652·26	680,494·61	682,895·41
Do. ...	Bulong ...	589·01	...	277·92	...	84·18	...	342·63	...	237·38	...	2,400·80	...
Coolgardie ...	Coolgardie ...	1,737·03	2,607·31	1,553·87	1,850·61	1,362·64	1,853·22	1,684·09	1,178·81	1,905·39	2,829·88	17,009·37	20,981·45
Do. ...	Kunanalling	870·28	...	296·74	...	490·58	...	94·72	...	924·49	...	6,972·08	...
Yilgarn ...	...	...	7,438·81	...	7,622·37	...	9,119·93	...	6,660·03	...	7,270·39	...	88,744·72
Dundas ...	...	...	2,063·19	...	2,188·74	...	2,811·50	...	2,632·38	...	2,410·24	...	26,590·76
Phillips River ...	...	...	231·63	...	732·67	...	489·05	...	251·84	...	965·99	...	4,665·42
State generally ...	...	...	84	...	...	...	...	...	68·59	...	23·31	...	144·16
TOTAL	Fine ounces ...	...	106,770·29	...	101,314·47	...	107,765·45	...	104,335·64	...	104,326·90	...	1,214,239·19
	Sterling value	£453,531	£430,357	£457,759	£443,190	£443,152	£5,157,760						

TABLE II.

TOTAL YEARLY PRODUCTION OF GOLD, IN FINE OUNCES, AS REPORTED TO THE MINES DEPARTMENT, TO 31ST DECEMBER, 1914.

GOLDFIELD.	DISTRICT.	1914.		1913.		1912.		1911.		1910.		1909.	
		District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.
Kimberley	...	...	...	...	...	...	...	...	...	...	...	...	...
Pilbara	Marble Bar	3,304.94	453.29	3,845.81	...	3,441.44	271.63	2,346.74	171.45	2,613.40	265.53	2,523.16	134.52
Do.	Nullagine	1,872.52	5,177.46	1,752.40	5,598.21	2,557.67	5,999.11	2,261.34	4,608.08	2,756.54	5,369.94	4,241.33	6,764.49
West Pilbara	...	...	1,022.70	...	1,421.15	...	1,118.20	...	983.17	...	1,483.62	...	1,539.62
Ashburton	...	...	...	...	11.70	...	38.73	...	256.33	...	247.63	...	436.32
Gascoyne	...	...	3.76	...	31.45	...	6.55	...	7.87	...	26.31	...	...
Peak Hill	...	...	2,602.62	...	2,765.59	...	1,861.64	...	1,747.01	...	4,327.02	...	7,918.79
East Murchison	Lawlers	4,324.57	...	4,843.05	...	7,307.72	...	27,193.85	...	45,203.50	...	77,542.23	...
Do.	Wiluna	6,936.34	70,808.46	7,501.11	87,977.47	7,728.33	99,130.78	7,829.83	102,390.79	14,258.17	130,371.21	*	155,908.60
Do.	Black Range	59,547.55	...	75,633.31	...	84,094.73	...	67,367.11	...	70,909.54	...	78,366.37	...
Murchison	Cue	4,491.02	...	6,525.65	...	8,993.26	...	11,455.56	...	9,576.29	...	21,271.13	...
Do.	Meekatharra	80,400.07	115,722.42	72,701.81	122,027.56	50,558.20	105,372.78	54,241.79	119,653.40	50,046.60	124,351.38	50,992.21	133,105.86
Do.	Day Dawn	18,926.64	...	27,126.72	...	28,283.42	...	37,947.41	...	46,474.13	...	44,447.89	...
Do.	Mt. Magnet	11,904.69	...	15,673.38	...	17,537.90	...	16,008.64	...	18,254.36	...	16,394.63	...
Yalgoo	...	...	6,025.92	...	8,163.47	...	6,165.92	...	1,162.04	...	1,332.72	...	1,805.31
Mt. Margaret	Mt. Morgans	4,880.95	...	1,255.47	...	3,438.55	...	5,484.08	...	10,331.24	...	25,722.76	...
Do.	Mt. Malcolm	66,071.07	96,792.51	72,738.73	91,272.70	74,238.81	102,969.60	92,811.29	152,474.39	97,689.68	160,281.18	90,436.33	155,864.99
Do.	Mt. Margaret	25,840.49	...	17,278.50	...	25,242.24	...	54,179.02	...	52,260.26	...	39,705.90	...
North Coolgardie	Menzies	53,789.52	...	44,227.89	...	36,126.25	...	39,062.97	...	40,247.69	...	35,851.38	...
Do.	Ularring	5,026.09	72,188.05	7,710.48	68,526.60	9,526.65	58,270.47	9,472.85	64,759.69	8,669.96	72,747.55	15,286.66	79,398.99
Do.	Niagara	6,724.42	...	6,941.08	...	6,342.67	...	8,423.55	...	12,007.07	...	17,061.87	...
Do.	Yerilla	6,648.02	...	9,647.15	...	6,274.90	...	7,800.32	...	11,822.83	...	11,199.08	...
Broad Arrow	...	...	9,285.98	...	34,739.33	...	13,375.43	...	7,152.73	...	15,481.88	...	17,121.70
N.E. Coolgardie	Kanowna	9,560.02	...	11,133.30	...	11,364.53	...	17,958.07	...	22,203.96	...	23,785.63	...
Do.	Kurnalpi	574.08	10,134.10	1,259.58	12,392.88	2,491.18	13,855.71	1,596.68	19,554.75	823.31	23,027.27	1,676.75	25,462.38
East Coolgardie	East Coolgardie	680,494.61	682,895.41	719,323.42	719,928.72	755,368.56	756,795.14	775,050.60	776,493.74	777,893.88	778,479.54	896,900.15	899,289.27
Do.	Bulong	2,400.80	...	605.30	...	1,426.58	...	1,443.14	...	585.66	...	2,389.12	...
Coolgardie	Coolgardie	17,009.37	20,981.45	28,407.27	31,891.49	37,246.77	42,181.59	28,982.04	33,753.71	31,928.00	37,911.04	28,382.62	34,134.90
Do.	Kunanalling	3,972.08	...	3,484.22	...	4,934.82	...	4,771.67	...	5,983.04	...	5,752.28	...
Yilgarn	...	...	88,744.72	...	82,333.96	...	30,675.40	...	18,811.40	...	27,857.93	...	20,909.12
Dundas	...	...	26,590.76	...	27,039.47	...	25,314.35	...	28,989.86	...	29,627.34	...	29,549.27
Phillips River	...	...	4,665.42	...	2,788.47	...	4,201.36	...	5,656.54	...	8,194.90	...	6,713.52
† Donnybrook	...	...	...	...	...	...	...	...	...	...	...	...	...
State generally	...	...	144.16	...	178.60	...	240.40	...	359.99	...	847.41	...	348.09
* TOTAL	Fine Ounces	...	1,214,239.19	...	1,299,088.82	...	1,267,844.79	...	1,338,986.94	...	1,422,231.40	...	1,576,405.74
	Sterling Value	...	£5,157,760	...	£5,518,179	...	£5,385,462	...	£5,687,655	...	£6,041,254	...	£6,696,146

* Previous to 1st March, 1910, included in Lawlers District. † Abolished 4th March, 1908.

TABLE II.—Total Yearly Production of Gold, in Fine Ounces, etc.—continued.

GOLDFIELD.	DISTRICT.	1908.		1907.		1906.		1905.		PREVIOUS TO 1905.		TOTAL TO DECEMBER 31, 1914.	
		District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.
Kimberley ...	...	...	150.16	...	336.57	...	165.72	...	496.14	...	15,021.03	...	17,466.04
Pilbara ...	Marble Bar ...	3,179.76	6,965.61	5,856.44	10,042.96	2,256.97	5,711.90	4,534.25	11,473.83	73,431.35	109,978.29	107,334.26	177,689.88
Do. ...	Nullagine ...	3,785.85	...	4,186.52	...	3,454.93	...	6,939.58	...	36,546.94	...	70,355.62	177,689.88
West Pilbara ...	...	...	1,005.60	...	464.08	...	749.16	...	801.14	...	14,457.39	...	25,045.83
Ashburton ...	...	...	161.71	...	143.01	...	278.24	...	207.53	...	7,095.54	...	8,876.74
Gascoyne ...	...	...	...	...	...	...	...	...	...	...	505.27	...	581.21
Peak Hill ...	...	...	7,980.10	...	8,111.14	...	2,008.20	...	13,586.87	...	190,772.77	...	243,681.75
East Murchison ...	Lawlers ...	72,109.75	...	61,259.79	...	60,351.20	...	68,232.52	...	452,520.87	...	880,889.07	...
Do. ...	Wiluna ...	*	144,792.31	*	119,207.31	*	95,771.49	*	84,926.28	*	464,793.62	...	1,556,078.32
Do. ...	Black Range ...	72,682.56	...	57,947.52	...	35,420.29	...	16,693.76	...	12,272.75	...	44,253.78	...
Murchison ...	Cue ...	24,702.50	...	25,878.80	...	18,337.11	...	15,125.05	...	179,393.13	...	630,935.47	...
Do. ...	Meekatharra ...	38,820.52	157,848.40	31,792.41	169,397.46	26,572.08	182,395.82	18,549.17	206,734.88	164,277.88	1,131,594.34	638,952.74	2,568,204.30
Do. ...	Day Dawn ...	84,422.44	...	101,591.06	...	124,047.58	...	161,507.28	...	562,138.10	...	1,236,912.67	...
Do. ...	Mt. Magnet ...	9,902.94	...	10,135.19	...	13,439.05	...	11,553.38	...	225,785.23	...	366,589.39	...
Yalgoo ...	...	...	551.03	...	4,371.38	...	4,450.19	...	4,742.77	...	50,769.15	...	89,539.90
Mt. Margaret ...	Mt. Morgans ...	28,912.13	...	28,755.18	...	30,206.54	...	35,130.45	...	302,341.71	...	476,459.06	...
Do. ...	Mt. Malcolm ...	86,018.61	153,597.15	81,709.00	169,466.07	94,095.06	166,258.94	96,644.33	188,712.21	473,784.50	988,555.70	1,326,287.41	2,426,245.44
Do. ...	Mt. Margaret ...	38,666.41	...	59,001.89	...	41,957.34	...	56,937.43	...	212,429.49	...	623,498.97	...
North Coolgardie ...	Menzies ...	37,023.37	...	37,353.24	...	33,237.86	...	41,895.33	...	411,043.45	...	809,558.35	...
Do. ...	Ularring ...	21,598.97	91,251.59	19,072.73	86,790.67	25,210.13	110,957.04	43,387.07	148,771.00	110,715.27	912,684.06	275,676.86	1,766,345.71
Do. ...	Niagara ...	21,477.90	...	18,881.94	...	37,418.89	...	45,520.17	...	312,789.35	...	493,588.91	...
Do. ...	Yerilla ...	11,151.35	...	11,782.76	...	15,090.16	...	17,968.43	...	78,135.99	...	187,520.99	...
Broad Arrow ...	...	...	18,429.97	...	21,907.18	...	21,510.61	...	18,583.66	...	225,116.03	...	402,704.50
N.E. Coolgardie ...	Kanowna ...	26,355.22	...	29,244.99	...	37,267.87	...	42,341.66	...	427,720.56	...	658,935.81	...
Do. ...	Kurnalpi ...	717.50	27,072.72	1,952.97	31,197.96	830.87	38,098.74	832.72	43,174.38	14,903.92	442,624.48	27,659.56	686,595.37
East Coolgardie ...	East Coolgardie ...	888,415.37	890,772.70	937,238.61	941,170.94	989,357.24	995,831.87	997,193.02	1,006,965.90	6,192,065.57	6,318,585.85	14,609,301.03	14,767,209.08
Do. ...	Bulong ...	2,357.33	...	3,932.33	...	6,474.63	...	9,772.88	...	126,520.28	...	157,908.05	...
Coolgardie ...	Coolgardie ...	32,820.61	40,029.39	53,029.44	60,810.37	55,771.11	64,030.18	54,499.04	63,664.27	566,882.25	696,389.68	934,958.52	1,125,778.07
Do. ...	Kunanalling ...	7,208.78	...	7,780.93	...	8,259.07	...	9,165.23	...	129,507.43	...	190,819.55	...
Yilgarn ...	...	...	22,162.87	...	19,291.98	...	23,546.75	...	19,291.42	...	225,223.62	...	578,849.17
Dundas ...	...	...	28,643.63	...	23,602.23	...	20,434.84	...	25,960.95	...	249,222.99	...	514,975.69
Phillips River ...	...	...	4,404.69	...	4,313.87	...	2,779.89	...	2,563.26	...	19,211.21	...	65,493.13
†Donnybrook ...	...	...	...	...	...	...	...	...	...	...	841.76	...	841.76
State generally ...	...	...	271.13	...	1,367.70	...	1,315.71	...	...	...	1,389.30	...	6,462.49
TOTAL	Fine Ounces ...	...	1,596,090.76	...	1,671,992.88	...	1,736,295.29	...	1,840,656.49	...	12,064,832.08	...	27,028,664.38
	Sterling Value	£6,779,763		£7,102,174		£7,375,314		£7,818,612		£51,248,149		£114,810,468	

* Previous to March, 1910, included in Lawlers District.

† 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 1914.

GOLDFIELD.	DISTRICT.	DATE OF PROCLAMATION OF GOLDFIELD.				AREA IN SQUARE MILES.		LEASES IN FORCE.		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				30								10
Pilbara	{ Marble Bar Nullagine }	1-10-88	1-10-88	1-3-07	1-3-07	32,696	25,809	26	265	55	1	8			39	60		26
West Pilbara		20-9-95	1-11-95	1-3-07	1-3-07	10,843		5	48	35	2	8			7	18		17
Ashburton		11-12-90	11-12-90	18-10-01	14-10-01	14,230												15
Gascoyne		25-6-97	15-4-97	18-10-01	14-10-01	5,313												5
Peak Hill		19-3-97	1-4-97	13-11-14	1-12-14	24,000		14	159	40	2	13	3		11	10		3
East Murchison	{ Lawlers Wiluna Black Range Cue }	28-6-95	28-6-95	1-11-12	1-1-13	28,746	9,379	20	233	148	5	41	8	3	56	55		12
Murchison	{ Meekatharra Day Dawn Mt. Magnet }	24-9-91	24-9-91	28-11-13	1-1-14	25,474	10,496	32	535	95	14	30	22	5	67	48		1
Yalgoo		8-2-95	23-1-95	1-3-07	1-3-07	18,833	8,871	29	321	70	4	21			53	54		7
Mt. Margaret	{ Mt. Morgans Mt. Malcolm Mt. Margaret }	12-3-97	1-4-97	1-3-07	1-3-07	44,860	8,593	29	321	70	4	21			53	54		6
North Coolgardie	{ Menzies Ularring Niagara Yerilla }	28-6-95	28-6-95	10-10-13	1-11-13	26,116	12,250	94	1,227	206	31	50	19	4	342	448		22
Broad Arrow		17-11-96	20-11-96	8-6-06	1-7-06	1,038	896	44	477	60	12	22	13	2	140	159		13
North-East Coolgardie	{ Mt. Magnet }	8-2-95	23-1-95	1-3-07	1-3-07	18,833	3,735	42	381	70	10	12		1	75	75		7
East Coolgardie	{ Mt. Margaret }	12-3-97	1-4-97	1-3-07	1-3-07	44,860	1,637	8	158	60	7	32	18	2	28	29		8
Coolgardie	{ Mt. Malcolm Mt. Margaret }	12-3-97	1-4-97	1-3-07	1-3-07	44,860	3,330	79	1,462	162	22	47	16	4	249	345		28
Yilgarn	{ Mt. Margaret }	12-3-97	1-4-97	1-3-07	1-3-07	44,860	39,893	70	1,197	104	23	40	11	1	176	187		14
Dundas	{ Menzies Ularring Niagara Yerilla }	28-6-95	28-6-95	10-10-13	1-11-13	26,116	6,805	50	730	115	21	81	5	2	207	267		11
Phillips River	{ Ularring Niagara Yerilla }	28-6-95	28-6-95	10-10-13	1-11-13	26,116	3,093	24	299	55	6	41	5	2	63	80		7
State generally							688	14	197	60	7	32	2	2	73	85		16
							15,530	29	400	45	5	28	1	1	156	159		33
							1,038	43	610	70	15	15	4	2	79	132		68
	{ Kanowna Kurnalpi }	20-3-96	15-4-96	27-3-08	1-4-08	20,604	1,094	31	381	138	10	43			75	101		15
	{ East Coolgardie Bulong }	21-9-94	1-10-94	27-3-08	1-4-08	1,800	19,510	5	47	5	1				10	10		6
	{ Coolgardie Kunanalling }	6-4-94	6-4-94	1-3-07	1-3-07	11,702	810	155	2,140	630	330	220	184	120	2,046	2,851		12
							990	14	241	30	2	7			49	39		6
							9,384	55	758	263	14	119			162	228		3
							2,318	17	221	85	4	42			48	56		1
							17,478	153	2,932	192	27	94	9	5	453	431		
							11,430	50	596	100	19	58	15	3	92	124		
							5,300	12	186	45	2	6			8	14		
															3			
Total						334,296		1,282	18,440	3,224	621	1,207	347	194	5,134	6,588		388

TABLE III.—Return showing for the respective Goldfields and Districts, etc.—continued.

Goldfield.	District.	1914 GOLD AND SILVER YIELD—DISTRICTS.						1914 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	..	...	...	...	...	...	...	453·29	...	...	...	453·29	...
Pilbara	.. Marble Bar ..	471·00	15·62	2,976·00	2,818·32	3,304·94	...	}	582·52	15·62	4,649·75	4,579·32	5,177·46	...
Do.	.. Nullagine ..	111·52	...	1,673·75	1,761·00	1,872·52	...		91·91	...	852·90	930·79	1,022·70	...
West Pilbara	}	3·76	3·76	1,637·20
Ashburton		54·94	9·98	2,265·25	2,537·70	2,602·62	...
Gascoyne	}	6·71	2,366·99	145,999·25	68,434·76	70,808·46	1,982·56
Peak Hill		369·89	2,778·46	196,044·44	112,574·07	115,722·42	4,392·25
East Murchison	.. Lawlers ..	2·41	55·65	6,323·75	4,266·51	4,324·57	6·47	}	...	201·24	6,753·80	5,824·68	6,025·92	...
Do.	.. Wiluna	15,099·50	6,936·34	6,936·34	46·82		308·15	666·89	205,426·00	95,817·47	96,792·51	5,749·17
Do.	.. Black Range ..	4·30	2,311·34	124,576·00	57,231·91	59,547·55	1,929·27	}	51·55	79·05	100,294·42	72,057·45	72,188·05	1,341·66
Murchison	.. Cue	31·07	6,830·60	4,459·95	4,491·02	...		8·03	308·34	27,394·65	8,969·61	9,285·98	193·00
Do.	.. Meekatharra ..	261·82	585·07	140,361·90	79,553·18	80,400·07	1,341·85	}	63·94	140·04	15,858·36	9,930·12	10,134·10	...
Do.	.. Day Dawn ..	28·53	593·47	40,699·50	18,304·64	18,926·64	3,050·40		139·61	1,699·66	1,691,671·39	681,056·14	682,895·41	92,066·33
Do.	.. Mt. Magnet ..	79·54	1,568·85	8,152·44	10,256·30	11,904·69	...	}	412·66	229·87	37,285·75	20,338·92	20,981·45	29·41
Yalgoo	30·28	211,453·90	88,714·44	88,744·72	4,987·22
Mt. Margaret	.. Mt. Morgans ..	136·49	...	15,992·00	4,744·46	4,880·95	...	}	11·85	497·55	53,652·25	26,081·36	26,590·76	...
Do.	.. Mt. Malcolm ..	127·82	361·89	149,057·25	65,581·36	66,071·07	5,281·02		2,494·32	4,665·42	4,665·42	51·01
Do.	.. Mt. Margaret ..	43·84	305·00	40,376·75	25,491·65	25,840·49	468·15	}	...	...	144·16	144·16	1,943·75
North Coolgardie	.. Menzies ..	5·11	48·92	68,486·24	53,735·49	53,789·52	1,259·85		2,558·81	9,023·97	2,702,096·43	1,202,656·41	1,214,239·19	114,378·56
Do.	.. Ularring ..	...	2·02	6,126·00	5,024·07	5,026·09	...	...	...	...	...	...	...
Do.	.. Niagara ..	46·44	...	17,532·57	6,677·98	6,724·42	79·24	...	...	...	...	...	...
Do.	.. Yerrilla ..	...	28·11	8,149·61	6,619·91	6,648·02	2·57	...	...	...	...	...	...
Broad Arrow	..	...	...	...	...	...	...	...	...	...	...	...	...
N.E. Coolgardie	.. Kanowna ..	10·26	48·32	15,807·86	9,501·44	9,560·02	...	...	...	...	...	...	...
Do.	.. Kurnalpi ..	53·68	91·72	50·50	428·68	574·08	...	...	...	...	...	...	...
East Coolgardie	.. E. Coolgardie ..	139·61	1,665·91	1,682,395·89	678,689·09	680,494·61	92,066·33	...	...	...	...	...	...
Do.	.. Bulong ..	...	33·75	9,275·50	2,367·05	2,400·80	...	...	...	...	...	...	...
Coolgardie	.. Coolgardie ..	357·91	222·23	33,396·25	16,429·23	17,009·37	2·41	...	...	...	...	...	...
Do.	.. Kunanalling ..	54·75	7·64	3,889·50	3,909·69	3,972·08	27·00	...	...	...	...	...	...
Yilgarn	..	...	...	...	...	...	...	...	...	...	...	...	...
Dundas	..	...	...	...	...	...	...	...	...	...	...	...	...
Phillips River	..	...	...	...	...	...	...	...	...	...	...	...	...
State generally	..	...	...	...	...	...	...	...	...	...	...	...	...
Total for 1914	..	...	...	...	...	...	...	2,558·81	9,023·97	2,702,096·43	1,202,656·41	1,214,239·19	114,378·56

*By-product in the treatment of auriferous ore.

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 ..	..	...	...	...	...	...	...	3,338.79	...	17,597.50	14,127.25	17,466.04	...
Pilbara ..	Marble Bar ..	11,110.45	3,242.53	61,391.33	92,981.28	107,334.26	574.01	} 16,913.20	} 3,614.72	} 98,279.57	} 157,161.96	} 177,689.88	} 574.01
Do. ..	Nullagine ..	5,802.75	372.19	36,888.24	64,180.68	70,355.62	...						
West Pilbara ..	..	...	...	...	...	...	...	} 5,145.23	} 244.17	} 17,266.21	} 19,656.43	} 25,045.83	} 314.94
Ashburton ..	..	...	...	...	...	...	...
Gascoyne ..	..	...	...	...	...	...	...	} 8,561.10	} 315.64	} ..	} ..	} 8,876.74	} 1,799.22
Peak Hill ..	..	...	...	...	...	...	...
East Murchison ..	Lawlers ..	5,604.65	6,042.27	1,951,394.99	869,242.15	880,889.07	24,803.24	} 7,135.12	} 19,006.32	} 3,008,604.95	} 1,529,936.88	} 1,556,078.32	} 37,528.70
Do. ..	Wiluna ..	90.79	188.98	95,955.25	43,974.01	44,253.78	67.11						
Do. ..	Black Range ..	1,439.68	12,775.07	961,254.71	616,720.72	630,935.47	12,658.35	} 14,425.07	} 28,599.65	} 3,544,199.66	} 2,525,179.58	} 2,568,204.30	} 165,508.10
Murchison ..	Cue ..	964.95	3,957.46	364,374.30	320,827.09	325,749.50	400.11						
Do. ..	Meekatharra ..	9,504.85	8,698.82	858,304.84	620,749.07	638,952.74	3,320.88	} 1,310.92	} 1,444.10	} 125,545.64	} 86,784.88	} 89,539.90	} 3.30
Do. ..	Day Dawn ..	2,254.83	4,334.02	1,828,899.58	1,230,323.82	1,236,912.67	160,654.68						
Do. ..	Mt. Magnet ..	1,700.44	11,609.35	492,620.94	353,279.60	366,589.39	1,132.43	} 7,160.61	} 13,642.95	} 4,323,223.42	} 2,405,441.88	} 2,426,245.44	} 87,998.08
Yalgoo ..	..	...	...	...	...	...	...
Mt. Margaret ..	Mt. Morgans ..	1,697.85	3,297.04	806,963.66	471,464.17	476,459.06	5,758.43	} 3,647.56	} 12,636.78	} 2,265,178.42	} 1,750,061.37	} 1,766,345.71	} 24,083.38
Do. ..	Mt. Malcolm ..	2,326.68	6,469.16	2,403,633.38	1,317,491.57	1,326,287.41	49,435.83						
Do. ..	Mt. Margaret ..	3,136.08	3,876.75	1,112,626.38	616,486.14	623,498.97	32,803.82	} 18,707.14	} 4,543.36	} 667,726.05	} 379,454.00	} 402,704.50	} 1,416.56
North Coolgardie ..	Menzies ..	972.08	2,668.61	897,526.72	805,918.26	809,558.95	12,984.01						
Do. ..	Ularring ..	21.46	1,113.72	272,358.99	274,541.68	275,676.86	5,432.91	} 116,319.72	} 14,720.78	} 890,300.29	} 555,554.87	} 686,595.37	} 2,530.03
Do. ..	Niagara ..	1,417.34	1,305.76	890,044.29	490,865.81	493,588.91	5,603.42						
Do. ..	Yerilla ..	1,236.68	7,548.69	205,248.42	178,735.62	187,520.99	63.04	} 52,865.58	} 39,406.33	} 21,447,642.02	} 14,674,937.17	} 14,767,209.08	} 1,144,369.89
Broad Arrow ..	..	...	...	...	...	...	...
N.E. Coolgardie ..	Kanowna ..	104,343.41	10,701.02	885,246.08	543,891.38	658,935.81	2,518.81	} 8,725.49	} 13,327.76	} 1,689,201.95	} 1,103,724.82	} 1,125,778.07	} 811.69
Do. ..	Kurnalpi ..	11,976.31	4,019.76	5,054.21	11,663.49	27,659.56	11.22						
East Coolgardie ..	E. Coolgardie ..	26,361.43	24,628.21	21,304,981.18	14,558,311.39	14,609,301.03	1,144,369.89	} 77.74	} 1,312.00	} 1,265,056.50	} 577,459.43	} 578,849.17	} 11,608.40
Do. ..	Bulong ..	26,504.15	14,778.12	142,660.84	116,625.78	157,908.05	...						
Coolgardie ..	Coolgardie ..	8,171.81	8,389.72	1,441,771.98	918,396.99	934,958.52	763.02	} 2,027.12	} 8,920.84	} 714,915.30	} 504,027.73	} 514,975.69	} 34,948.22
Do. ..	Kunanalling ..	553.68	4,938.04	247,429.97	185,327.83	190,819.55	48.67						
Yilgarn ..	..	...	...	...	...	...	...	} 472.20	} 775.33	} 76,329.83	} 64,245.60	} 65,493.13	} 15,233.22
Dundas ..	..	...	...	...	...	...	...
Phillips River ..	..	...	...	...	...	...	...	} 23.24	} ..	} 1,653.30	} 818.52	} 841.76	} ..
† Donnybrook ..	..	...	...	...	...	...	...
State generally	} 124.89	} 155.90	} 27.00	} 6,181.70	} 6,462.49	} 6,919.04
Total to 31-12-1914						

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* By-product in the treatment of auriferous ore. † Abolished 4th March, 1908.

TABLE IV.

PRODUCTION OF GOLD AND SILVER FROM ALL SOURCES, SHOWING IN FINE OUNCES THE OUTPUT AS REPORTED TO THE MINES DEPARTMENT DURING 1914, AND THE TOTAL PRODUCTION TO DATE.

Kimberley Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Hall's Creek..	..	Voided leases .. ..	..	..	..	..	..	..	423-00	477-76	..
Do.	Sundry claims .. ..	..	..	..	..	..	..	94-55	62-68	..	
Mt. Dockerell	..	Voided leases .. ..	..	..	..	..	..	..	44-00	435-93	..
Ruby Creek	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	453-29	..	..	..	..	..	3,338-79	..	..
		Total	453-29	..	..	..	..	..	3,338-79	..	17,597-50
											14,127-25	

Pilbara Goldfield.

MARBLE BAR DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Bamboo Creek	733	Bamboo Queen .. ..	..	..	35-00	68-83	..	..	..	96-25	180-71	..
Do. ..	(718)	Bamboo Revenue .. ..	..	..	..	..	..	..	392-26	84-50	413-94	..
Do. ..	777	Blue Bell .. ..	..	..	68-75	38-85	..	..	..	68-75	38-85	..
Do. ..	732	Bonnie Doon .. ..	..	..	636-75	471-97	..	..	..	786-75	581-06	..

Do.	712	Bonnie Dundee		52.75	53.06			52.75	53.06	
Do.	695	Bulletin			19.89			397.00	1,141.68	
Do.	(770)	Cave		24.00	16.48			24.00	16.48	
Do.	748	Federation		207.50	228.59			239.25	262.80	
Do.	(775)	Hidden Treasure						18.00	19.24	
Do.	707	Kitchener		66.75	161.72			277.25	957.12	
Do.	740	Mount Prophecy		72.00	44.50			153.00	82.65	
Do.	751	Mt. Prophecy North		95.50	47.26			95.50	47.26	
Do.	(750)	Rising Sun		7.00	7.08			7.00	7.08	
Do.	782	Wagtail		27.75	43.38			27.75	43.38	
Do.		Voided leases					62.35	11,361.75	18,672.88	
Do.		Sundry claims		104.75	72.17		307.83	350.75	657.11	
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						135.00	316.31	
Do.		Sundry claims						2.75	9.22	
Lalla Rookh		Voided leases						224.50	2,186.65	574.01
Do.		Sundry claims						6,308.00	5,530.86	
Marble Bar	(696)	Franklin						645.00	684.73	
Do.	768	Homeward Bound	6.17	54.00	50.00		6.17	120.00	144.73	
Do.	694	Jo Jo		91.00	40.50			1,408.50	1,596.41	
Do.	(766)	Last Chance						37.75	64.44	
Do.	(735)	Nabob						290.00	354.45	
Do.	762	True Blue		10.75	15.67			80.75	156.21	
Do.	722	Viking		134.50	149.83			728.00	680.65	
Do.	780	Yorkshire Lass		44.25	79.30			44.25	79.30	
Do.		Voided leases					141.73	14,258.70	19,109.89	
Do.		Sundry claims		298.50	210.73		38.68	126.22	3,495.73	
North Pole		Voided leases						474.00	340.75	
North Shaw		Voided leases					7.53	351.45	674.72	
Do.		Sundry claims						567.06		
Sharks		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						1,438.50	1,739.44	
Do.		Sundry claims						64.65	639.25	797.44
Warrawoona	604	(Klondyke Boulder)						1,946.69	2,585.67	
Do.	604	Klondyke Boulder G.M. Co., Ltd.		788.00	726.76			1,194.00	1,177.86	
Do.	627	Klondyke Queen					3.80	462.25	603.78	
Do.		Voided leases					13.19	6,327.86	13,679.02	
Do.		Sundry claims					44.30	362.50	1,123.04	2,157.33
Western Shaw		Voided leases						1,222.50	957.80	
Do.		Sundry claims					12.52	67.47		

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Pilbara Goldfield—continued.

MARBLE BAR DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Wyman's Well	744	Euro	..	..	126.50	181.30	..	..	..	193.00	219.78	..
Do.	..	Voided leases	..	..	..	..	..	..	33.55	115.04	493.98	..
Do.	..	Sundry claims	..	..	..	..	..	..	16.72	334.86	525.67	..
Yandicoogina	724	Thelma	..	..	30.00	90.45	..	..	..	68.70	226.24	..
Do.	..	Voided leases	..	..	..	..	..	..	140.76	2,664.50	5,597.99	..
Do.	..	Sundry claims	..	..	..	..	..	..	238.35	103.75	120.34	..
		<i>From District generally:—</i>										
		Sundry parcels treated at:										
		Various Works	..	..	..	..	..	..	10,812.08	226.50	237.95	1,204.91
		Reported by Banks and Gold Dealers	471.00	9.45	..	..	..	..	..	..	..	..
		Total	471.00	15.62	2,976.00	2,818.32	..	11,110.45	3,242.53	61,391.33	92,981.28	574.01

NULLAGINE DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Eastern Creek	180L	Crescent	..	..	..	..	..	..	..	700.75	1,157.53	..
Do.	176L	(Doherty Reward)	..	..	..	..	..	..	..	142.25	171.43	..
Do.	176L	Doherty Reward	..	..	200.00	421.35	..	..	..	200.00	421.35	..
Do.	176L, (177L)	(Doherty Reward leases)	..	..	..	..	..	..	..	219.00	1,007.68	..
Do.	182L	Morning Star	..	..	..	..	..	..	4.19	367.00	834.03	..
Do.	205L	Rose	..	..	20.00	23.25	..	..	..	20.00	23.25	..
Do.	178L	Shamrock	..	..	..	..	..	..	4.00	350.25	590.47	..
Do.	..	Voided leases	..	..	..	..	..	..	..	267.50	214.00	..
Do.	..	Sundry claims	..	..	10.00	10.46	..	..	3.77	270.00	494.80	..
Elsie	..	Voided leases	..	..	..	..	..	..	..	408.25	1,323.85	..
Do.	..	Sundry claims	..	..	..	..	..	..	..	24.00	27.48	..

McPhee's Creek	208L	.. ..	Judge .. ..	.. ..	14.50	15.91	.. ..	.. ..	14.50	15.91	.. ..
Do.	196L	.. ..	Prospector .. ..	.. ..	81.00	63.37	.. ..	.. ..	91.00	80.79	.. ..
Do.		.. ..	Voided leases .. ..	.. ..	.. ..	.. ..	.. ..	.. ..	7.50	10.62	.. ..
Middle Creek	106L	.. ..	Barton .. ..	.. ..	.. ..	24.99	.. ..	.. ..	5,627.65	6,507.32	.. ..
Do.	202L	.. ..	Mundella .. ..	.. ..	7.00	54.14	.. ..	.. ..	7.00	54.14	.. ..
Do.		.. ..	Voided leases .. ..	.. ..	.. ..	.. ..	.. ..	.. ..	552.25	1,055.53	.. ..
Do.		.. ..	Sundry claims .. ..	.. ..	.. ..	.. ..	.. ..	.. ..	174.00	262.28	.. ..
Mosquito Creek	79L	.. ..	(Galtee More) .. ..	.. ..	.. ..	.. ..	.. ..	.. ..	586.00	1,648.33	.. ..
Do.	79L, 145L	.. ..	Galtee More leases .. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1,592.50	2,792.61	.. ..
Do.		.. ..	Voided leases .. ..	.. ..	.. ..	.. ..	1.07	21.42	5,081.30	8,023.06	.. ..
Do.		.. ..	Sundry claims .. ..	.. ..	.. ..	.. ..	.. ..	166.47	2,154.94	3,084.93	.. ..
Nullagine		.. ..	Voided leases .. ..	.. ..	.. ..	.. ..	.. ..	13.96	7,453.25	11,335.12	.. ..
Do.		.. ..	Sundry claims .. ..	.. ..	.. ..	.. ..	104.70	102.29	3,908.75	8,324.35	.. ..
20-Mile Sandy	204L	.. ..	All Nations .. ..	.. ..	335.00	90.21	.. ..	.. ..	335.00	90.21	.. ..
Do.	195L	.. ..	Billjim .. ..	.. ..	610.00	441.88	.. ..	.. ..	1,470.00	1,190.11	.. ..
Do.	136L	.. ..	Little Wonder .. ..	.. ..	65.50	96.04	.. ..	.. ..	1,050.00	3,859.26	.. ..
Do.	207L	.. ..	Wonder West .. ..	.. ..	208.00	190.20	.. ..	.. ..	208.00	190.20	.. ..
Do.		.. ..	Voided leases .. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1,012.70	1,561.51	.. ..
Do.		Sundry claims	122.75	97.58	33.10	20.55	2,552.40	3,592.35
<i>From District generally:—</i>												
Sundry parcels treated at:												
Doherty's Works 493.13												
State Battery—20-Mile Sandy 231.62												
Various Works 50.50												
Reported by Banks and Gold Dealers 111.52												
Total				111.52	1,673.75	1,761.00	5,663.88	372.19	36,888.24	64,180.68		

West Pilbara Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
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	(106), (109)	Ninety Nine leases .. ..	..	..	..	..	..	1.10	588.35	343.78	..
Do.	..	Voided leases .. ..	..	..	..	..	..	..	64.85	53.44	..
Do.	..	Sundry claims .. ..	..	..	..	..	10.44	2.71	10.00	11.51	..
Mallina	(156)	Naumai Rawhite .. ..	..	..	..	..	..	..	38.00	25.61	..
Do.	..	Voided leases .. ..	..	..	..	..	..	..	103.60	102.83	..

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

West Pilbara Goldfield—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Nicol ..	..	Voided leases .. .. .	..	..	..	..	..	..	30·00	11·47	..
Pilbara ..	..	Voided leases .. .. .	..	..	..	..	..	48·12	148·00	293·42	..
Do. ..	..	Sundry claims .. .. .	..	..	..	..	1·11	86·24	..	..	..
Roebourne ..	M.L. 143..	Carlow Castle .. .. .	..	..	..	..	..	..	..	2·93	4·85
Do. ..	..	Voided leases .. .. .	..	..	..	..	..	..	113·36	570·98	233·06
Do. ..	..	Sundry claims .. .. .	..	..	..	..	..	..	108·60	88·70	77·03
Station Peak ..	(157) ..	Momentum .. .. .	..	..	..	..	..	7·06	..	9·74	..
Do. ..	..	Voided leases .. .. .	..	..	..	..	177·74	16·38	9,993·00	11,074·75	..
Do. ..	..	Sundry claims .. .. .	..	..	..	..	..	..	37·50	48·19	..
Towranna ..	155 ..	Tauri Tom Tit .. .. .	..	..	562·00	736·97	..	..	1,359·00	1,691·82	..
Do. ..	..	Voided leases .. .. .	..	..	..	..	..	..	1,934·80	2,088·26	..
Upper Nicol ..	..	Sundry claims .. .. .	..	..	..	..	..	..	6·50	2·57	..
Weerianna ..	151 ..	(Hillside) .. .. .	..	..	130·00	97·64	..	..	780·00	1,402·16	..
Do. ..	2P.P., 151 ..	Hillside leases .. .. .	..	..	130·00	63·95	..	..	130·00	63·95	..
Do. ..	151, (152) ..	(Hillside leases) .. .. .	..	..	..	..	..	..	640·00	704·69	..
Do. ..	160 ..	Mount Veale .. .. .	..	..	18·90	18·64	..	..	34·90	29·96	..
Do. ..	..	Voided leases .. .. .	..	..	..	..	..	..	748·25	522·65	..
Do. ..	..	Sundry claims .. .. .	..	..	12·00	13·59	..	..	49·50	50·60	..
From Goldfield generally:— Reported by Banks and Gold Dealers			91·91	..	..	..	..	..	4,934·54	82·54	6·38
Total			91·91	..	852·90	930·79	5,145·23	244·17	17,266·21	19,656·43

Ashburton Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Mt. Mortimer ..	..	Sundry claims .. .. .	..	..	..	..	..	..	354·37	315·64	..
Uaroo ..	M.L. 43, M.L. 49	Uaroo Silver-Lead Mines, Ltd.	..	..	..	..	..	..	..	..	1,637·20
Do. ..	..	Voided leases .. .. .	..	..	..	..	..	..	..	..	162·02
From Goldfield generally:— Reported by Banks and Gold Dealers .. .. .			..	..	..	..	..	..	8,206·73	..	..
Total .. .. .			..	..	..	..	..	..	8,561·10	315·64	1,799·22

Gascoyne Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Bangemall	Voided leases .. .. .	..	..	..	..	..	..	6.22	236.70	218.49	..
Do.	Sundry claims .. .. .	..	..	..	..	..	12.29	6.00	24.01	..	..
		<i>From Goldfield generally:—</i>										
		Reported by Banks and Gold Dealers	3.76	..	..	..	..	..	..	..	..	..
		Total	3.76	..	..	..	..	..	18.51	242.70	242.50	..

