



REPORT
OF THE
DEPARTMENT OF MINES
FOR THE YEAR
WESTERN · 1913 · AUSTRALIA



PRESENTED TO BOTH HOUSES OF PARLIAMENT

BY HIS EXCELLENCY'S COMMAND



H. D. C. HIGGINS

1914.

WESTERN AUSTRALIA.

REPORT

OF THE

DEPARTMENT OF MINES

FOR THE YEAR

1913.

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

PERTH:

BY AUTHORITY: FRED. WM. SIMPSON, GOVERNMENT PRINTER.

1914.

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The Hon. P. Collier M.L.A.
Minister for Mines
1913

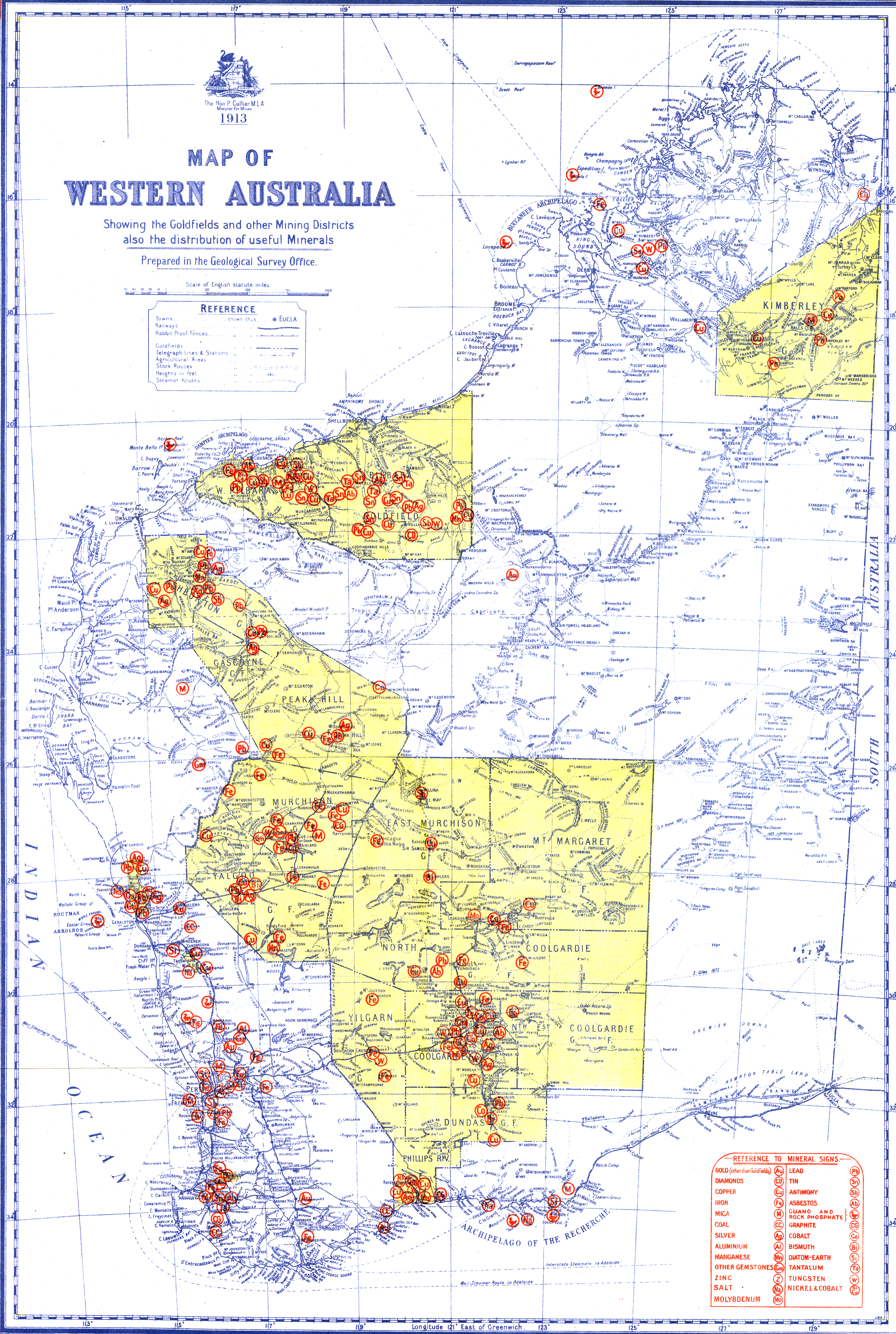
MAP OF WESTERN AUSTRALIA

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

Prepared in the Geological Survey Office.

Scale of English statute miles
0 10 20 30 40 50 60 70 80 90 100

REFERENCE	
Towns	shown thus
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)		LEAD	
DIAMONDS		TIN	
COPPER		ANTIMONY	
IRON		ASBESTOS	
MICA		GUANO AND ROCK PHOSPHATE	
COAL		GRAPHITE	
SILVER		COBALT	
ALUMINIUM		BISMUTH	
MANGANESE		DIATOM-EARTH	
OTHER GEMSTONES		TANTALUM	
ZINC		TUNGSTEN	
SALT		NICKEL & COBALT	
MOLYBDENUM			

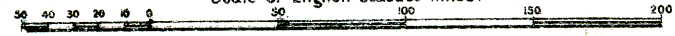
LIST OF MAPS.

MAP OF WESTERN AUSTRALIA

Showing
4 Mile to 1 Inch Series of Geological Sketch Maps,
& other Geological Maps issued since 1896.