Peak Hill Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Egerton ..	352P	Hibernian .. .. .	..	..	623.00	397.85	..	..	..	1,121.00	721.80	..
Do. ..	452P	Homeward Bound .. .. .	..	..	81.00	130.01	..	..	..	81.00	130.01	..
Do. ..	..	Voided leases .. .. .	..	..	..	..	..	..	.91	3.75	16.13	..
Do. ..	..	Sundry claims .. .. .	..	53	500.25	296.64	..	..	23.51	510.25	316.91	..
Horseshoe ..	445P	Mahoney's New Brilliant .. .. .	..	..	8.00	29.19	..	..	..	8.00	29.19	..
Do. ..	..	Voided leases .. .. .	..	..	..	..	..	..	1,902.09	712.38	1,937.65	2.00
Do. ..	..	Sundry claims .. .. .	..	..	..	..	..	..	632.37	16.05	45.14	..
Mt. Fraser ..	..	Voided leases .. .. .	..	..	..	..	..	..	..	389.50	320.96	..
Do. ..	..	Sundry claims .. .. .	..	..	..	..	..	..	..	80.00	55.41	..
Peak Hill ..	399P	Bobby Dazzler .. .. .	..	..	44.00	55.64	..	..	3.01	81.50	107.57	..
Do. ..	364P [1261N]	Harder to Find .. .. .	..	..	..	..	..	..	46.29	14.00	30.62	..
Do. ..	370P [1263N]	Lucky Call .. .. .	..	..	..	..	..	..	..	23.00	42.94	..
Do. ..	5P, 306P	No. 1 North leases .. .. .	..	..	194.00	138.32	..	..	..	322.50	579.30	..
Do. ..	386P	Pacific .. .. .	..	..	39.50	43.82	..	..	4.57	141.00	155.42	..
Do. ..	(1P), (2P), (4P), 5P, (6P), (8P), (9P), (13P), (15P), (16P), (26P), (27P), (28P),	(Peak Hill Goldfield, Ltd.) .. .. .	..	..	..	..	..	..	191.46	462,057.01	223,273.59	2,285.59

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Peak Hill Goldfield—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.			
Peak Hill ..	(29P),(35P), (36P), (43P),(53P), (54P), (63P), (146P), (152P), (190P), (213P), (222P), (239P), (248P), (252P), (262P), (274P), 306P, (313P)	(Peak Hill Goldfield, Ltd.)—continued.													
Do. ..	402P	Ravelstone .. ..	..	..	19·00	16·28	..	..	..	40·00	37·99	..	..
Do. ..	(400P)	Reefers .. ..	..	..	54·50	27·67	..	..	..	54·50	27·67	..	..
Do. ..	398P	Temperance .. ..	..	6·65	260·00	80·85	..	..	6·65	314·00	166·63	..	..
Do. ..	448P	Evening Star .. ..	..	..	250·00	709·03	..	..	..	250·00	709·03	..	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	467·67	4,369·62	3,537·65	..	..
Do. ..	.. ..	Sundry claims .. ..	..	2·80	192·00	216·06	..	..	118·29	1,642·25	1,079·11	..	..
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	..	..
Vilthorpe ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	47·00	20·93	..	..
		<i>From Goldfield generally:—</i>													
		Sundry Parcels treated at:—													
		State Battery—Ravelstone .. ..	..	..	..	396·34	..	..	3·05	15·00	888·31	..	..
		Various Works] .. ..	..	..	..	..	..	..	..	30·00	319·97	..	..
		Reported by Banks and Gold Dealers .. ..	..	..	..	54·94	..	..	1,713·96	345·17	..	..	..
		Total	54·94	9·98	2,265·25	2,537·70	..	1,713·96	3,870·22	477,225·26	238,097·57	2,287·59

East Murchison Goldfield.

LAWLERS DISTRICT.

Note.—From the 1st March, 1910, the Lawlers District was subdivided into Wiluna and Lawlers. The gold produced after that date by the mines at Wiluna will be found in the Wiluna District, and the lease numbers of both districts are shown in each case.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
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: Yellow Aster G.M. Co., N.L.	..	..	567·50	298·39	..	..	9,273·75	4,804·52	..
Do. ..	..	Voided leases .. .. .	..	..	..	..	..	141·57	23,291·50	11,350·24	..
Do. ..	..	Sundry claims .. .. .	..	..	32·00	22·24	..	478·40	1,400·75	804·80	..
Lake Darlot	182	Amazon .. .. .	..	..	..	..	..	11·54	3,850·50	6,285·51	..
Do. ..	(1166)	British King East .. .. .	..	..	..	..	..	..	1,211·00	653·85	..
Do. ..	626	Filbandint .. .. .	..	..	..	..	..	..	999·00	918·19	..
Do. ..	1181	King of the Hills .. .. .	..	..	31·75	7·52	..	..	31·75	7·52	..
Do. ..	(375)	King of the Hills .. .. .	..	..	..	..	..	101·48	2,276·00	1,895·58	..
Do. ..	648	Monte Cristo .. .. .	..	..	..	..	..	..	71·25	54·08	..
Do. ..	648, (654), (852)	(Monte Cristo leases) .. .. .	..	..	..	..	..	..	6,762·60	3,279·52	..
Do. ..	273	St. George .. .. .	..	45·56	18·50	28·74	..	2,972·78	858·00	7,943·75	..
Do. ..	633	(Zangbar) .. .. .	..	..	..	..	..	..	997·00	505·75	..
Do. ..	633, (823)	Zangbar leases .. .. .	..	..	..	..	..	..	20,340·00	7,664·55	..
Do. ..	..	Voided leases .. .. .	..	..	..	..	..	832·90	27,727·20	19,163·26	..
Do. ..	..	Sundry Claims .. .. .	..	4·41	115·50	89·66	..	1·16	241·84	2,368·71	..
Lawlers ..	1177	Eastern Star .. .. .	..	..	90·00	46·44	..	..	90·00	46·44	..
Do. ..	(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

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 1914.					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	1171	Great Eastern	..	..	509.00	216.43	..	..	..	509.00	216.43	..
Do.	(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 Co., Ltd.)	..	..	..	..	..	..	..	179,563.00	40,438.14	2,560.31
Do.	1163	May Bee	..	..	876.00	278.51	..	..	..	2,406.00	686.36	..
Do.	1173	Never-Can-Tell	..	..	182.00	270.91	..	..	6.90	182.00	270.91	..
Do.	(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.	..	..	2,943.00	973.72	..	..	..	396,596.50	101,347.31	8,356.89
Do.	1172	Queen	..	..	197.00	340.47	6.47	..	..	334.00	503.14	6.47
Do.	910, 923	Sunris leases	..	..	..	..	..	..	..	8,289.00	3,985.12	..
Do.	(1165)	Vivien	..	..	11.00	23.16	..	..	..	2,008.50	699.80	..
Do.	62, (562), (533)	(Waronga South leases)	..	..	..	..	..	..	..	42,150.00	14,329.48	..
Do.	(1145)	White Hope	..	..	..	..	..	..	..	89.50	58.35	..
Do.	58	(Waronga : London and Western Australian Exploration Co., Ltd.)	..	..	..	..	..	..	..	2,438.50	755.45	..
Do.	..	Voided leases	..	..	..	..	..	..	421.71	281,748.48	145,799.20	1,794.21
Do.	..	Sundry claims	..	1.23	383.00	381.73	..	14.81	76.61	7,978.35	5,290.46	..
New England	..	Voided leases	..	..	..	..	..	..	57.54	899.00	720.25	..
Do.	..	Sundry claims	..	..	..	..	..	..	4.32	554.50	465.23	..

Sir Samuel	1175	Bellevue North	4.45	8.97	4.45	53.75	37.46					
Do.	(1142)	Bluey's Release		20.03	4.50	529.75	372.31					
Do.	1176	Canberra		59.50	199.03	100.50	311.06					
Do.		Voided leases			4.54	264,316.50	137,493.80	10,225.58				
Do.		Sundry claims		164.50	171.58	2,465.00	1,962.16					
Wiluna	1137 [118j]	Aurora				8.00	46.38					
Do.	946 [23j]	(Bulletin)				5,605.00	2,144.82					
Do.	(959) ([30j])	(Bulletin North)				391.00	91.44					
Do.	(1039) ([51j])	Caledonia				78.00	138.38					
Do.	(140) ([2j])	(Golden Age)				752.00	870.93					
Do.	(140) ([2j]), 162 [4j], 163 [5j]	(Golden Age Consolidated, Ltd.)				42,521.00	19,750.45					
Do.	(140) ([2j])	(Golden Age: Golden Age Lake Way, Ltd.)				12,899.00	7,468.69					
Do.	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.	954 [28j]	(Indicator)				767.00	143.44					
Do.	162 [4j], 163 [5j]	(Lake Way leases)				630.00	309.60					
Do.	162 [4j]	(Lake Way: Western Australian Gfs., Ltd.)				2,786.00	1,238.44					
Do.	870 [10j]	(Moonlight)				1,856.00	787.66					
Do.	(967) ([33j])	(Red Page)				457.00	424.50					
Do.	917 [12j]	(Squib)				276.50	67.00					
Do.		Voided leases			537.27	37,192.75	30,113.95	124.00				
Do.		Sundry claims			5.30	2,841.15	1,516.76					
<i>From District Generally:—</i>												
Sundry Parcels treated at:												
		Cinderella Battery		16.00	337.26	1,218.00	2,543.57	26.00				
		Lawlers Public Battery		70.00	140.63	284.00	2,730.80					
		Old Condor Battery—Sir Samuel			411.09		965.04					
		State Battery—Lake Darlot				315.00	1,097.09					
		State Battery—Wiluna				390.00	2,047.17	20.00				
		Various Works				117.50	8,379.57	718.33				
		Reported by Banks and Gold Dealers	2.41				5.74					
		Total	2.41	55.65	6,323.75	4,266.51	6.47	5,604.65	6,042.27	1,951,394.99	869,242.15	24,803.24

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

East Murchison Goldfield—continued.

WILUNA DISTRICT.

Note.—Previous to the 1st March, 1910, Wiluna formed part of the Lawlers District. The gold produced by mines at Wiluna previous to that date will be found in the Lawlers District, and the lease numbers of both districts are shown in each case.

MINING CENTRE.	NUMBER OF LEASES.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Collavilla ..	(71j) ((1083)), (72j) ((1084))	(May Queen leases) .. ..	..	..	..	..	..	..	36.00	25.16	..
Do. ..	(71j) ((1083)), (72j) ((1084))	May Queen Reward, Ltd. .. ..	..	..	..	..	..	..	1,482.00	471.72	..
Do. ..	..	Sundry claims .. ..	..	..	..	..	..	..	30.00	21.47	..
Mt Keith ..	118j	Aurora .. ..	..	..	513.00	428.25	..	..	1,419.00	1,669.47	..
Do. ..	(183j)	Chicane .. ..	..	..	67.00	16.64	..	..	67.00	16.64	..
Do. ..	167j	Grand Schlam .. ..	..	..	265.00	257.49	..	..	983.00	678.61	..
Do. ..	168j	Little Schlam .. ..	..	..	72.00	68.36	..	..	194.00	166.51	..
Do. ..	(173j)	Starlight .. ..	..	..	..	..	..	..	85.50	54.40	..
Do. ..	176j	Winifred .. ..	..	..	114.00	66.49	..	..	198.00	107.00	..
Do. ..	..	Voided leases .. ..	..	..	..	..	..	..	69.00	75.36	..
Do. ..	..	Sundry claims .. ..	..	..	104.00	70.74	..	78.26	301.00	249.51	..
New England ..	..	Voided leases .. ..	..	..	..	..	..	..	952.00	309.11	..
Do. ..	..	Sundry claims .. ..	..	..	..	..	..	..	115.00	100.62	..
Wiluna ..	91j, [940]	(Adelaide) .. ..	..	..	..	..	..	..	401.00	33.29	..
Do. ..	23j	(Bulletin) .. ..	..	..	..	..	..	..	5,787.00	1,427.81	..
Do. ..	(51j) ((1039))	Caledonia .. ..	..	..	131.00	223.16	..	..	603.00	690.45	..
Do. ..	(165j)	Cicely .. ..	..	..	..	..	..	..	58.00	2.60	..
Do. ..	188j	Comet .. ..	..	..	112.50	14.49	..	..	112.50	14.49	..
Do. ..	187j	Essex .. ..	..	..	1,045.00	263.74	..	..	1,045.00	263.74	..
Do. ..	(2j), ([140])	Golden Age: Wiluna G.Ms., Ltd. .. ..	..	..	..	..	..	..	60.00	96.10	..
Do. ..	6j [542], 7j [548], 8j [550], 11j [906], 13j [930], (14j) ([931]), (15j) ([932]), 17j [937], (18j) [938], 21j, [943] (22j) ([944]), 24j [950], (25j) [901], (26j) [952], (39j) [987], 161j 163j	(Gwalia Consolidated, Ltd.) .. ..	..	..	1,902.50	187.73	..	..	29,774.50	10,780.42	20.29
Do. ..	119j	(Happy Jack) .. ..	..	..	..	..	..	..	743.00	236.41	..
Do. ..	161j	(Lake View) .. ..	..	..	..	..	..	..	17.50	1.82	..
Do. ..	4j, [162], 5j [163]	Lake Way leases: Wiluna G.Ms., Ltd.	..	..	..	..	..	..	2,044.00	975.78	..

Do.	10J [870]	(Moonlight)									5,181.00	1,078.40	
Do.	10J, 37J, 91J, 109J, 123J	Moonlight leases			1,130.00	705.16					8,498.00	3,483.60	
Do.	(185J)	Titanic			104.00	9.68					104.00	9.68	
Do.	120J	Ullina			931.50	133.84					1,936.50	357.79	
Do.	6J, 7J, 8J, 11J, 13J, (14J), (15J), 17J, 21J, 161J, 163J	Western Machinery Co., Ltd.			5,727.00	2,048.66					5,727.00	2,048.66	
Do.	12J, [917], 23J [946], 28J, [945], (30J) ((959)), (33J) ((967)), (36J) ((975)), 43J, [1018], (76J) ((1090)), 113J, 119J, 124J, (137J)	Wiluna G.Ms., Ltd.			1,569.00	259.98					18,278.50	6,572.61	
Do.		Voided leases								27.92	6,224.50	3,366.18	
Do.		Sundry Claims			1,312.00	352.50		33.	87.59	79.88	3,273.75	1,332.66	33
<i>From District Generally:—</i>													
Sundry Parcels treated at:													
		State Battery—Mt. Keith				292.31	12.68					292.31	12.68
		State Battery—Wiluna				1,537.12	33.81				155.00	6,962.23	33.81
		Reported by Banks and Gold Dealers							3.20	2.92			
		Total			15,099.50	6,936.34	46.82	90.79	188.98	95,955.15	42,974.01	67.11	

BLACK RANGE DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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	773B, [1458], 774B, [1459], ([1484]), ([1486]), ([1560])	Barrambie Ranges G.M. Co., N.L.			19.00	527.53				10.00	1,005.95		
Do.	809B	Lilyveil			134.00	119.12				134.00	119.12		
Do.		Sundry claims		2.22					2.22	94.00	75.23		
Bellochambers		Sundry claims			12.00	4.24				45.00	36.62		
Birrigrin	128B	(Pelerin)								1,765.46	3,621.53		
Do.	128B	Pelerin			375.00	89.49				766.00	662.80		
Do.	128B, (356B)	(Pelerin leases)								1,066.00	1,425.71		
Do.		Voided leases								820.68	9,155.19		
Do.		Sundry claims			15.00	5.72				34.52	713.00	466.66	

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

East Murchison Goldfield—continued.

BLACK RANGE DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Currán's Find	(806B)	Federal	..	..	40.00	12.71	..	..	..	40.00	12.71	..
Do.	641B	Red White and Blue	..	..	1,470.00	437.88	..	..	24.58	1,642.00	582.61	..
Do.	(771B)	Result	..	..	87.00	20.27	..	..	..	87.00	20.27	..
Do.	..	Voided leases	..	..	..	..	..	..	107.70	37.50	38.84	..
Do.	..	Sundry claims	..	..	252.00	77.52	..	..	2.08	326.50	188.97	..
Erroll's	814B	Light of the World	..	18.54	..	..	..	..	18.54	..	..	..
Do.	775B, [1712]	Mystery: Lupton's G.M.'s., N.L.	..	..	..	..	..	..	..	..	363.76	..
Do.	..	Voided leases	..	..	..	..	..	14.17	..	67.00	24.82	..
Do.	..	Sundry claims	..	15.40	209.50	243.69	..	..	15.40	209.50	243.69	..
Hancocks	826B	Allies	..	..	12.00	1.32	..	..	..	12.00	1.32	..
Do.	811B	Artesian	..	310.34	79.00	52.88	..	..	310.34	79.00	52.88	..
Do.	(478B)	Breakaway	..	166.72	16.00	43.80	..	..	1,840.23	932.00	983.96	..
Do.	382B	(Bull Oak)	..	..	..	..	..	..	..	725.00	956.77	..
Do.	674B	Comedy King	..	253.54	318.50	422.61	..	..	457.85	1,422.00	2,153.01	..
Do.	369B, 379B, 382B, 383B	(Comrades leases)	..	..	..	..	..	..	..	4,641.50	3,443.73	..
Do.	389B	(Faugh-a-ballagh)	..	..	..	..	..	..	..	139.00	109.31	..
Do.	389B, 495B, 710B	Faugh-a-ballagh leases	..	..	595.75	692.43	..	..	267.00	2,060.75	2,605.59	..
Do.	820B	Great Koh-i-nor	..	..	991.00	302.78	..	..	..	991.00	302.78	..
Do.	330B	Koinoor North	..	..	74.50	82.80	..	..	29.76	1,712.50	1,188.85	..
Do.	(139B)	(Lady Ellen)	..	..	..	..	..	..	..	219.75	458.96	..
Do.	(139B)	Lady Ellen	..	113.24	..	..	..	..	1,896.34	163.50	336.69	..
Do.	(139B), (234B)	(Lady Ellen leases)	..	..	..	..	..	..	..	259.50	488.61	11.00
Do.	633B	Lady Seddon	..	..	11.00	8.65	..	..	..	11.00	8.65	..
Do.	633B, (637B)	(Lady Seddon leases)	..	..	80.50	39.15	..	..	..	579.50	320.37	..
Do.	383B	(Maid Marion)	..	..	..	..	..	..	2.47	373.00	490.40	..
Do.	813B	Rambler	..	653.09	48.00	101.00	..	..	653.09	48.00	101.00	..
Do.	369B, 379B, 382B, 383B	Royal Oak Mining Co., N.L.	..	..	1,622.75	839.74	..	..	..	1,706.75	895.93	..
Do.	790B	Sensation	..	..	109.50	64.33	..	..	..	109.50	64.33	..
Do.	822B	Titanic	..	..	21.75	1.76	..	..	..	21.75	1.76	..
Do.	..	Voided leases	..	..	..	..	..	..	72.44	7,920.50	10,005.28	39.58
Do.	..	Sundry claims	..	71.62	112.50	42.84	..	..	81.65	885.00	446.61	..

Maninga Marley	203B	(Havilah)							1,507.50	2,315.74	
Do.	203B, (243B), (249B), (254B), (287B), (288B), (289B), (305B), (350B), (504B)	(Havilah G.M. Co., N.L.)							36,508.00	20,052.80	22.55
Do.	203B, (243B), (287B), (289B), (350B)	(Havilah G.M. Co., N.L.)							6,026.00	5,029.69	
Do.	203B, (243B), (249B), (254B), (287B), (288B), (289B), (305B)	(Havilah leases)							2,240.00	2,432.48	
Do.	203B, (243B), (289B)	Havilah leases: Tailings Treatment, Ltd.							371.00	2,086.50	
Do.	(53B)	(Maninga Marley)							222.75	274.92	
Do.	(53B), (77B), (100B)	Maninga Marley leases			37.00	162.02			7,128.83	8,779.78	
Do.	765B	Maninga Marley North			256.00	223.96			665.00	409.07	
Do.		Voided leases						195.20	3,960.65	4,978.58	
Do.		Sundry claims			22.00	14.99		122.66	589.50	567.80	
Montagu	(135B)	Montague Boulder							6,964.00	4,541.22	
Do.		Voided leases							94.39	2,169.40	
Do.		Sundry claims							45.67	639.50	
Nungarra	(792B)	Mae's Addition			6.00	3.97				6.00	3.97
Do.	793B	Margaret	469.90	1,460.50	414.91			527.15	2,043.00	563.07	
Do.	619B	Nungarra Junction	45.78	206.00	86.12			93.57	1,380.50	647.25	
Do.		Voided leases						25.94	241.47	8,620.50	7,534.73
Do.		Sundry claims	10.22	229.00	52.48		46.67	1,335.55	2,708.65	1,951.68	3.64
Sandstone	4B	(Adelaide)							7.21	7,443.00	12,675.94
Do.	4B, 5B, 11B, 17B, 26B, 70B, 140B, 150B	(Adelaide leases)								21,010.00	30,255.28
Do.	5B	(Black Range)							152.68	637.00	1,477.66
Do.	4B, 5B, 9B, 11B, 17B, 26B, 70B, 140B, 150B, 256B, 494B, 509B, 620B, 627B	Black Range Mining Co., N.L.		28,846.00	15,131.89		4.75	199.90	200,033.00	142,566.88	1,315.00
Do.	255B	Black Range West G.M. Co., N.L.		935.50	786.41				1,077.65	1,035.43	
Do.	149B	(Golden Gate)							113.75	62.98	
Do.	151B	(Golden Key)							883.00	1,412.75	
Do.	815B	Jumbo	13.24	19.50	13.38			13.24	19.50	13.38	
Do.	16B	(Kingoonya)							1,406.00	1,850.40	
Do.	509B	(Mary S.)							275.60	70.00	84.09
Do.	810B	Myrtle		65.75	111.65				65.75	111.65	
Do.	6B, 10B, 16B, 74B, 81B, 114B, 149B, 151B, 189B, 193B, 206B, 216B, 238B, 463B, 477B, 498B, 553B	(Oroya Black Range, Ltd.)							283,330.00	157,307.04	6,154.63
Do.	789B	Pyx		198.00	169.70				386.75	333.23	
Do.	187B	(Sandridge: Sandstone Development G.M. Co., N.L.)							263.00	102.22	

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

East Murchison Goldfield—continued.

BLACK RANGE DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.		
Sandstone	6B	(Sand Stone)	..	..	..	..	..	..	..	..	..	..	..	..
Do.	174B, 187B, 196B, (229B), 231B, (232B), 236B, (283B), (284B)	(Sandstone Development G.M. Co., N.L.)	..	..	..	..	..	..	..	..	1,439.50	1,938.54	..	..
Do.	174B, 187B, 196B, (229B), 231B, (232B), 236B, (283B), (284B)	(Sandstone G.M. Co., N.L.)	..	..	..	..	..	..	..	..	26,086.50	15,055.94	242.30	..
Do.	766B	Trafalgar	..	91.53	113.00	110.98	..	..	294.70	..	559.50	756.66	..	..
Do.	(797B)	Two P's	..	..	..	..	..	..	..	..	36.00	14.99	..	..
Do.	10B	(Undaunted)	..	..	..	..	..	..	..	..	50.00	46.04	..	..
Do.	74B	(Undaunted East)	..	..	..	..	..	..	..	..	648.25	619.82	..	..
Do.	114B	(Undaunted East Extended)	..	..	..	..	..	..	..	..	276.00	181.34	..	..
Do.	794B	Wanderie	..	..	149.00	86.66	..	..	..	..	149.00	86.66	..	..
Do.	174B	(Wonoka)	..	..	..	..	..	..	..	..	68.50	36.35	..	..
Do.	174B	(Wonoka)	..	..	..	..	..	..	..	..	165.00	156.12	..	..
Do.	6B, 10B, 16B, 74B, 81B, 114B, 149B, 151B, 174B, 187B, 189B, 193B, 196B, 206B, 216B, (229B), 231B, 232B, 236B, 238B, (283B), (284B), 463B, 477B, 498B, 553B	Yuanmi G.M.s. Ltd.	..	..	35,523.00	15,315.35	1,577.07	..	..	..	85,772.04	36,051.84	3,923.89	..
Do.	..	Voided leases	..	..	..	..	..	..	1,657.33	..	9,066.63	7,234.61	..	..
Do.	..	Sundry claims	..	75.96	166.50	119.32	..	..	24.01	754.15	1,595.75	859.05	..	..
Youanme	622B	(Edna)	..	..	..	..	..	..	..	..	320.00	210.17	..	..
Do.	526B	(Great Western)	..	..	..	..	..	..	9.71	..	553.75	417.43	..	..
Do.	770B	Hill End	..	..	778.50	53.42	..	..	..	..	1,643.50	214.46	..	..
Do.	564B	(Junction)	..	..	..	..	..	..	..	..	975.50	668.33	..	..
Do.	630B	(Oversight)	..	..	..	..	..	..	..	..	132.00	37.05	..	..
Do.	521B	(Peru)	..	..	..	..	..	..	..	..	98.00	126.86	..	..

Do.	514B	United	1,011-00	183-27	..	..	9,749-50	3,100-39	..	
Do.	(795B)	United North	115-50	20-93	..	..	136-00	27-77	..	
Do.	518B, 521B, 522B, 525B, 526B, 564B, 585B, 603B, 605B, 611B, 618B, 622B, 626B, 630B, 636B, 688B, 692B	Yuanmi G.Ms., Ltd.	47,702-00	19,008-77	352-20	..	164,998-00	65,940-68	880-63			
Do.	..	Voided leases	..	..	..	36	105-35	5,472-25	1,710-50
Do.	..	Sundry claims	30-00	22-95	..	..	1-22	1,484-50	380-04	
<i>From District generally:—</i>												
Sundry parcels treated at:												
	Reply Works	..	..	..	..	..	37-00	2,531-55	..
	State Battery—Sandstone	..	..	404-68	..	..	202-00	10,614-21	59-53
	State Battery—Youanme	..	..	87-96	..	..	..	2,311-72	..
	Various Works	..	..	..	..	..	..	3,133-23	..
	Reported by Banks and Gold Dealers	..	4-30	..	..	1,323-78	11-43	..	..	
	Total	..	4-30	2,311-34	124,576-00	57,231-91	1,929-27	1,439-68	12,775-07	961,254-71	616,720-72	12,658-35

Murchison Goldfield.
CUE DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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	1458 [773B], 1459 [774B], (1484), (1486), (1560)	Barrambie Ranges G.M. Co., N L	..	..	..	..	..	..	15,665-33	13,566-97	125-60
Do.	1458 [773B]	(Golden Treasure)	..	..	..	..	..	6-54	..	..
Do.	..	Voided leases	..	..	..	..	..	15-95	1,238-59	771-55	
Do.	..	Sundry claims	..	..	..	..	..	70-50	35-81	..	
Cuddingwarra	(1848)	Bell Topper	..	..	371-00	123-68	..	5-16	621-00	162-38	..
Do.	1860	Big Bell	..	..	352-36	78-53	..	..	552-36	159-85	..
Do.	1891	Hit or Miss	..	..	5-00	4-99	..	..	5-00	4-99	..
Do.	(1844)	Mad Mull	..	..	..	..	..	54-74	366-50	233-00	..
Do.	..	Voided leases	..	..	..	..	..	10-59	64-43	34,863-25	43,396-22
Do.	..	Sundry claims	..	..	64-00	91-20	..	..	11-86	462-54	606-48

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Murehison Goldfield—continued.

CUE DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.	
Cue ..	1833 ..	Agamemnon ..	..	..	2,055·50	936·24	..	..	..	2,094·50	959·17	..
Do. ..	1809 ..	Bob Bell ..	..	..	7·00	4·46	..	..	..	613·00	1,249·48	..
Do. ..	(1875) ..	Buttercup ..	..	..	15·00	6·07	..	..	..	83·00	39·79	..
Do. ..	203, 1148 ..	(Cue Consolidated G.Ms., Ltd.) ..	..	..	..	..	..	..	..	23,427·50	18,382·10	..
Do. ..	203 ..	Cue No. 1 ..	..	..	..	..	..	..	..	7,753·00	12,680·69	..
Do. ..	1637 ..	(Gem of Cue) ..	..	..	..	..	..	..	..	214·50	233·79	..
Do. ..	1637 ..	Gem of Cue ..	..	..	234·50	303·53	..	..	..	901·00	896·59	..
Do. ..	(1889) ..	Gem of Cue Extended ..	..	12·18	..	..	..	..	12·18	..	..	..
Do. ..	(1020) ..	Gem of Cue Extended ..	..	..	..	..	..	..	..	36·50	3,646·40	..
Do. ..	1637, (1663) ..	(Gem of Cue leases) ..	..	..	..	..	..	..	..	3,264·50	1,941·52	..
Do. ..	(1020), (1044) ..	(Gem of Cue, Ltd.) ..	..	..	..	..	..	..	..	11,724·00	6,746·05	..
Do. ..	1783 ..	Hidden Treasure ..	..	..	980·00	376·78	..	..	..	10,525·50	11,843·16	..
Do. ..	1148 ..	(Light of Asia) ..	..	..	..	..	..	..	..	10,175·00	7,302·20	..
Do. ..	1148, (1299), (1300), (1634), (1666), (1667) ..	(Light of Asia leases) ..	..	..	..	..	..	..	..	14,024·00	9,078·43	..
Do. ..	1148, 1151, 1252, (1300), 1362, 1498, (1634), (1667) ..	Light of Asia and Queen of the May leases ..	..	..	528·50	794·26	..	..	..	1,837·50	1,882·95	..
Do. ..	1151, 1252, 1362, (1391), 1498 (1689) ..	(Queen of the May leases) ..	..	..	..	..	..	..	..	6,926·00	6,974·06	..
Do. ..	1897 ..	Never-can-tell ..	..	..	274·50	161·08	..	..	..	274·50	161·08	..
Do. ..	1248 ..	Rising Sun ..	..	..	78·00	30·07	..	..	..	1,447·00	964·84	..
Do. ..	(1886) ..	Silence ..	..	..	26·00	20·07	..	..	..	26·00	20·07	..
Do. ..	(1325) ..	(Starlight) ..	..	..	..	..	..	..	..	1,506·50	1,473·40	..
Do. ..	(1325) ..	Starlight ..	..	..	23·50	14·81	..	..	..	183·00	222·62	..
Do. ..	(1325), (1639) ..	(Starlight leases) ..	..	..	..	..	..	..	..	1,155·50	1,432·07	..
Do. ..	(1706) ..	St. Catherine's Bank ..	..	..	263·00	25·17	..	..	..	830·56	343·96	..
Do. ..	(1888) ..	Tom Flynn ..	..	..	78·00	44·40	..	..	..	78·00	44·40	..
Do. ..	1868 ..	Uncle Sam ..	..	3·84	372·00	125·19	..	..	3·84	692·00	223·94	..
Do. ..	1853 ..	(Vera) ..	..	..	131·00	81·81	..	..	..	418·00	432·64	..
Do. ..	1853, 1855 ..	Vera leases ..	..	..	78·50	56·63	..	..	..	78·50	56·63	..
Do. ..	(1854) ..	Wanda ..	..	..	8·50	1·32	..	..	..	8·50	1·32	..
Do. ..	(1887) ..	Wrangler ..	..	..	70·50	32·51	..	..	..	70·50	32·51	..
Do.	Voided leases	34·72	445·72	144,431·06	94,883·98	43·35
Do.	Sundry claims	15·05	693·74	455·26	10·50	292·73	12,517·09	7,968·38	..

Eelya	..	..	Voided leases	..	..	..	..	..	8.78	966.00	1,774.03	..
Do.	..	..	Sundry claims	..	..	58.50	53.23	..	73.65	499.15	555.85	..
Errolls	1743	[776B]	Great Saddle	..	..	..	..	..	..	1,729.00	721.81	..
Do.	1712	[775B]	(Mystery)	..	..	..	..	..	16.63	2,683.00	2,134.18	..
Do.	1712	[775B]	Mystery: Lupton's G.Ms., N.L.	..	..	..	..	..	..	1,545.00	783.36	..
Do.	..	..	Voided leases	..	..	..	..	..	3.62	8,141.50	5,262.89	..
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	1,004.00	1,123.77	..
Reedy's Find	..	..	Voided leases	..	..	..	..	..	210.65	540.00	673.20	..
Do.	..	..	Sundry claims	..	..	..	..	136.94	17.76	195.05	116.52	..
Tukanarra	1895	..	Dryberra	..	..	6.00	12.71	..	..	6.00	12.71	..
Do.	1337	..	Nemesis	..	..	56.00	348.73	..	..	608.78	5,956.57	..
Do.	..	..	Voided leases	..	..	..	..	14.65	2,046.50	15,570.10	14,367.11	172.77
Do.	..	..	Sundry claims	..	..	..	..	3.76	40.39	2,539.70	5,238.42	..
<i>From District generally:—</i>													
Sundry parcels treated at:													
Cue No. 1 Works 277.22													
Gem of Cue Extended Works													
State Battery—Tukanarra 518.50													
Various Works 5,055.02													
Reported by Banks and Gold Dealers 750.72													
Total													
						31.07	6,830.60	4,459.95	964.95	3,957.46	364,374.30	320,827.09	400.11

MEEKATHARRA (LATE NANNINE) DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.	
Abbotts	..	..	Voided leases	..	..	..	..	..	..	..	35,165.60	37,103.60	..
Do.	..	..	Sundry claims	..	..	..	..	..	..	..	44.60	63.56	..
Burnakura	509N, 527N	..	(Federal City leases)	..	..	..	..	..	..	..	14,583.00	7,288.96	..
Do.	509N, 527N, (949N)	..	(Federal City leases)	..	..	..	..	..	..	..	2,084.00	1,120.21	..
Do.	509N, 527N, (949N), (1009N)	..	Federal City leases	..	..	..	..	..	..	..	4,019.00	1,330.40	..
Do.	(938N)	..	Perseverance	..	..	..	..	..	..	11.12	207.00	204.06	..
Do.	..	..	Voided leases	..	..	..	..	..	3,228.31	17,587.95	20,625.37	26.90	..
Do.	..	..	Sundry claims	1.16	51.58	28.00	12.15	..	12.51	81.11	53.00	31.05	..
Chesterfield	..	..	Voided leases	..	..	..	..	..	29.02	409.15	6,756.26	7,445.01	80
Do.	..	..	Sundry claims	..	..	..	..	..	..	38.83	428.60	472.64	..

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Murchison Goldfield—continued.

MEEKATHARRA (LATE NANNINE) DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Gabanintha ..	(1224N)	Faugh-a-Balaugh .. ..	..	..	..	..	..	..	..	45·00	61·57	..
Do. ..	1324N	Hamburg Belle .. ..	..	..	22·00	14·34	..	..	..	22·00	14·34	..
Do. ..	1323N	Ivy .. ..	..	..	127·00	71·89	..	..	..	127·00	71·89	..
Do. ..	1068N	(New Brew) .. ..	..	..	..	..	..	..	..	815·00	575·89	..
Do. ..	1068N	New Brew .. ..	..	..	32·00	23·89	..	..	..	32·00	23·89	..
Do. ..	1068N, (1070N), (1223N)	(New Brew leases) .. ..	..	..	300·00	131·60	..	..	..	705·50	387·06	..
Do. ..	1175N	Unexpected .. ..	..	..	117·00	60·35	..	..	..	193·00	90·66	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	18,541·50	11,504·12	524·66
Do. ..	.. ..	Sundry claims .. ..	..	..	30·00	6·96	..	1 33	37·34	874·00	602·46	..
Garden Gully	(1226N)	Booty .. ..	..	..	..	..	..	..	..	12·10	6·55	..
Do. ..	1036N	(Kanowna) .. ..	..	..	..	..	..	..	6·49	..	..	..
Do. ..	928N	(Kyarra) .. ..	..	..	..	..	..	..	..	761·00	1,145·88	..
Do. ..	928N, 1036N, 1037, 1077N, 1168N (1221N)	Kyarra G.M. Co., N.L. .. ..	..	..	11,875·00	9,582·61	704·80	..	..	22,823·00	16,739·40	898·60
Do. ..	.. ..	Kyarra View .. ..	..	..	30·00	5·95	..	..	..	76·10	60·90	..
Do. ..	1342N	Lydia .. ..	..	19·42	·03	9·18	..	..	19·42	·03	9·18	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	26·36	30·31	603·33	909·39	..
Do. ..	.. ..	Sundry claims .. ..	..	1·85	..	..	..	..	3·32	199·60	258·53	..
Gum Creek ..	(1198N)	Blue Bell .. ..	..	..	..	..	..	..	..	23·00	32·59	..
Do. ..	(1314N)	Groper .. ..	..	..	50·00	6·97	..	..	..	20·00	6·97	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	25·27	88·12	2,484·08	3,067·36	..
Do. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	..	..	29·00	264·87	..
Holden's Find	1283N	Bulgarian .. ..	..	·95	..	..	..	..	·95	..	..	..
Do. ..	1307N	Golden Horn .. ..	..	8·72	..	..	..	..	8·72	..	..	..
Do. ..	1278N	Junction .. ..	..	5·10	72·00	195·10	..	..	5·10	72·00	195·10	..
Do. ..	1277N	Woodrow .. ..	..	..	71·75	117·57	..	..	..	71·75	117·57	..
Jillawarra ..	(1252N)	Eclipse .. ..	..	2·60	14·00	14·65	..	..	2·60	14·00	14·65	..
Do. ..	1337N	Peep of Day .. ..	..	46·08	..	..	..	..	46·08	..	..	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	1,050·64	1,480·55	2,768·95	..	..
Do. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	169·02	120·55	17·50	43·78	..
Meeka Pools	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	111·58	82·27	..
Do. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	..	2·84	211·72	184·83	..

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Murchison Goldfield—continued.

MEEKATHARRA (LATE NANNINE) DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.	
Quinns	(1174N)	Forget-me-not	..	54.38	..	..	..	..	155.20	8.00	15.58	..
Do.	1334N	Kaladbro	..	6.31	37.00	15.36	..	..	6.31	37.00	15.36	..
Do.	994N	Kaladbro	..	2.78	14.00	33.10	..	..	386.76	283.20	377.37	..
Do.	(1321N)	Millionaire	..	..	50.00	4.86	..	..	..	50.00	4.86	..
Do.	1225N	Nowthanna	..	..	287.50	95.19	..	..	..	450.50	149.21	..
Do.	1055N	Parramatta	..	..	..	..	..	..	13.33	936.00	493.81	..
Do.	1244N	Phoenix Extended	..	..	737.75	346.88	..	..	..	838.75	399.68	..
Do.	1341N	Singapore	..	..	57.00	49.07	..	..	..	57.00	49.07	..
Do.	..	Voided leases	..	..	..	..	..	7.30	291.28	13,795.06	6,397.43	90.70
Do.	..	Sundry claims	..	43.56	148.75	134.41	..	2.25	642.89	1,170.75	653.99	..	
Ruby Well	(1276N) ([407P])	Bloodstone	..	..	40.00	32.08	..	..	..	40.00	32.08	..
Do.	1261N [364P]	Harder to Find	..	..	1,945.00	823.08	..	..	..	1,945.00	823.08	..
Do.	(1297N) ([432P])	Little Jim	..	..	59.00	19.22	..	..	..	59.00	19.22	..
Do.	(1282) ([413P])	Ruby Gem	..	..	7.00	6.06	..	..	..	7.00	6.06	..
Do.	1262N [369P]	Trafalgar	..	..	93.50	40.75	..	..	..	93.50	40.75	..
Do.	..	Sundry claims	..	8.48	152.00	148.11	..	..	8.48	152.00	148.11	..
Stake Well	..	Voided leases	..	..	..	..	..	..	200.12	21,342.00	9,536.07	..
Do.	..	Sundry claims	..	..	..	..	..	..	31.79	90.00	74.46	..
Star of the East	..	Voided leases	..	..	..	..	..	..	..	27,244.00	20,305.40	..
Do.	..	Sundry claims	..	..	..	10.28	..	..	..	127.62	94.97	..
Yaloginda	1084N	Chunderloo	..	..	755.00	196.35	..	..	..	1,805.55	610.26	8.68
Do.	1236N	Mystery	..	..	321.10	240.44	..	..	..	460.10	330.74	..
Do.	(859N), (675N)	New Santa Claus G.M. Co., Ltd.	..	..	50.00	10.15	..	..	..	50.00	10.15	..
Do.	1260N	Pariah	..	..	30.00	5.38	..	..	..	30.00	5.38	..
Do.	(1240N)	Rejected	..	..	..	..	..	..	..	120.00	14.53	..
Do.	891N	Romsey	..	..	131.50	138.98	..	..	28.77	4,271.53	1,220.46	..
Do.	(675N)	(Two Bells)	..	..	..	..	..	..	..	154.50	200.70	..
Do.	(675N), (859N)	(Yaloginda Consols G.M. Co., Ltd.)	..	..	..	..	..	..	..	58.00	31.16	..
Do.	..	Voided leases	463.37	17,711.84	10,369.33	..
Do.	..	Sundry claims	..	7.18	89.29	524.00	190.50	..	10.89	231.34	1,504.17	957.37	..

From District Generally :-															
Sundry Parcels treated at :-															
Connecticut Battery	173·61	..	..	..	173·61	..				
Parcell's Cyanide Works	630·13	..				
Margueritta Cyanide Works	31·37	..				
State Battery—Meekatharra	14·00	9,893·59	19·00				
State Battery—Nannine	404·11	..				
State Battery—Quinn's..	498·87	..	..	..	498·87	..				
Various Works	139·75	3,124·89	342·17				
Reported by Banks and Gold Dealers	249·33	..	..	..	..	..
Total	261·82	585·07	140,361·90	79,553·18	1,341·85	9,504·85	8,698·82	858,304·84	620,749·07	3,320·88

DAY DAWN DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Day Dawn	389D	(Creme D'or)	..	..	..	..	..	..	150·00	175·18	..
Do.	389D, 421D, 422D	Creme D'or leases	..	..	1,050·00	749·09	..	2·49	3,843·62	2,801·49	..
Do.	1D, 2D, 86D, 87D, 99D, 119D, 129D, 158D, 159D, 170D, 185, 191D, 209D, 210D, 211D, 212D, 213D, 224D, 225D, (249D), 424D, 453D, (455D), (467D)	Great Fingall Consolidated, Ltd.	..	..	39,238·00	17,317·89	3,050·40	..	1,738,700·63	1,123,437·09	160,654·44
Do.	(14D), (138D), (166D), (167D), (180D), (254D), (255D), (256D), (260D), (337D), (432D)	Murchison Associated G.Ms., Ltd.	..	..	..	..	..	..	6,417·75	3,017·32	..
Do.	500D	Parisian	..	..	238·50	126·74	..	..	363·39	236·27	..
Do.	321D	Richmond	..	..	..	..	..	4·12	..	..	..
Do.	119D	(West Fingall No. 6)	..	..	..	..	..	..	43·00	15·32	..
Do.	..	Voided leases	..	..	..	..	..	123·81	506·91	33,406·62	23,995·26
Do.	..	Sundry claims	..	2·21	90·00	76·55	..	..	127·53	1,569·58	1,230·74
La'e Austin (Island)	(497D)	Central	..	..	..	..	..	..	..	326·63	168·82
Do.	443D	Eureka	..	12·78	..	..	..	65·71	74·21	101·04	737·25
Do.	407D	First Chip	..	..	5·51	..	..	57·93	302·94	377·50	906·56
Do.	..	Voided leases	..	..	..	..	..	462·24	294·86	28,910·70	43,427·62
Do.	..	Sundry claims	..	..	..	..	..	17·74	179·92	239·04	141·81
Mainland	507D	Enterprise	..	503·63	..	..	..	..	706·03	..	..
Do.	..	Voided leases	..	..	..	..	..	41	1,821·46	7,272·13	23,129·51
Do.	..	Sundry claims	..	..	..	..	..	3·24	12·08	77·45	89·03

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Murchison Goldfield—continued.
DAY DAWN DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERER NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Webb's Patch	513D	Comet .. .. .	..	..	58·00	23·35	..	..	..	67·20	36·23	..
Do.	512D	Eclipse .. .. .	..	14·28	25·00	11·02	..	..	14·28	55·05	38·38	..
Do.	526D	Hill End .. .. .	..	64·75	..	..	..	..	64·75	..	..	..
Do.	(510D)	Hillend .. .. .	..	..	..	..	..	..	..	211·00	43·39	..
Do.	.. .. .	Voided leases .. .. .	..	..	..	..	..	4·90	83·76	5,748·50	4,850·37	..
Do.	.. .. .	Sundry claims .. .. .	..	3·09	..	..	..	..	121·08	78·00	308·11	..
		<i>From District generally:—</i>										
		Sundry parcels treated at:—										
		Various Works .. .. .	..	..	..	..	..	..	16·61	940·75	1,537·30	..
		Reported by Banks and Gold Dealers	15·75	..	..	..	..	..	3·48	..	..77	..
		Total	28·53	593·47	40,699·50	18,304·64	3,050·40	2,254·83	4,334·02	1,828,899·58	1,230,323·82	160,654·68

MOUNT MAGNET DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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 .. .. .	..	..	865·50	3,060·80	..	..	..	1,649·00	7,361·81	..
Do.	767M	(Galtee Moore) .. .. .	..	..	..	..	..	..	6·80	3,025·00	1,180·85	..
Do.	767M	Galtee Moore .. .. .	..	..	997·00	299·66	..	..	..	5,875·00	1,407·30	..
Do.	767M, (807M)	(Galtee Moore leases) .. .. .	..	..	..	..	..	..	..	578·00	171·97	..
Do.	(1093M)	Iona .. .. .	..	..	8·00	11·33	..	..	..	19·91	27·33	..
Do.	1061M	Long Reef: Great Boulder No. 1, Ltd.	..	..	..	100·69	..	..	..	..	1,863·02	..
Do.	.. .. .	Voided leases .. .. .	..	..	..	..	..	..	3,185·81	123,764·07	107,797·21	458·82
Do.	.. .. .	Sundry claims	7·11	25·40	61·50	39·28	..	7·11	48·31	1,676·42	943·90	..
Mt. Magnet	(1074M)	Bertie .. .. .	..	..	..	..	..	..	..	171·00	32·20	..
Do.	(314M), (317M), (320M), (988M), (989M)	(Black Hill Development Co., Ltd.) .. .. .	..	..	..	..	..	..	..	15,702·43	9,416·32	..
Do.	(1113M)	Bonnie Doon .. .. .	..	..	45·75	22·01	..	..	..	45·75	22·01	..
Do.	(1024M)	Boogardie View .. .. .	..	..	..	..	..	..	1,358·54	217·75	1,729·99	..
Do.	(507M)	(Bronzewing) .. .. .	..	..	..	..	..	..	43·48	..	..	..

Do.	(490M)	(Cushie Doo)						76-71	166-00	263-35		
Do.	(490M), (507M)	Cushie Doo leases						75-85	1,652-52	702-44	3-05	
Do.	(1094M)	Don't Forget		134-75	38-70				162-75	55-94		
Do.	1032M	Early Bird		140-0	91-15			114-00	1,092-00	1,153-60		
Do.	1105M	Easter Gift		80-00	47-48				80-00	47-48		
Do.	752M, (826M), (833M), (1025M)	Great Boulder No. 1, Ltd.		28-00	9-56				98,120-95	29,806-80		
Do.	1108M	Hard Cash		5-37				5-37				
Do.	1048M	Hesperian		15-92	262-75	152-36		105-99	782-03	790-82		
Do.	1013M	Mars							273-15	134-99		
Do.	1097M	May Queen		6-69	62-00	12-72		6-69	74-00	32-42		
Do.	1107M	Mint		115-82	34-25	53-34		115-82	34-25	53-34		
Do.	(314M), (317M), (320M), (972M), (989M), (989M), 1049M, 1050M, (1051M), (1052)M	Morning Star G.Ms., Ltd.			796-00	348-34			17,387-50	6,599-35		
Do.	1098M	Mountain View		278-00	49-50	350-46		278-00	49-50	350-46		
Do.	445M	Neptune			113-00	42-50		895-33	2,125-91	2,645-84		
Do.	1046M	New Year			604-00	763-39			999-00	1,541-99		
Do.	10-5M	Pearl		2-36	87-04	89-55		2-36	99-82	99-24		
Do.	(1076M)	Polar Star				23-17		1,298-23	45-75	384-88		
Do.	1085M	Problem Solved			13-10	6-25			13-10	6-25		
Do.	1102M	Ready Money		474-47	208-00	413-34		474-47	208-00	413-34		
Do.	1096M	Return		120-35	203-00	315-52		120-35	267-50	677-55		
Do.	911M	(Saturn)							305-00	78-29		
Do.	911M	(Saturn: Black Hill Development Co., Ltd.							64-00	38-50		
Do.	911M	Saturn: Morning Star G.Ms., Ltd.		15-03	20-00	23-08		15-03	4,661-75	1,512-58		
Do.	696M	Sirdar			2,000-00	976-60			15,758-85	5,603-99		
Do.	752M	(St. George)							3,335-00	1,439-07		
Do.	1041M	St. Patrick			133-00	116-42			605-60	773-41		
Do.	1118M	Totalisator			78-00	10-29			78-00	10-29		
Do.	(1090M)	Treasury		245-32	188-75	763-41		880-13	188-75	763-41		
Do.	1069M	Turning Point		2-31	45-00	26-90		2-31	80-50	111-65		
Do.	1058M	Two Phills			10-25	34-38			89-50	119-83		
Do.	(1089)M	Uncle Sam						13-63				
Do.	1055M	Worker							101-00	17-89		
Do.		Voided leases						27-83	920-80	171,144-62	669-56	
Do.		Sundry claims		171-42	579-70	436-99			583-67	11,584-33		
Do.		Voided leases						63-29	764-53	5,522-28		
Mt. Magnet												
East												
Do.		Sundry claims						37-22	214-50	144-10		
Moyagee	1104M	Kuranui			150-00	6-92			150-00	6-92		
Do.	1081M	Moonlight			19-00	103-18			19-00	103-18		
Do.	1099M	Moyagee			57-00	138-25			57-00	138-25		
Do.		Voided leases							1,765-65	2,086-07		
Do.		Sundry claims			68-60	30-41			89-18	406-48		
Paynesville	1112M	Paynesville View		90-39	10-00	6-27			90-39	10-00		
Youanme		Sundry claims							33-00	44-58		
<i>From District generally:—</i>												
Sundry parcels treated at:												
		Longref Treatment Works				533-60				2,114-05		
		Morning Star Battery				492-19				684-32		
		State Battery—Boogardie				142-36			45-01	9,834-87		
		State Battery—Lennonville				123-45			18-06	6,576-77		
		Various Works							25-00	7,028-75	1-00	
		Reported by Banks and Gold Dealers		72-43				1,602-21	35			
		Total		79-54	1,588-85	8,152-44	10,256-30	1,700-44	11,609-35	492,620-94	353,279-60	1,132-43

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Yalgoo Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Adavale ..	..	Sundry claims .. ..	..	..	..	..	..	..	10·00	12·56	..
Bilberatha ..	..	Voided leases .. ..	..	..	..	..	..	..	554·00	200·07	..
Carlaminda ..	..	Voided leases .. ..	..	..	..	..	..	..	947·32	524·72	3·30
Do. ..	..	Sundry claims .. ..	..	..	..	..	..	..	114·00	71·96	..
Field's Find ..	(658)	Commodore .. ..	..	..	73·00	53·95	..	..	477·00	406·26	..
Do. ..	680	Field's Find Extended ..	..	..	196·00	278·87	..	..	375·00	394·56	..
Do. ..	699	Ironclad .. ..	..	..	38·00	12·45	..	..	38·00	12·45	..
Do. ..	(707)	Ironclasp .. ..	..	..	2·30	70·32	..	..	5·30	152·03	..
Do. ..	752	May Bird	88·36	..	..	..	..	88·36	..	..	..
Do. ..	(685)	May Bird .. ..	..	..	26·00	9·39	..	33·85	54·00	92·45	..
Do. ..	708	Mug's Luck .. ..	..	..	89·00	33·33	..	..	123·00	53·19	..
Do. ..	731	Porcupine .. ..	..	..	23·00	4·45	..	..	23·00	4·45	..
Do. ..	739	Porcupine South .. ..	..	..	5·00	2·62	..	..	5·00	2·62	..
Do. ..	734	Shot Over .. ..	..	..	4·00	36·19	..	..	4·00	36·19	..
Do. ..	(696)	Tarrangower .. ..	..	..	..	14·69	..	..	78·00	401·37	..
Do. ..	727	Warriedar .. ..	..	..	45·00	45·21	..	..	45·00	45·21	..
Do. ..	..	Voided leases .. ..	..	..	..	..	..	68·63	33,228·50	23,545·53	..
Do. ..	..	Sundry claims .. ..	..	65·81	30·00	45·04	..	107·94	191·75	193·76	..
Goodingnow ..	681	Aster Consolidated .. ..	..	..	381·00	299·52	..	..	586·50	557·63	..
Do. ..	690	Blend .. ..	..	..	255·00	174·99	..	..	355·50	240·94	..
Do. ..	603	Carnation .. ..	..	..	915·00	1,050·10	..	..	1,509·50	1,945·06	..
Do. ..	615	Daphne .. ..	..	..	31·00	39·04	..	2·55	263·50	355·45	..
Do. ..	(682)	Havela Gold .. ..	..	..	..	..	..	15·82	22·00	91·91	..
Do. ..	606	(Lake View) .. ..	..	..	..	..	..	..	163·00	185·46	..
Do. ..	606	Lake View: Payne's Find Develop- ment Co., N.L. .. ..	..	..	1,015·00	620·38	..	..	1,959·00	1,370·53	..
Do. ..	733	Marigold .. ..	..	..	39·00	81·19	..	..	39·00	81·19	..
Do. ..	(660)	Marigold .. ..	..	..	66·00	97·55	..	..	382·50	313·80	..
Do. ..	630	Marraposa .. ..	..	..	138·00	113·20	..	..	639·00	626·76	..
Do. ..	613	Orchid .. ..	..	..	270·00	605·51	..	..	564·00	1,429·03	..
Do. ..	607	Sweet William .. ..	..	..	146·00	132·54	..	..	146·00	132·54	..
Do. ..	607	(Sweet William) .. ..	..	..	..	..	..	2·16	4·85	81·59	..
Do. ..	607, (608), (662)	(Sweet William Consolidated Mines, N.L.) .. ..	..	..	147·00	211·93	..	7·68	907·46	1,564·84	..
Do. ..	..	Voided leases .. ..	..	..	..	..	..	..	930·50	767·97	..
Do. ..	..	Sundry claims .. ..	..	2·47	216·50	91·59	..	148·00	4·32	1,339·50	722·42
Gullewa ..	(170), (171), (174)	(Monarch G.M. Syndicate) ..	..	..	..	..	..	..	12·00	9·04	..
Do. ..	(170), (171), (174)	(Monarch leases) .. ..	..	..	..	..	..	..	5,571·00	1,640·88	..
Do. ..	(170), (171), (174), (562), (576), (577), (578), (579)	Victory United G.M. Co., N.L. ..	..	..	..	..	..	..	2,852·00	1,017·34	..

Do.	..	..	Voided leases ..	..	..	..	..	..	..	..	13,244.50	11,667.05	..
Do.	..	..	Sundry claims ..	..	..	418.00	344.39	..	..	..	629.50	531.62	..
Kirkalucka	..	..	Sundry claims ..	..	..	..	..	..	..	..	8.80	4.01	..
Melville	..	..	Voided leases ..	..	..	..	..	..	..	14.37	2,716.50	1,420.76	..
Do.	..	..	Sundry claims ..	..	..	..	..	..	11.55	..	238.00	158.11	..
Messenger's Patch	714	..	Golden Acres ..	..	..	17.11	..	..	..	17.11	..	..	..
Do.	..	..	Voided leases ..	..	..	..	..	..	..	298.88	587.20	305.89	..
Do.	..	..	Sundry claims ..	..	..	27.49	..	..	463.12	273.45	304.30	181.28	..
Mt. Farmer	..	..	Sundry claims ..	..	..	..	5.00	6.22	..	..	5.00	6.22	..
Noongal	672	..	St. Michael ..	..	..	..	29.50	68.12	..	..	1.49	147.45	321.11
Do.	..	..	Voided leases ..	..	..	..	..	..	..	..	50.00	6.88	..
Nyounda	..	..	Voided leases ..	..	..	..	..	..	..	217.63	416.00	183.91	..
Do.	..	..	Sundry claims ..	..	..	..	..	..	..	..	18.00	21.67	..
Pinyalling	(709)	..	Barron ..	..	..	..	14.50	8.30	..	..	14.50	8.30	..
Do.	(683)	..	Battler ..	..	..	..	..	..	..	..	5.60	12.75	..
Do.	743	..	Golden Eagle ..	..	..	..	70.00	13.90	..	..	70.00	13.90	..
Do.	..	..	Voided leases ..	..	..	..	..	..	..	1.36	2,191.50	867.08	..
Do.	..	..	Sundry claims ..	..	..	..	..	..	..	..	42.50	22.14	..
Rothesay	..	..	Voided leases ..	..	..	..	..	..	..	..	8,971.00	3,300.07	..
Wadgingarra	..	..	Voided leases ..	..	..	..	..	..	..	..	541.61	600.91	..
Do.	..	..	Sundry claims ..	..	..	..	..	..	..	..	71.50	38.21	..
Yalgoo	495	..	(Ivanhoe) ..	..	..	..	..	..	..	..	6.00	5.98	..
Do.	495, 518	..	Ivanhoe G.M. Co., N.L., Yalgoo ..	..	..	..	..	..	..	..	697.00	236.19	..
Do.	518	..	(Ivanhoe Extended: Ivanhoe G.M. Co., N.L., Yalgoo)	..	..	..	..	..	..	..	123.00	41.69	..
Do.	..	..	Voided leases ..	..	..	..	..	..	..	3.23	5,160.00	9,640.55	..
Do.	..	..	Sundry claims ..	..	..	..	..	..	..	16.37	378.50	175.59	..
Yuin	712, 735	..	Bullrush Gold Estates, N.L. ..	..	..	2,066.00	570.27	..	..	..	2,066.00	570.27	..
Do.	(409), (469), (470), (524), (525), (654), (655), (656)	..	Bullrush Gold Estates, N.L. ..	..	..	..	..	..	..	..	6,904.00	2,144.03	..
Do.	(409), (469), (470)	..	(Royal Standard leases)	..	..	..	..	..	..	..	20,289.50	11,113.24	..
Do.	(409), (469), (470), (524), (525)	..	(Royal Standard leases)	..	..	..	..	..	..	..	4,049.00	1,679.01	..
Do.	..	..	Voided leases ..	..	..	..	..	..	..	127.12	139.00	20.76	..
Do.	..	..	Sundry claims ..	..	..	..	..	..	..	4.70	276.50	57.88	..
<i>From Goldfield generally :-</i>														
Sundry parcels treated at:														
Field's Find Extended Treatment Works ..														
Goodingnow (Payne's Find) State Battery ..														
Tarrangower Works ..														
Various Works ..														
Reported by Banks and Gold Dealers ..														
Total	201.24	6,753.80	5,824.68	..	1,310.92	1,444.10	125,545.64	86,784.88	3.30	..

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Mount Margaret Goldfield.
MOUNT MORGANS DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Australia	..	Voided leases .. .. .	..	..	..	..	..	1,911·63	15,913·69	23,305·76	1·76
United	..	..	..	..	..	..	..	184·96	781·55	2,029·33	..
Do.	..	Sundry claims .. .. .	..	..	..	..	..	..	1,248·50	1,782·71	..
Federation Well	..	Voided leases .. .. .	..	..	..	..	..	..	63·50	33·20	..
Do.	..	Sundry claims .. .. .	..	..	..	..	..	..	..	..	..
Korong	..	Voided leases .. .. .	..	..	..	..	17·95	72·23	2,722·00	3,473·45	..
Do.	..	Sundry claims .. .. .	..	..	..	..	..	34·97	258·00	167·06	..
Mt. Margaret..	314F	Mt. Morven .. .. .	..	..	565·00	375·06	..	..	973·00	601·72	..
Do.	(276F)	Norah and Mary .. .. .	..	..	..	..	..	..	58·00	8·55	..
Do.	..	Voided leases .. .. .	..	..	..	..	..	..	3,905·00	2,688·55	12·55
Do.	..	Sundry claims .. .. .	..	..	..	..	16·61	44·03	365·50	281·86	..
Mt. Morgans..	278F	Australian .. .. .	..	..	..	..	..	..	71·50	19·99	..
Do.	6F	(Lily of the Valley South: Westralia Mt. Morgans G.M. Co., 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.	(316F)	Transvaal South .. .. .	..	..	..	168·32	..	..	..	656·67	75·76
Do.	5F, (10F), (19F), (22F), (32F), (73F)	(Westralia Mt. Morgans G.M. Co., Ltd.)	..	..	..	..	..	..	575,148·00	294,758·28	5,552·63
Do.	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)	Westralia Mt. Morgans Mines, N.L. ..	..	..	15,427·00	3,685·32	..	..	15,827·00	3,861·73	..
Do.	..	Voided leases .. .. .	..	..	..	..	..	76·56	33,966·25	19,518·13	2·10
Do.	..	Sundry claims .. .. .	..	..	..	403·32	..	6·61	22·66	1,222·75	1,483·16
Murrin Murrin	(208F)	(Alex Junior) .. .. .	..	..	..	..	..	..	2,182·25	2,791·98	..
Do.	(203F)	(Alex Junior) .. .. .	..	..	..	..	..	..	170·00	88·73	..
Do.	(208F), (250F)	(Alex Junior leases) .. .. .	..	..	..	..	..	..	4,981·00	3,504·29	..
Do.	(195F)	(Elbe) .. .. .	..	..	..	..	..	..	60·00	116·41	..
Do.	(195F)	(Elbe) .. .. .	..	..	..	..	..	..	12·00	59·17	..
Do.	(195F), (197F)	(Elbe leases) .. .. .	..	..	..	..	..	..	2,731·75	2,891·06	3·60
Do.	(193F), (194F), (195F), (196F), (198F), (199F), (200F), (201F), (202F), (208F), (258F), (259F), (269F), (272F), (273F), (274F), (275F), (279F), (280F), (281F), (295F)	(Hill's Proprietary, Ltd.) .. .. .	..	..	..	..	..	..	2,563·47	1,636·94	..

Do.	(193F), (195F), (198F), (200F), (208F), (269F), (281F)	(194F), (196F), (199F), (202F), (258F), (274F), (281F)	Hill's Proprietary, Ltd.	..	..	..	112.44	..	..	..	1,997.00	2,215.11	..
Do.	(269F)	..	(Hopeful)	..	..	..	..	..	..	..	31.00	25.78	..
Do.	(194F)	..	(Murrin Murrin Proprietary)	..	..	..	..	..	..	..	3,767.00	4,461.70	..
Do.	(196F)	..	(Perseverance)	..	..	..	..	..	..	..	6,074.50	6,198.52	..
Do.	(193F)	..	(Proprietary Extended)	..	..	..	..	..	..	..	1,454.50	1,172.33	..
Do.	(193F), (198F), (201F),	(194F), (199F), (202F)	(Proprietary Extended leases)	..	..	..	..	..	..	..	43,813.00	21,760.15	6.00
Do.	..	..	Voided leases	..	..	..	..	10.43	222.93	..	57,527.25	53,684.72	20.00
Do.	..	..	Sundry claims	..	..	..	..	..	154.48	..	786.75	756.17	..
Redcastle	..	..	Voided leases	..	..	..	..	4.49	436.54	..	2,509.95	2,169.63	..
Do.	..	..	Sundry claims	..	..	..	..	..	103.58	..	139.00	163.01	..
<i>From District generally:—</i>													
Sundry parcels treated at:													
Mt. Morven Cyanide Works													
Oratava Works—Kalgoorlie													
Various Works													
Reported by Banks and Gold Dealers													
				136.49	..	..	..	..	1,641.39	32.47	..	..	..
Total				136.49	..	15,992.00	4,744.46	..	1,697.85	3,297.04	806,963.66	471,464.17	5,758.43

MOUNT MALCOLM DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Cardinia	..	Voided leases	..	..	..	..	..	1,568.29	1,628.24	3,550.42	..	..
Diorite King	1449c	Artful Dodger	..	..	37.50	132.90	..	..	71.75	279.37	..	..
Do.	1459c	King of the Hills	..	..	290.00	539.26	24.05	..	44.49	382.00	685.92	24.05
Do.	..	Voided leases	..	..	..	..	..	..	74.66	32,412.78	29,243.48	..
Do.	..	Sundry claims	..	..	36.50	22.75	..	..	65.50	2,310.30	2,810.22	..
Dodger's Well	1317c	Ivy	..	2.93	..	..	..	..	2.93	421.25	259.09	..
Do.	..	Voided leases	..	..	..	..	..	..	54.97	780.05	1,641.52	..
Do.	..	Sundry claims	..	..	..	..	..	..	3.37	720.25	562.32	..
Leonora	1473c	Auckland	..	..	91.50	26.26	..	..	..	91.50	26.26	..
Do.	(1356c)	Auckland	..	..	42.00	38.64	..	..	..	266.50	281.64	..
Do.	1447c	Casino	..	7.66	160.00	255.34	..	..	7.66	350.00	520.84	..
Do.	198c	(Eastern)	..	..	..	..	..	..	..	302.00	321.72	..
Do.	1360c	Federal Mint	..	..	..	..	..	..	..	78.50	171.46	..

TABLE 4.—Production of Gold and Silver from all sources, etc.—continued.

Mount Margaret Goldfield—continued.

MOUNT MALCOLM DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Leonora	(1448c)	Forrest: Leonora Main Reefs, Ltd.	..	..	30·00	99·28	..	..	39·00	139·41	..
Do.	(1469c)	Giant Reefs	..	..	10·00	1·06	..	..	10·00	1·06	..
Do.	1456c	Harbour Lights	..	..	..	..	..	..	85·50	17·17	..
Do.	(1454c)	Hope of Leonora	..	..	..	..	..	..	14·00	5·23	..
Do.	195c, 196c	Leonora Gold Blocks leases	..	..	698·00	383·31	..	..	17,207·00	14,548·77	..
Do.	1479c, 1480c	Leonora Proprietary, Ltd.	..	..	760·00	111·23	..	..	760·00	111·23	..
Do.	(1446c)	Mt. Gerमतong	..	..	..	..	..	..	21·00	3·42	..
Do.	(1466c)	Nellie Mac	..	..	..	..	..	..	6·00	40·72	..
Do.	1413c	Nil Desperandum	..	..	11·00	27·68	..	..	162·50	503·46	..
Do.	1216c	Rajah	..	..	33·00	56·10	..	..	539·50	1,132·74	..
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, 1341c, 1342c, 1343c, 1344c, 1345c, 1346c, 1347c	Sons of Gwalia, Ltd.	..	..	143,716·00	58,935·74	5,256·97	..	1,860,504·50	940,721·34	47,711·84
Do.	198c, 1082c	(Sons of Gwalia South G.M. Co., N.L.)	..	..	..	..	..	..	631·00	903·61	..
Do.	198c, (1257c), 1259c, (1285c), (1300c), (1301c)	(Sons of Gwalia South G.Ms., Ltd.)	..	..	..	..	..	..	98,239·00	51,593·99	8·66
Do.	198c, 1082c, 1259c	(Sons of Gwalia South G.Ms., Ltd.)	..	..	..	..	..	..	9,909·00	3,169·89	..
Do.	1453c	Tiger	..	..	52·50	14·95	..	..	125·00	38·27	..
Do.	263c	(Trump)	..	..	..	..	..	..	562·50	2,393·40	..
Do.	263c	Trump: Gwalia Central G.Ms., Ltd.	..	..	165·00	488·80	..	..	433·00	1,828·40	..
Do.	263c, (774c), (793c)	(Trump leases)	..	..	..	..	..	..	21,794·45	16,002·07	..
Do.	1307c	Victor	..	339·66	57·00	109·29	..	..	864·82	452·55	672·61

Do.	..	..	Voided leases .. .. .	..	..	..	..	..	728-08	110,456-95	43,535-25	10-71
Do.	..	..	Sundry claims .. .. .	..	2-10	140-00	634-96	..	45-06	7,909-55	6,367-14	..
Malcolm	..	1175c	North Star: Malcolm Prospecting Co., N.L.	..	..	2,577-00	1,261-96	..	..	25,092-50	14,248-71	..
Do.	..	(991c)	Richmond Gem .. .. .	..	..	11-00	32-83	..	..	9,190-00	8,056-53	..
Do.	..	..	Voided leases .. .. .	..	..	..	..	..	47-07	26,879-28	24,634-06	..
Do.	..	..	Sundry claims .. .. .	..	..	2-00	18-48	..	6-64	2,768-40	2,026-36	..
Mertondale	..	638c, 644c, (645c), (648c), (653c), (1146c), (1178c)	(Merton's Reward G.M. Co., Ltd.) ..	..	..	..	..	..	..	75,476-50	37,151-80	1,497-58
Do.	..	638c	(Merton's Reward North) ..	..	..	..	..	..	..	11,396-50	20,033-09	..
Do.	..	638c, 644c, (648c), (653c)	Merton's Reward North leases ..	..	..	..	695-39	..	..	503-00	2,437-85	..
Do.	..	..	Voided leases .. .. .	..	..	..	..	..	..	1,287-00	938-51	..
Do.	..	..	Sundry claims .. .. .	..	..	..	..	..	55-24	1,051-00	733-24	..
Mt. Clifford	..	(1337c)	Just in Time .. .. .	..	..	..	..	..	791-79	10-00	272-72	..
Do.	..	1329c	Victory No. 1 .. .. .	..	..	88-60	298-69	..	..	620-46	5,659-48	..
Do.	..	..	Voided leases .. .. .	..	..	..	..	..	572-66	3,255-50	6,723-50	..
Do.	..	..	Sundry claims .. .. .	..	..	..	..	9-75	208-44	635-25	939-05	..
Pig Well	..	1295c	(Starlight) .. .. .	..	..	..	..	..	..	181-50	695-73	..
Do.	..	1295c, 1324c	Starlight leases .. .. .	..	..	..	..	..	..	75-50	235-87	..
Do.	..	..	Voided leases .. .. .	..	..	..	..	..	..	12,982-07	13,538-20	63-68
Do.	..	..	Sundry claims .. .. .	..	..	..	..	..	34-61	2,391-40	1,036-51	..
Randwick	..	1401c	Triangle .. .. .	..	..	49-25	527-38	..	..	65-40	970-37	..
Do.	..	..	Voided leases .. .. .	..	..	..	..	..	235-37	7,931-75	7,150-18	..
Do.	..	..	Sundry Claims .. .. .	..	9-54	..	..	66-57	105-66	1,246-35	890-24	..
Webster's Find	..	..	Voided leases .. .. .	..	..	..	..	30-30	..	21,760-00	13,970-17	..
Do.	..	..	Sundry claims .. .. .	..	..	..	..	36-37	15-73	1,365-30	916-47	..
Wilson's Creek	..	..	Voided leases .. .. .	..	..	..	..	..	..	333-50	168-27	..
Do.	..	..	Sundry claims .. .. .	..	..	..	..	..	4-24	5-00	19-04	..
Wilson's Patch	..	(1120c), (1127c), (1130c)	(Great Western leases) .. .. .	..	..	..	..	..	..	12,698-50	5,572-69	..
Do.	..	(1120c), (1127c), (1130c)	Great Western (Wilson's Patch) G.M., Ltd.	..	..	..	18-71	..	..	5,931-50	2,290-42	..
Do.	..	..	Voided leases .. .. .	..	..	..	..	..	99-38	7,718-10	4,612-46	1-05
Do.	..	..	Sundry claims .. .. .	..	..	..	..	..	1-50	638-00	345-85	..
<i>From District Generally:—</i>													
Sundry Parcels treated at:—													
Fremantle Trading Co's. Works													
King of the Hills Works													
Mt. Clifford Battery													
North Star Battery													
Oratava Works—Kalgoorlie													
Randwick Battery													
Richmond Gem Works													
State Battery—Leonora													
State Battery—Pig Well													
Various Works													
Reported by Banks and Gold Dealers													
				127-82					2,183-69	131-00			
Total				127-82	361-89	149,057-25	65,581-36	5,281-02	2,326-68	6,469-16	2,403,633-38	1,317,491-57	49,435-83

TABLE IV.—Production of Gold and Silver from all Sources, etc.—continued.

Mount Margaret Goldfield—continued.

MOUNT MARGARET DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Burtville	1935T	Black Swan	..	..	268·00	405·18	50·97	..	..	523·00	864·41	50·97
Do.	(1832T)	Boomerang	..	..	64·50	70·88	..	..	569·00	810·44	..	
Do.	1952T	Curiosity	..	1·50	70·00	25·50	..	1·50	70·00	25·50	..	
Do.	1553T	Golden Bell	..	..	10·00	5·58	..	..	2,473·00	6,895·45	..	
Do.	(1851T)	Golden Bell North	..	..	..	..	..	..	1,491·00	1,886·33	..	
Do.	(943T)	(Mikado)	..	..	..	..	..	..	342·00	206·14	..	
Do.	(943T), (1124T)	Mikado G.M. Co., Ltd.	..	..	..	..	..	..	11,417·10	9,111·15	8·30	
Do.	1044T	Nil Desperandum	..	..	978·50	2,433·06	..	..	5,607·50	11,048·20	..	
Do.	1885T	Nulla Nulla	..	14·41	92·00	163·22	..	22·20	383·00	443·51	..	
Do.	1841T	Redeemed.	..	..	128·00	155·35	..	221·97	839·00	1,048·87	..	
Do.	(781T)	Sailor Prince	..	..	..	..	..	1·27	4,771·00	4,725·83	16·00	
Do.	(1931T)	Savage Captain	..	..	9·50	6·66	..	..	64·50	41·38	..	
Do.	(1644T), (1747T)	Specimen Hill leases	..	..	12·00	183·24	..	..	3,123·00	1,792·94	..	
Do.	..	Voided leases	..	..	..	..	..	1·02	128·78	30,310·58	60,019·30	200·00
Do.	..	Sundry claims	..	..	297·75	203·65	..	..	54·75	2,853·90	2,674·26	..
Duketon	1938T	Great Dolorite No. 1	..	105·86	10·00	18·18	..	3·54	374·02	10·00	18·18	..
Do.	1937T	Limonite	..	108·29	77·00	90·57	..	..	408·71	110·00	214·12	..
Do.	(1875T)	(Mulga Queen)	..	..	..	..	..	..	..	470·00	221·08	..
Do.	1990T	Mulga Queen Consols	..	..	180·00	190·88	..	..	..	180·00	190·88	..
Do.	(1875T)	Mulga Queen (West Australia) G.M. Co., Ltd.	..	..	180·00	44·14	..	..	..	480·00	98·19	..
Do.	..	Voided leases	..	..	..	..	..	..	110·53	29,502·00	20,300·54	..
Do.	..	Sundry claims	..	14·67	118·50	164·20	..	..	14·67	118·50	164·20	..
Eagle's Nest	..	Voided leases	..	..	..	..	..	..	145·34	331·00	1,215·78	..
Do.	..	Sundry claims	..	..	..	..	..	..	..	55·00	42·21	..
Erlistoun	(1923T)	Bundoleer	..	..	..	..	..	..	..	9·00	11·29	..
Do.	..	Voided leases	..	..	..	..	..	..	11·66	27,003·07	18,450·06	..
Do.	..	Sundry claims	..	..	..	..	..	1,175·43	116·81	2,109·90	1,809·69	..
Euro	..	Voided leases	..	..	..	..	..	..	65·14	83,964·25	35,957·12	..
Do.	..	Sundry claims	..	..	..	..	..	..	..	209·00	87·27	..
Laverton	371T	(Augusta)	..	..	..	..	..	..	..	11,216·00	11,670·72	..
Do.	371T	(Augusta Golden Rhine G.Ms. (W.A.), Ltd.)	..	..	..	..	..	..	..	15,497·50	11,031·75	..

Laverton	371T, 1650T	(Augusta G.M. Co., N.L.)								1,753.00	2,037.66		
Do.	370T, 1650T	Augusta G.M. Co., N.L.	17.66		2,239.00	683.62		17.66		2,589.00	776.02		
Do.	1918T	Bega		54.18	42.50	88.01			66.52	89.00	338.52		
Do.	1985T	British Lion South			46.50	20.83				46.50	20.83		
Do.	1957T	Bulldog				18.00				18.00	16.52		
Do.	(1797T), (1798T)	Craiggiemore leases								27,211.00	5,783.75		
Do.	(1922T)	Fairfield			21.00	18.17				260.00	292.47		
Do.	838T	(General Wabash)								100.00	288.72		
Do.	829T	(Ida H.)								111.00	285.13		
Do.	829T, 838T, 846T, 1219T, 1310T, 1671T, 1894T	Ida H. G.M. Co., Ltd.			16,584.00	3,939.88				184,484.00	137,014.22	4,674.69	
Do.	715T, 806T, 1206T, 1207, 1483T, 1523T, 1524T, 1525T, 1542T, 1544T, 1548T	Kalgoorlie and Boulder Firewood Co., Ltd.			10,977.00	2,954.97	417.18			10,977.00	2,954.97	417.18	
Do.	1897T	(Lady Harriet)								991.00	98.94		
Do.	1897T, 1900T	Lady Harriet leases: Mary Mac G.M. Co., N.L.			7,893.50	3,103.29				8,245.00	3,252.00		
Do.	715T, 806T, 1206T, 1207T, 1483T, 1523T, 1524T, 1525T, 1542T, 1544T, 1548T	(Lancefield G.M. Co., Ltd.)								102,179.78	39,402.81		
Do.	715T, 806T, 1206T, 1207T, 1483T, 1523T, 1524T, 1525T, 1542L, 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.	1949T	Pinnacles								96.00	36.51		
Do.		Voided leases								1,313.80	45,288.11		
Do.		Sundry claims		6.09	59.50	74.55		43.56		820.35	2,926.70		
Mt. Barnicoat		Voided leases								62.00	359.12		
Do.		Sundry claims								23.00	23.37		
Quartz Hill		Voided leases								10.00	3.86		
<i>From District Generally:—</i>													
Sundry Parcels treated at:—													
		Brown Hill Consols Works—Kalgoorlie				10.97					13.70		
		Craiggiemore Works									110.28		
		Mulga Queen Works									140.39		
		State Battery—Burtville									62.00	6,099.26	
		State Battery—Laverton				420.55					49.50	740.84	
		Various Works									89.00	2,944.94	
		Reported by Banks and Gold Dealers		26.18				1,893.60					
		Total		43.84	305.00	40,376.75	25,491.65	468.15	3,136.08	3,876.75	1,112,626.38	616,486.14	32,803.82

Menzies	4931z, 4935z, 5074z, 5260z, 5315z	4934z, 4936z, 5075z, 5261z	Menzies Consolidated G.Ms., Ltd.	..	..	29,858-00	15,268-42	..	..	..	307,357-00	165,926-21	78-67
Do.	(2820z)	..	Menzies Gold Mine	..	..	2,001-25	2,792-83	677-10	..	..	7,013-25	8,702-74	1,868-20
Do.	(2820z), (3031z)	(3006z)	(Menzies Gold Mine leases)	..	..	..	..	..	..	..	40,446-25	22,580-04	1,529-07
Do.	(2832z), (3100z), (4966z)	(2844z), (3138z), 5392z	Menzies Mining and Exploration Corporation, Ltd.	..	..	302-00	228-91	..	..	..	25,864-00	29,655-85	..
Do.	5359z	..	No Name	..	..	153-50	44-63	..	..	..	1,039-00	467-51	..
Do.	5392z	..	(Revival)	..	..	..	..	..	..	..	22-50	5-90	..
Do.	2823z	..	Robinson Crusoe	..	..	195-50	61-31	..	..	13-24	3,214-50	1,637-85	..
Do.	2823z	..	(Robinson Crusoe: Crusoe Gold Claims, Ltd.)	..	..	..	..	..	..	..	33,135-00	32,978-74	1,038-47
Do.	(5345z)	..	Seemore	..	..	..	..	..	..	..	701-00	544-13	..
Do.	5318z	..	Surprise	..	..	26-00	162-68	..	..	480-50	308-25	912-55	..
Do.	3048z	..	Warrior	..	..	35-00	6-39	..	..	..	111-50	21-32	..
Do.	3048z	(5336z)	(Warrior leases)	..	..	..	..	..	..	..	8,099-00	4,733-00	5-00
Do.	3048z	..	(Warrior: Menzies G.M. Co., N.L.)	..	..	..	..	..	..	..	1,165-00	731-48	..
Do.	..	..	Voided leases	..	..	..	..	..	45-42	548-82	139,422-21	173,970-53	6,822-32
Do.	..	..	Sundry claims	..	..	711-75	385-94	..	6-69	343-61	14,985-50	8,654-17	..
Mt. Ida	5307z	..	(Copperfield)	..	..	..	..	..	..	..	120-00	24-89	..
Do.	5307z	..	Copperfield	..	..	252-00	53-96	..	..	..	2,031-00	1,693-68	..
Do.	(5306z), 5035z	5307z	(Copperfield leases)	..	..	..	..	..	..	..	158-00	89-34	..
Do.	5250z	..	Federation	..	..	51-00	95-66	..	..	..	1,874-00	4,847-77	..
Do.	(5243z), (5322z), (5355z)	5321z, (5341z)	Forest Belle	..	..	136-00	171-45	..	..	..	3,812-00	3,434-00	..
Do.	..	..	(Mt. Ida Meteor leases)	..	..	..	..	..	..	..	9,472-00	7,148-80	39-00
Do.	(5243z), 5382z	5321z	Mt. Ida Meteor leases	..	..	72-00	20-59	..	..	..	896-00	1,159-89	..
Do.	(5399z)	..	Mt. Ida West	..	..	198-00	276-17	..	..	..	398-00	611-78	..
Do.	5321z	..	Pactolus	..	..	30-00	11-83	..	..	..	30-00	11-83	..
Do.	5177z	..	(Timoni)	..	..	..	..	..	..	..	20-00	36-62	..
Do.	5290z	..	Unexpected	..	..	267-00	149-30	..	..	..	4,737-00	8,599-10	..
Do.	5290z	(5329z)	Unexpected South	..	..	464-00	483-26	8-25	..	..	774-00	655-67	8-25
Do.	5290z	(5381z)	(Unexpected South leases)	..	..	..	..	..	..	..	4,524-00	8,179-29	35-64
Do.	5292z	..	Wild Rose	..	..	185-00	157-03	..	..	..	849-00	735-80	..
Do.	..	..	Voided leases	..	..	..	..	..	..	77-07	23,631-58	28,529-86	23-74
Do.	..	..	Sundry claims	..	..	127-00	38-41	..	..	9-57	3,759-50	2,470-93	..
<i>From District Generally:—</i>													
Sundry Parcels treated at:—													
Balkis Battery 977-75 1,801-54 ..													
Crusoe Wedderburn Cyanide Works 443-87 973-14 ..													
Fremantle Trading Co., Ltd. 30-88 212-98 ..													
Lady Harriet Battery 232-50 62-50 852-25 ..													
Menzies Mining and Exploration Corporation, Ltd., Works 639-50 732-04 ..													
Menzies Residue Plant 120-22 120-22 ..													
Mt. Ida Cyanide Works 3,323-96 ..													
Mt. Ida Meteor Works 467-01 1,090-95 ..													
State Battery—Menzies 575-88 486-50 1,043-50 14,130-31 486-50													
State Battery—Mt. Ida 1,833-25 4,471-57 ..													
Various Works 763-55 3,152-49 122-93													
Reported by Banks and Gold Dealers 5-11 891-10 195-48 ..													
Total				5-11	48-92	68,486-24	53,735-49	1,259-85	972-08	2,668-61	897,526-72	805,918-26	12,984-01

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

North Coolgardie Goldfield—continued.

ULARRING DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Davyhurst ..	959v	Expansion .. ..	..	..	1,325·00	211·92	..	..	..	1,795·00	286·98	..
Do. ..	924v	Golden Eagle .. ..	..	..	48·25	18·37	..	..	..	48·25	18·37	..
Do. ..	459v	(Golden Pole) .. ..	..	..	..	..	..	..	..	34·00	47·51	..
Do. ..	459v, 461v, 468v, (484v), (786v), (873v)	(Golden Pole G.Ms., Ltd.) .. ..	..	..	..	..	..	..	..	74,110·90	71,961·09	..
Do. ..	459v, 461v, 468v	Golden Pole G.Ms., Ltd. .. ..	..	..	317·00	313·29	..	..	..	3,344·00	2,298·79	..
Do. ..	459v, 461v, 468v, (484v)	(Golden Pole G.Ms., N.L.) .. ..	..	..	..	..	..	..	..	970·00	2,321·69	..
Do. ..	(613v)	(Great Ophir) .. ..	..	..	..	..	..	..	..	161·00	96·79	..
Do. ..	(613v)	(Great Ophir G.Ms., Ltd.) .. ..	..	..	..	..	..	..	3·34	559·10	311·83	..
Do. ..	(613v), (834v), (857v), (864v), (878v), 907v, 924v	(Great Ophir Gold Corporation, Ltd.) .. ..	..	..	..	..	..	..	..	3,342·00	468·57	..
Do. ..	(613v), (834v), (857v), (864v), (878v)	Great Ophir Gold Corporation, Ltd. .. ..	..	..	..	..	..	..	..	1,222·00	169·95	..
Do. ..	882v	Lady Ellen .. ..	..	..	32·75	64·58	..	..	..	..	..	..
Do. ..	907v	North Pole .. ..	..	..	39·75	9·89	..	..	20·33	800·25	1,184·79	..
Do. ..	(928v)	Pirate .. ..	..	..	15·00	37·34	..	..	..	39·75	9·89	..
Do. ..	(874v)	(Resurgam) .. ..	..	..	..	..	..	..	..	497·75	835·34	..
Do. ..	(874v)	Resurgam .. ..	..	..	104·00	155·85	..	..	..	415·00	769·72	..
Do. ..	(874v), (877v) ..	(Resurgam leases) .. ..	..	..	..	..	..	..	..	214·00	422·31	..
Do. ..	438v	(Waihi) .. ..	..	..	..	..	..	..	..	1,005·25	2,660·93	..
Do. ..	438v	Waihi .. ..	..	..	65·75	278·60	..	..	4·51	243·50	851·09	..
Do. ..	438v	(Waihi: Westralia Waihi G.Ms., N.L.) .. ..	..	..	..	..	..	..	..	411·75	1,003·96	..
Do. ..	438v	(Waihi: Westralia Waihi G.Ms., N.L.) .. ..	..	..	..	..	..	..	..	1,437·00	1,526·94	58·90
Do. ..	907v, 924v	(Westralia United Goldfields, Ltd.) .. ..	..	..	502·00	232·44	..	..	..	686·50	465·60	..
Do. ..	438v, (792v) ..	(Westralia Waihi G.Ms., N.L.) .. ..	..	..	..	..	..	..	..	1,471·75	814·49	..
Do. ..	.. ..	Voiced leases .. ..	..	..	..	..	..	..	2·93	26,192·00	15,004·51	5,225·54
Do. ..	.. ..	Sundry claims .. ..	..	..	257·25	212·74	..	..	110·81	26,957·98	18,398·69	118·60
Do. ..	.. ..	.. ..	..	..	..	..	..	..	30·12	5,133·85	2,735·50	..
Diemel's Find	.. ..	Sundry claims .. ..	..	..	..	..	..	..	7·37	102·50	119·13	..
Mulline ..	955v	Belle Maie .. ..	..	..	56·25	148·56	..	..	..	84·00	234·83	..
Do. ..	(957v)	Crusoe .. ..	..	..	10·50	1·52	..	..	..	43·50	7·41	..
Do. ..	(961v)	Golden Horn .. ..	..	..	24·50	24·78	..	..	..	48·00	66·42	..
Do. ..	139v, 235v, 555v, (670v), (671v), (679v), (732v), (862v)	(Lady Gladys's G.M. Co., N.L.) .. ..	..	..	..	..	..	..	..	16,871·50	17,777·42	..

Mulline	139v, 235v, 555v, (670v)	(Lady Gladys G.M. Co., N.L.)								1,220.50	512.52	
Do.	139v, 235v, 555v	(Lady Gladys leases)							170.89	7,741.00	15,025.05	
Do.	139v, 235v, 555v, (670v)	Lady Gladys leases			319.75	162.80				691.25	332.35	
Do.	960v	Peach Tree			42.50	47.66				70.75	77.73	
Do.	123v	Riverina			240.00	270.30				5,897.00	3,283.12	
Do.	123v (773v)	(Riverina G.M. Co., N.L.)								11,254.00	7,096.21	
Do.	324v, 600v, 730v	Riverina South leases			1,370.00	1,174.07			43.87	16,764.50	12,794.55	
Do.	763v	Young Australian			52.50	54.33				52.50	74.33	
Do.	763v	(Young Australian)								1,295.00	3,609.26	
Do.	763v, (938v), 939v	(Young Australian leases)			184.50	229.00				2,672.25	5,763.88	
Do.		Voided leases							59.33	21,555.47	22,947.43	2.71
Do.		Sundry claims		2.02	489.00	318.25			35.53	4,410.25	3,769.02	.69
Mulwarrie	966v	Great Britain			24.50	8.39				24.50	8.39	
Do.	(951v)	Killaloe				7.74				121.50	101.83	
Do.	919v	Mulwarrie			37.00	54.61				588.00	361.62	
Do.	967v	Mulwarrie Main Reef			39.75	29.45				39.75	29.45	
Do.		Voided leases							56.84	17,365.39	24,822.43	26.37
Do.		Sundry claims			286.75	224.17			19.24	1,853.75	1,536.28	
Ularring	954v	Cardinal			151.50	145.46			8.32	224.50	207.44	
Do.		Voided leases							526.63	8,963.85	13,051.86	
Do.		Sundry claims								143.00	113.15	
<i>From District Generally:—</i>												
Sundry Parcels treated at:—												
		Expansion Battery				38.31					38.31	
		Golden Pole Battery				185.26					242.52	
		Oratava Works—Kalgoorlie									54.39	
		State Battery—Mulline			40.25	189.58				482.75	12,508.96	
		*State Battery—Mulwarrie				174.81				595.20	3,383.51	
		Various Works							15.82	90.25	145.55	
		Reported by Banks and Gold Dealers						18.53				
		Total		2.02	6,126.00	5,024.07		21.46	1,113.72	272,358.99	274,541.68	5,432.91

NIAGARA DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Desdemona	725G	Hawk			148.50	202.88						
Do.		Voided leases							5.73	9,207.75	6,905.98	12.04
Do.		Sundry claims							8.99	1,331.70	634.19	

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

North Coolgardie Goldfield—continued.

NIAGARA DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Kookynie	320g	Champion	..	..	255.50	114.72	..	..	..	20,181.00	9,724.68	2.28
Do.	320g	(Champion; Champion Proprietary, Ltd.)	..	..	..	..	..	..	..	36,310.00	18,381.09	425.32
Do.	320g, (335g), (347g)	(Champion leases)	..	..	..	..	..	..	..	2,157.50	2,554.15	..
Do.	320g, (335g), (347g)	(Champion leases: Guthrie and Co., Ltd.)	..	..	..	..	..	..	..	2,705.00	1,556.16	..
Do.	756g	(Cosmopolitan No. 1: Cosmopolitan Proprietary, Ltd.)	..	..	123.00	98.21	..	..	..	578.00	793.00	..
Do.	756g	Cosmopolitan No. 1: Western Machinery Co., Ltd.	..	..	115.00	104.10	..	..	..	115.00	104.10	..
Do.	757g	(Cosmopolitan No. 2: Cosmopolitan Proprietary, Ltd.)	..	..	116.00	110.48	..	..	..	710.00	909.66	..
Do.	757g	Cosmopolitan No. 2: Western Machinery Co., Ltd.	..	..	370.00	404.01	..	..	..	370.00	404.01	..
Do.	..	Voided leases	..	..	..	..	..	..	257.33	666,943.97	349,511.68	4,948.37
Do.	..	Sundry claims	..	..	187.75	611.51	..	30.59	74.79	3,874.50	3,910.53	..
Niagara	419g, 461g	(Hannans Main Reef G.M. Co., Ltd.)	..	..	..	..	..	..	..	11,119.00	5,910.89	..
Do.	(763g)	Lone Hand	..	..	10.00	5.17	..	..	13.64	725.00	478.88	..
Do.	734g	(Lubra Queen)	..	..	..	..	..	..	..	831.00	285.51	..
Do.	734g, (735g), (744g), 749g	Lubra Queen G.M. Co., N.L.	..	..	1,170.00	492.11	..	..	..	4,490.00	1,786.59	..
Do.	734g, (735g)	(Lubra Queen leases)	..	..	..	..	..	..	..	1,230.00	966.71	..
Do.	(721g)	May	..	..	38.00	28.68	..	..	..	1,167.25	837.19	..
Do.	419g	(Opal)	..	..	..	..	..	..	..	552.50	490.53	..
Do.	419g	(Opal: Hannans Main Reef G.M. Co., Ltd.)	..	..	..	..	..	..	..	119.00	70.99	..
Do.	419g, 461g, (679g), (688g), (689g), (705g)	Orion Mines, Ltd.	..	..	..	282.64	..	..	..	24,744.25	12,344.01	..
Do.	461g	(Pearl: Hannans Main Reef G.M. Co., Ltd.)	..	..	..	..	..	..	..	398.00	224.38	..
Do.	..	Voided leases	..	..	..	..	..	..	90.90	38,614.00	27,999.33	..
Do.	..	Sundry claims	..	..	519.50	358.52	..	13.27	46.97	8,363.50	5,103.31	..
Tampa	278g	(Fortuna)	..	..	..	..	..	..	..	109.00	187.42	..
Do.	278g	Fortuna	..	..	..	..	..	..	..	30.00	27.06	..
Do.	278g, (349g)	(Fortuna leases)	..	..	..	..	..	..	..	1,763.50	2,371.95	..
Do.	753g, 754g, 759g, 760g	Golden Butterfly G.M. Co., N.L.	..	..	14,479.32	3,585.24	79.24	..	..	31,379.32	7,808.27	174.24
Do.	..	Voided leases	..	..	..	..	..	..	15.66	15,950.05	11,748.91	..
Do.	..	Sundry claims	..	..	..	..	..	5.07	4.37	2,514.50	1,404.34	..

From District generally :-

Sundry parcels treated at :											
Grafter Battery	.. .. .	..	..	..	32.13	..	..	..	82.00	271.28	..
State Battery—Niagara	.. .. .	..	..	..	247.58	..	..	..	622.50	8,273.72	..
Various Works	.. .. .	..	..	..	..	..	..	..	451.00	6,356.43	41.17
Reported by Banks and Gold Dealers	.. .. .	46.44	..	..	..	..	1,368.41	787.38	..	..	..
Total	.. .. .	46.44	..	17,532.57	6,877.98	79.24	1,417.34	1,305.76	890,044.29	490,865.81	5,603.42

YERILLA DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Edjudina	994R	Digger	..	..	28.00	12.58	..	..	..	55.00	24.78	..
Do.	(1016R)	Gawler Extended	..	..	14.33	10.50	..	..	..	14.33	10.50	..
Do.	(418R), (497R)	(Gawler G.M. Co., Ltd.)	..	..	..	..	..	..	..	1,505.50	2,641.43	..
Do.	(1009R)	Marama	..	..	81.00	42.38	..	..	..	81.00	42.38	..
Do.	(418R)	Neta Extended	..	..	..	..	..	..	..	61.50	48.61	..
Do.	(418R)	(Neta Extended)	..	..	..	..	..	..	..	1,182.50	1,421.81	..
Do.	1018R	Neta Extended	..	..	169.25	236.92	..	..	..	169.25	236.92	..
Do.	1010R, 1011R	Neta leases	..	..	87.00	68.14	..	..	..	119.50	98.46	..
Do.	(401R), (418R), (497R), (500R)	(Neta leases)	..	..	..	..	..	..	..	5,217.00	9,968.12	34.58
Do.	1015R	Senate	..	..	184.00	93.13	..	..	..	184.00	93.13	..
Do.	..	Voided leases	..	..	..	..	..	..	14.06	21,151.76	24,727.16	3.21
Do.	..	Sundry claims	..	..	172.83	114.13	..	..	13.06	2,531.00	2,111.69	..
Eucalyptus	..	Voided leases	..	..	..	..	..	..	2,864.77	1,351.35	3,020.68	..
Do.	..	Sundry claims	..	..	79.00	69.49	..	..	367.50	362.50	381.82	..
Linden	1025R	Andy Fisher	..	..	109.70	116.34	..	..	..	109.70	116.34	..
Do.	998R	Bindah	..	..	501.50	171.62	..	..	..	1,423.50	516.97	..
Do.	965R	Danube	..	..	210.00	211.08	..	..	..	773.50	854.37	..
Do.	871R	Democrat	..	..	127.75	432.49	..	..	9.01	1,825.75	3,964.62	..
Do.	1019R	Edna	..	..	31.25	22.32	..	..	..	31.25	22.32	..
Do.	1024R	Great Carbine	..	..	23.50	12.37	..	..	..	23.50	12.37	..
Do.	(928R)	Great Carbine	..	..	67.00	13.32	..	7.53	..	1,721.00	1,117.57	..
Do.	942R	Great Junction	..	6.11	228.75	239.84	..	..	6.11	889.75	808.45	..
Do.	971R	Linden Star	..	22.00	27.00	52.76	..	..	22.00	130.75	145.51	..
Do.	1005R	Olympic	..	..	..	..	..	..	..	37.00	17.93	..
Do.	903R, (904R), 985R, (992R)	Westralia United Goldfields, Ltd.	..	..	..	..	..	..	..	1,995.00	1,452.42	..
Do.	..	Voided leases	..	..	..	..	..	..	516.04	8,904.90	12,237.80	..
Do.	..	Sundry claims	..	..	293.50	136.26	..	77.81	35.11	5,745.00	4,055.74	..
Mt. Celia	..	Voided leases	..	..	..	..	..	..	..	14.00	5.39	..
Mt. Howe	..	Sundry claims	..	..	..	..	..	..	..	5.00	11.13	..

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

North Coolgardie Goldfield—continued.

YERILLA DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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. Remarkable	..	Voided leases ..	..	..	..	..	..	17.74	528.72	415.09	..
Do.	..	Sundry claims ..	..	..	..	..	..	4.00	1.32	..	
Pinjin	729R	Anglo Saxon ..	..	..	80.50	57.51	..	..	6,112.90	5,084.21	..
Do.	..	Voided leases ..	..	..	..	..	..	46.99	7,961.90	4,895.04	..
Do.	..	Sundry claims ..	..	..	188.00	99.39	..	99.36	3,207.85	2,147.06	..
Yarri	788R	Dostmund ..	..	..	63.00	53.71	..	..	838.00	1,679.35	2.00
Do.	947R	Dostmund West ..	..	..	57.00	164.60	..	..	459.00	625.73	..
Do.	(1017R)	Golden Butterfly ..	..	..	..	..	..	..	49.50	71.68	..
Do.	581R	Wallaby ..	..	..	728.00	138.16	..	41.36	11,211.50	4,158.31	..
Do.	999R	Wallaby Central ..	..	..	845.50	147.08	..	..	845.50	147.08	..
Do.	..	Voided leases ..	..	..	..	..	..	6.30	45.72	21,903.25	12,226.90
Do.	..	Sundry claims ..	..	..	424.00	94.14	..	..	3.31	4,594.60	2,423.30
Yerilla	850R	(Central East) ..	..	..	..	..	..	..	244.00	166.12	..
Do.	1020R	Melba ..	..	..	6.00	4.74	..	..	6.00	4.74	..
Do.	752R, 850R	Viola leases ..	..	..	242.00	191.59	2.57	..	9.64	2,164.00	1,958.48
Do.	(1001R)	Westward Ho ..	..	..	57.00	29.92	..	..	..	267.50	130.04
Do.	851R	Yerilla King ..	..	..	2,307.25	1,374.04	..	..	3,079.87	5,896.75	4,419.03
Do.	..	Voided leases ..	..	..	..	..	..	..	6,996.96	5,617.10	8.54
Do.	..	Sundry claims ..	..	..	38.50	36.77	..	19.30	15.88	2,041.00	1,161.75
Yilgangie	..	Voided leases ..	..	..	..	..	..	..	218.75	295.45	..
Do.	..	Sundry claims ..	..	..	..	..	..	121.67	29.83	25.50	46.17
Yundamindera	931R	Battles Ville ..	..	..	510.00	84.89	..	..	2,481.50	639.88	..
Do.	979R	Potosi ..	..	..	..	..	..	..	41.00	94.53	..
Do.	..	Voided leases ..	..	..	..	..	..	..	71.37	66,010.10	44,750.25
Do.	..	Sundry claims ..	..	..	167.50	195.83	..	..	85.22	2,361.00	1,912.80
<i>From District generally:—</i>												
Sundry parcels treated at:												
Battlesville Battery ..					151.35				151.35			
Fremantle Trading Co.'s Works ..					..				4.92		
Neta Battery ..					108.03				189.62			
Pinjin Cyanide Works ..					381.10				381.10			
State Battery—Linden ..					327.45				72.00		3,366.48	
State Battery—Pinjin ..					80.97				125.50		1,265.36	
State Battery—Yarri ..					344.53				231.50		3,480.89	
State Battery—Yerilla ..					493.44		2.17		72.00		1,194.66	
Various Works ..					..				660.85		3,463.41
Reported by Banks and Gold Dealers ..					..		1,001.90		154.74		..
Total					28.11		8,149.61		6,619.91		2.57	
					1,236.68		7,548.69		205,248.42		178,735.62	
					68.04							

Broad Arrow Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Bardoc ..	1743w ..	Zoroastrian ..	..	..	17.57	37.00	..	..	..	17.57	37.00	..
Do. ..	(1659w) ..	Zoroastrian ..	..	..	53.01	69.67	..	..	..	720.87	277.66	..
Do. ..	..	Voided leases ..	..	..	..	..	..	..	256.68	72,011.36	50,465.51	203.60
Do. ..	..	Sundry claims ..	..	..	156.72	60.52	..	..	180.70	2,579.97	1,831.48	..
Black Flag ..	(1681w) ..	Great Wonder ..	..	..	..	..	..	..	17.43	44.00	17.81	..
Do. ..	(1726w) ..	Lady Bountiful ..	..	..	..	..	..	..	..	8.63	19.46	..
Do. ..	(1730w) ..	Stella May ..	..	..	19.20	12.83	..	..	..	38.20	25.66	..
Do. ..	..	Voided leases ..	..	..	..	..	..	27.81	356.56	39,983.49	24,314.17	..
Do. ..	..	Sundry claims ..	..	..	..	..	..	686.51	154.78	1,913.26	1,786.09	..
Broad Arrow	1744w ..	Arrow Star ..	..	7.99	8.25	113.61	..	..	7.99	8.25	113.61	..
Do. ..	1636w ..	Eldorado ..	..	48.27	..	..	..	..	309.99	34.35	83.10	..
Do. ..	(1677w) ..	Jumbo ..	..	..	18.40	20.41	..	..	..	158.63	84.78	..
Do. ..	1707w ..	Pearl ..	..	18.61	8.90	7.65	..	..	18.61	36.10	40.23	..
Do. ..	(1684w) ..	Surbiton ..	..	..	..	..	..	..	..	118.17	86.20	..
Do. ..	1735w ..	Tara ..	..	..	72.60	418.78	..	..	..	72.60	418.78	..
Do. ..	1745w ..	Yellow Jacket ..	..	..	148.00	77.08	..	..	..	148.00	77.08	..
Do. ..	..	Voided leases ..	..	..	..	..	..	54.85	817.21	116,137.38	94,913.63	15.85
Do. ..	..	Sundry claims ..	..	218.39	114.84	140.48	..	967.96	1,072.93	6,760.03	4,548.28	..
Paddington ..	1740w ..	Indarra ..	..	..	14.55	5.14	..	..	..	14.55	5.14	..
Do. ..	1733w ..	Mount Eddy ..	..	..	21.50	112.19	..	..	..	67.50	409.21	..
Do. ..	1747w ..	Mount Eddy Extended ..	..	..	36.25	72.55	..	..	..	36.25	72.55	..
Do. ..	1658w ..	Star of W.A. ..	..	..	89.00	168.07	..	..	..	182.15	409.73	..
Do. ..	..	Voided leases ..	..	..	..	..	..	5,557.72	257.75	173,252.17	80,769.93	18.96
Do. ..	..	Sundry claims ..	..	..	221.04	148.83	..	1,714.16	..	9,642.73	6,242.49	..
Siberia ..	(1694w) ..	A.N.A. ..	..	..	..	..	..	..	..	21.00	7.84	..
Do. ..	1399w, 1424w, 1429w, 1442w, 1655w	Associated Northern Blocks (W.A.), Ltd.	..	..	7,155.71	2,607.15	198.00	..	..	123,519.09	34,930.02	899.30
Do. ..	1722w ..	Bonnie Doon ..	..	..	30.00	24.20	..	..	..	36.25	56.35	..
Do. ..	(1460w) ..	Brace and Bit ..	..	..	..	..	..	..	..	163.50	13.79	..
Do. ..	(1685w), (1701w)	Comedy King leases ..	..	..	..	..	..	..	..	31.00	8.51	..
Do. ..	(1698w) ..	Gimlet Central Extended ..	..	..	..	..	..	..	..	107.43	195.27	..
Do. ..	1739w ..	Gimblet Consols ..	..	..	24.00	3.02	..	..	..	24.00	3.02	..
Do. ..	(1427w) ..	Gimblet Consols ..	..	..	..	..	..	..	..	133.00	17.63	..
Do. ..	(1695w) ..	Gimblet Duke ..	..	..	..	..	..	..	..	166.00	31.21	..
Do. ..	(1452w), (1458w)	Gimblet Proprietary, N.L. ..	..	..	..	..	..	..	..	30.00	3.76	..
Do. ..	1371w ..	Gimblet South ..	..	..	14,537.00	2,668.82	..	..	..	38,379.50	7,779.59	..
Do. ..	1399w ..	(Gimblet South Extended) ..	..	..	..	..	..	..	..	525.00	835.44	..

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Broad Arrow Goldfield—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Siberia	1399w, 1424w, 1429, 1442w	(Gimblet South Extended leases)	215·00	39·98	..	
Do.	1338w	(Gimblet West)	..	..	..	..	..	680·50	482·83	..
Do.	1286w, 1403w	Golden leases	..	..	27·32	17·14	..	374·82	205·73	538·82
Do.	1358w	Golden Mount	..	..	159·50	95·88	..	4·26	1,673·50	967·41
Do.	(1693w)	Golden Mount South	..	..	..	..	..	..	30·00	9·08
Do.	1644w, 1673w	Home Signal G.M. Syndicate, N.L.	..	..	..	..	..	..	12·00	15·59
Do.	(1710w)	Indarra	..	..	16·00	7·78	..	..	78·00	16·98
Do.	1434w	Jack Hugh	..	..	33·00	30·43	..	..	44·41	176·00
Do.	1289w, 1308w	Lady Evelyn leases	..	1·83	429·50	236·17	..	..	25·26	3,684·25
Do.	1737w	Lorna Doon	..	5·30	17·75	11·80	..	..	5·30	17·75
Do.	1746w	May Day	..	..	5·50	9·50	..	..	..	5·50
Do.	1293w	Mexico	..	..	86·50	87·96	..	..	..	214·50
Do.	1293w, (1298w)	(Mexico leases)	..	..	..	..	..	..	..	457·00
Do.	(1670w)	New Golden Gimlet	..	..	..	..	..	..	..	222·00
Do.	1736w	Pole	..	..	60·00	15·62	..	..	..	60·00
Do.	(1416w)	Prince Foote	..	..	..	..	..	..	..	22·50
Do.	1375w	(Siberia Consols)	..	..	..	..	..	..	41·58	1,013·50
Do.	1375w, 1610w, 1720w	Siberia Consols G.M. Co., N.L.	..	..	235·00	232·43	..	..	..	235·00
Do.	1336w	(Slippery Gimblet)	..	..	..	..	..	..	..	26,110·50
Do.	1336w, 1338w, 1419w	Slippery Gimblet leases	..	..	2,258·00	624·72	..	..	..	3,993·00
Do.	(1671w)	Stirling West	..	..	25·00	3·28	..	..	..	115·00
Do.	(1705w)	Whitehaven	..	..	..	..	..	..	..	105·00
Do.	..	Voided leases	..	..	..	..	..	..	168·21	18,160·25
Do.	..	Sundry claims	3·51	7·95	729·67	516·11	..	126·49	405·10	4,603·02		
Smithfield	..	Voided leases	..	..	..	..	..	..	..	1,027·00
Do.	..	Sundry claims	..	..	..	..	..	..	23·79	49·50
<i>From Goldfield generally:—</i>												
Sundry parcels treated at:												
..	..	Allsop and Howell's Works, Kalgoorlie	6·70	
..	..	Brown Hill Consols Works, Kalgoorlie	38·99	15·32	271·76	
..	..	Duke Cyanide Works	5·25	
..	..	Fremantle Trading Co., Ltd., Works	80·10	
..	..	Hannan's Central Works, Kalgoorlie	8·70	15·47	
..	..	Northey's Venture Works	81·59	613·24	

Oratava Works, Kalgoorlie .. .. .	..	..	..	..	..	..	..	..	..	94.89	..
Paddington Slimes Plant .. .. .	..	..	..	..	..	..	..	..	..	789.17	..
Pole Works .. .. .	..	..	..	..	..	..	..	..	..	356.07	..
Regan's Carnage Battery .. .. .	..	..	..	..	..	..	..	..	27.00	598.81	..
State Battery—Ora Banda .. .. .	..	..	..	..	..	..	..	..	19.00	15.08	..
State Battery—Siberia .. .. .	..	..	..	..	..	..	..	..	..	40.00	746.57
Zoroastrian Works .. .. .	..	..	..	..	..	..	..	..	..	116.50	1,082.23
Various Works .. .. .	..	..	..	..	..	..	..	..	2,271.17	16,622.68	30,251.66
Cement from Alluvial Claims at Paddington .. .. .	..	..	..	49.95	6.61	..	..	..	..	49.95	6.61
Cement from Alluvial Claims at Siberia .. .. .	..	..	..	515.25	76.36	..	..	..	..	515.25	76.36
Reported by Banks and Gold Dealers .. .. .	..	..	4.52	..	..	..	..	..	7,300.47	..	..
Total	8.03	308.34	27,394.65	8,969.61	198.00	18,707.14	4,543.36	667,726.05	379,454.00	1,416.56

North-East Coolgardie Goldfield.
KANOWNA DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Black Swan ..	..	Voided leases .. .. .	..	..	..	..	..	..	160.00	141.76	..
Gambier ..	..	Voided leases .. .. .	..	..	..	..	..	38.73	12,729.00	6,638.30	..07
Do. ..	..	Sundry claims .. .. .	..	..	..	..	24.70	245.94	858.75	750.42	..
Gindalbie ..	(394x), (396x) ..	Kalgoorlie Foundry, Ltd. .. .. .	..	..	..	..	..	..	4,524.00	2,468.70	..
Do. ..	(392x), (394x), (396x), (1048x), (1207x)	(Melton G.M. Co., N.L.) .. .. .	..	..	..	..	..	..	654.00	485.80	..
Do. ..	(392x), (394x), (396x), (1048x), (1207x)	(Queen Margaret G.M. Co., Ltd.) .. .. .	..	..	..	..	..	..	25,540.03	24,642.71	38.31
Do. ..	(392x), (394x), (396x)	(South Gippsland leases) .. .. .	..	..	..	..	..	..	3,697.00	3,805.05	..
Do. ..	(392x), (394x), (396x), (1048x), (1207x)	(South Gippsland leases) .. .. .	..	..	..	..	..	..	1,060.00	1,119.69	..
Do. ..	..	Voided leases .. .. .	..	..	..	..	..	19.94	8,130.05	6,913.37	..
Do. ..	..	Sundry claims .. .. .	..	..	..	..	..	674.82	1,017.75	1,207.80	..
Gordon ..	891x	(Sirdar) .. .. .	..	..	..	..	..	32.60	168.50	1,319.35	..
Do. ..	891x	Sirdar .. .. .	..	..	765.00	505.56	..	12.32	2,010.00	910.57	..
Do. ..	891x, (1222x), (1223x), (1229x)	(Sirdar G.M. Co., Ltd.) .. .. .	..	..	..	..	..	..	35,988.00	5,759.77	..
Do. ..	..	Voided leases .. .. .	..	..	..	..	..	205.17	1,570.80	1,074.78	..
Do. ..	..	Sundry claims .. .. .	..	..	..	..	..	54.65	630.50	577.80	..

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

North-East Coolgardie Goldfield—continued.

KANOWNA DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Kanowna	(1062x)	Gentle Polly	..	..	30·00	21·95	..	..	24·46	6,949·25	12,498·22	359·00
Do.	1288x	Golden Crown	..	..	308·00	126·83	..	..	10·89	1,802·00	539·97	..
Do.	1302x	Golden Valley	..	..	83·00	128·91	..	..	..	464·00	203·61	..
Do.	1342x	Hidden Boulder	..	..	648·00	209·55	..	..	..	1,064·00	403·81	..
Do.	(1344x)	Hill	..	31·76	12·00	2·57	..	..	47·99	38·00	29·53	..
Do.	1019x	Kanowna	..	..	279·00	248·18	..	..	691·94	6,927·50	9,115·24	..
Do.	1299x	Kanowna Consol	..	..	..	..	..	..	..	713·50	129·30	..
Do.	(1341x)	Kanowna Queen	..	..	..	..	..	..	..	103·00	4·29	..
Do.	(1055x)	Kintore	..	..	56·00	52·94	..	..	..	2,159·75	2,623·88	..
Do.	(1331x)	Lady Alice	..	..	28·00	3·60	..	..	..	139·00	28·22	..
Do.	18x, 19x	(Lily Australis G.Ms., Ltd.)	..	..	..	..	..	..	..	197·00	119·18	..
Do.	1295x	Louisa	..	..	301·00	94·76	..	..	6·32	616·00	192·13	..
Do.	1282x	Luck at Last	..	..	28·00	9·68	..	..	..	591·50	508·17	..
Do.	(1347x)	Nora	..	..	56·00	74·86	..	..	..	86·00	124·50	..
Do.	(1296x)	North Lead	..	..	..	..	..	..	..	6,720·00	1,479·40	..
Do.	(3x), 14x, 15x, 18x, 19x, (60x), (81x), (938x), 974x, 1035x, 1103x, (1263x)	(North White Feather G.Ms., Ltd.)	..	..	..	..	..	..	..	147,974·75	74,343·01	159·19
Do.	14x, 15x, 18x, 19x, 974x, 1035x, 1103x, (1263x), (1276x), 1278x	(North White Feather G.Ms., Ltd.)	..	..	..	..	..	..	..	37,768·50	10,594·79	..
Do.	12x, 13x, 14x, 15x, 18x, 19x, 72x, 855x, 974x, 1035x, 1103x, (1263x), 1278x	North White Feather G.Ms., Ltd.	..	..	9,545·00	4,572·53	..	..	..	27,915·50	13,320·46	..
Do.	(1339x)	Polly Ann	..	15·26	28·00	15·13	..	..	84·89	125·00	56·67	..
Do.	1261x	Prince Foote	..	..	..	..	..	..	..	429·00	155·03	..
Do.	(1332x)	Prince Guelph	..	..	..	..	..	..	..	137·00	70·32	..
Do.	1330x	Robinson	..	..	1,261·00	946·76	..	..	..	2,069·00	1,504·59	..
Do.	1300x	Sunset	..	..	528·00	143·37	..	..	..	797·00	223·93	..
Do.	(1232x)	(Try Again)	..	..	..	..	..	..	..	1,878·50	471·90	..
Do.	(1232x)	Try Again: Last Chance G.M. Co., N.L.	..	..	..	..	..	..	..	509·00	190·48	..
Do.	12x, 13x, 14x, 15x, 855x, (1001x), (1012x), 1103x, (1107x), (1108x), (1109x)	(White Feather Main Reefs, Ltd.)	..	..	..	..	..	..	..	123,327·56	82,334·52	1,675·68

Do.	(9x), (10x), 12x, 13x, 72x, (83x), (201x), 855x, (1001x), (1012x), (1108x), (1249x)	(White Feather Main Reefs, (1906) Ltd.)	..	..	..	..	..	..	20.45	24,393.00	9,138.31	..
Do.	(9x), (10x), 72x, (83x), (180x), (200x), (201x), (431x)	(White Feather Reward, Ltd.)	..	..	..	..	..	..	..	42,767.75	22,255.23	14.80
Do.	..	Voided leases ..	..	..	..	..	..	3.59	3,447.75	172,863.71	90,829.63	270.26
Do.	..	Sundry claims ..	..	1.30	49.00	24.08	..	88.57	1,354.52	12,184.56	5,856.20	1.50	
Mulgarrie	(1228x) ..	Lady Pratt ..	..	..	10.00	3.14	..	..	148.46	311.00	107.55	..
Do.	(1284x) ..	Moorilla ..	..	..	..	..	..	..	20.93	700.75	302.82	..
Do.	(1326x) ..	Palm Gold Mine ..	..	..	..	..	..	..	..	278.00	191.38	..
Do.	1297x ..	Valentine ..	..	..	26.86	29.86	..	..	3.43	196.86	236.16	..
Do.	..	Voided leases ..	..	..	..	..	..	..	1,043.81	3,369.00	1,973.16	..
Do.	..	Sundry claims ..	..	..	75.00	77.38	..	..	13.29	755.00	464.07	..
Six Mile	..	Voided leases ..	..	..	..	..	..	..	1,595.63	559.00	767.72	..
Do.	..	Sundry claims ..	..	..	..	..	..	..	31.44	105.50	83.08	..
<i>From District generally:—</i>														
Sundry parcels treated at:														
		Edquist Truman and Coy's. Works ..	..	..	..	..	..	..	..	..	1,677.87	..
		Golden Valley Works ..	..	..	..	48.64	..	..	..	..	425.16	..
		Kalgoorlie Foundry, Ltd., Works ..	..	..	..	..	..	..	..	..	553.56	..
		Lady Pratt's Works ..	..	..	..	136.39	..	..	..	..	141.09	..
		Last Chance Cyanide Works ..	..	..	..	..	..	..	..	..	1,314.62	..
		North White Feather Filter Press Plant ..	..	..	..	..	..	..	..	..	797.46	..
		Old Cement Works ..	..	..	..	1,110.83	..	..	..	70.00	7,335.41	..
		Riedel and Norton's Works ..	..	..	..	260.96	..	..	..	642.00	1,709.50	..
		South Gippsland Cyanide Works ..	..	..	..	270.70	..	..	..	..	356.20	..
		State Battery Cyanide Works—Kalpini ..	..	..	..	..	..	..	..	..	95.12	..
		W.A. Slimes Co., Ltd. ..	..	..	..	..	..	..	..	..	2,420.35	..
		Various Works ..	..	..	..	..	..	25.01	..	903.10	16,044.63	..
		Total for Lease and Quartz claims	48.32	14,116.86	9,119.15	..	141.81	9,832.64	730,138.92	434,157.30	2,518.81	
<i>Cement from Alluvial claims:—</i>														
		Reported by Owners ..	..	..	..	..	..	305.41	867.52	26,376.40	12,715.90	..
		Treated locally (not reported by owners) at:	..	..	..	..	..	..	..	..	..	..
		Kalgoorlie Foundry, Ltd. ..	..	..	..	..	..	..	..	50.00	12.75	..
		Lady Pratt Works ..	..	..	15.00	3.18	..	..	..	15.00	3.18	..
		Old Cement Works ..	..	..	424.00	120.77	..	..	..	10,474.00	3,426.66	..
		Riedel and Norton's Works ..	..	..	1,252.00	258.34	..	..	..	13,037.00	1,861.22	..
		State Battery—Kalpini ..	..	..	..	..	..	..	..	260.00	22.69	..
		Various Works ..	..	..	..	..	..	..	..	77,090.21	54,895.82	..
		Treated outside District (not reported by owners)	..	..	..	..	..	..	..	27,804.55	36,711.17	..
		Reported by Banks and Gold Dealers ..	..	..	10.26	..	..	..	103,896.13	86	84.69	..
		Total	10.26	48.32	15,807.86	9,501.44	..	104,343.41	10,701.02	885,246.08	543,891.38	2,518.81

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

North-East Coolgardie Goldfield—continued.

KURNALPI DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.	
Jubilee ..	..	Voided leases .. .. .	..	..	..	..	..	..	..	145·13	1,821·25	1,408·51	..
Do. ..	..	Sundry claims .. .. .	..	..	..	..	18·87	..	..	46·00	28·91	..	
Kurnalpi ..	(329K)	Kurnalpie .. .. .	..	..	..	..	..	..	..	9·50	..	..	..
Do. ..	(333K)	Kurnalpi King .. .. .	..	..	..	..	..	..	..	823·39	15·51	306·34	..
Do. ..	422K	Perseverance .. .. .	..	83·61	5·00	26·59	..	..	..	83·61	5·00	26·59	..
Do. ..	..	Voided leases .. .. .	..	..	..	..	371·18	867·18	2,780·80	..	..	1,906·44	6·27
Do. ..	..	Sundry claims .. .. .	..	..	..	..	217·92	76·23	130·00	..	..	157·19	..
Mulgabbie ..	312K	Mulgabbie Perseverance .. .. .	..	..	3·00	292·46	..	..	..	27·40	2,928·25	4·95	..
Do. ..	421K	Star .. .. .	..	..	..	..	..	..	..	12·94	2·75	284·47	..
Do. ..	338K	White Elephant .. .. .	..	5·35	1·00	63·94	..	..	..	34·68	3·50	225·69	..
Do. ..	..	Voided leases .. .. .	..	..	..	..	..	..	..	514·69	41·00	3,511·60	..
Do. ..	..	Sundry claims .. .. .	..	2·76	41·50	45·69	..	6·50	1,432·79	124·50	686·35	..	
<i>From District generally:—</i>													
Sundry parcels treated at:													
Glover's Works .. .. .			..	..	..	..	..	..	..	..	..	5·76	..
Various Works .. .. .			..	..	..	..	..	..	..	56·50	187·39	..	
Reported by Banks and Gold Dealers			53·68	..	..	..	..	11,361·84	19·62	..	..	..
Total			53·68	91·72	50·50	428·68	..	11,976·31	4,019·76	5,054·21	11,663·49	11·22	

East Coolgardie Goldfield.

EAST COOLGARDIE DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Binduli ..	..	Voided leases .. .. .	..	..	..	..	..	..	175·80	97·60	..	
Do. ..	..	Sundry claims .. .. .	..	..	..	..	..	..	138·47	74·34	..	
Boorara ..	3908E, 3910E, 3912E, 4033E, 4045E, 4327E	Golden Ridge G.M. Co., Ltd. ..	..	..	28,115·00	10,132·81	..	..	..	210,016·75	115,266·47	308·79

Do.	3908E, 3910E, 3912E, 4033E	(Waterfall leases)								2,849.00	2,389.48	
Do.		Voided leases							268.28	56,587.63	31,157.14	
Do.		Sundry claims			11.25	4.05		.49	2.30	60.25	97.33	
Boulder	392E	(Acrobat: Paringa Consolidated Mines, Ltd.)								10.25	37.15	
Do.	392E	Acrobat: Paringa Mines (1909), Ltd.			3,496.95	1,226.67				11,123.62	5,062.87	
Do.	38E, 71E, 72E, (101E)	Associated Gold Mines of W.A., Ltd.			113,867.00	33,628.12	385.20		8.49	1,442,114.70	880,972.62	28,129.38
Do.	49E, 4211E	Associated Northern Blocks (W.A.), Ltd.			6,430.60	6,245.77	736.70		524.18	335,925.71	415,992.75	4,844.50
Do.	(682E), 902E, 923E, 986E, (1064E), 1124E, 1196E, 4075E	(Boulder Deep Levels, Ltd.)								3,043.00	1,778.10	26.71
Do.	902E, 923E, 986E, 1124E, 1196E, 4075E	(Boulder Deep Levels (1907), Ltd.)								787.50	210.30	
Do.	281E	(Brookman Bros.: Boulder G.M. Co., Ltd.)								8,655.00	8,417.00	
Do.	989E	(Brown Hill Central G.Ms., Ltd.)								2,957.50	2,071.92	
Do.	558E, (1175E), 3961E	Brown Hill Extended, Ltd.			409.80	836.20				34,432.78	44,804.37	
Do.	1163E	(Cassidy's North)								67.00	7.95	
Do.	24E, (888E), 949E	Central and West Boulder G.Ms., Ltd.			4,424.78	1,538.04				58,510.87	30,626.77	
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 G.M. Co. (1913), Ltd.			13,350.00	3,334.91	129.57			13,350.00	3,334.91	129.57
Do.	1621E	(Croesus Proprietary G.M. Co.)								79.00	45.87	
Do.	13E, 90E, 302E, 989E	Croesus South G.Ms., Ltd.			2,607.10	720.88				67,873.97	25,873.28	
Do.	351E, 1001E, 1002E, 1085E, 1113E, 1219E, 1326E, 1397E	Golden Horseshoe Estates Co., Ltd.			284,496.00	91,497.11	28,813.03			3,277,466.00	2,189,708.94	291,552.60
Do.	750E	(Golden Link Consolidated G.Ms., Ltd.)								10,729.00	6,096.80	
Do.	2325E, 2326E	(Golden Link 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.	50E	Great Boulder No. 1, Ltd.			2,003.24	1,499.66				16,892.25	13,533.43	
Do.	66E	Great Boulder Perseverance G.M. Co., Ltd.			219,244.00	61,149.96	11,027.39			2,389,002.23	1,415,876.95	113,977.45
Do.	16E, 51E, 61E, 102E, 280E, 1109E, 4366E	Great Boulder Proprietary G.Ms., Ltd.			190,117.00	132,843.25	20,666.00			2,358,018.00	2,270,803.52	198,042.36
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	

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 1914.					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	15E, 60E, 902E, 923E, 986E, 1116E, 1124E, 1196E, 4075E	(Hannan's Star Consolidated)	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	..	..	15,130.00	4,591.02	..	2,079.69	34,396.77	22,391.33	..
Do.	946E, 4370E	Ironsides North leases	..	..	8,430.00	14,268.98	..	..	35,316.50	51,393.06	..
Do.	946E	(Ironsides North G.M. Co., N.L.)	..	..	..	..	..	..	1,348.00	807.48	..
Do.	31E, 1357E, 1413E, 1507E, 4399E, 4445E, 4476E	Ivanhoe Gold Corporation, Ltd.	..	..	195,017.00	85,486.66	16,279.68	..	2,736,068.00	1,881,937.34	272,936.52
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.	33E	(Kalgoorlie Bank of England G.M. Co., Ltd.)	..	..	..	..	..	..	11,775.50	7,080.49	..
Do.	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.M.s., Ltd.)	..	..	..	..	..	..	3,647.00	7,454.80	..
Do.	1004E	(Kalgurli Golden Eagle)	..	..	..	..	..	..	4,891.50	1,289.65	..
Do.	1004E	(Kalgurli Golden Eagle: Golden Links, Ltd.)	..	..	..	..	..	..	193.00	31.63	..
Do.	22E, 34E	Kalgurli Gold Mines, Ltd.	..	..	113,727.00	60,431.79	..	..	1,250,558.22	872,693.04	188.24
Do.	15E, 25E, 32E, 60E, 902E, 923E, 986E, 1116E, 1124E, 1196E, 2325E, 2326E, 4075E, 4432E, 4433E, 4434E, 4493E	Lake View and Star, Ltd.	..	..	195,63.71	63,59.72	6,279.15	..	799,545.36	271,566.19	31,269.81

Do.	25E, 32E, 2325E, 2326E	(Lake View Consols, Ltd)							1,179,303·55	1,016,875·27	38,491·89
Do.	(4439E)	Lake View Extended		33·45	6·36				616·75	164·49	
Do.	75E	(Lake View South G.M. (W.A.), Ltd.)							10,712·98	11,393·57	
Do.	75E	Lake View South, Ltd.		1,298·00	320·51				15,237·90	3,904·65	
Do.	(4522E)	Last Hope							61·65	10·59	
Do.	33E, 35E, 975E	New North Boulder G.Ms., Ltd.		2,752·24	921·04				17,320·14	10,354·24	
Do.	(4523E)	New Trafalgar		40·23	13·41				78·63	21·84	
Do.	33E, 35E, 975E	(New 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.		7,191·28	2,225·79				13,694·90	5,064·14	
Do.	(535E)	(Octagon Explorers, Ltd.)							3,180·00	1,069·29	
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.	4211E	(Oroya East (Hannan's) G.M., Ltd.)							625·00	288·39	
Do.	6E, 73E, 131E, 245E, 269E, 301E, 410E, 448E, 532E, 578E, 698E, 739E, 743E, 750E, 794E, 944E, 969E, 1004E, 1395E, 1621E, (3031E), (4180E)	Oroya Links, Ltd.		132,842·25	38,498·91	3,759·96			592,156·98	189,417·13	18,068·00
Do.	4E, 392E	(Paringa Mines, Ltd.)							37,962·98	16,779·96	
Do.	4E, 392E	(Paringa Mines (1909), Ltd.)							26,890·74	12,599·54	
Do.	1208E, 3612E, 3643E	South Kalgurli Consolidated, Ltd.		103,519·00	31,250·35	1,781·41			154,939·00	47,883·37	3,526·59
Do.	1208E, 3612E	(South Kalgurli G.Ms., Ltd.)							826,909·00	347,222·75	17,609·67
Do.	(535E)	(Union Jack)							23·00	4·49	
Do.	(535E)	Union Jack: Union Jack G.M. Co., N.L.		25·08	13·07				1,295·74	453·66	
Do.	(4525E)	West Boulder								2·91	
Do.		Voided leases					109·90	5,780·86	60,958·20	40,121·59	
Do.		Sundry claims					24·58		1,313·96	928·29	
Feysville	Block 48	Hampton Plains Estate, Ltd.					4,565·62		20,583·40	2,413·76	
Do.	Block 50	(Hampton Plains Estate (1906), Ltd.)							85·00	108·82	
Do.	Block 50	(Hampton Properties, Ltd.)							6,348·00	3,956·22	
Do.	Block 45	Hampton Properties, Ltd.						7·26	51·75	76·63	
Do.	Block 50	Hampton Properties, Ltd.		27·03	35·05			52·75	542·36	472·27	
Do.	(4521E)	Monte Vesuveo		90·85	5·02			6·26	90·85	5·02	
Do.		Voided leases							22·86	214·85	106·88
Do.		Sundry claims							156·01	48·73	
Kalgoorlie	4509E, 4530E	Adelaide Enterprise Prospecting Synd., N.L.		1,682·00	330·94				1,682·00	330·94	
Do.	796E, 1228E	(Bonnie Lass leases)						160·69	6,011·00	5,945·22	
Do.	796E, 1228E, 3771E	Bonnie Lass leases		3,547·65	1,738·51				11,307·65	6,461·52	
Do.	4088E	Bonnie Play		27·00	2·14				83·61	12·14	
Do.	(4505E)	C.Q.							35·00	6·87	
Do.	4E	Cassidy's Hill	1,053·10	1,459·00	1,733·24	13·90		1,053·10	1,459·00	1,733·24	13·90

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 1914.					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.
Kalgoorlie ..	4E	(Cassidy's Hill: Paringa Mines (1909), Ltd.)	..	149·42	17·50	49·94	..	..	734·99	638·50	3,079·51	..
Do. ..	4524E	Corn Cob .. ..	..	..	310·01	69·31	..	..	..	383·06	80·24	..
Do. ..	(4515E)	Creswick .. ..	..	..	388·00	42·94	..	..	..	1,404·86	261·40	..
Do. ..	4037, 4039E, 4054E	(Devon Consols South Extended leases)	..	..	..	..	..	..	..	2,251·00	1,400·94	..
Do. ..	4037E, 4039E, 4054E, (4231E), 4368E	(Devon Consols South Extended leases)	..	..	..	..	..	..	..	8,269·14	2,712·76	..
Do. ..	4037E, 4039E, 4054E, (4231E), 4368E	Devon Consols South Extended leases: Forwood Down and Co., Ltd.	..	..	590·04	143·28	..	..	..	590·04	143·28	..
Do. ..	3770E	(Eagle Hawk United) .. ..	..	..	..	..	..	109·01	828·69	4,161·56	3,180·60	..
Do. ..	4509E	(Enterprise) .. ..	..	..	..	..	..	..	..	219·00	76·49	..
Do. ..	4052E, 4063E, (4319E)	Fair Play leases .. ..	..	..	192·66	37·03	..	..	4·77	2,786·50	3,901·57	..
Do. ..	4331E	(Gem) .. ..	..	..	..	..	..	..	30·75	57·00	10·40	..
Do. ..	(4025E), 4293E, (4486E)	Golden Dream G.M. Co., N.L.	..	..	957·00	78·56	..	..	..	8,999·00	811·29	..
Do. ..	1694E	(Golden Zone) .. ..	..	..	..	..	..	..	..	5,614·50	2,639·52	..
Do. ..	1694E	(Golden Zone) .. ..	..	..	..	..	..	..	489·50	2,106·00	3,295·08	..
Do. ..	1694E, 4273E, 4274E, 4331E, (4380E)	Golden Zone leases .. ..	..	..	4,790·00	9,739·89	..	..	28·25	43,986·00	65,350·23	..
Do. ..	4539E	(Gordon) .. ..	..	..	64·89	14·24	..	..	..	64·89	14·24	..
Do. ..	(4412E)	(Gordon) .. ..	..	..	..	..	..	..	..	629·00	84·79	..
Do. ..	(4412E)	Gordon: Cunard G.M. Co., N.L.	..	..	312·25	20·70	..	..	..	4,519·25	473·03	..
Do. ..	14CE, 415E, 1163E	Hannan's Consols leases .. ..	..	22·84	10·17	14·21	..	2·84	276·35	45,428·67	6,142·22	..
Do. ..	14CE, 415E, 1163E	(Hannan's Consols, Ltd.) .. ..	..	..	..	..	..	..	..	6,584·00	3,806·65	..
Do. ..	4273E, 4274E	(Hannan's North G.Ms., Ltd.) .. ..	..	..	..	..	..	..	..	1,244·00	392·72	..
Do. ..	97E, 160E, 211E, (212E), 213E, 1653E	(Hannan's Reward and Mt. Charlotte, Ltd.) .. ..	..	..	..	..	..	..	2·58	121,605·10	47,203·84	..
Do. ..	97E, 160E, 211E, (212E), 213E, 1653E	Hannan's Reward, Ltd. .. ..	..	..	9,781·71	1,263·37	..	..	..	191,219·21	25,599·93	..
Do. ..	796E, 1228E	(Hannan's Reward North G.M. Co., N.L.) .. ..	..	..	..	..	..	..	16·87	334·00	247·34	..
Do. ..	4001E, 4035E, 4036E	Hidden Secret leases .. ..	..	105·65	513·01	472·05	..	..	105·65	10,643·95	15,279·18	43,383·29
Do. ..	(4502E)	Ineeda .. ..	..	..	74·60	31·44	..	..	..	465·61	132·65	..
Do. ..	4532E	Kalgoorlie .. ..	..	..	93·79	16·95	..	..	..	93·79	16·95	..

Do.	4498E	Levant	234.38	18.48			333.38	29.48	
Do.	4346E	(Little Wonder)					3,796.00	1,530.61	
Do.	4346E, 4347E	Little Wonder leases	1,770.00	456.30			5,271.55	1,831.57	
Do.	4345E	(Lone Hand)					6,092.00	408.02	
Do.	4345E, 4459E, (4461E)	Lone Hand leases	3,380.00	346.49			6,560.00	1,721.71	
Do.	4477E	Lord Nelson	126.86	217.49			83.86	2,024.38	671.50
Do.	2E, 279E	(Maritana G.M. Co., N.L.)					32.27	11,373.50	4,628.55
Do.	2E, 279E, 3770E	Maritana leases	334.90	4,730.10	3,297.80	24.19	644.50	20,347.63	7,955.05
Do.	4293E	(Milanese)						7,663.00	1,389.36
Do.	4293E	(Milanese: Golden Dream G.M. Co., N.L.)						29,528.00	3,175.71
Do.	4347E	(Mystery)						8,783.00	1,815.12
Do.	4520E	Nancy Agnes						310.00	61.33
Do.	(4025E)	(Napoleon)						2,878.00	1,499.30
Do.	1694E	(New Golden Zone Co., N.L.)						344.00	175.61
Do.	4482E	North Collier	59.32	65.82				273.83	1,473.77
Do.	(4485E)	North End Extended						281.14	86.30
Do.	4037E, 4039E, 4054E	(North End Mines, Ltd.)						1,812.00	883.27
Do.	4037E, 4039E, 4054E	(North End Gold Mines, Ltd.)						5,876.00	2,425.03
Do.	4E	(Paringa Consolidated Mines, Ltd.)						216.00	157.80
Do.	1228E	(Red, White, and Blue)						130.00	25.56
Do.	4039E	(Rising Sun)						170.00	28.50
Do.	4039E	(Rising Sun)						16.00	1.88
Do.	4037E, 4039E, 4054E, 4231E	(Rising Sun leases)						294.00	98.78
Do.	3771E	(Sons of Gwalia—Kalgoorlie)						1,428.00	844.54
Do.	4289E	(Union Club)						700.00	257.45
Do.	4289E	Union Club	170.00	57.44		61.09		2,518.00	761.31
Do.	4289E, 4320E	(Union Club leases)					53.28	4,626.00	1,437.28
Do.	4037E, 4039E, 4054E, (4231E), 4368E	(Westralia United Goldfields, Ltd.)	197.67	58.96				1,719.77	504.80
Do.	4499E	Williamstown	716.85	142.76				1,321.23	370.08
Do.		Voided leases				45.35	1,061.99	213,190.51	87,890.32
Do.		Sundry claims	1,842.80	387.61		207.69	157.79	12,343.83	2,828.30
Wombola	4349E	Sudden Jerk	6.41	17.45			301.49	13.20	95.76
Do.		Voided leases					312.37	4,708.78	1,882.55
Do.		Sundry claims	12.33	10.38				481.46	107.54
<i>From District generally :-</i>									
		Sundry claims				10,907.93	431.95	5,208.00	1,560.12
Sundry parcels treated at:									
		Adeline Slimes Works		47.02		42.64	35.12	33.00	20,620.14
		Allsop and Don's Works		639.56	942.25				1,041.71
		Associated Northern Works		3.82					287.41
		Bonnie Lass Works						55.00	1,297.73
		Brown Hill Consols Works		4,184.58				683.85	42,407.92
		Croesus South Works						9,230.35	13,912.25
		Dunstan and Cumming's Works		1,117.89					2,522.53
		Fremantle Trading Co.'s Works		720.35	1,252.09				4,093.94
		Golden Dream Works							85.87

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 1914.					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.
		Golden Zone Works .. .. .	..	..	..	..	..	..	..	..	340·97	..
		Hainault Sulphide Plant .. .. .	..	..	..	222·84	..	..	..	..	222·84	..
		Hannan's Central Lakeside Works .. .. .	..	..	·25	36·83	..	..	..	·25	4,622·02	..
		Hannan's Central Works .. .. .	..	..	7·80	3,076·61	..	..	..	142·80	36,806·39	..
		Hannan's Consols Works .. .. .	..	..	..	..	..	..	..	..	172·90	..
		Ironsides North Works .. .. .	..	..	..	1,688·91	..	..	..	73·00	10,515·97	..
		Kalgoorlie Gold Recovery Works .. .. .	..	..	..	..	..	..	..	..	2,196·84	202·37
		Leviathan Tailings lease: Barnett's Works .. .. .	..	..	..	..	..	..	..	..	208·58	..
		North Kalgurli Battery .. .. .	..	..	..	189·85	..	..	..	..	189·85	..
		Oratava Works .. .. .	..	..	..	..	..	..	..	..	1,458·29	..
		Various Works .. .. .	..	..	..	..	..	..	341·72	15·15	29,452·55	45,937·93
		Reported by Banks and Gold Dealers	139·61	..	..	..	..	..	9,874·39	9,013·32	..	4·57
		Total	139·61	1,665·91	1,682,395·89	678,689·09	92,066·33	26,361·43	24,628·21	21,304,981·18	14,558,311·39	1,144,369·89

BULONG DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.	
Balagundi ..	1080Y	Balagundi .. .. .	..	..	11·00	74·37	..	..	..	542·52	21·00	159·07	..
Do. ..	.. ..	Voided leases .. .. .	..	..	..	..	..	..	..	1,815·53	1,079·68	1,247·22	..
Do. ..	.. ..	Sundry claims .. .. .	..	..	8·98	3·75	..	..	..	64·39	206·40	146·93	..
Bulong ..	1067Y, 1076Y ..	Southern Cross .. .. .	..	..	..	..	..	..	..	..	14,897·66	2,128·17	..
Do. ..	.. ..	Voided leases .. .. .	..	..	..	..	..	..	107·54	8,364·22	84,703·56	80,276·13	..
Do. ..	.. ..	Sundry claims .. .. .	..	33·75	38·52	13·50	..	..	1,648·60	954·98	6,785·32	14,452·96	..

Hogan's Find	..	..	..	..	..	..	..	..	908·82	309·50	276·51	..
Majestic	..	..	..	..	..	..	..	..	..	1,001·25	318·78	..
Do.	..	..	..	..	..	..	..	..	..	17·00	7·42	..
Mt. Monger	..	..	..	..	..	..	..	..	..	43·20	..	..
Do.	..	..	..	..	..	..	..	..	..	..	..	..
Mt. Monger	..	..	..	..	..	..	..	..	1,862·57	1,121·35	969·69	..
Do.	..	..	..	..	..	..	..	..	..	357·80	220·18	..
Randall's	1079x	..	..	..	..	..	..	..	..	437·24	181·95	..
Do.	1086x,	1087x,	..	..	..	..	..	..	..	8,708·90	2,129·73	..
	1088x	..	..	..	..	..	..	..	..	..	..	..
Do.	..	..	..	..	..	..	..	..	..	60·04	11,453·10	5,592·16
Do.	..	..	..	..	..	..	..	..	..	20·45	1,867·55	478·49
Sudden Jerk	..	..	..	..	..	..	..	..	..	63·91	14·25	53·67
Do.	..	..	..	..	..	..	..	..	..	..	·15	10·23
Taurus	..	..	..	..	..	..	..	..	..	2·06	3·70	1,678·15
Do.	..	..	..	..	..	..	..	..	..	112·69	..	276·0
Woodline	..	..	..	..	..	..	..	..	..	..	792·75	610·57
Do.	..	..	..	..	..	..	..	..	..	..	39·33	61·57
<i>From District generally:—</i>													
Sundry parcels treated at:													
Hilda Mill													
State Battery—Randall's													
Various Works													
Reported by Banks and Gold Dealers													
Total													
				33·75	9,275·50	2,367·05	26,504·15	14,778·12	142,660·84	116,625·78	..

Coolgardie Goldfield. COOLGARDIE DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Bonnievale	4433	Lorna V	..	..	18·00	24·23	..	..	5·38	356·25	226·06	..
Do.	(4441)	Lorna Doon	..	..	..	..	..	..	..	90·00	32·49	..
Do.	1552	New Victoria	..	..	70·00	25·66	..	..	..	70·00	25·66	..
Do.	1552	(New Victoria)	..	..	..	..	..	..	..	264·00	169·00	..
Do.	1552, (4313)	(New Victoria leases)	..	..	155·00	54·66	..	..	..	2,744·00	1,338·39	..
Do.	(4313)	(New Victoria South)	..	..	..	..	..	..	..	1,065·00	324·87	..
Do.	1552, (3947), (4353)	(Vale of Coolgardie G.Ms., Ltd.)	..	..	..	..	..	..	..	74,835·00	38,993·49	..
Do.	..	Voided leases	..	..	..	..	..	..	2·26	270,538·85	145,720·53	..
Do.	..	Sundry claims	..	..	144·00	108·89	..	..	..	1,284·50	700·43	..

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 1914.					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.
Bulla Bulling	..	Voided leases .. .. .	..	..	..	..	..	..	..	563·63	340·01	..
Do.	..	Sundry claims .. .. .	..	..	..	..	..	12·82	..	314·60	182·17	..
Burbanks	4460	Aurifer .. .. .	..	6·31	76·25	130·35	..	..	6·31	76·25	130·35	..
Do.	134, 135, 136, 1527, (1705), 2761, 3571, 3661, (3806), (3996), (4025), (4032)	(Burbanks Birthday Gift G.M., Ltd.)	..	..	..	..	..	..	..	132,706·00	126,351·59	..
Do.	134, 135, 136, 1527, (1705), 2761, 3571, 3661, (3806), (3996), (4025), (4032)	(Burbanks Birthday G.Ms., Ltd.)	..	..	..	..	..	..	..	36,677·20	25,186·99	334·85
Do.	134, 135, 136, 1527, 2761, 3571, 3661	Burbanks Birthday G.Ms., Ltd.	..	..	2,130·00	897·64	..	..	..	30,211·08	18,954·99	89·38
Do.	2985, 2986, 3444, 3870, 4059	(Burbanks Main Lode, Ltd.)	..	..	..	..	..	..	..	3,209·00	1,671·63	..
Do.	2985, 2986, 3444, 3870, 4059	(Burbanks Main Lode (1902), Ltd.)	..	..	..	..	..	..	..	4,824·00	3,214·50	..
Do.	2985, 2986, 3444, 3870, 4059	(Burbanks Main Lode (1904), Ltd.)	..	..	..	..	..	..	..	76,844·10	44,924·94	..
Do.	(1705), 2985, 2986, 3444, 3870, 4059, 4446, 4447	Burbanks Main Lode (1904), Ltd.	..	..	6,558·00	3,973·95	..	..	..	59,159·00	35,101·06	..
Do.	4409	Burbanks Mainstay .. .. .	..	..	550·00	150·93	..	..	..	1,159·00	316·55	..
Do.	4168	Glenloth South .. .. .	..	..	85·00	75·56	..	..	79·67	892·00	1,288·48	..
Do.	4471	Ivanhoe Burbanks .. .. .	..	..	163·00	120·12	..	..	..	163·00	120·12	..
Do.	(4379)	Ivanhoe Burbanks .. .. .	..	..	203·25	91·36	..	..	..	1,166·75	753·84	..
Do.	4442	Ivanhoe North .. .. .	..	..	58·00	29·74	..	..	..	81·75	39·27	..
Do.	2160	Lady Robinson .. .. .	..	..	..	381·17	..	..	..	4,446·00	1,735·03	..
Do.	2160	(Lady Robinson) .. .. .	..	..	..	..	..	..	..	5,315·40	3,327·12	..
Do.	2160 (3950), (4125)	(Lady Robinson G.M. Co., N.L.)	..	..	..	..	..	..	..	16,823·50	7,797·88	..

Do.	(4459)	Lord Bobs		220.00	38.63			220.00	38.63	
Do.		Voided leases				13.36	105.24	26,911.13	22,409.42	96.83
Do.		Sundry claims		484.75	468.48	43.37	56.60	3,092.00	2,222.13	
Coolgardie	133, 139, (142)	(Bayley's G.Ms., Ltd.)				882.14	89.41	76,402.97	99,179.62	
Do.	133, 139, (142)	(Bayley's leases)				7.18	171.21	7,820.80	8,904.15	
Do.	133, 139, (142)	(Bayley's Mines, Ltd.)				15.10	10.59	2,319.74	2,323.66	
Do.	4444	Benjamin George	34.50	109.00	513.22		67.16	701.75	1,926.31	
Do.	4461	Coolgardie		146.50	73.15			205.25	100.17	
Do.	(4421)	Columbia Park					9.00	14.50	36.45	
Do.	4474	Gift		63.75	27.46			63.75	27.46	
Do.	4448	Griffiths Gold Mine						172.25	49.88	
Do.	Block 49	Hampton Plains Estate, Ltd.		15.50	13.99			15.50	13.99	
Do.	Block 53	Hampton Plains Estate, Ltd.					358.42	67.00	112.49	
Do.	Block 59	Hampton Plains Estate, Ltd.		270.00	230.29			6,922.00	6,361.16	
Do.	4122	(King's Cross)						792.00	561.39	
Do.	4443	King Solomon	4.12	500.00	306.78		11.65	810.75	380.32	
Do.	4470	Lady Mary	10.02	174.00	64.86		10.02	174.00	64.86	
Do.	(4467)	May Queen		166.00	42.50			166.00	42.50	
Do.	133, 139, (4067), 4122, 4372	New Bayley's Mines, Ltd.		250.00	240.14			596.25	1,179.71	
Do.	(4439)	Proprietary		43.50	16.35			295.50	123.88	
Do.	4435	Prosperity	3.13	973.25	459.12		33.43	1,701.00	939.17	
Do.	33, 3824, 3830, 4227, 4323, 4326	Tindal's Coolgardie G.M. Co., N.L.		10,688.10	2,008.00			138,437.85	34,159.77	
Do.	(4445)	Union Jack South					261.80	62.75	216.01	
Do.	(4067), 4122	(W.A. Sluicing Syndicate, Ltd.)						742.00	373.22	
Do.	(4368)	Waterfall Prospecting Syndicate						1,855.82	1,604.14	
Do.		Voided leases				392.08	2,866.27	290,003.05	159,544.39	96
Do.		Sundry claims	31.85	2,198.70	869.54	44.60	916.53	20,406.55	9,756.34	
Eundynie	4253	(Hidden Secret North)						68.00	60.72	
Do.	4253, 4266, 4351, (4405), (4406), 4462	Hidden Secret North leases		5,677.00	2,791.23			24,625.00	12,451.26	
Do.		Voided leases						1,473.50	644.31	1.75
Do.		Sundry claims						117.00	31.11	
Gibraltar	4418	Reform		132.00	35.68			154.00	48.29	
Do.		Voided leases						227.50	70.20	
Do.		Sundry claims		9.00	9.46			92.50	45.01	
Gnarlbine		Voided leases					10.94	1,899.75	1,049.90	
Do.		Sundry claims		29.50	20.07		1.31	137.50	77.69	
Higginsville	4184, (4185), (4191), (4206), (4207)	(Red Hill Westralia G.Ms., Ltd.)						16,983.00	6,848.02	127.78
Do.	4184	(Sons of Erin: Forwood, Down, & Co., Ltd.)						117.00	1,000.35	
Do.	4184, (4185)	(Sons of Erin G.M. Co., N.L.)					285.20	4,742.00	2,938.77	
Do.	4184, (4185), (4191), (4206), (4207)	(Sons of Erin leases)						1,394.00	911.95	
Do.	4184, 4428, 4432	Sons of Erin leases: Forwood, Down, & Co., Ltd.		397.00	346.68	2.41		627.00	471.10	2.41
Do.		Voided leases					2.06	5,274.00	1,020.45	
Do.		Sundry claims					16.52	541.50	405.18	

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 1914.					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.
Londonderry	3834	Cheapside	..	..	120.00	46.72	..	..	..	4,447.75	2,465.32	..
Do.	(4450)	Fenian	..	..	..	..	..	..	..	20.00	12.45	..
Do.	4475	Vice Regal	..	..	29.50	129.91	..	..	..	29.50	129.91	..
Do.	..	Voided leases	..	..	..	..	..	..	46.25	14,498.66	13,130.68	..
Do.	..	Sundry claims	..	..	..	..	..	..	1.06	709.35	490.88	..
Mungari	..	Voided leases	..	..	..	..	..	..	17.71	735.00	331.78	..
Do.	..	Sundry claims	..	..	18.94	52.37	..	..	..	255.01	138.49	..
Red Hill	..	Voided leases	..	..	..	..	..	..	1,541.48	40,793.20	31,064.05	..
Do.	..	Sundry claims	..	..	24.80	64.38	..	..	34.62	144.57	124.32	..
Widgiemooltha	4472	Connie K.	..	23.98	17.93	20.90	..	..	23.98	17.93	20.90	..
Do.	4028	Flinders	..	..	30.00	123.82	..	..	29.11	427.10	2,285.76	..
Do.	(4454)	Horseman	..	108.32	4.75	21.42	..	..	273.97	8.75	39.52	..
Do.	..	Voided leases	..	..	..	..	..	..	466.02	8,609.60	3,586.56	17
Do.	..	Sundry claims	..	..	332.28	204.39	..	3.62	22.68	2,291.68	1,013.51	..
<i>From District generally:—</i>												
Sundry parcels treated at:												
		Burbanks Main Lode Works	..	..	..	27.49	..	2.77	..	557.50	1,057.02	..
		Carswell's Cyanide Works	..	..	..	304.35	..	..	..	..	668.99	..
		Fremantle Trading Co.'s Works	..	..	..	..	..	..	..	..	20.08	..
		Highgate Works	..	..	..	..	..	..	..	100.00	286.51	..
		Lady Robinson Cyanide Works	..	..	..	..	..	..	..	70.00	348.28	..
		Moore's Cyanide Works	..	..	..	..	..	..	..	..	17.94	..
		New Victoria Works	..	..	..	..	..	..	..	..	98.56	..
		Oratava Works—Kalgoorlie	..	..	..	..	..	..	..	..	171.81	..
		Pickering's Cyanide Works	..	..	..	177.10	..	..	..	..	177.10	..
		State Battery—Coolgardie	..	..	..	636.49	..	..	..	647.50	6,539.88	..
		State Battery—Widgiemooltha	..	..	..	..	..	..	..	38.50	307.73	..
		Various Works	..	..	..	..	..	4.98	..	3,045.11	14,175.99	108.89
		Reported by Banks and Gold Dealers	..	..	..	..	..	..	6,762.61	543.04	..	..
		Total	..	..	33,396.25	16,429.23	2.41	8,171.81	8,389.72	1,41,771.9	918,396.99	763.02

KUNANALLING DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Balgarrie ..	(622s)	(Balgarrie G.M. Co., N.L.) .. ..	..	..	..	..	..	..	1-64	340-00	81-43	..
Do. ..	(622s)	United Australia .. ..	..	..	..	..	..	..	8-53	1,253-50	687-39	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	10-94	..	65-31	3,530-75	4,036-92	1-38
Do. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	..	18-57	912-25	358-01	..
Carbine ..	33s	(Carbine) .. ..	..	..	..	..	..	..	10-85	2,401-00	1,164-53	..
Do. ..	33s, 710s, 711s ..	Carbine leases .. ..	..	..	1,630-00	1,562-67	..	..	677-13	22,581-50	12,764-13	..
Do. ..	776s	Spearmint .. ..	..	..	..	..	..	..	..	522-00	633-56	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	2,002-00	2,022-43	..
Do. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	..	..	55-00	30-82	..
Carnage ..	.. ..	Voided leases .. ..	..	..	..	..	..	176-04	659-31	2,402-00	2,170-67	..
Do. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	..	..	61-00	27-50	..
Cashman's ..	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 ..	822s	Resolute .. ..	..	..	..	..	..	..	..	219-00	779-83	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	822-75	1,097-78	..
Do. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	..	86	507-00	449-22	..
Dumnsville ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	181-12	17,407-10	7,982-23	..
Do. ..	.. ..	Sundry claims	43	..	..	..	..	43	27-63	293-09	265-11	..
Jourdie Hills ..	(773s), (786s) ..	(Jourdie Enterprise leases) ..	..	..	..	..	..	..	..	9,884-00	3,715-75	..
Do. ..	(786)	(Jourdie Enterprise South) ..	..	..	..	..	..	..	..	91-00	39-42	..
Do. ..	(786s)	Jourdie Enterprise South ..	..	..	..	..	..	..	..	260-00	27-66	..
Do. ..	369s, (661s) ..	(Jourdie Hills G.M. Co., Ltd.) ..	..	..	..	..	..	..	..	9,635-0	7,868-08	..
Do. ..	369s, (661s) ..	(Jourdie United G.Ms., Ltd.) ..	..	..	..	..	..	..	..	1,520-00	1,027-63	..
Do. ..	514s	Pride of Jourdie North ..	..	..	180-00	175-55	..	..	..	2,957-00	2,682-46	..
Do. ..	369s	(Pride of the Jourdies) ..	..	..	..	..	..	..	..	410-74	465-47	..
Do. ..	369s	Pride of the Jourdies: Forwood ..	..	..	133-00	479-69	27-00	..	..	705-00	1,292-40	28-45
Do. ..	.. ..	Down and Co., Ltd. ..	..	..	..	..	..	..	..	..	..	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	18-00	1,823-00	726-67	..
Do. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	..	..	760-50	405-00	..
Kandana ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	465-00	68-12	..
Kintore ..	(797s)	Sugarloaf .. ..	..	..	..	..	..	..	..	471-00	610-85	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	143-66	42,556-14	31,136-59	..
Do. ..	.. ..	Sundry claims .. ..	..	..	42-50	31-34	..	100-30	..	956-70	1,032-51	..

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Coolgardie Goldfield—continued.
KUNANALLING DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.		
Siberia	674s [1286w]	(Golden)	..	..	..	..	..	..	..	..	..	..	..	..
Do.	728 [1293w]	Mexico	..	..	..	..	..	..	..	..	..	..	..	..
Do.	..	Voided leases	..	..	..	..	..	..	1.07	..	..	..	..	..
Do.	..	Sundry claims	..	..	..	..	..	..	30.91	..	..	..	..	..
25-Mile	696s	(Blue Bell)	..	..	..	..	..	..	..	8.05	..	..	..	..
Do.	727s	(Blue Bell Extended)	..	..	..	..	..	..	..	..	..	..	..	..
Do.	696s, 727s	Blue Bell leases	..	..	..	..	..	..	..	..	..	..	..	..
Do.	(839s)	Hopeful	..	..	..	..	..	..	..	..	..	..	..	..
Do.	852s	Premier	..	..	..	..	..	..	..	..	..	..	..	..
Do.	845s	Sadie	..	..	..	..	..	..	..	..	..	..	..	..
Do.	(586s), (602s)	Shamrock leases	..	..	..	..	..	..	..	..	..	..	..	..
Do.	645s	Star of Fremantle	..	..	..	..	..	..	..	..	..	..	..	..
Do.	(849s)	Swallow Extended	..	..	..	..	..	..	..	..	..	..	..	..
Do.	603s	Sydney Mint	..	..	..	..	..	..	..	..	..	..	..	..
Do.	847s	Turn of the Tide	..	..	..	..	..	..	..	..	..	..	..	..
Do.	..	Voided leases	..	..	..	..	..	..	..	..	..	..	..	..
Do.	..	Sundry claims	..	..	..	..	..	..	..	..	..	..	..	..
		From District, generally:—												
		Sundry parcels treated at:												
		Blue Bell Works	..	..	..	..	..	..	..	..	..	..	..	..
		Oratava Works—Kalgoorlie	..	..	..	..	..	..	..	..	..	..	..	..
		Stanley Works	..	..	..	..	..	..	..	..	..	..	..	..
		Various Works	..	..	..	..	..	..	..	..	..	..	..	..
		Reported by Banks and Gold Dealers	..	..	..	..	..	..	..	..	..	..	..	..
		Total	..	..	..	..	..	..	..	..	..	..	..	..
			54.75	7.64	3,889.50	3,909.69	27.00	553.68	4,938.04	247,429.97	185,327.83	48.67		

Yilgarn Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.		
Blackbourne	..	Voided leases	..	..	..	..	..	..	..	..	..	..	..	..
Bullfinch	2779	Bell Bird	..	..	..	..	..	..	..	..	..	..	..	..
					10.00	4.93				10.00	4.93			

Do.	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.		66,430.00	25,682.98	4,841.29			115,042.42	64,988.36	7,185.35
Do.		Voided leases							326.85	318.23	
Corinthian	893	Corinthian							2,684.50	1,123.80	
Do.	896, 934, 946	Corinthian North G.Ms., Ltd.		48,730.00	10,149.25				67,443.00	14,469.26	
Do.		Voided leases							601.50	405.74	
Do.		Sundry claims							69.00	68.93	
Golden Valley	2272	Glide Away		233.00	331.32				851.00	1,001.83	
Do.	(2658)	Lady Ellen							27.50	49.30	
Do.	2790	Manxman Consols		4.35	6.98				4.35	6.98	
Do.	(2255)	Manxman South Extended	.94	8.30	63.45			.94	126.60	411.56	
Do.	2389	Marie's Find		44.00	85.60				336.00	460.51	
Do.	2541, 2542	New Green Harp leases		39.00	25.87				648.90	421.39	
Do.	(2595)	Rosalie		18.00	33.94				64.00	126.57	
Do.	2712	Sand King		66.00	29.12				66.00	29.12	
Do.	(2690)	Two Seas		39.00	35.78				79.00	77.92	
Do.	2653	Violet							60.00	12.80	
Do.		Voided leases						17.11	2,564.25	2,497.47	
Do.		Sundry claims		350.00	326.42				990.65	871.47	
Greenmount	(503), (535), (555)	(Greenmount G.Ms., Ltd.)							5.00	2.11	
Do.	(503), (555)	Greenmount Mines, N.L.							64,186.00	15,788.99	364.72
Do.	550	(Sunbeam)					14.00		4,472.00	1,427.25	
Do.	550	Sunbeam							200.00	100.14	
Do.	550, (565)	(Sunbeam leases)							3,191.00	816.42	
Do.	536	Transvaal							30,233.00	7,340.62	579.78
Do.	(503)	(United Australia)							410.00	120.15	
Do.		Voided leases				31.99	21.62		5,696.00	1,548.63	
Do.		Sundry claims		12.50	23.84		4.12		617.50	249.29	
Hope's Hill	2544	Colleen Bawn		56.00	401.36				211.20	585.74	
Do.	2523	Parisian	4.24	264.50	116.34		4.24		797.50	561.50	
Do.	(1432)	Phoenix		60.00	17.43		50.20		1,442.50	532.93	
Do.	(2571)	Phoenix South							30.00	3.90	
Do.	921	Rodda's Reward							312.00	42.13	1.00
Do.		Voided leases					2.53		127,214.85	32,746.57	
Do.		Sundry claims	19.84	515.50	91.94		22.55		1,099.50	334.85	
Kennyville	2786	Catherine		65.00	13.31				65.00	13.31	
Do.	776	Cornishman		231.00	209.49		13.18		1,696.00	1,469.47	
Do.	570	(Great Leviathan)							3,821.85	2,948.67	
Do.	570	Great Leviathan		432.00	367.28				3,357.00	2,792.09	
Do.	570	(Great Leviathan: Northern Blocks Syndicate, Ltd.)							10,705.00	2,974.64	
Do.	911	Trafalgar		227.00	138.26				1,087.00	977.30	
Do.		Voided leases					5.58		1,048.50	436.66	.09
Do.		Sundry claims		41.00	13.01				277.00	151.42	
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 1914.					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	923	Bohemian	..	..	700·00	699·89	..	..	17·44	2,010·00	1,673·31	..
Do.	1689	Bronco	..	..	..	..	..	..	..	217·00	22·17	..
Do.	2703	Bronco Link	..	..	43·00	7·53	..	..	..	43·00	7·53	..
Do.	1465	Comet	..	..	2,098·50	1,118·81	..	..	..	6,102·00	5,263·61	..
Do.	768	(Donovan's Find)	..	..	..	..	..	..	..	1,768·00	1,999·43	..
Do.	768	Donovan's Find: Greenmount Mines, N.L.	..	..	39·00	18·05	..	..	..	1,376·00	1,027·52	..
Do.	1463	Eclipse	..	..	142·00	136·54	..	..	..	1,187·00	769·56	..
Do.	(869)	(Eveless Eden)	..	..	..	..	..	..	..	104·00	44·29	..
Do.	820	Gentle Annie	..	..	180·00	47·78	..	..	..	1,488·00	614·97	..
Do.	719	(Great Victoria)	..	..	..	..	..	..	..	1,356·00	281·53	..
Do.	719, 944, 945, 1227, 1228, 1606	Great Victoria leases	..	..	11,678·00	1,244·48	..	..	..	31,250·00	3,868·41	..
Do.	490, 517, 558	Jacoletti G.Ms., Ltd.	..	..	103·00	34·69	..	..	..	6,522·00	2,794·18	..
Do.	490, 517, 558, (559)	(Lady Loch Mines, Ltd.)	..	..	..	..	..	..	..	2,091·00	674·01	..
Do.	714	(Marvel Loch)	..	..	..	..	..	..	..	500·00	316·81	..
Do.	714, (723), (822), (869)	Marvel Loch G.M. Co., N.L.	..	..	5,911·50	2,165·38	..	..	..	47,539·50	17,947·59	379·96
Do.	2662	Marvel Loch North	..	..	96·00	49·52	..	..	..	96·00	49·52	..
Do.	852	May Queen	..	..	108·00	478·35	..	..	4·07	389·00	1,983·05	..
Do.	2684	Mountain King	..	5·26	96·00	94·28	..	..	19·77	188·00	152·53	..
Do.	(805)	Mountain Prince	..	..	..	..	..	..	..	255·00	106·84	..
Do.	803, 838, 948, (949), (950), 951	(Mountain Queen leases)	..	..	..	..	..	..	..	748·00	508·39	..
Do.	803, 838, 948, (949), (950), 951, (2543)	Mountain Queen, Ltd.	..	..	25,014·00	6,044·49	131·03	..	..	102,402·00	28,893·10	376·17
Do.	665	(Never Never)	..	..	..	..	..	..	..	29,395·00	7,709·26	..
Do.	(2490)	New Democrat	..	..	62·00	31·49	..	..	..	316·50	241·71	..
Do.	1011	Rising Star	..	..	..	..	..	..	..	140·00	11·48	..
Do.	2575	Saint George	..	..	419·00	199·79	..	..	..	1,266·00	443·93	..
Do.	490, 517	(Turnbull leases)	..	..	..	..	..	..	..	2,143·00	1,481·72	..
Do.	(1452)	Undaunted	..	..	24·00	8·82	..	..	..	834·00	249·41	..
Do.	665, 765	Yilgarn G.M. Co., Ltd.	..	..	3,284·00	659·28	14·90	..	..	3,449·00	694·53	14·90
Do.	..	Voided leases	..	..	..	..	..	..	..	10,850·00	5,468·18	..
Do.	..	Sundry claims	..	..	467·00	192·34	..	..	54·14	3,548·25	1,889·16	..
Do.	..	..	..	..	..	..	..	..	65·10	..	..	..
Mt. Jackson	1979	Allen's Find	..	..	300·00	174·87	..	..	..	638·55	494·86	..
Do.	1933	Butcher Bird No. 1	..	..	60·00	50·07	..	..	..	563·00	476·78	..
Do.	2053	Great Unknown	..	..	123·00	393·36	..	..	37·22	877·93	3,129·13	..

Do.	(2636)	Lone Chance						10.00	6.77		
Do.	2190	Miner's Dream		31.00	19.11			76.00	35.53		
Do.	(2713)	Newmarket						9.00	30.48		
Do.		Voided leases						34.98	21,009.55	2,305.28	
Do.		Sundry claims		98.00	66.07			10.84	1,058.50	663.88	
Mt. Rankin		Voided leases				3.84		5.20	496.00	122.17	
Do.		Sundry claims							170.00	54.38	
Parker's Range	503	Australia		264.00	59.44				2,961.00	1,604.20	
Do.	2785	Briton		28.00	25.32				28.00	25.32	
Do.	2656	Golden Dream		98.00	214.73				162.00	340.77	
Do.	(2649)	Kia Ora			9.00				84.00	37.88	
Do.	2606	King of the Range		125.00	224.37				274.00	555.20	
Do.	(2683)	Referenda							66.00	148.54	
Do.	(1779)	Searchlight: Ziegler Prospecting and Option Syndicate, N.L.							57.50	40.84	
Do.	2546	South Side		72.00	28.43			4.82	112.00	42.21	
Do.	(2676)	South Side Extended		36.00	20.17				36.00	20.17	
Do.	(2670)	Sphinx		13.00	12.89				34.00	33.11	
Do.	724	Spring Hill		1,004.00	203.84				3,232.00	607.21	
Do.	724 (760)	(Spring Hill leases)							8,910.00	2,215.59	
Do.	(2682)	Star of the Range							140.00	146.95	
Do.		Voided leases						63.22	8,745.25	6,065.43	
Do.		Sundry claims		254.00	120.66				1,297.75	929.51	
Southern Cross	(881), (882), 888, 889, (890)	(British and Foreign Development Syndicate, Ltd.)							90,791.75	66,545.29	356.35
Do.	2744	Central		230.00	40.38				230.00	40.38	
Do.	889	(Fraser's G.M. Co., N.L.)							151,771.00	67,870.33	
Do.	888, 889	Fraser's G.M. Syndicate		36.25	16.74				287.25	664.46	
Do.	2714	Fraser's North Extended							10.00	10.37	
Do.	888	(Fraser's South G.M. Co., N.L.)							48,233.00	20,013.23	
Do.	2342	Haddon Consolidated		1,985.00	555.81				3,183.50	1,119.82	
Do.	2416	(Maori Lass)							250.00	52.31	
Do.	2416	Maori Lass, Ltd.		483.00	54.47				483.00	54.47	
Do.	2651	(Queen Ann)		27.00	15.08				388.00	129.23	
Do.	2651	Yilgarn Consols G.M. Co., N.L.		598.50	155.42				598.50	155.42	
Do.		Voided leases				2.13		211.22	134,602.20	54,073.23	8.06
Do.		Sundry claims		177.00	40.71		3.73	595.45	1,776.30	500.05	
Weston's	2180	(Edna May)							581.00	919.27	
Do.	2291, 2585, 2615	Edna May Central G.M. Co., N.L.		7,029.00	1,446.23				7,029.00	1,446.23	
Do.	2180, 2605	Edna May G.M. Co., N.L.		28,998.00	28,755.69				38,117.00	37,730.90	
Do.	(2688)	Elsie			43.50				73.50	22.19	
Do.	2775	Emma May		40.00	20.31				40.00	20.31	
Do.	2086, 2087, 2088, (2635)	Greenfinch Proprietary G.M., N.L.		776.00	171.05				7,576.00	2,783.73	
Do.	2291	(Myrtle Central)							751.00	243.96	
Do.	2186, 2238	Myrtle Consols leases							112.00	58.03	
Do.	2570	Myrtle East		129.00	76.11				177.00	105.15	
Do.		Voided leases							98.25	77.07	
Do.		Sundry claims		45.00	62.37			.25	457.75	246.36	

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 1914.					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 Goldfield generally:—</i>										
		Sundry parcels treated at:										
		Allsop and Don's Works									989.96	
		Andre's Cyanide Works									377.33	
		Australia Battery				35.53					97.15	
		Donovan's Find Battery				537.08					1,029.94	
		Fraser's G.M. Works				110.05					583.63	
		Fraser's South Extended Tailings Works									1,443.31	2.64
		Fremantle Smelting Works								21.28	592.34	33.90
		Greenfinch Proprietary G.M. Works				587.13					1,801.14	
		Greenmount Works									154.77	
		Hope's Hill Cyanide Works				387.02					1,025.19	
		Jacoletti Works				615.84					2,062.82	
		Jones' Cyanide Works									127.39	
		Marvel Loch Mining Coy., N.L.				918.09					961.41	
		Oratava Works—Kalgoorlie									238.22	
		Spring Hill Works									235.44	
		State Battery—Mt. Jackson				7.59					7.59	
		Sunbeam Works				813.79				8.00	4,145.99	
		Violet Works				119.50					525.44	
		Yilgarn G.M. Co., N.L. Works				137.44					1,207.07	
		Various Works								59.00	6,507.96	
		Reported by Banks and Gold Dealers							22.05	3.53		
		Total		30.28	211,453.93	88,714.44	4,987.22	77.74	1,312.00	1,265,053.50	577,459.43	11,608.40

Dundas Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Buldania	Voided leases								3.02	846.05	708.99
Do.	Sundry claims			17.00	8.60			36.53	341.27	519.77	

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TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Dundas Goldfield—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Peninsula	Voided leases .. .. .	..	..	..	..	..	..	17·61	7,764·00	4,705·10	..
		<i>From Goldfield Generally:—</i>										
		Sundry Parcels treated at:—										
		Break-o'-Day Cyanide Works .. .. .	..	..	..	..	..	..	..	..	195·72	..
		Lady Mary Works .. .. .	..	..	..	..	..	..	..	16·00	984·04	..
		Little Wonder Cyanide Works .. .. .	..	..	..	..	..	..	..	..	174·54	..
		Mararoa Crushing and Cyaniding Works .. .. .	..	..	..	..	..	..	..	232·50	2,543·56	38·75
		Rawlings, Bullen, and Rumble's Works .. .. .	..	..	..	560·08	..	..	..	..	1,851·40	..
		State Battery—Norseman .. .. .	..	..	..	63·13	..	..	..	376·00	10,050·75	885·41
		Various Works .. .. .	..	..	..	..	..	..	54·52	103·00	2,577·19	607·70
		Reported by Banks and Gold Dealers	11·85	..	..	..	..	..	1,026·29	..	1·04	..
		Total	11·85	497·55	53,652·25	26,081·36	..	2,027·12	8,920·84	714,915·30	504,027·73	34,948·22

Phillips River Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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 ..	M.L. 349 ..	(Christmas Gift) .. .. .	..	..	..	..	..	..	..	169·50	23·26	..
Do. ..	M.L. 349, (M.L. 355) ..	Christmas Gift leases .. .. .	..	..	..	..	..	..	..	68·00	35·25	..
Do. ..	147, 179 ..	Fair Pay leases .. .. .	..	..	486·63	1,113·21	..	..	..	2,294·38	2,456·75	12·63
Do. ..	136, 137, 138, (139) ..	(Flag Gold and Copper Mining Co., Ltd.) .. .. .	..	..	..	..	..	..	..	7,031·50	4,729·53	1,078·38
Do. ..	136, 137, 138 ..	Flag leases .. .. .	..	..	664·83	832·25	..	..	..	1,279·83	971·00	..
Do. ..	184 ..	Gem .. .. .	..	..	139·06	144·01	..	..	..	139·06	144·01	..
Do. ..	(65) ..	(Gem) .. .. .	..	..	..	..	..	..	..	687·50	613·34	..
Do. ..	151 ..	(Gem Consolidated) .. .. .	..	..	..	..	..	..	..	777·50	616·30	..
Do. ..	151, 156 ..	Gem Consolidated leases .. .. .	..	..	201·01	233·18	..	..	..	3,631·01	1,703·41	8·00
Do. ..	(65), (79) ..	Gem leases .. .. .	..	..	..	..	..	..	..	8,238·35	3,546·35	..
Do. ..	M.L. 52, M.L. 94 ..	Harbour View Gold and Copper Co., Ltd. .. .. .	..	..	226·85	{ 422·19 } * 74·30	..	..	..	510·35	616·87	..

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.	M.L. 347	Harbour View North		6.11	{ 3.84				132.61	48.78	
					* 11.30						
Do.	98	Hillsborough		288.45	912.87				1,784.79	3,786.78	118.03
Do.	(174)	May Day		6.98	7.41				460.98	373.77	
Do.	M.L. 52, M.L. 94	(Ravensthorpe G.M. Syndicate, N.L.)							1,124.00	433.94	164.98
Do.	182	South Gift		273.39	146.94				273.39	146.94	
Do.	74	Two Boys		52.00	58.98			3.90	9,963.62	6,415.90	1,991.82
Do.		Voided leases					113.28	172.41	5,959.69	4,458.68	
Do.		Sundry claims		35.92	9.96		79.05	71.58	662.96	392.82	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)			* 8.42					9.19	
Do.	M.L. 208	Desmond: Phillips River Gold and Copper Co., Ltd.			*69.20					201.99	14.55
Do.	M.L. 95	Elverdton: Phillips River Gold and Copper Co., Ltd.			* 187.81					2,542.67	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					.94	
Do.	M.L. 357	Ironclad			* 16.09					16.09	
Do.	M.L. 109	(Mt. Desmond)					1.40			36.97	
Do.	M.L. 109	Mt. Desmond: Phillips River Gold and Copper Co., Ltd			* 8.00					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					3.14	
Do.		Voided leases							9.00	113.01	152.22
Do.		Sundry claims			* 28.94	* 51.01				29.50	51.01
Mt. Purchas.		Voided leases						4.38	298.05	260.96	
Do.		Sundry claims							4.75	4.68	
Ravensthorpe	M.L. 116	Last Chance			* 7.65					33.47	46.57
Do.	(153)	Maori Queen							754.67	501.96	
Do.	M.L. 16	(Marion Martin)								20.09	
Do.	M.L. 16	Marion Marjin: Phillips River Gold and Copper Co., Ltd			* 36.68					268.47	205.97
Do.	M.L. 175	(Mt. Benson)								287.88	
Do.	M.L. 175	Mt. Benson: Phillips River Gold and Copper Co., Ltd.			* 23.43					482.20	199.83
Do.	M.L. 351	Mt. Benson East			* 5.01					5.01	
Do.	M.L. 15	(Mt. Cattlin)					49		200.00	85.50	
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.			*120.79					3,074.23	3,814.45
Do.	M.L. 342	Surprise			* 3.46					11.82	
Do.		Voided leases						141.31	20,933.32	17,251.14	64.33
Do.		Sundry claims		113.09	{ 122.24		157.82		1,918.27	1,067.91	20.65
					* 13.92						

* From Copper Ore.

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Phillips River Goldfield—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.	
West River	Voided leases .. ..	..	..	..	..	..	..	..	..	10.34	31.06	
Do.	Sundry claims .. ..	..	..	..	..	..	..	..	..	1.69	3.44	
		<i>From Goldfield Generally:—</i>											
		Sundry Parcels treated at:—											
		Gem Battery	138.89	..
		Phillips River Smelter .. ..	..	..	..	..	..	..	..	..	230.39	398.82
		Two Boys Works .. ..	..	..	..	..	..	..	..	..	100.95	..
		Various Works .. ..	..	..	..	..	..	..	..	..	4.76	..
		Reported by Banks and Gold Dealers .. ..	..	..	..	..	..	..	..	122.05	..	..
		Total .. ..	..	..	2,494.32	4,665.42	51.01	472.20	775.33	76,329.83	64,245.60	15,233.22

* From Copper Ore.

† Donnybrook Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
Donnybrook..	..	Voided leases .. ..	..	..	..	..	..	..	..	..	23.24	..
Do.	Sundry claims .. ..	..	..	..	..	..	..	..	..	40.00	816.23
		Total .. ..	..	..	..	..	..	..	..	23.24	1,653.30	818.52

† Abolished 4th March 1908.

State generally.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1914.					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.
		Sundry parcels treated at:—										
		Fremantle Trading Co., Ltd.—Fremantle .. ..	..	..	..	144·16	1,943·75	..	..	..	1,770·56	6,437·27
		Hannan's Proprietary Works—Kalgoorlie .. ..	..	..	..	..	..	..	..	10·00	·90	..
		Oratava Works—Kalgoorlie .. ..	..	..	..	..	..	..	..	..	164·67	..
		Various Works .. ..	..	..	..	..	..	..	..	17·00	4,245·57	481·77
		Sundry Specimens .. ..	..	..	..	..	..	..	2·87	..	..	..
		Reported by Banks and Gold Dealers .. ..	..	..	..	..	..	124·89	153·03	..	..	..
		Total .. ..	..	..	..	144·16	1,943·75	124·89	155·90	27·00	6,181·70	6,919·04

TABLE

TOTAL OUTPUT OF GOLD BULLION ENTERED FOR EXPORT, AND RECEIVED AT THE PERTH BRANCH OF THE QUANTITY OBTAINED EACH YEAR FROM THE RESPECTIVE

Year.	KIMBERLEY.			PILBARA.			WEST PILBARA.			ASHBURTON.		
	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.
1886	fine ozs. 270-17	fine ozs. ...	fine ozs. 270-17	fine ozs. ...	fine ozs. ...	fine ozs. ...	fine ozs. ...	fine ozs. ...	fine ozs. ...	fine ozs. ...	fine ozs. ...	fine ozs. ...
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	29-15	576-14	605-80	8,629-83	6,709-99	15,339-82	522-78	122-85	645-61	44-82	469-09	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	...	617-77	617-77	...	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	...	1,076-68	1,076-68	...	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	1,387-66	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
Total	22,422-06	5,752-51	23,174-57	147,284-08	108,517-92	255,802-00	4,286-67	23,296-96	27,583-63	4,104-96	2,031-88	6,136-84

Year.	YALGOO.			Mt. MARGARET.			NORTH COOLGARDIE.			BROAD ARROW.		
	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.
1886	fine ozs. ...	fine ozs. ...	fine ozs. ...	fine ozs. ...	fine ozs. ...	fine ozs. ...	fine ozs. ...	fine ozs. ...	fine ozs. ...	fine ozs. ...	fine ozs. ...	fine ozs. ...
1887	...	...	...	...	...	...	...	...	...	...	...	...
1888	...	...	...	...	...	...	...	...	...	...	...	...
1889	...	...	...	...	...	...	...	...	...	...	...	...
1890	...	...	...	...	...	...	...	...	...	...	...	...
1891	...	...	...	...	...	...	...	...	...	...	...	...
1892	...	...	...	...	...	...	...	...	...	...	...	...
1893	...	...	...	...	...	...	...	...	...	...	...	...
1894	...	...	...	...	...	...	...	...	...	...	...	...
1895	...	...	...	...	...	...	...	...	...	...	...	...
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	66,697-57	...	66,697-57	22,035-17	...	22,035-17
1899	5,089-83	4,643-00	9,732-83	58,064-19	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	65,998-38	60,607-45	126,605-83	15,680-11	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	6,620-82	122,808-58	129,427-40	9,313-50	17,066-80	26,379-59
1902	483-32	4,866-91	4,880-23	61,846-01	124,308-49	186,152-50	4,064-18	156,856-06	160,920-24	2,128-49	18,665-52	15,794-01
1903	47-08	1,430-59	1,477-67	65,416-00	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	69,180-89	119,889-93	183,070-82	1,614-64	139,513-37	141,133-01	318-83	20,680-78	20,979-61
1905	76-75	4,549-25	4,626-00	34,949-75	153,203-05	188,152-80	1,140-45	145,615-47	146,800-18	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	4,262-94	13,610-81	17,903-15
1908	...	456-43	456-43	19,324-02	147,879-80	167,203-82	6,701-28	76,700-77	83,402-05	3,613-64	7,946-35	11,559-89
1909	...	626-80	626-80	24,123-15	135,314-94	160,038-09	6,889-19	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	1,869-24	60,836-71	62,775-95	...	321-40	321-40
1911	...	294-60	294-60	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	49,999-76	...	4-33	4-33
1913	...	2,837-97	2,837-97	157-14	89,408-71	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
Total	11,346-58	49,662-02	61,008-60	605,578-04	1,845,860-44	2,451,438-48	259,845-71	1,481,176-58	1,741,022-29	121,540-42	161,297-31	282,837-73

Year.	DUNDAS.			PHILLIPS RIVER.			DONNYBROOK.			STATE GENERALLY.		
	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.
1886	fine ozs. ...	fine ozs. ...	fine ozs. ...	fine ozs. ...	fine ozs. ...	fine ozs. ...	fine ozs. ...	fine ozs. ...	fine ozs. ...	fine ozs. ...	fine ozs. ...	fine ozs. ...
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	39,980-65	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	...	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	4-94	82-64	82-64	53-44	2,889-44	2,923-88
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	27,411-81	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									

V.

ROYAL MINT, FROM 1ST JANUARY, 1886, TO 31ST DECEMBER, 1914, SHOWING, IN FINE OUNCES, THE GOLDFIELDS, AND THE TOTAL ANNUAL VALUE.

Year.	b GASCOYNE.			c PEAK HILL.			e 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
1888
1889
1890
1891	1,846.83	...	1,846.8
1892	21,789.19	...	21,789.19
1893	18,974.77	...	18,974.77
1894	47,365.54	...	47,365.54
1895	58,575.66	...	58,575.66
1896	63,769.17	...	63,769.17
1897	4,571.38	...	4,571.38	8,457.34	...	8,457.34	74,154.67	...	74,154.67
1898	12,288.93	...	12,288.93	35,393.19	...	35,393.19	83,794.22	...	83,794.22
1899	297.96	76.63	374.59	14,064.24	14,558.64	28,622.88	33,826.08	3,361.95	37,188.03	61,586.09	22,074.71	83,660.80
1900	6.59	77.02	83.61	9,528.14	16,119.79	25,647.93	23,545.54	28,071.55	51,617.09	53,815.70	43,423.77	97,239.47
1901	...	16.82	23.41	231.85	19,352.44	19,584.29	29,750.63	40,557.07	70,337.70	92,149.56	38,996.10	131,145.66
1902	...	107.29	107.29	85.93	28,044.55	28,130.48	25,450.63	53,583.10	79,033.73	141,731.91	40,926.08	182,657.99
1903	...	30.76	30.76	29,395.32	29,598.92	58,994.24	21,878.06	65,394.05	87,272.11	154,012.88	54,348.53	208,361.41
1904	...	10.95	10.95	203.60	17,475.33	17,475.33	21,296.85	64,550.36	85,847.21	165,292.07	52,683.16	217,975.23
1905	...	21.34	21.34	125.01	13,371.75	13,496.76	1,361.68	89,249.93	90,611.61	131,656.36	82,742.05	224,388.41
1906	...	78.73	78.73	...	2,038.62	2,038.62	140.68	95,168.89	95,309.57	79,172.69	109,936.80	189,109.49
1907	...	8.44	8.44	...	5,918.75	5,918.75	2,891.66	117,735.69	120,627.35	51,811.74	115,497.50	170,309.24
1908	...	31.82	31.82	...	9,864.36	9,864.36	10,701.24	137,028.14	147,729.38	45,483.05	111,540.54	157,023.59
1909	...	7.37	7.37	...	7,322.29	7,322.29	11,599.83	136,637.67	148,237.50	21,662.47	107,167.27	131,849.74
1910	...	26.31	26.31	...	3,057.25	3,057.25	1,557.78	137,190.44	138,748.22	19,568.5	111,414.23	130,983.08
1911	...	7.87	7.87	...	134.23	134.23	11.77	96,412.87	96,454.64	13,919.70	109,444.91	123,364.61
1912	...	6.55	6.55	...	196.11	196.11	...	90,397.82	90,397.82	6,377.17	105,245.32	111,622.49
1913	258.10	258.10	195.78	80,122.11	80,317.89	5,749.47	115,694.96	121,444.43
1914	...	4.11	4.11	...	85.66	85.66	354.75	65,609.61	65,964.36	6,443.82	111,522.67	118,266.49
Total	304.55	512.01	816.56	41,099.08	167,193.19	208,292.27	228,443.49	1,301,641.25	1,530,084.74	1,426,664.18	1,342,958.60	2,769,622.78

Year.	e NORTH-EAST COOLGARDIE.			e EAST COOLGARDIE.			g COOLGARDIE.			YILGARN.		
	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	...	...	...	...	...	...	...	...	...	...	...	...
1894	...	...	...	...	...	...	...	...	...	...	...	...
1895	...	...	...	...	...	...	...	...	...	...	...	...
1896	3,679.63	...	3,679.63	76,297.42	...	76,297.42	61,848.03	...	61,848.03	14,819.20	...	14,819.20
1897	29,437.40	...	29,437.40	268,411.95	...	268,411.95	93,312.00	...	93,312.00	16,097.78	...	16,097.78
1898	112,039.58	...	112,039.58	402,847.31	...	402,847.31	113,816.75	...	113,816.75	10,463.35	...	10,463.35
1899	57,674.82	14,940.55	72,615.37	796,666.63	29,567.58	826,234.21	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	600,328.29	125,105.24	725,433.53	60,988.33	46,167.62	107,155.95	688.47	25,628.83	26,317.39
1901	6,798.56	39,024.18	45,822.74	698,042.56	238,840.93	936,883.49	9,584.35	70,720.21	80,304.56	49.15	26,677.85	26,727.00
1902	549.07	46,316.67	46,865.74	480,462.26	546,964.68	1,007,426.94	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	69,681.39	77,000.01	...	22,761.00	22,761.00
1904	55.09	33,262.10	33,317.19	555,016.48	534,579.88	1,089,596.36	1,100.07	61,073.11	62,173.18	28.87	29,965.37	29,994.24
1905	2,187.11	40,520.19	42,707.30	613,103.20	1,092,357.57	1,705,460.77	103.78	60,474.81	60,578.59	...	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	1,050.88	61,670.65	62,721.53	...	23,311.41	23,311.41
1907	3,132.83	25,399.75	28,532.58	323,550.65	643,139.11	966,689.16	871.76	40,982.65	41,854.41	...	20,866.10	20,866.10
1908	925.44	23,902.44	24,827.88	267,748.62	657,936.89	925,685.51	36.91	36,311.70	36,348.61	204.41	20,958.23	21,162.64
1909	1,774.45	24,566.87	26,341.32	306,462.21	620,612.07	927,074.28	...	38,264.02	38,264.02	...	24,049.13	24,049.13
1910	...	19,082.01	19,082.01	179,062.94	653,211.05	832,273.99	...	33,840.93	33,840.93	...	14,688.17	14,688.17
1911	...	18,528.97	18,528.97	123,160.54	696,386.80	809,547.34	...	42,327.65	42,327.65	...	27,439.88	27,439.88
1912	194.22	14,475.38	14,669.60	71,429.00	717,356.45	783,785.45	...	35,593.00	35,593.00	9,688.59	63,679.58	73,368.17
1913	...	11,210.69	11,210.69	70,078.57	722,593.22	792,671.79	...	21,957.78	21,957.78	3,798.03	81,713.56	85,511.59
1914	...	5,210.22	5,210.22	40,393.05	677,609.26	718,002.31	...	...	...	...	...	...
Total	274,748.07	419,453.49	694,201.56	6,744,335.36	8,710,344.14	15,454,679.50	661,131.91	786,720.59	1,447,852.50	210,519.63	462,947.89	673,467.57

GRAND TOTAL.

Year.	Export.		Mint.		Total.		Value.	
	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	£ s. d.	
1886	270.17	...	270.17	...	270.17	...	1,147 12 2 1/2	
1887	4,359.37	...	4,359.37	...	4,359.37	...	18,517 8 6 1/2	
1888	3,124.82	...	3,124.82	...	3,124.82	...	13,273 7 10 1/2	
1889	13,859.52	...	13,859.52	...	13,859.52	...	58,871 9 11 1/2	
1890	20,402.42	...	20,402.42	...	20,402.42	...	86,663 19 5	
1891	27,116.14	...	27,116.14	...	27,116.14	...	115,182 0 10 1/2	
1892	53,271.65	...	53,271.65	...	53,271.65	...	226,283 11 8	
1893	99,202.50	...	99,202.50	...	99,202.50	...	421,385 8 8 1/2	
1894	185,298.73	...	185,298.73	...	185,298.73	...	787,098 19 6	
1895	207,110.20	...	207,110.20	...	207,110.20	...	879,748 4 2 1/2	
1896	251,618.69	...	251,618.69	...	251,618.69	...	1,068,808 5 2	
1897	603,846.44	...	603,846.44	...	603,846.44	...	2,564,976 12 9 1/2	
1898	939,489.49	...	939,489.49	...	939,489.49	...	3,990,697 13 10	
1899	1,283,360.25	187,244.41	1,470,604.66	...	1,470,604.66	...	6,246,731 10 7 1/2	
1900	894,387.27	519,923.59	1,414,310.86	...	1,414,310.86	...	6,007,610 13 4 1/2	
1901	923,686.96	779,729.56	1,703,416.52	...	1,703,416.52	...	7,235,653 9 1	
1902	707,039.75	1,163,997.60	1,871,037.35	...	1,871,037.35	...	7,947,661 9 7 1/2	
1903	833,685.78	1,231,115.62	2,064,801.40	...	2,064,801.40	...	8,770,718 17 0 1/2	
1904	810,616.04	1,172,614.03	1,983,230.07	...	1,983,230.07	...	8,424,225 17 3 1/2	
1905	655,088.88	1,300,226.00	1,955,315.88	...	1,955,315.88	...	8,305,653 18 5 1/2	
1906	562,250.59	1,232,296.01	1,794,546.60	...	1,794,546.60	...	7,622,749 8 7	
1907	431,803.14	1,265,750.45	1,697,553.59	...	1,697,553.59	...	7,210,749 6 2 1/2	
1908	356,353.96	1,291,557.17	1,647,911.13	...	1,647,911.13	...	6,999,881 10 10 1/2	
1909	386,370.58	1,208,898.83	1,595,269.41	...	1,595,269.41	...	6,776,273 14 7 1/2	
1910	293,970.34	1,236,661.68	1,470,632.02	...	1,470,632.02	...	6,246,847 15 0	
1911	160,422.28	1,210,445.24	1,370,867.52	...	1,370,867.52	...	5,823,076 1 9 1/2	
1912	83,577.12	1,199,080.87	1,282,657.99	...	1,282,657.99	...	5,448,384 16 5 1/2	
1913	86,255.13	1,227,788.15	1,314,043.28	...	1,314,043.28	...	5,581,701 1 2 1/2	
1914	51,454.65	1,181,522.17	1,232,976.82	...	1,232,976.82	...	5,227,352 12 6 1/2	
TOTAL	10,869,293.86	17,408,851.38	28,278,145.24	...	28,278,145.24	...	120,117,925 17	

b. Prior to March, 1899, included with Ashburton. c. From 1st August, 1897. e. Prior to 1st May, 1896, included with Coolgardie. g. Declared 5th April, 1894, to which date included with Yilgarn.

TABLE VI.

COMPARATIVE RETURN OF GOLD BULLION ENTERED FOR EXPORT AND RECEIVED AT THE PERTH BRANCH OF THE ROYAL MINT, DURING THE YEARS 1912, 1913, AND 1914, SHOWING IN FINE OUNCES THE QUANTITY RECORDED EACH MONTH, AND ITS VALUE.

MONTHS AND QUARTERS.	1912.				1913.				1914.			
	EXPORT.	MINT.	TOTAL.	VALUE.	EXPORT.	MINT.	TOTAL.	VALUE.	EXPORT.	MINT.	TOTAL.	VALUE.
JANUARY	fine ozs. 10,697·39	fine ozs. 95,672·55	fine ozs. 106,369·94	£ s. d. 451,830 15 8½	fine ozs. 9,738·44	fine ozs. 94,966·58	fine ozs. 104,705·02	£ s. d. 444,758 13 1	fine ozs. 9,762·33	fine ozs. 102,260·64	fine ozs. 112,022·97	£ s. d. 475,843 6 7½
FEBRUARY	10,440·49	92,091·18	102,531·67	435,526 17 0	8,780·28	92,206·81	100,987·09	428,965 17 10	8,493·49	94,811·61	103,305·10	438,812 3 5½
MARCH	408·28	92,596·60	93,004·88	395,059 12 4½	754·13	97,014·63	97,768·76	415,295 5 10½	1,173·04	91,446·40	92,619·44	393,422 7 5½
1st January to 31st March ...	21,546·16	280,360·33	301,906·49	1,282,417 5 1	19,272·85	284,188·02	303,460·87	1,289,019 16 9½	19,428·86	288,518·65	307,947·51	1,308,077 17 6½
APRIL	10,698·58	99,707·68	110,406·26	468,975 19 7¾	7,920·37	103,324·22	111,244·59	472,536 19 7¾	8,773·75	90,233·07	99,006·82	420,554 4 9½
MAY	9,288·33	98,104·59	107,392·92	456,176 2 6½	7,094·03	103,084·87	110,178·90	468,010 4 4½	7,138·22	99,068·35	106,206·57	451,136 16 8
JUNE	1,214·05	106,929·69	108,143·74	459,365 8 2¾	5,111·96	108,373·12	113,485·08	482,053 19 7	1,725·28	99,289·93	101,015·21	429,085 6 9
1st January to 30th June ...	42,747·12	585,102·29	627,849·41	2,666,934 15 6	39,399·21	598,970·23	638,369·44	2,711,621 0 5	37,066·11	577,110·00	614,176·11	2,608,854 5 9
JULY	8,802·06	96,837·59	105,639·65	448,728 14 2½	11,704·78	97,091·44	108,796·22	462,136 19 4½	8,293·67	88,305·48	96,599·15	410,327 2 1¾
AUGUST	7,262·43	101,377·45	108,639·88	461,472 17 6½	7,610·81	102,558·22	110,169·03	467,968 5 10½	101·39	102,346·09	102,447·48	435,169 4 8¾
SEPTEMBER	1,580·45	109,525·78	111,106·23	471,949 5 4	3,206·28	111,962·12	115,168·40	489,204 5 4½	1,534·96	103,577·74	105,112·70	446,490 7 4½
1st January to 30th September	60,392·06	892,843·11	953,235·17	4,049,085 12 7	61,921·08	910,582·01	972,503·09	4,130,930 11 0	46,996·13	871,339·31	918,335·44	3,900,840 19 11½
OCTOBER	10,288·58	95,977·50	106,266·08	451,389 12 3¾	11,628·78	99,879·80	111,508·58	473,658 6 9¾	2,027·55	99,366·30	101,393·85	430,693 13 11¾
NOVEMBER	8,065·39	99,154·00	107,219·39	455,439 0 4¾	9,581·44	108,330·12	117,911·56	500,856·9 5	1,217·39	109,282·40	110,499·79	469,373 5 5½
DECEMBER	4,831·09	111,106·26	115,937·35	492,470 11 2¾	3,123·83	108,996·22	112,120·05	476,255 14 0	1,213·58	101,534·16	102,747·74	436,444 13 1¾
Total	83,577·12	1,199,080·87	1,282,657·99	5,448,384 16 5¾	86,255·13	1,227,788·15	1,314,043·28	5,581,701 1 2¾	51,454·65	1,181,522·17	1,232,976·82	5,237,352 12 6½

TABLE VII.

MONTHLY RETURN OF GOLD, CONTAINED IN BULLION, FURNACE PRODUCTS, AND ORE, ENTERED FOR EXPORT DURING 1914.

MONTH.	UNITED KINGDOM.			VICTORIA.			NEW SOUTH WALES.			GERMANY.			TOTALS.			Minted Gold Exported.*
	Bullion.	Furnace Products.	Ore.	Bullion.	Furnace Products.	Ore.	Bullion.	Furnace Products.	Ore.	Bullion.	Furnace Products.	Ore.	Bullion.	Furnace Products.	Ore.	
1914.	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 ...	8,035.35	968.15	6.67	635.63	116.53	...	...	...	...	...	...	...	8,670.98	1,084.68	6.67	14,220.94
February ...	7,722.24	531.44	4.39	235.42	...	...	...	...	...	...	...	...	7,957.66	531.44	4.39	+ 129.12 4,746.35
March ...	...	881.31	4.05	252.50	...	...	...	...	...	...	5.18	...	232.50	881.31	9.23	...
April ...	7,694.22	602.92	3.85	470.84	...	...	...	...	...	...	1.92	...	8,165.06	602.92	5.77	4,155.93
May ...	6,162.11	583.39	3.79	188.33	197.75	...	...	...	...	...	2.85	...	6,350.44	781.14	6.64	+ 6.39 4,135.18
June ...	...	1,105.71	5.01	588.55	...	...	...	23.54	...	...	2.47	...	588.55	1,129.25	7.48	+ 103.07 1,180.81
July ...	7,097.20	759.94	8.06	329.59	...	...	...	...	98.88	...	...	...	7,426.79	759.94	106.94	+ 20.26 7,117.58
August ...	...	97.83	1.63	...	...	...	...	...	...	...	1.93	...	...	97.83	3.56	4,743.61
September ...	...	755.23	2.84	776.89	...	...	...	...	...	...	...	...	776.89	755.23	2.84	3,555.43
October ...	...	851.55	...	1,176.00	...	...	...	...	...	...	...	...	1,176.00	851.55	...	4,738.64
November ...	...	793.28	.35	423.76	...	...	...	...	...	...	...	...	423.76	793.28	.35	+ 265.96
December ...	...	432.64	4.05	776.89	...	...	...	...	...	...	...	...	776.89	432.64	4.05	...
TOTALS ...	36,711.12	8,363.39	44.69	5,884.40	314.28	...	...	23.54	98.88	...	...	14.35	42,595.52	8,701.21	157.92	49,119.27

* 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.
 † To United Kingdom. ‡ To China. All the other amounts in this column were fine bars of minted gold exported to India.

TABLE VIII.

RETURN OF GOLD BULLION RECEIVED AT THE PERTH BRANCH OF THE ROYAL MINT FROM MAY, 1899, TO THE 31ST DECEMBER, 1914, 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.	Mt. Margaret.	North Coolgardie.	Broad Arrow.	North-East Coolgardie.
1899	308.45	529.80	...	281.80	85.65	16,274.00	3,758.07	24,675.64	5,190.05	16,911.54	44,779.38	8,503.50	16,700.90
1900	644.02	7,493.88	137.33	474.26	86.10	18,019.08	32,049.74	48,540.12	8,851.52	67,748.45	88,688.14	14,376.10	40,503.12
1901	663.37	11,279.93	394.38	55.42	18.56	21,351.67	44,746.88	43,024.65	9,191.01	126,703.91	135,493.31	18,829.13	43,055.63
1902	439.93	10,706.03	3,234.37	...	124.86	32,637.17	62,357.98	47,628.18	5,116.94	144,663.12	182,543.06	15,903.42	53,901.58
1903	511.75	14,217.53	6,481.58	135.30	36.29	34,684.27	77,089.29	64,127.18	1,687.99	148,006.49	197,229.08	21,528.20	42,649.25
1904	37.69	8,293.58	5,170.06	150.73	13.10	20,909.99	77,237.31	63,037.71	3,345.82	143,453.51	166,939.82	24,721.53	39,799.55
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	184,178.87	175,057.14	18,394.17	48,352.22
1906	785.23	6,007.79	915.63	168.30	95.43	2,471.21	115,363.22	133,264.79	5,919.37	166,097.63	130,784.60	20,415.43	37,509.91
1907	431.72	4,924.97	396.22	49.89	10.06	7,057.22	140,382.15	137,713.43	3,815.06	183,693.29	86,685.09	16,228.85	30,285.39
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	175,092.47	90,815.08	9,408.64	28,300.91
1909	203.59	6,662.82	1,682.49	274.93	8.89	8,823.58	164,652.43	129,139.74	755.31	163,781.55	80,293.29	5,860.66	29,603.84
1910	586.44	7,094.46	1,670.20	208.31	31.67	3,679.72	165,123.37	134,098.94	873.58	158,847.24	73,283.66	386.84	22,967.23
1911	183.78	6,033.33	1,014.60	334.38	9.78	119,267.86	119,267.86	135,342.46	363.85	162,319.77	74,536.34	346.78	22,917.38
1912	361.11	7,674.55	912.60	47.77	8.09	237.96	110,585.25	128,679.43	1,410.49	124,123.10	61,018.13	5.32	17,705.86
1913	319.55	5,048.77	1,491.66	47.37	...	564.67	96,270.04	139,021.56	3,410.52	107,391.67	73,160.41	10,814.52	13,452.90
1914	238.83	6,750.56	1,538.31	56.09	5.00	104.45	79,785.02	135,990.48	1,705.85	125,937.60	89,904.49	3,727.56	6,318.12
Total	6,771.99	128,447.53	27,782.86	2,389.41	596.81	194,735.29	1,558,207.54	1,607,844.15	59,731.56	2,198,950.21	1,751,211.02	189,450.65	494,023.79

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Year.	East Coolgardie.	Coolgardie.	Yilgarn.	Dundas.	* Phillips River.	Donnybrook. †	State generally.	TOTAL.				GRAND TOTAL.	
								Western Australia.		Other Countries.		Quantity.	Actual Value.
								Quantity.	Actual Value.	Quantity.	Actual Value.		
1899	33,051.33	27,611.24	9,070.70	473.63	...	196.17	904.39	209,306.24	762,546 11 6	103.46	336 18 3	209,409.70	762,883 9 9
1900	139,845.60	51,607.26	28,648.51	31,583.20	...	265.55	1,620.93	581,182.91	2,096,212 14 2	17.49	44 15 7	581,200.40	2,096,257 9 9
1901	263,514.75	78,026.07	29,433.84	32,825.75	...	4.64	1,667.79	860,280.69	3,033,311 0 4	92.25	297 5 8	860,372.94	3,033,608 6 0
1902	636,536.52	94,134.17	25,873.68	31,088.91	5,146.80	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	685,289.82	82,218.79	26,856.28	40,006.39	6,420.79	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	699,475.35	73,076.66	35,854.87	37,508.11	2,450.03	...	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	737,065.14	74,615.36	30,404.65	32,953.56	1,753.32	...	1,821.99	1,563,115.76	5,475,841 2 10	525.80	1,491 0 7	1,563,641.56	5,477,332 3 5
1906	742,525.99	73,307.24	30,996.76	24,484.65	1,744.38	...	925.10	1,493,782.66	5,330,245 12 1	413.86	974 16 0	1,494,196.52	5,331,220 8 1
1907	766,846.83	73,532.99	27,795.35	27,222.21	1,806.30	...	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	779,009.10	48,524.18	22,835.58	48,785.54	4,299.19	...	2,080.42	1,529,226.86	5,473,858 15 8	1,313.84	3,885 2 3	1,530,540.70	5,390,743 17 11
1909	747,856.04	43,756.68	25,255.30	43,254.22	4,345.04	...	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	786,209.41	46,054.82	28,945.68	52,068.70	6,056.08	...	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	848,725.06	41,861.54	18,190.20	59,831.49	5,242.16	...	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	876,900.05	51,732.78	33,429.29	52,220.76	4,026.32	...	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	867,887.30	42,738.63	76,581.73	47,535.02	4,221.40	...	277.7	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	824,280.77	26,696.51	99,410.57	47,487.27	480.65	...	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
Total	10,435,019.06	929,494.92	549,582.99	609,329.41	47,992.46	630.96	18,561.09	20,310,753.70	73,166,896 7 9	9,522.01	18,247 2 6	20,820,275.71	73,185,145 10 3

* 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 1914, 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.		
tons.	tons.	tons.	£	tons.	tons.	tons.	£	tons.	tons.	tons.	£		
Previous to 1899	...	75.45	75.45	4,419	...	1,590.33	1,590.33	66,108	...	1,665.78	1,665.78	70,527	
1899	...	57.50	57.50	3,612	...	277.32	277.32	21,658	...	334.82	334.82	25,270	
1900	...	387.87	387.87	27,174	...	435.62	435.62	29,528	...	823.49	823.49	56,702	
1901	...	412.98	412.98	21,148	...	321.34	321.34	18,852	...	734.32	734.32	40,000	
1902	...	216.35	216.35	15,103	...	403.21	403.21	24,680	...	619.56	619.56	39,783	
1903	...	292.11	292.11	21,528	...	524.94	524.94	34,362	...	817.05	817.05	55,890	
1904	...	320.86	320.86	24,355	...	533.64	533.64	34,462	...	854.50	854.50	58,817	
1905	...	435.74	435.74	33,880	...	643.52	643.52	52,960	...	1,079.26	1,079.26	86,840	
1906	...	36.59	675.06	711.65	78,449	26.18	757.10	783.28	79,195	62.77	1,432.16	1,494.93	157,644
1907	...	104.13	749.56	853.69	85,603	40.40	729.60	770.00	73,045	144.53	1,479.16	1,623.69	158,648
1908	...	31.00	372.03	403.03	30,636	13.90	562.43	576.33	41,046	44.90	934.46	979.36	71,682
1909	...	81.75	212.21	293.96	22,431	44.40	414.35	458.75	34,786	126.15	*628.08	*754.23	+57,335
1910	...	33.75	119.75	153.50	12,899	25.06	292.65	317.71	27,974	58.81	412.40	471.21	40,873
1911	...	27.35	121.30	148.65	16,064	27.82	383.30	411.12	44,638	55.17	504.60	559.77	60,702
1912	...	10.25	113.13	123.38	14,993	14.90	415.55	430.45	50,166	25.15	528.68	553.83	65,159
1913	...	14.15	124.35	139.10	16,506	29.06	429.42	458.48	50,954	43.21	†557.72	†600.93	§67,717
1914	...	12.35	75.05	87.40	8,168	5.32	239.22	244.54	21,145	17.67	314.27	331.94	29,313
Total	351.32	4,761.90	5,113.22	436,968	227.04	3,953.54	9,180.58	705,559	578.36	13,720.31	14,298.67	1,142,502	

* 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 D.				GREENBUSHES MINERAL FIELD.				TOTAL.				
	Quantity.			Value.	Quantity.			Value.	Quantity.			Value.	
	Lode.	Stream.	Total.		Lode.	Stream.	Total.		Lode.	Stream.	Total.		
tons.	tons.	tons.	£	tons.	tons.	tons.	£	tons.	tons.	tons.	£		
Previous to 1899	
1899	
1900	
1901	
1902	
1903	
1904	
1905	...	70.95	70.95	8,925	...	2.34	2.34	1,590	...	73.29	73.29	10,515	
1906	...	1.80	12.85	14.65	2,644	1.80	12.85	14.65	2,644
1907	
1908	
19094545	11385	.85	214	.45	.85	1.30	327
1910	
1911	
1912	
1913	
1914	
Total	2.25	83.80	86.05	11,682	...	3.19	3.19	1,804	2.25	86.99	89.24	13,486	

Period.	PYRITIC ORE.				COPPER ORE.											
	Mt. Morgans D.		PILBARA GF.				WEST PILBARA GF.		ASHBURTON GF.		PEAK HILL GF.		E. MURCHISON GF.			
	Quantity.		Value.		Quantity.		Value.		Quantity.		Value.		Quantity.		Value.	
	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£
Previous to 1899	...	...	...	...	...	...	...	7,018.00	55,270	...	...	...	...	...	...
1899	...	...	...	...	...	...	...	2,555.00	29,478	...	...	...	...	...	...
1900	...	...	...	...	...	...	...	1,605.00	12,139	...	...	...	...	...	...
1901	...	...	...	...	...	...	...	1,162.00	15,891	...	...	...	...	...	...
1902	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1903	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1904	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1905	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1906	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1907	...	...	7.77	190	...	...	...	3,365.50	63,548	...	...	...	...	...	...
1908	...	...	...	...	...	...	...	1,486.00	17,691	188.00	2,311	...	...	6.77	69
1909	...	...	...	...	...	...	...	7,135.50	62,447	10.75	259	...	...	...	...
1910	...	...	...	...	...	...	...	8,479.80	64,861	...	...	...	...	...	...
1911	9,938.92	3,529	25.10	196	5.00	120	...	9,082.02	69,140	...	...	...	...	...	...
1912	7,625.80	2,543	...	...	...	...	...	12,284.02	104,289	...	...	...	...	...	...
1913	10,216.18	3,658	...	...	...	...	...	12,621.73	76,878	...	...	...	...	...	...
1914	9,758.83	3,485	...	...	...	...	...	7,764.18	40,607	...	...	112.70	2,409	...	...
Total	37,539.73	13,215	32.87	386	5.00	120	74,558.75	612,239	198.75	2,570	112.70	2,409	6.77	69		

||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 1899	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£		
1899	...	...	...	...	...	...	98'00	1,715	38'00	407	273'00	4,338	...	...
1900	...	...	5'15	91	...	...	...	...	...	...	4,539'00	30,718	...	...
1901	...	...	10'50	76	...	...	38'50	277	...	...	7,660'00	40,738	...	...
1902	...	...	...	...	...	...	...	...	...	...	1,954'00	6,852	...	...
1903	...	...	...	...	...	...	...	...	...	...	18,965'00	43,557	...	...
1904	...	...	...	...	...	...	...	...	...	...	500'00	900	...	...
1905	...	...	...	...	...	...	...	...	...	...	60'00	674	...	...
1906	133'50	2,816	...	...	13'91	91	...	...	...	...	4,361'05	21,934	...	...
1907	...	...	31'71	274	10'00	130	...	...	...	...	5,141'52	58,888	2'85	26
1908	...	...	...	...	9'50	97	...	...	133'55	1,482	4,404'10	20,221	...	...
1909	608'00	2,823	...	...	...	...	...	...	...	...	...	...	...	...
1910	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1911	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1912	...	...	4'80	54	...	...	...	...	...	...	...	...	...	...
1913	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1914	15'19	248	3'40	27	...	...	...	...	...	...	...	...	...	...
Total	756'69	5,887	55'56	522	33'41	318	136'50	1,992	171'55	1,889	47,857'67	230,820	2'85	26		

COPPER ORE—continued.

Period.	NORTH COOLGARDIE GOLDFIELD.		EAST COOLGARDIE GOLDFIELD.		PHILLIPS RIVER GOLDFIELD.		STATE GENERALLY.		TOTAL.	
	Menzies District.		E. Coolgardie D.		Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Quantity.	Value.	Quantity.	Value.						
Previous to 1899	7,018'00	55,270
1899	2,964'00	35,938
1900	34'00	725	...	...	6,183'15	43,673
1901	1,089'14	12,918	...	...	9,960'14	69,900
1902	308'25	1,238	...	...	2,262'25	8,090
1903	1,561'33	10,984	...	...	20,526'33	56,541
1904	3,468'89	24,280	...	...	3,968'89	25,180
1905	2,329'04	15,592	...	...	2,389'04	16,266
1906	4'70	33	2,885'00	25,270	13'50	193	7,411'66	50,337
1907	1'42	18	10,414'57	57,273	3'08	40	18,978'42	180,387
1908	2,015'71	9,233	...	...	8,294'30	51,434
1909	50'67	330	7,330'70	29,815	...	15,084'95	95,344
1910	25,871'65	96,745	...	...	34,351'45	161,606
1911	13,563'68	46,862	...	...	22,675'80	116,318
1912	1,318'38	15,815	...	...	13,607'20	120,168
1913	806'95	9,737	...	...	13,428'68	86,615
1914	4,841'15	37,524	38'50	426	12,775'12	81,241
Total	6'12	51	50'67	330	77,838'44	394,011	55'08	659	201,879'38	1,254,298

Period.	IRONSTONE.								LEAD ORE.		SILVER LEAD ORE.		COAL.	
	W. PILBARA GF.		E. COOLGARDIE GF.		STATE GENERALLY.		TOTAL.		NORTHAMPTON MF.		ASHBURTON GF.		COLLIE RIVER COAL MF.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Previous to 1899	100'00	300	...	...	...	...	100'00	300	...	...	...	...	3,508'00	1,761
1899	12,852'00	8,939	12,852'00	8,939	82'75	912	...	...	54,336'00	25,951
1900	12,251'00	9,258	12,251'00	9,258	268'00	533	...	...	118,410'10	54,835
1901	450'00	247	20,119'00	12,999	20,569'00	13,246	...	...	21'05	152	117,835'80	68,561
1902	4,800'00	2,040	4,800'00	2,040	...	...	35'85	277	140,883'90	86,188
1903	220'00	88	220'00	88	...	...	...	...	133,426'62	69,128
1904	1,441'50	577	1,441'50	577	...	...	...	...	138,550'04	67,174
1905	3,212'60	1,285	3,212'60	1,285	...	...	...	...	127,364'06	55,312
1906	1,279'87	512	1,279'87	512	...	...	...	...	149,755'27	57,998
1907	1,093'53	438	1,093'53	438	10'00	128	...	...	142,372'54	55,158
1908	57'00	461	727'25	6,914	175,247'92	75,694
1909	440'00	3,520	214,301'98	90,965
1910	† 10'50	† 12	10'50	12	185'10	1,777	...	...	262,166'06	113,699
1911	8,194'76	17,663	...	...	249,899'15	111,154
1912	11,098'50	24,412	...	...	295,078'91	135,857
1913	26,589'53	50,474	125'50	1,757	313,817'96	153,614
1914	15,334'62	38,351	715'10	9,807	319,210'32	148,684
Total	100'00	300	450'00	247	57,280'00	36,148	57,830'00	36,695	61,820'26	134,711	2,064'75	22,427	2,956,164'63	1,371,733

† Iron ore from Koolan Island, Yampi Sound.

TABLE IX.—Minerals other than Gold, etc.—continued.

Period.	WOLFRAM ORE.		GODOLINITE.		ASBESTOS.		LIMESTONE.								DIAMONDS.	
	STATE GENERALLY.		PILBARA GF.		PILBARA GF.		MURCHISON GF.		YILGARN GOLDFIELD.		STATE GENERALLY.		TOTAL.		PILBARA GF.	
			Marble Bar D.		Marble Bar D.		Cue District.								Nullagine District.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	carats.	£
Previous to 1899
1899
1900	269.85	273	17,593.00	2,838	17,593.00	2,838	§	24
1901	1,642.00	919	16,568.00	3,429	18,210.00	4,348	...	...
1902	535.00	340	4,545.35	1,000	5,080.35	1,340	...	...
1903	102.00	75	1,177.50	103	1,279.50	178	...	...
1904	13,397.20	1,699	13,397.20	1,699	...	...
1905	9,144.60	1,220	9,144.60	1,220	...	...
1906	9,472.28	1,691	9,472.28	1,691	...	...
1907	298.00	772	...	...	3,303.95	610	3,601.95	1,382	...	...
1908	40.00	1,600	...	...	...	...	...	...	...	...	...	...
1909	2.83	154	...	...	...	...	...	...	...	...	...	...
1910
1911
1912
1913
1914
Total	245.64	1,151	1.00	112	42.83	1,754	298.00	772	2,548.85	1,607	90,858.88	15,911	93,705.73	18,290	...	24

* Produced within the West Kimberley Magisterial District. † 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.

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 XXIII., pages 98-101.

TABLE X.

QUANTITY AND VALUE OF BLACK TIN REPORTED TO THE MINES DEPARTMENT DURING 1914,
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1914.				TOTALS TO DATE.			
			Quantity.			Value.	Quantity.			Value.
			Lode.	Stream.	Total.		Lode.	Stream.	Total.	
			tons.	tons.	tons.	£	tons.	tons.	tons.	£
PILBARA GOLDFIELD.										
MARBLE BAR DISTRICT.										
Cooglegong ..	..	Sundry claims .. ..	..	35·80	35·80	3,326	..	1,540·17	1,540·17	127,819
Mills Find ..	..	Sundry claims .. ..	..	..	..	..	..	85	85	69
Moolyella ..	..	Voided leases .. ..	..	..	..	..	..	330·53	330·53	21,340
Do. ..	..	Sundry claims .. ..	..	38·45	38·45	3,703	..	2,601·31	2,601·31	235,204
Old Shaw ..	..	Voided leases .. ..	..	..	..	..	..	6·75	6·75	424
Do. ..	..	Sundry claims .. ..	..	..	..	..	..	214·04	214·04	14,525
Wodgina ..	84 ..	(Mount Cassiterite) ..	..	..	..	..	133·52	13·85	147·7	14,184
Do. ..	84, 93, 148	Mount Cassiterite leases ..	11·45	80	12·25	1,045	174·20	1·60	175·80	14,223
Do. ..	93 ..	(Mount Cassiterite North) ..	..	..	..	..	9·67	..	9·67	971
Do. ..	(255) ..	Mount Tinstone .. ..	..	60	60	70	2·45	..	2·45	280
Do. ..	..	Voided leases .. ..	..	..	..	..	25·70	6·10	31·80	3,163
Do. ..	..	Sundry claims .. ..	..	30	30	24	5·78	46·70	52·48	4,766
		Totals	12·35	75·05	87·40	8,168	351·32	4,761·90	5,113·22	436,968
MURCHISON GOLDFIELD.										
CUE DISTRICT.										
Cuddingwarra ..	..	Sundry claims .. ..	..	..	..	..	..	3·20	3·20	242
Poonsa ..	..	Sundry claims .. ..	..	..	..	..	..	1·52	1·52	118
		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..	472 ..	(Aqua) .. ..	..	..	..	..	..	1·50	1·50	128
Do. ..	436 ..	Battery Hill: Caledonian Tin Mining Co., N.L.	..	..	..	..	4·49	·05	4·54	412
Do. ..	(563) ..	Bunbury End .. ..	..	..	..	..	56	..	56	60
Do. ..	296 ..	(Central) .. ..	..	..	..	..	100·16	100·16	9,728	
Do. ..	511 ..	Champion .. ..	..	8·50	8·50	803	..	69·50	69·50	6,975
Do. ..	356, 514 ..	Cornwall leases .. ..	..	75	75	75	54·97	13·63	68·60	6,122
Do. ..	369 ..	Enterprise .. ..	..	67	67	62	20	5·46	5·66	483
Do. ..	472, 497, 510	Excelsior leases .. ..	..	..	..	..	..	20·30	20·30	2,408
Do. ..	510 ..	(Excelsior Extended) ..	..	..	..	..	..	·05	·05	5
Do. ..	497 ..	(Excelsior Tin Mining Co., Ltd.)	..	..	..	..	..	4·05	4·05	281
Do. ..	35, (169), 218, 272, 287, 295, 296, (331), (375), (395), (421), (425), (428), (432), (448), (453)	Greenbushes Development Co., Ltd.	..	41·00	41·00	3,322	35	858·75	859·10	73,916
Do. ..	35 ..	(Horan's) .. ..	..	..	..	..	..	188·35	188·35	11,605
Do. ..	515 ..	Kapanga .. ..	..	..	..	..	12·31	76	13·07	1,417
Do. ..	71, 233, 271	King Tin leases .. ..	..	4·85	4·85	444	5·31	50·53	55·84	5,513
Do. ..	271 ..	(King Tin North) .. ..	..	..	..	..	..	1·84	1·84	117
Do. ..	552 ..	Last Chance .. ..	..	3·47	3·47	281	1·55	4·82	6·37	615
Do. ..	470 ..	Little Wonder .. ..	..	..	..	..	5·00	49·73	54·73	5,455
Do. ..	(507) ..	Lost and Found North ..	..	16	16	15	8·23	25	8·48	919
Do. ..	(460), (461)	Mt. Jones Leases .. ..	..	2·00	2·00	202	..	167·05	167·05	19,788
Do. ..	73 ..	(Nelson) .. ..	..	..	..	..	..	22·40	22·40	1,675
Do. ..	73, 233	(Nelson leases) .. ..	..	..	..	..	..	61·01	61·01	4,164
Do. ..	(413), (423), (424), (425), 470, (471)	(Nickel Kramer Tin Mining Co., Ltd.)	..	..	..	..	..	9·17	9·17	726

TABLE X.—Quantity and Value of BLACK TIN, etc.—continued.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1914.				TOTALS TO DATE.			
			Quantity.			Value.	Quantity.			Value.
			Lode.	Stream.	Total.		Lode.	Stream.	Total.	
			tons.	tons.	tons.	£	tons.	tons.	tons.	£
GREENBUSHES MINERAL FIELD—continued.										
Greenbushes.	(396), (397), (460), (461), (479), (480)	(Norlup Tin Mining and Dredging Co., Ltd.)	..	..	..	..	..	3.82	3.82	291
Do.	(564)	North Cornwall	..	..	..	..	..	.25	.25	30
Do.	504	Old Bunbury	..	..	..	..	..	35.05	35.05	3,129
Do.	498	Rat	..	..	..	..	..	.74	.74	84
Do.	(531)	Scadden	..	..	..	..	..	1.41	1.41	176
Do.	505	Scotia	..	7.05	7.05	660	..	33.29	33.29	2,969
Do.	(567)	South Cornwall	4.41	..	4.41	384	4.41	..	4.41	384
Do.	450, 458, 485, 486, 487, 488, 489	Stanhope United leases	..	27.95	27.95	2,885	..	348.99	348.99	37,983
Do.	569	Substitute	..	3.00	3.00	410	..	3.00	3.00	410
Do.	529	Three C's	..	11.77	11.77	752	..	18.37	18.37	1,541
Do.	565	Turn of the Tide	..	1.40	1.40	92	..	3.09	3.09	263
Do.	218	(W.A. Mount Bischoff)	..	..	..	..	..	5.38	5.38	342
Do.	(381), (435), 436, 472, (478)	(Westralian Gully Tin Co., Ltd.)	..	..	..	..	6.38	34.38	40.76	3,235
Do.	35, (169), (195), 218, (221), (228), 272, 287, (293), 295, (299), (310), (375)	(Westralian Stanneries, Ltd.)	..	..	..	..	..	109.33	109.33	8,171
Do.	(550)	You and Me	..	..	..	..	..	2.15	2.15	210
Do.	Loc. 289, 290	Freehold Ground (Clarth and others)	..	..	..	..	..	318.04	318.04	28,959
Do.	..	Voided leases	..	..	..	..	100.72	470.57	571.29	46,267
Do.	..	Sundry claims	..	127.56	127.56	10,758	22.31	5,936.57	5,958.88	418,603
		Totals	5.32	239.22	244.54	21,145	227.04	8,953.54	9,180.58	705,559

TABLE XI.

QUANTITY AND VALUE OF TANTALITE REPORTED TO THE MINES DEPARTMENT DURING 1914,
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1914.				TOTAL TO DATE.			
			Quantity.			Value.	Quantity.			Value.
			Lode.	Stream.	Total.		Lode.	Stream.	Total.	
			tons.	tons.	tons.	£	tons.	tons.	tons.	£
PILBARA GOLDFIELD.										
MARBLE BAR DISTRICT.										
Wodgina ...	86, 87, 95	H.M. and Anchorite leases	...	...	...	...	2.25	32.30	34.55	5,558
Do. ...	...	Sundry claims	...	...	...	...	...	51.50	51.50	6,124
		Totals ...	...	...	...	...	2.25	83.80	86.05	11,682
GREENBUSHES MINERAL FIELD.										
Greenbushes	369	Enterprise	...	...	...	...	...	3.19	3.19	1,804
		Totals ...	...	...	...	...	...	3.19	3.19	1,804

TABLE XII.

QUANTITY AND VALUE OF PYRITIC ORE REPORTED TO THE MINES DEPARTMENT DURING 1914,
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1914.		TOTAL TO DATE.	
			Quantity.	†Value.	Quantity.	†Value.
			tons.	£	tons.	£
MT. MARGARET GOLDFIELD.						
MT. MORGANS DISTRICT.						
Eulaminna ...	4F, 5F, 11F, 12F	West Australian Copper Co., Ltd.	8,366.48	2,936	32,662.59	11,345
Murrin Murrin ...	18F	Nangeroo: Nangeroo Mines, Ltd.	1,392.35	549	4,877.14	1,870
		Totals ...	9,758.83	3,485	37,539.73	13,215

† Represents the value of the sulphur only, the copper contents not having been treated yet.

TABLE XIII.

QUANTITY AND VALUE OF COPPER ORE REPORTED TO THE MINES DEPARTMENT DURING 1914,
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1914.			TOTALS TO DATE.		
			Quantity.		Value.	Quantity.		Value.
			Ore.	Metallic Copper.		Ore.	Metallic Copper.	
			tons.	tons.	£	tons.	tons.	£
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 Shore	...	Voided leases	...	...	...	7.77	1.90	190
		Totals				32.87	5.41	386
NULLAGINE DISTRICT.								
McPhee's Creek	...	Voided leases	...	...	...	5.00	2.22	120
		Totals				5.00	2.22	120
WEST PILBARA GOLDFIELD.								
Croydon	...	Voided leases	...	...	...	604.00	108.65	7,333
Egina	...	Voided leases	...	...	...	542.00	104.15	6,643
Roebourne	M.L. 143	Carlow Castle	...	...	...	59.28	9.50	662
Do.	M.Ls. 145, 146, 164, 165	Good Fortune leases	...	...	...	219.15	44.75	2,988
Do.	M.L. 167	Quod Est	22.43	3.49	256	22.43	3.49	256
Do.	M.L. 144	Yannery Hill	5.75	1.20	76	128.75	34.65	2,412
Do.	...	Voided leases	...	...	...	1,721.67	317.68	25,971
Do.	...	Sundry claims	...	...	...	47.94	10.18	582
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.	...	...	...	77.00	12.10	774
Do.	Loc. 71	Whim Well Copper Mines, Ltd.	7,736.00	633.90	40,275	69,097.53	8,783.36	552,332
Do.	...	Voided leases	...	...	...	30.00	5.50	250
		Totals	7,764.18	638.59	40,607	74,558.75	9,600.84	612,239
ASHBURTON GOLDFIELD.								
Red Hill	...	Voided leases	...	...	...	175.50	33.85	2,126
Uaroo	...	Voided leases	...	...	...	23.25	7.25	444
		Totals				198.75	41.10	2,570
PEAK HILL GOLDFIELD.								
Peak Hill	(M.L. 33P)	Jadina	7.75	3.48	223	7.75	3.48	223
Do.	M.L. 32P	Resurgam	16.00	4.32	244	16.00	4.32	244
Do.	M.L. 9P	Sons of Gwalia	15.07	6.44	406	15.07	6.44	406
Do.	M.Ls. 10P, 11P	Sons of Gwalia South leases	2.87	1.04	68	2.87	1.04	68
Do.	M.Ls. 29P, 30P, 31P	Two Sisters leases	56.25	27.37	1,181	56.25	27.37	1,181
Do.	...	Sundry claims	14.76	4.59	287	14.76	4.59	287
		Totals	112.70	47.24	2,409	112.70	47.24	2,409
EAST MURCHISON GOLDFIELD.								
LAWLEES DISTRICT.								
Kathleen Valley	(12)	Shepherd	...	...	...	6.77	1.32	69
		Totals				6.77	1.32	69
MURCHISON GOLDFIELD.								
MEEKATHARRA DISTRICT.								
Gabanintha	G.M.L. 1175	Unexpected	8.52	1.77	114	8.52	1.77	114
Do.	...	Voided leases	...	...	...	741.50	83.60	5,639
Do.	...	Sundry claims	6.67	2.06	134	6.67	2.06	134
		Totals	15.19	3.83	248	756.69	87.43	5,887

TABLE XIII.—Quantity and Value of COPPER ORE, etc.—continued.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1914.			TOTALS TO DATE.		
			Quantity.		Value.	Quantity.		Value.
			Ore.	Metallic Copper.		Ore.	Metallic Copper.	
			tons.	tons.	£	tons.	tons.	£
MURCHISON GOLDFIELD—continued.								
DAY DAWN DISTRICT.								
Day Dawn ...	(G.M.L. 138D)	Rubicon : Murchison Associated G.Ms., Ltd.	...	...	...	4.80	1.00	54
Do. ...	...	Voided leases	...	...	...	22.15	4.17	251
Do. ...	...	Sundry Claims	3.40	.43	27	28.61	2.93	217
		Totals	3.40	.43	27	55.56	8.10	522
YALGOO GOLDFIELD.								
Twin Peaks ...	...	Sundry Claims	...	...	...	19.50	3.49	227
Wadgingarra ...	...	Voided leases	...	...	...	13.91	.95	91
		Totals	...	...	...	33.41	4.47	318
NORTHAMPTON MINERAL FIELD.								
Geraldine ...	...	Voided leases	...	...	...	136.50	36.05	1,992
		Totals	...	...	...	136.50	36.05	1,992
YANDANOOKA MINERAL FIELD.								
Arrino ...	...	Sundry claims	...	...	...	126.05	18.48	1,386
Yandanooka ...	Freehold Gd.	Muggawa Copper Mine	...	...	...	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],	(Mt. Malcolm Copper Mine)	...	...	...	13,516.00	1,001.98	70,754
Do. ...	(12c, 37c),	(Mt. Malcolm Copper Mine)	...	...	...	3,839.00	418.00	17,065
Do. ...	[10c, 11c],	(Murrin Copper Mines, Ltd.)	...	...	...	19,165.00	798.50	45,817
Do. ...	4F, 5F,	West Australian Copper Co., Ltd.	...	...	...	9,794.05	1,976.03	80,199
Mt. Margaret ...	(12c, 37c),	Voided leases	...	...	...	11.53	2.40	163
Murrin Murrin ...	4F, 5F, 11F,	Nangeroo : Nangeroo Mines, Ltd.	...	...	...	6.80	3.00	160
Do. ...	12F	Voided leases	...	...	...	1,525.29	248.04	16,662
		Totals	...	...	...	47,857.67	4,445.00	230,820
MOUNT MARGARET DISTRICT.								
Burtville ...	...	Voided leases	...	...	...	2.85	.29	26
		Totals	...	...	...	2.85	.29	26
NORTH COOLGARDIE GOLDFIELD.								
MENZIES DISTRICT.								
Goongarrie ...	...	Voided leases	...	...	...	4.70	.42	33
Do. ...	...	Sundry claims	...	...	...	1.42	.40	18
		Totals	...	...	...	6.12	.82	51
EAST COOLGARDIE GOLDFIELD.								
EAST COOLGARDIE DISTRICT.								
Boorara ...	...	Voided leases	...	...	...	50.67	6.22	330
		Totals	...	...	...	50.67	6.22	330

TABLE XIII.—Quantity and Value of COPPER ORE, etc.—continued.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1914.			TOTALS TO DATE.		
			Quantity.		Value.	Quantity.		Value.
			Ore.	Metallic Copper.		Ore.	Metallic Copper.	
			tons.	tons.	£	tons.	tons.	£
PHILLIPS RIVER GOLDFIELD.								
Kundip	M.Ls. 349, (355)	Christmas Gift leases .. ..	..	..	..	8.00	1.13	72
Do.	G.M.Ls. 147, 179	Fair Play leases .. ..	..	20.89	1,241	130.09	27.63	1,735
Do.	G.M.Ls. 136, 137, 138, (139)	(Flag Gold and Copper Co., Ltd.) ..	..	..	..	2,107.84	144.75	8,494
Do.	G.M.Ls. 136, 137, 138	Flag leases .. ..	..	3.59	203	..	3.59	203
Do.	G.M.Ls. 151, 156	Gem Consolidated leases .. ..	..	1.66	103	48.00	3.35	229
Do.	M.Ls. 52, 94	Harbour View Gold and Copper Co., Ltd.	267.61	15.31	978	267.61	15.31	978
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.	M.L. 347	Harbour View North	6.55	.43	27	6.55	.43	27
Do.	G.M.L. 98	Hillsborough .. ..	..	14.87	940	692.84	27.73	1,796
Do.	(G.M.L. 174)	May Day .. ..	..	.35	22	..	.35	22
Do.	M.Ls. 52, 94	(Ravensthorpe G.M. Syndicate, N.L.)	..	..	..	132.56	24.36	1,382
Do.	G.M.L. 182	South Gift .. ..	..	.39	22	..	.39	22
Do.	..	Voided leases .. ..	..	..	..	949.50	104.32	6,750
Do.	..	Sundry claims	1.65	.43	27	66.18	9.56	687
Mt. Desmond	M.L. 203 ..	British Flag: Phillips River Gold and Copper Co., Ltd.	..	..	..	19.90	3.64	250
Do.	M.L. 208 ..	Desmond: Phillips River Gold and Copper Co., Ltd.	364.57	55.13	3,256	1,192.41	210.22	14,644
Do.	M.L. 95 ..	(Elverdton) .. ..	..	..	..	130.00	5.70	570
Do.	M.L. 95 ..	Elverdton: Phillips River Gold and Copper Co., Ltd.	2,188.15	220.26	13,532	30,186.03	2,148.99	122,125
Do.	M.L. 95 ..	(Elverdton: Phillips River Options Syndicate, N.L.)	..	..	..	2,946.02	401.43	22,65
Do.	M.L. 168 ..	(Elverdton South) .. ..	..	..	..	18.48	2.39	119
Do.	M.L. 168 ..	Elverton South: Phillips River Gold and Copper Co., Ltd.	15.73	1.46	92	15.73	1.46	92
Do.	M.L. 357..	Ironclad	69.21	10.94	649	69.21	10.94	649
Do.	M.L. 109 ..	(Mt. Desmond) .. ..	..	..	..	193.87	30.77	1,640
Do.	M.L. 109 ..	Mt. Desmond: Phillips River Gold and 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 and Copper Co., Ltd.	17.56	1.88	121	17.56	1.88	121
Do.	..	Voided leases .. ..	..	..	..	945.96	155.77	9,121
Do.	..	Sundry claims	52.95	11.01	709	87.05	17.59	1,142
Ravensthorpe	M.L. 116 ..	Last Chance	147.38	23.30	1,409	1,281.86	205.02	12,439
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.	744.95	114.95	6,890	2,723.76	353.25	22,252
Do.	M.L. 175 ..	(Mount Benson) .. ..	..	..	..	605.19	73.64	3,702
Do.	M.L. 175 ..	Mount Benson: Phillips River Gold and Copper Co., Ltd.	22.40	2.22	140	1,164.80	82.43	5,832
Do.	M.L. 351 ..	Mount Benson Extended	36.71	5.88	365	36.71	5.88	365
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	333.59	28,841
Do.	M.L. 15 ..	(Mt. Cattlin: Phillips River Gold and Copper Co., Ltd.)	..	..	..	1,263.76	80.26	7,664
Do.	M.L. 15 ..	Mt. Cattlin: Phillips River Gold and Copper Co., Ltd.	229.09	15.98	960	14,418.24	712.93	40,202
Do.	M.L. 342 ..	Surprise	210.42	48.21	3,012	325.80	75.57	4,974
Do.	..	Voided leases .. ..	..	..	..	3,334.60	416.77	24,967
Do.	..	Sundry claims	188.46	19.16	1,191	337.33	31.67	1,886
West River	..	Voided leases .. ..	..	..	..	44.04	7.41	414
Do.	..	Sundry claims .. ..	..	..	..	118.29	22.20	1,698
		From Goldfield generally	277.76	24.93	1,635	1,108.15	102.92	6,329
		Totals	4,841.15	613.23	37,524	77,838.44	6,411.09	394,011

STATE GENERALLY.

M.L. 221H	Yampi Sound Copper Mine ..	38.50	9.21	426	38.50	9.21	426
	Voided leases .. ..	..	..	..	3.08	1.26	40
	Sundry claims .. ..	..	..	..	13.50	2.27	193
	Totals	38.50	9.21	426	55.08	12.74	659

TABLE XIV.

QUANTITY AND VALUE OF IRONSTONE REPORTED TO THE MINES DEPARTMENT DURING 1914,
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1914.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons.	£
WEST PILBARA GOLDFIELD.						
Whim Creek	Voided leases ...	...	...	100'00	300
		Totals ...	...	...	100'00	300
EAST COOLGARDIE GOLDFIELD.						
EAST COOLGARDIE DISTRICT.						
Boulder	Voided leases ...	...	...	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	7,418'00	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 1914,
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1914.			TOTALS TO DATE.		
			Lead Ore.	Metal therefrom.	Value.	Lead Ore.	Metal therefrom.	Value.
			tons.	tons.	£	tons.	tons.	£
NORTHAMPTON MINERAL FIELD.								
Geraldine ..	..	Voided leases ..	..	..	..	57'00	41'61	461
Narra Tarra ..	Loc. 833	Narra Tarra Lead Mine ..	378'22	277'57	5,198	744'05	540'13	10,318
Do. ...	..	Sundry claims ..	..	..	..	225'00	27'00	185
Northampton ..	Loc. 1472	Baddera Lead Mine ..	14,956'40	1,796'51	33,153	60,658'46	7,006'13	122,359
Do. ...	..	Voided leases ..	..	..	..	116'75	72'58	1,176
Victoria ...	..	Voided leases ..	..	..	..	19'00	12'54	212
		Totals ..	15,334'62	2,074'08	38,351	61,820'28	7,699'99	134,711

TABLE XVI.

QUANTITY AND VALUE OF SILVER-LEAD ORE REPORTED TO THE MINES DEPARTMENT DURING 1914
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1914.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons.	£
ASHBURTON GOLDFIELD.						
Ashburton ...	...	Voided leases ...	...	...	56'90	429
Uaroo ...	43, 49	Uaroo Silver-Lead Mines ...	715'10	9,807	2,007'85	21,998
		Totals ...	715'10	9,807	2,064'75	22,427

TABLE XVII.

QUANTITY AND VALUE OF COAL REPORTED TO THE MINES DEPARTMENT DURING 1914,
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1914.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons.	£
COLLIE RIVER MINERAL FIELD.						
Collie	197, etc.	Cardiff Coal Mining Co., Ltd.	75,223·96	32,945	527,337·08	224,349
Do.	151, etc.	(Collie-Boulder Coal Co., Ltd.)	..	..	71,512·70	26,139
Do.	244, etc.	Collie-Co-operative Collieries, Ltd.	82,014·02	39,387	556,463·50	264,664
Do.	88 (pt. of)	(Collie Proprietary Coalfields of W.A., Ltd.), (No. 1 Pit)	..	..	477,781·55	242,918
Do.	85-100	(Collie Proprietary Coalfields of W.A., Ltd.), (No. 2 Pit)	..	..	580,392·15	289,246
Do.	260-266	Premier Coal Mining Co., Ltd.	2,639·60	1,180	79,962·26	36,943
Do.	151, etc.	Scottish Co-operative Collieries Co., Ltd.	43,467·84	18,065	393,417·05	154,111
Do.	88 (pt. of)	The Proprietary Coal Mines of W.A., Ltd. (No. 1 Pit)	..	..	109·00	54
Do.	85-100	The Proprietary Coal Mines of W.A., Ltd. (No. 2 Pit)	73,569·00	37,170	126,501·00	63,945
Do.	250-254 256	Westralian Coal Mining Co., Ltd.	42,295·90	19,937	117,118·49	56,434
		Voided leases	..	..	25,569·85	12,930
		Totals	319,210·32	148,684	2,956,164·63	1,371,733

TABLE XVIII.

QUANTITY AND VALUE OF LIMESTONE REPORTED TO THE MINES DEPARTMENT DURING 1914,
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1914.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons.	£
MURCHISON GOLDFIELD.						
CUE DISTRICT.						
Cuddingwarra	..	Voided Leases	..	..	298·00	772
		Totals	..	..	298·00	772
YILGARN GOLDFIELD.						
Southern Cross	..	Voided Leases	..	..	2,548·85	1,607
		Totals	..	..	2,548·85	1,607
STATE GENERALLY.						
Fremantle	90,858·88	15,911
		Totals	..	..	90,858·88	15,911

TABLE XIX.

QUANTITY AND VALUE OF ASBESTOS REPORTED TO THE MINES DEPARTMENT DURING 1914,
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1914.		TOTALS TO DATE.	
			Quantity.	Value.	QUANTITY.	VALUE.
			tons.	£	tons.	£
PILBARA GOLDFIELD.						
MARBLE BAR DISTRICT.						
Soansville	Voided Leases ... ..	...	...	42'83	1,754
		Totals ... ..	...	...	42'83	1,754

TABLE XX.

QUANTITY AND VALUE OF GODOLINITE REPORTED TO THE MINES DEPARTMENT DURING 1914,
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1914.		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 XXI.

QUANTITY AND VALUE OF WOLFRAM REPORTED TO THE MINES DEPARTMENT DURING 1914,
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1914.			TOTALS TO DATE.		
			Ore.	Metallic contents.	Value.	Ore.	Metallic contents.	Value.
			tons.	tons.	£	tons.	tons.	£
MURCHISON GOLDFIELD.								
CUE DISTRICT.								
Callie Spring	...	Sundry Claims	...	...	...	4.64	.70	69
Cuddingwarra	...	Voided Leases	...	...	...	194.00	6.11	877
Do.	...	Sundry claims	...	...	...	20.00	.85	85
		Totals ...	...	...	...	218.64	7.66	1,031
STATE GENERALLY.								
Derby	146H.	(Taylor's Wolfram Reward)	...	...	...	27.00	2.00	120
		Totals ...	...	...	...	27.00	2.00	120

TABLE XXII.

QUANTITY AND VALUE OF DIAMONDS REPORTED TO THE MINES DEPARTMENT DURING 1914,
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1914.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			carats.	£	carats.	£
PILBARA GOLDFIELD.						
NULLAGINE DISTRICT.						
Nullagine	M.R.C.6L	(Morgans, A. E.)	...	...	...	24
		Totals ...	...	...	...	24

TABLE

RETURN OF ORE AND MINERALS OTHER THAN GOLD

YEAR.	COPPER.												Total Value of Copper Exported.	
	COPPER ORE.										COPPER INGOT, MATTE, Etc.			
	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	982	...	...	...	...	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	...	...	...	...	...	...	336	6,162	343	30,367	36,529
7	3,727	61,493	3,727	61,493	1,602	141,883	203,376
8	2,503	29,272	2,503	29,272	479	27,819	57,091
9	6,959	59,541	6,959	59,541	833	45,100	104,641
1910	6,309	27,271	6,309	27,271	1,281	68,657	95,928
1911	9,825	33,709	9,825	33,709	828	44,409	78,118
1912	9,536	58,688	9,536	58,688	28	1,136	59,824
1913	4,339	136,472	4,339	136,472	82	5,891	142,363
1914	3,913	33,654	3,913	33,654	183	4,520	38,174
Total	...	...	...	...	...	...	...	...	65,380	750,863	8,934	542,023	1,292,886

† See Woodward's Mining Handbook, Perth: By Authority, 1895; page 123.

‡ Weight not stated.

XXIII.

ENTERED FOR EXPORT FROM 1850 TO 1914, INCLUSIVE.

TIN.												YEAR.
BLACK TIN (Dressed Tin).								TIN INGOT. (White tin.)		Total Value of Tin Exported.		
Pilbarra 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
30	2,025	278	21,138	...	...	308	23,163	...	...	23,163	1900
368	30,146	102	8,032	...	...	470	38,178	142	18,872	57,050	1
439	34,600	68	4,895	...	...	507	39,495	97	12,607	52,102	2
248	19,698	31	2,870	...	...	279	22,568	141	16,830	39,398	3
267	20,988	25	1,868	...	...	292	22,856	235	29,277	52,133	4
64	4,932	24	1,889	379	20,797	467	27,118	129	16,155	43,273	5	
188	16,853	119	8,177	666	51,748	973	76,778	2+	1	76,779	6	
329	28,375	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	2+	1	83,595	9	
...	698	62,989	698	62,989	...	...	62,989	1910	
...	500	45,129	500	45,129	...	...	45,129	1911	
...	495	55,220	495	55,220	...	...	55,220	1912	
...	651	79,738	651	79,738	...	...	79,738	1913	
...	484	72,142	484	72,142	...	...	72,142	1914	
...	363	35,649	363	35,649	...	...	35,649	Total	
...	12,139	1,050,892	867	117,214	1,168,106		

*+ Probably the produce of Pilbara Goldfield and Greenbushes Mineral Field.

TABLE XXIII.—Return of Ore and Minerals other than Gold

YEAR.	SILVER.		LEAD ORE.		SILVER-LEAD ORE.		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	...	...	...	...	...	...
4	...	...	...	...	...	...	55	1,200	...	...
5	...	...	25	250	...	...	122	2,440	...	...
6	...	...	...	...	...	...	134	2,675	...	...
7	...	...	...	...	...	...	60	1,200	...	...
8	...	...	...	...	...	...	120	2,410	...	...
9	...	...	...	...	...	...	61	1,220	...	...
1860	...	...	13	135	...	...	25	495	...	...
1	...	...	98	985	...	...	...	...	...	...
2	...	...	79	790	...	...	...	...	...	...
3	...	...	9	90	...	...	...	...	...	...
4	...	...	230	2,300	...	...	...	...	...	...
5	...	...	80	800	...	...	...	...	...	...
6	...	...	703	8,436	...	...	...	...	...	...
7	...	...	273	3,282	...	...	...	...	...	...
8	...	...	902	10,824	...	...	†3	50	...	...
9	...	...	1,100	13,206	...	...	...	...	...	...
1870	...	...	699	8,394	...	...	...	...	...	...
1	...	...	1,209	14,514	...	...	...	...	...	...
2	...	...	420	5,040	...	...	...	...	...	...
3	...	...	364	4,368	...	...	...	...	...	...
4	...	...	965	11,586	...	...	...	...	...	...
5	...	...	2,144	25,725	...	...	...	...	...	...
6	...	...	2,289	27,468	...	...	4	89	...	...
7	...	...	2,192	26,298	...	...	†7	155	...	...
8	...	...	3,956	47,466	...	...	†1	15	...	...
9	...	...	3,618	43,410	...	...	...	...	...	...
1880	...	...	2,775	33,300	...	...	...	...	...	...
1	...	...	1,921	15,368	...	...	†5	89	...	...
2	...	...	1,401	11,204	...	...	†1	20	...	...
3	...	...	1,794	14,348	...	...	...	...	...	...
4	...	...	1,038	7,266	...	...	...	...	...	...
5	...	...	696	4,872	...	...	...	...	...	...
6	...	...	465	3,255	...	...	...	...	...	...
7	...	...	611	4,277	...	...	...	...	...	...
8	...	...	471	4,710	...	...	†6	120	...	...
9	...	...	532	5,320	...	...	†2	40	...	...
1890	...	...	250	2,500	...	...	...	...	...	...
1	...	...	214	2,135	...	...	...	...	...	...
2	...	...	25	250	...	...	...	...	...	...
3	...	...	30	150	...	...	...	...	...	...
4	...	...	...	...	...	...	...	...	...	...
5	...	...	...	...	...	...	...	...	...	...
6	...	...	...	...	...	...	...	...	...	...
7	...	...	†	4	...	...	...	...	...	...
8	...	...	5	33	...	...	†1	11	...	...
9	...	...	16	96	...	...	...	...	...	...
1900	...	...	27	242	...	...	77	1,077	...	...
1	28,749	3,594	...	...	...	...	...	...	...	...
2	60,869	7,609	...	...	...	...	...	...	...	...
3	83,293	9,190	...	...	...	...	...	...	...	...
4	168,113	19,153	...	...	...	...	...	...	...	...
5	399,190	45,912	...	...	...	...	...	...	...	...
6	359,744	44,278	...	...	...	...	...	...	...	...
7	282,145	37,612	...	...	...	...	...	...	...	...
8	189,265	25,382	...	...	211	1,866	...	...	73	3,390
9	176,843	18,778	...	...	518	5,006	...	...	11	98
1910	176,139	18,777	...	...	211	1,199	...	...	19	244
1911	169,043	18,333	248	1,433	...	...	...	...	12	147
1912	165,371	19,725	1,679	6,682	...	...	...	...	12	189
1913	188,020	23,420	870	8,320	...	...	...	...	14	217
1914	189,837	22,913	1,868	22,270	...	...	...	...	...	...
1915	...	...	3,169	59,002	...	...	...	...	...	...
1916	...	...	3,554	46,315	...	...	...	...	22	379
Total	2,805,076	333,553	44,032	508,778	940	8,071	684	13,306	163	4,664

† Weight not stated. †† Estimated. † cwts. †† Includes Cobalt ore, 2 tons, valued at £41; Plumbago ore, 1 ton, valued at £6. † Concentrates

entered for EXPORT from 1850 to 1914, inclusive—continued.

WOLFRAM.		NON-METALLIC MINERALS.						MINERALS NOT ELSEWHERE INCLUDED.		Total Value of Minerals other than Gold, Exported to Date.	YEAR.
		ASBESTOS.		COAL.		MICA.					
State generally.		State generally.		Collie River Coal Mf.		State generally.					
Quantity	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	£	
tons.	£	tons.	£	tons.	£	tons.	£	tons.	£		
...	55	1850
...	1
...	2
...	1,211	3
...	2,440	4
...	2,951	5
...	2,218	6
...	4,330	7
...	10,751	8
...	14,752	9
...	9,006	1860
...	7,129	1
...	12,626	2
...	14,508	3
...	18,016	4
...	21,726	5
...	11,644	6
...	15,929	7
...	14,451	8
...	10,719	9
...	14,604	1870
...	5,040	1
...	4,368	2
...	12,434	3
...	26,723	4
...	30,628	5
...	30,638	6
...	48,284	7
...	43,545	8
...	33,300	9
...	15,577	1880
...	11,224	1
...	14,371	2
...	7,341	3
...	6,642	4
...	5,048	5
...	8,012	6
...	5,175	7
...	6,848	8
...	4,704	9
...	7,671	1890
...	14,912	1
...	2+	25	...	...	22,714	2
...	2+	4	...	...	11,744	3
...	15,274	4
...	2+	3	...	...	22,658	5
...	4,438	6
...	2+	209	...	...	4,532	7
...	7,060	8
...	...	2+	1	798	772	2+	50	...	...	66,611	9
...	355	350	2+	3	5	85	95,261	1900
...	971	969	...	...	...	4	171,453	1
...	12	12	...	...	6+ 3	47	61,551	2
...	...	6+	10	110	127	...	...	7+ 22	230	109,468	3
...	11	7	...	...	...	7	97,132	4
...	108	87	...	...	8+ 80	5,856	192,251	5
...	86	65	...	...	...	10	222,621	6
...	26	28	...	...	9+ 100	1,587	402,906	7
...	*1,447	1,138	...	...	...	...	...	...
...	...	2+	1,242	13	11	2+	10	10+	3,150	176,827	8
...	*9,612	7,747	...	...	...	...	...	...
1	100	...	...	353	183	...	...	11+263	735	282,650	9
2	190	...	...	*85,647	93,781	...	...	...	...	...	...
9	826	...	...	3	2	...	...	12+	100	200,106	1910
...	*48,876	38,400	...	...	...	...	...	...
...	40,063	29,344	...	...	13+14	407	197,439	1911
...	6	6	...	...	...	...	...	...
...	*42,602	30,721	...	...	14+	8	212,509	1912
1	86	...	...	*54,228	39,125	...	...	...	5	336,155	1913
½	40	...	...	*54,416	38,244	4	323	15+16	675	182,712	1914
13	1,242	...	1,253	339,744	281,120	...	627	...	14,017	3,627,623	Total.

* Bunker Coal. † Antimony ore. ‡ Includes Tantalite, 18 tons, valued at £5,729.

† Includes Antimony ore, 25 tons ... = £630
 Scheelite, 4 tons ... = 140
 N.E.I., 71 tons ... = 817
 Total ... £1,587

10+ Includes Tantalite ... = £400
 N.E.I., 42 tons ... = £2,750
 Total ... £3,150

11+ Includes Other Concentrates, 29 tons ... = £108
 N.E.I., 234 tons ... = £627
 Total ... £735

14+ Includes N.E.I., ½ ton ... = £100
 15+ Includes: Iron ore, 9 tons ... = 7
 Ores, N.E.I., 5 tons ... = 400
 Total ... £407

16+ Includes Manganese, 2 tons ... = 4
 N.E.I. ... = 4
 Total ... £8

17+ Includes Bismuth, 9 tons ... = 635
 Graphite, 7 tons ... = 40
 Total ... £675

PART III.—ALL MINES.

TABLE XXIV.

MILLING AND CYANIDING PLANTS ERECTED IN THE RESPECTIVE GOLDFIELDS, DISTRICTS, AND MINERAL FIELDS ON THE 31ST DECEMBER, 1914, 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.		Other Mills.							Leaching Vats.	Agitating Vats.	Vacuum Filters and Presses.	
		Number of Heads of Stampers.	Prospecting Mills.	Ball Mills.	Griffin Mills.	Huntington Mills.	Tremain Mills.	Puddlers.	Other Crushers.	Flint Mills.					Grinding Pans.
KIMBERLEY GOLDFIELD.														
<i>The Brockman</i> 141 A.C., M.A. 8	Mt. Bradley Tunnelling Claim ..	10	..	..	..	..	..	..	..	..	..	..	..	..
<i>Ruby Creek.</i> M.A. 9	Ruby Queen	20	..	..	..	..	..	..	..	..	..	..	..	..
	Total	30	..	..	..	..	..	..	..	..	..	..	..	£4,000
PILBARA GOLDFIELD.														
MARBLE BAR DISTRICT.														
<i>Bamboo Creek.</i> 695	Bulletin	10	..	..	..	..	..	..	..	..	4	..	..	..
Λ	State Battery, Bamboo Creek ..	5	..	..	..	..	..	..	..	1	..	..	..	..
<i>Lalla Rookh.</i> R.C. 112	Lalla Rookh G.M.	5	..	..	..	..	..	..	..	..	..	..	..	..
<i>Marble Bar.</i> (716)	Stray Shot Battery	5	..	..	..	..	..	..	..	..	..	..	..	..
Λ	State Battery, Marble Bar	5	..	..	..	..	..	..	..	..	..	..	..	..
<i>Warrawoona.</i> (505)	Bow Bells	10	..	..	..	..	..	..	..	..	..	..	..	..
604	Klondyke Boulder G.M. Co., Ltd. ..	5	..	..	..	..	..	..	..	..	..	..	..	..
<i>Yandicoogina.</i>	Lady Adelaide Battery	10	..	..	..	..	..	..	..	..	4	..	..	..
	Total	55	..	..	..	..	..	..	..	1	8	..	..	£12,967
NULLAGINE DISTRICT.														
<i>Eastern Creek.</i> M.A. 11	Doherty's Works	10	..	..	..	..	..	..	..	..	4	..	..	..
<i>Middle Creek.</i> 106L	Barton	10	..	..	..	..	..	..	..	1	6	..	..	..
<i>McPhee's Creek.</i> M.A. 12L	Judge	3	..	..	..	..	..	..	..	..	..	..	..	..
<i>20-Mile Sandy Creek.</i> Λ	State Battery, 20-Mile Sandy Creek ..	10	..	..	..	..	..	..	..	..	4	..	..	..
	Total	33	..	..	..	..	..	..	..	1	14	..	..	£5,574
WEST PILBARA GOLDFIELD.														
<i>Station Peak.</i> 165	Belladonna	20	..	..	..	..	..	..	..	1	..	..	..	..
<i>Touranna.</i> 155	Tauri Tom Tit	10	..	..	..	..	..	..	..	1	4	..	..	..
<i>Weerianna.</i> M.A. 12	Porteminna Battery	5	..	..	..	..	..	..	..	..	4	..	..	..
	Total	35	..	..	..	..	..	..	..	2	8	..	..	£3,700
PEAK HILL GOLDFIELD.														
(Ip, etc.)	(Peak Hill Goldfields, Ltd.)	30	..	..	..	..	..	..	2	..	8	3	..	..
Λ	State Battery, Mt. Egerton	5	..	..	..	..	..	..	..	..	..	..	..	..
Λ	State Battery, Ravelstone	5	..	..	..	..	..	..	..	..	..	..	..	..
Λ	Purcell's Works .. .. .	..	..	..	..	..	..	..	..	..	5	..	..	..
	Total	40	..	..	..	..	..	..	2	..	13	3	..	£9,011

TABLE XXIV.—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.	Tremain Mills.	Puddlers.	Other Crushers.					Flint Mills.	Grinding Pans.
AST MURCHISON GOLDFIELD.															
LAWLERS DISTRICT.															
<i>Bronzewing.</i> ‡ (1017) <i>Kathleen Valley.</i> (113) 382	Bronzewing	3	..	..	..	..	..	..	..	..	..	2	..	..	..
	Nil Desperandum	10	..	..	..	..	..	..	..	..	..	..	..	..	..
	Yellow Aster G.M. Co., N.L.	10	..	..	..	..	..	..	..	..	..	4	..	..	..
<i>Lake Darlot.</i> 626 ^	Zangbar	10	..	..	..	..	..	..	..	..	..	6	2	..	..
	State Battery, Lake Darlot	10	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Lawlers.</i> M.A. 24 1171	Cinderella Battery	5	..	..	..	..	..	..	..	..	..	12	..	..	..
	Great Eastern	5	..	..	..	..	..	..	..	..	..	..	..	..	..
M.A. 11	Lawlers Public Battery .. .. .	..	..	..	..	..	..	..	..	..	..	4	..	..	..
M.H.L. 9	Leinster Homestead lease .. .. .	..	..	..	..	..	..	..	..	..	..	4	..	..	..
58, etc.	Northern Mines, Ltd.	35	..	..	..	..	..	2	..	..	..	6	6	3	..
(908)	Vivien Gem	5	..	..	..	..	..	..	..	..	..	..	..	..	..
62, etc.	Waroonga leases	10	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Sir Samuel.</i> M.A. 28 ^	Bellevue	40	..	..	..	..	..	1	..	2	..	..	..	..	..
	State Battery, Sir Samuel	5	..	..	..	..	..	..	..	..	..	3	..	..	..
	Total	148	..	..	..	..	..	3	..	2	..	41	8	3	£35,511
WILUNA DISTRICT.															
<i>Collavilla</i> 71J	May Queen Reward, Ltd	5	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Mt. Keith.</i> ^	State Battery, Mt. Keith	5	..	..	..	..	..	..	..	1	..	4	..	..	..
<i>Wiluna.</i> M.A. 57 (1J)	Christensen's Battery .. .. .	..	1	..	..	..	..	..	..	..	..	..	..	..	..
	Monarch	10	..	..	..	..	..	..	..	..	..	..	..	..	..
	Moonlight	10	..	..	..	..	..	..	..	2	..	..	6	1	..
6J, etc.	Western Machinery Co., Ltd.	30	..	1	..	..	..	1	..	4	..	13	13	3	..
23J, etc.	Wiluna Gold Mines, Ltd.	25	..	..	..	..	..	1	..	3	..	9	3	1	..
^	State Battery, Wiluna	10	..	..	..	..	..	..	..	..	..	4	..	..	..
	Total	95	1	1	..	..	..	2	..	10	..	30	22	5	£58,487
BLACK RANGE DISTRICT.															
<i>Barrambie.</i> 773B	Barrambie Ranges G.M. Co., N.L.	10	..	..	..	..	..	..	..	..	..	6	..	..	..
<i>Birrigrin.</i> 28B	Pelerin	5	..	..	..	..	..	..	..	..	..	4	..	..	..
M.A.A. 8B	Reply Works	5	..	..	..	..	..	..	..	..	..	4	..	..	..
<i>Curran's Find.</i> 641B	Red, White, and Blue	5	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Errolls.</i> M.A. 9B	Great Saddle	10	..	..	..	..	..	..	..	1	..	8	..	..	..
<i>Maninga</i> <i>Marley.</i> 203B, etc.	Havilah Development	10	..	..	..	..	..	..	..	1	..	5	..	..	..
M.A. 6B	Maninga Marley	10	..	..	..	..	..	..	..	..	..	4	..	..	..
<i>Montagu.</i> 135B	Montagu Boulder	10	..	..	..	..	..	..	..	..	..	4	..	..	..
<i>Sandstone.</i> 4B, etc.	Black Range M. Co., N.L.	20	..	..	..	..	..	..	..	..	..	11	5	32	..
10B, etc.	Yuanmi G.Ms., Ltd.	20	..	..	2	1	..	..	1	4	..	14	4	2	..
^	State Battery, Sandstone	10	..	..	..	..	..	..	..	2	..	3	..	..	..
<i>Youanme.</i> 526B, etc.	Yuanmi G.Ms., Ltd.	20	..	1	..	..	..	..	..	2	..	2	3	1	..
^	State Battery, Youanme	5	..	..	..	..	..	..	..	..	..	..	..	..	..
	Total	135	..	1	2	1	..	..	..	1	..	65	12	35	£157,711

TABLE XXIV.—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.	Tremain Mills.	Puddlers.	Other Crushers.	Flint Mills.					Grinding Pans.
MURCHISON GOLDFIELD—contd.														
MOUNT MAGNET DISTRICT.														
<i>Boogardie.</i> 696M	Sirdar	5	..	..	..	..	..	..	..	..	3	..	..	..
^ <i>Lennonville.</i> 964M	State Battery, Boogardie .. .	5	..	..	..	..	..	..	..	..	..	..	..	..
1061M (57M)	Empress G.Ms., N.L. .. .	5	..	..	..	..	..	..	..	1	3	..	..	..
M.A. 5M.	Long Reef .. .	10	..	..	..	..	..	..	..	2	..	..	..	..
^	Welcome .. .	..	..	..	..	1	..	..	..	..	..	..	..	..
<i>Mt. Magnet.</i> (953M)	Wheel of Fortune .. .	..	1	..	..	..	..	..	..	..	..	..	..	..
1032M	State Battery, Lennonville .. .	10	..	..	..	..	..	..	..	..	..	..	..	..
752M	Britannia .. .	..	..	..	..	1	..	..	..	..	..	..	..	..
1049M	Early Bird .. .	5	..	..	..	..	..	..	..	..	..	..	..	..
1075M	Great Boulder No. 1, Ltd. .. .	10	..	..	..	..	..	..	..	4	..	..	..	..
1104M	Morning Star G.Ms., Ltd. .. .	10	..	..	..	..	..	..	..	..	6	..	1	..
	New Havelock .. .	5	..	..	..	..	..	..	..	..	..	..	..	..
	Kuranui .. .	5	..	..	..	..	..	..	..	..	..	..	..	..
	Total .. .	70	1	..	..	2	..	..	..	7	12	..	1	£27,258
YALGOO GOLDFIELD.														
<i>Field's Find.</i> 680	Field's Find Extended .. .	20	..	..	..	..	..	..	..	..	6	..	..	..
743	Golden Eagle .. .	3	..	..	..	..	..	..	..	..	2	..	..	..
<i>Gullewa.</i> (579)	Victory United G.M. Co., N.J. .. .	10	..	..	..	..	..	..	..	..	..	..	..	..
<i>Noongal.</i> 672	St Michael .. .	5	..	..	..	..	..	..	..	..	..	..	..	..
<i>Payne's Find.</i> 606	Payne's Find Development Co., N.L.	5	..	..	..	..	..	..	..	..	2	..	..	..
^	State Battery, Payne's Find .. .	5	..	..	..	..	..	..	..	1	3	..	..	..
<i>Pinyalling.</i> (501)	Westralia United Goldfields, Ltd. .. .	10	..	..	..	..	..	..	..	..	5	..	..	..
<i>Yalgoo.</i> 495	Ivanhoe G.M. Co., N.L. .. .	5	..	..	..	..	..	..	..	..	..	..	..	..
(549)	Royal Mint .. .	5	..	..	..	..	..	..	..	..	..	..	..	..
<i>Yuin.</i> 409, etc	Bullrush Gold Estates, N.L. .. .	20	..	..	..	..	..	..	..	..	..	..	..	..
	Total .. .	88	..	..	..	..	..	..	..	1	18	..	..	£42,214
MT. MARGARET GOLDFIELD.														
MT MORGANS DISTRICT.														
<i>Korong.</i> (313F)	Royal Flush .. .	10	..	..	..	..	..	..	..	..	..	..	..	..
<i>Mt. Margaret.</i> 314F	Mt. Morven .. .	5	..	..	..	..	..	..	..	..	6	..	..	..
<i>Mt. Morgans</i> 5F, etc.	Westralia Mt. Morgans G.M., N.L. .. .	20	..	..	..	..	..	..	..	5	15	11	1	..
325F	Millionaire Works .. .	..	..	..	..	..	..	..	..	..	5	..	..	..
<i>Murrin</i> 208F	Alix Junior .. .	5	..	..	..	..	..	..	..	1	..	..	..	..
194F	Hill's Proprietary .. .	20	..	..	..	..	..	..	..	1	6	7	1	..
	Total .. .	60	..	..	..	..	..	..	..	7	32	18	2	£11,220

TABLE XXIV.—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.	Tremain Mills.	Puddlers.	Other Crushers.					Flint Mills.	Grinding Pans.
NORTH COOLGARDIE GOLD-FIELD—continued.															
ULARRING DISTRICT.															
<i>Davyhurst.</i> 959U	Expansion .. .. .	..	..	..	..	1	..	..	..	..	3	..	..	..
468U, etc. (613U)	Golden Pole G.Ms., Ltd.	20	..	..	..	1	..	..	1	..	4	3	1	..
438U	Great Ophir	10	..	..	..	..	..	..	..	..	6	..	..	..
<i>Mulline.</i> 123U	Waihi .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..
600U	Riverina	10	..	..	..	..	..	..	..	..	..	..	..	..
↑	Riverina South	5	..	..	..	..	..	..	..	..	4	..	..	..
<i>Mulwarrie.</i> ↑	State Battery, Mulline .. .. .	..	..	..	..	..	..	..	..	3	5	2	1	..
↑	State Battery, Mulwarrie	10	..	..	..	..	..	..	..	..	4	..	..	..
	Total	55	2	1	..	3	41	5	2	£16,950
NIAGARA DISTRICT.															
<i>Kookynie.</i> T.L. 128H	Champion Cyanide Works .. .. .	..	..	..	..	..	..	..	..	..	6	..	..	..
320G	Champion	10	..	..	..	..	..	..	..	..	..	..	..	..
<i>Niagara.</i> M.A. 35G	Eagle Hawk Heather	10	..	..	..	..	..	..	..	..	..	..	..	..
734G	Lubra Queen G.M. Co., N.L.	5	..	..	..	..	..	..	..	..	5	..	..	..
419G	Orion Mines, Ltd.	10	..	..	..	..	..	..	..	1	6	..	..	..
T.L. 108H	Bright's Cyanide Works .. .. .	..	..	..	..	..	..	..	..	1	3	..	..	..
↑	State Battery, Niagara	10	..	..	..	..	..	..	..	2	5	..	..	..
<i>Tampa.</i> 759G	Golden Butterfly G.M. Co., N.L.	10	..	..	..	..	..	..	..	2	5	2	2	..
M.A. 59G	Grafter	5	..	..	..	..	..	..	..	1	2	..	..	..
	Total	60	..	..	..	..	..	..	..	7	32	2	2	£18,291
YERILLA DISTRICT.															
<i>Edjudina.</i> 1011R	Neta Battery	10	..	..	..	..	..	..	..	1	3	..	..	..
<i>Linden.</i> ↑	State Battery, Linden	10	..	..	..	..	..	..	..	2	6	..	..	..
<i>Pinjin.</i> ↑	State Battery, Pinjin	5	..	..	..	..	..	..	..	1	5	..	..	..
<i>Yarri.</i> ↑	State Battery, Yarri	10	..	..	..	..	..	..	..	1	5	..	..	..
<i>Yerilla.</i> ↑	State Battery, Yerilla	5	..	..	..	..	..	..	..	..	4	..	..	..
<i>Yundamindera.</i> 931R	Battles Ville	5	..	..	..	..	..	..	..	..	5	1	1	..
	Total	45	..	..	..	..	..	..	..	5	28	1	1	£14,576
BROAD ARROW GOLDFIELD.															
<i>Broad Arrow.</i> 1391w	Duke	10	..	..	..	..	..	..	..	..	..	..	..	..
<i>Carnage.</i> M.A. 22w	Regan's Carnage Battery	10	..	..	..	..	..	..	..	..	4	..	..	..
<i>Paddington.</i> (1639w)	Mt. Corlic	10	..	..	..	..	..	..	..	..	..	..	..	..
W.R. 68w	Northey's Venture Mill	10	..	..	..	..	..	..	..	..	..	..	..	..
<i>Siberia.</i> 1424w, etc	Associated Northern Blocks (W.A.), Ltd. .. .. .	..	..	1	..	2	..	..	1	..	10	..	4	2
1371w	Gimlet South	10	..	..	..	..	..	..	..	..	8	..	..	..
1289w	Lady Evelyn	5	..	..	..	..	..	..	..	..	..	..	..	..
1736w	Pole Battery	5	..	..	..	..	..	..	..	..	3	..	..	..
↑	State Battery, Ora Banda	5	..	..	..	..	..	..	..	1	..	..	..	..
↑	State Battery, Siberia	5	..	..	..	..	..	..	..	..	..	..	..	..
	Total	70	..	1	..	2	1	..	11	15	4	2	£47,105

TABLE XXIV.—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.	Tremain Mills.	Puddlers.	Other Crushers.					Flint Mills.	Grinding Fans.
NORTH-EAST COOLGARDIE GOLDFIELD.																
KANOWNA DISTRICT.																
<i>Gindalbie.</i> (1047x)	Eclipse	5														
(1123x)	Gindalbie	10							3							
(394x)	Kalgoorlie Foundry, Ltd.	10									3					
891x	Sirdar	10										4				
(1174x)	United	5									1					
<i>Kanowna.</i> (918x)	Government Well	3														
M.A. 19x	Martin's Works	15										8				
39x	Mudlark							1								
M.A. 56x	North White Feather G.Ms., Ltd.	60									1	16				
Q.C. 57x	Reidel & Norton's Works.	10									1	6				
<i>Mulgarrrie.</i> M.A. 58x	Lady Pratt	10										4				
1228x	Lady Pratt Cyanide Plant.											5				
	Total	138							1	3		6	43		£21,350	
KURNALPI DISTRICT.																
<i>Kurnalpi.</i> M.A. 2K	Success	5														
<i>Mulgabbie.</i> M.A. 1K	Simmons Battery		1													
	Total	5	1												£140	
EAST COOLGARDIE GOLDFIELD.																
EAST COOLGARDIE DISTRICT.																
<i>Boorara.</i> T.L. 81E	Boorara Cyanide Plant											8				
3908E	Golden Ridge G.M. Co., Ltd.	20										6	4	1		
<i>Boulder.</i> 38E, etc.	Associated G.Ms. of W.A., Ltd.			12					1		20		6	9		
49E, etc.	Associated Northern Blocks (W.A.), Ltd.			3					1				5	1		
352E, etc.	Chaffers G.M. Co. (1913), Ltd.			3					1		11		4	1		
90E, etc.	Croesus South, G.Ms., Ltd.	20										3				
351E, etc.	Golden Horseshoe Estates, Ltd.	170		1				1	6	15	24	20	22	20		
50E	Great Boulder, No. 1, Ltd.	10									1	3				
66E	Great Boulder Perseverance G.M. Co., Ltd.			8					4	2	17		24	13		
M.A. 59E	Great Boulder Proprietary G.Ms., Ltd.		1	4	13				9		20		25	14		
M.A. 5E	Hannan's Central Battery	20							1			14	3	2		
4317E	Idaho	5			1							6				
946E	Ironides, North	10									2	7	3	1		
31E	Ivanhoe Gold Corporation, Ltd.	100							3	2	25	32	11	9		
22E, etc.	Kalgurli G.Ms., Ltd.			9					5		19		16	9		
15E, etc.	Lake View and Star, Ltd.	75		1					6	8	21		27	18		
75E	Lake View South, Ltd.				1							6				
33E, etc.	New North Boulder G.Ms., Ltd.				1						1	5	4			
287E, etc.	North Kalgurli (1912), Ltd.	20			1							9	3	1		
410E, etc.	Oroya Links, Ltd.	55		2							6	3	13	8		
1208E, etc.	South Kalgurli Consolidated, Ltd.	40		4					3		15	36	11	10		
<i>Kalgoorlie.</i> 4509E	Adelaide Enterprise Prospecting Syndicate, N.L.				1											
M.A. 65E	Adeline Crushing Mills				1						2	4				
796E	Bonnie Lass (Raven Battery)	10										13				
M.A. 5E	Brownhill Consols, Ltd.	20										18	3	2		
4E	Cassidy Hill				1						1	4				
P.A. 717E	(Creswick)				1											
4037E	Devon Consols	15														
M.A. 64E	Dunstan & Cummings Plant								1			12		1		
4293E	Golden Dream G.M. Co., N.L.				1											
1694E	Golden Zone	15		2								8				
97E	Hannan's Reward, Ltd.	20										3				
4001E	Hidden Secret	5		1												
4347E	Mystery				1							3				
	Total	630	1	50	13	10			1	41	33	181	220	184	120	£1,568,675

TABLE XXIV.—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.	Tremain Mills.	Puddlers.	Other Crushers.					Flint Mills.	Grinding Fans.
GOLD MINING.															
KIMBERLEY		30												£ 4,000	
PILBARA	Marble Bar	55								1	8			12,987	
	Nullagine	33								1	14			5,574	
WEST PILBARA		35									8			3,700	
ASHBURTON															
GASCOYNE															
PEAK HILL		40									13	3		9,011	
EAST MURCHISON	Lawlers	148							2	2	41	8	3	35,511	
	Wiluna	95	1	1					3		30	22	5	58,487	
	Black Range	135		1	2	1				1	16	65	12	157,711	
	Cue	70									4	21		20,166	
MURCHISON	Meekatharra	206							5	1	25	50	19	164,410	
	Day Dawn	60							4		8	22	13	203,450	
	Mt. Magnet	70	1				2				7	12	1	27,258	
YALGOO		88									1	18		42,214	
MT. MARGARET	Mt. Morgans	60									7	32	18	11,220	
	Mt. Malcolm	162			1			3	3	15	47	16	4	232,743	
	Mt. Margaret	104		5			1	3		14	40	11	1	79,290	
	Meazies	115			1			3		17	81	5	2	61,664	
	Ularring	55			2			1		3	41	5	2	16,950	
NORTH COOLGARDIE	Nit gara	60									7	32	2	18,291	
	Yerilla	45									5	28	1	14,576	
BROAD ARROW		70		1	2			1		11	15	4	2	47,105	
N.E. COOLGARDIE	Kanowna	138						1	3		6	43		21,350	
	Kurnalpi	5	1											140	
EAST COOLGARDIE	East Coolgardie	630	1	50	13	10		1	41	33	181	220	184	1,568,675	
	Bulong	30						1			1	7		11,700	
COOLGARDIE	Coolgardie	263						2			12	119		94,285	
	Kunanalling	85						1			3	42		11,788	
YILGARN		192					1	1	4	21	94	9	5	186,849	
DUNDAS		100						3		16	58	15	3	32,703	
PHILLIPS RIVER		45	1							1	6			12,400	
STATE GENERALLY				1				1						40,000	
	Total Gold Mining Machinery	3,224	5	59	15	17	2	4	80	42	397	1,207	347	194	£3,266,188
LEAD MINING.															
NORTHAMPTON M.F.									1						9,000
	Total Lead Mining Machinery								1						£9,000
TIN MINING.															
PILBARA	Marble Bar				1				1						25,000
GREENBUSHES TINFIELD		10	1		1			2	5						29,805
	Total Tin Mining Machinery	10	1		2			2	6						£54,805
COPPER MINING.															
PHILLIPS RIVER									10		2				81,350
WEST PILBARA															101,267
MT. MARGARET	Mt. Morgans														1,500
	Total Copper Mining Machinery								10		2				£184,117
COAL MINING.															
COLLIE RIVER COALFIELD															64,698
	Total Coal Mining Machinery														£64,698
	Total Machinery other than Gold Mining	10	1			2		2	17		2				£312,620
	Total all Mining Machinery	3,234	6	59	15	19	2	6	97	42	399	1,207	347	194	£3,518,808

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 or under Police escort.

A circular can be obtained from the Deputy Master of the Mint giving all necessary information for intending depositors, conditions of the Escort Service, Coining Regulations, etc., etc.

An Escort Service is provided by the Police Department for parcels of all sizes. The consignor pays for the carriage by coach or train, but the escort charges may be collected by the Mint.

Forms for use in connection with gold sent to the Mint by post or under Police escort 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 (see Regulation No. 6) 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 „ to 10,000 „ „ 5 „ „ „ „ „

“ „ 10,000 „ upwards „ „ 4 „ „ „ „ „

The rate at which payment for silver is made is liable to fluctuation.

GOLD ESCORT SERVICE.**RATES.**

Actual Cost, plus 20 per cent.

RATES FOR CARRIAGE OF GOLD ON GOVERNMENT RAILWAYS.

	Distance not over—							
	25 miles.	50 miles.	100 miles.	150 miles.	200 miles.	250 miles.	300 miles.	350 miles.
Gold dust and bullion per 100ozs. ...	s. d. 1 0	s. d. 2 0	s. d. 3 0	s. d. 3 9	s. d. 4 6	s. d. 5 0	s. d. 5 6	s. d. 6 0

6d. per 100ozs. for every additional 50 miles, or part thereof.

NOTE.—A special reduction of 25 per cent. is made for all gold dust or bullion consigned to the Perth Mint.

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
26200	19470
23705	311520
2495	£3·134(670)
	20
	s. 2·680
	12
	d. 8·160 = £3 2s. 8d., value per ounce of gold as produced from the mine.

17th May, 1915.

J. F. CAMPBELL,
Deputy Master.