Annual Report 1913

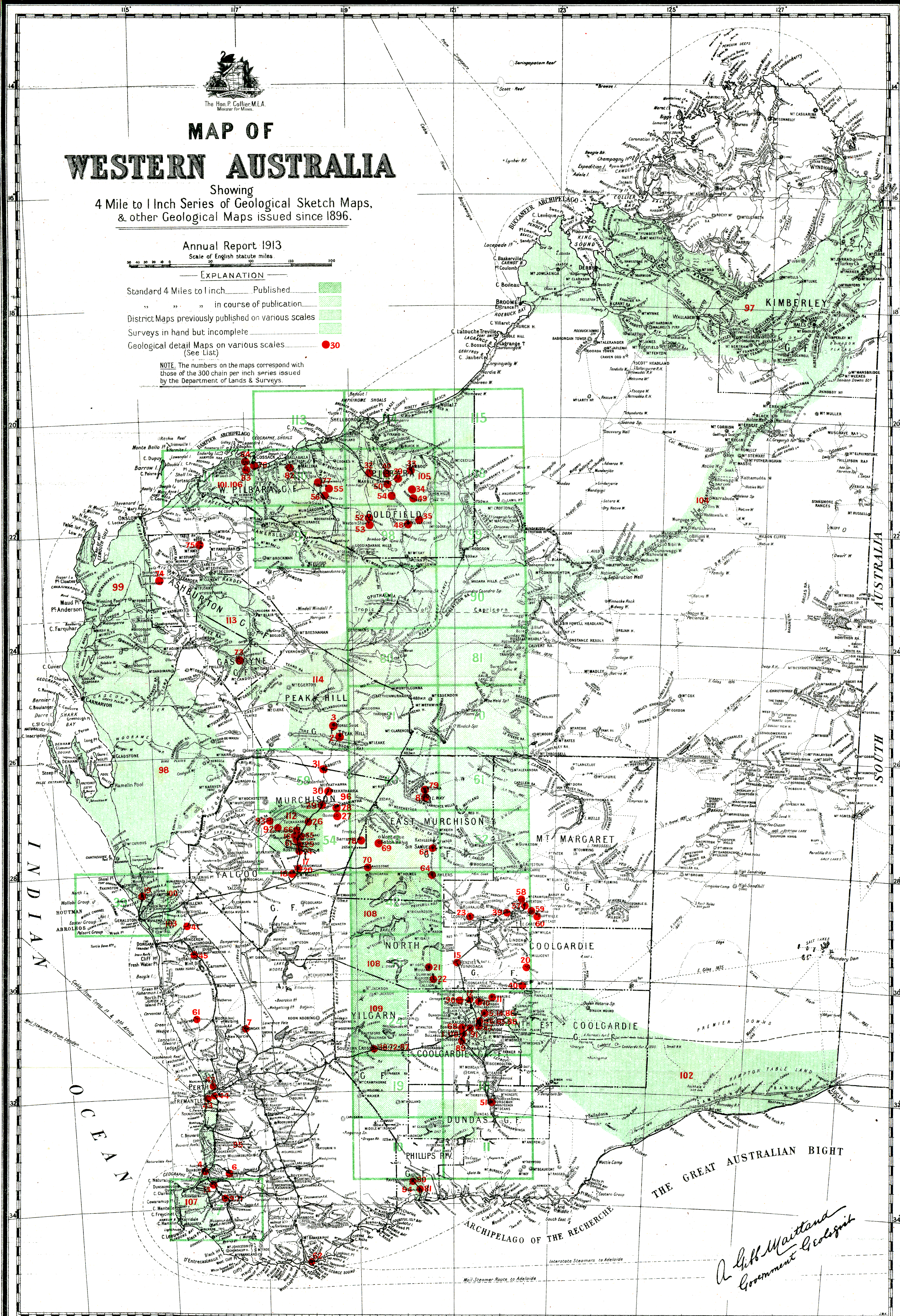
Scale of English statute miles



EXPLANATION

- Standard 4 Miles to 1 Inch..... Published.....
- " " " " in course of publication.....
- District Maps previously published on various scales.....
- Surveys in hand but incomplete.....
- Geological detail Maps on various scales..... 30

NOTE. The numbers on the maps correspond with those of the 300 chain per inch series issued by the Department of Lands & Surveys.



DISTRICT GEOLOGICAL MAPS OF INDIVIDUAL CENTRES.

1. Coolgardie.
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3. Horseshoe.
4. Bunbury.
5. Kanowna.
6. Collie Coal Field.
7. Wongan Hills.
8. Lake Way.
9. Greenbushes.
10. Mulgarric.
11. Lindsay's and Hayes' New Find.
12. Bardoc.
13. Donnybrook.
14. North Lead, Kanowna.
15. Menzies.
16. Auriferous Reefs, Cue and Day Dawn.
17. Lennonville.
18. Mt. Magnet and Boogardie.
19. Northampton.
20. Edjulina and Yarli.
21. Mulline.
22. Mulwarrie and Davyhurst.
23. Leonora.
24. The Island.
25. The Mainland.
26. Tuckanarra.
27. Quinns.
28. Gabanintha and Star of the East.
29. Namine.
30. Meekatharra.
31. Abbots.
32. Lalla Rookh.
33. Bamboo.
34. Yandicoogina.
35. Mosquito Creek.
36. Moolyella.
37. Talga Talga.
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40. Mulgabbie.
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*A. G. H. Maitland
Government Geologist*

**ANNUAL REPORT OF THE DEPARTMENT OF MINES, WESTERN
AUSTRALIA, 1913.**

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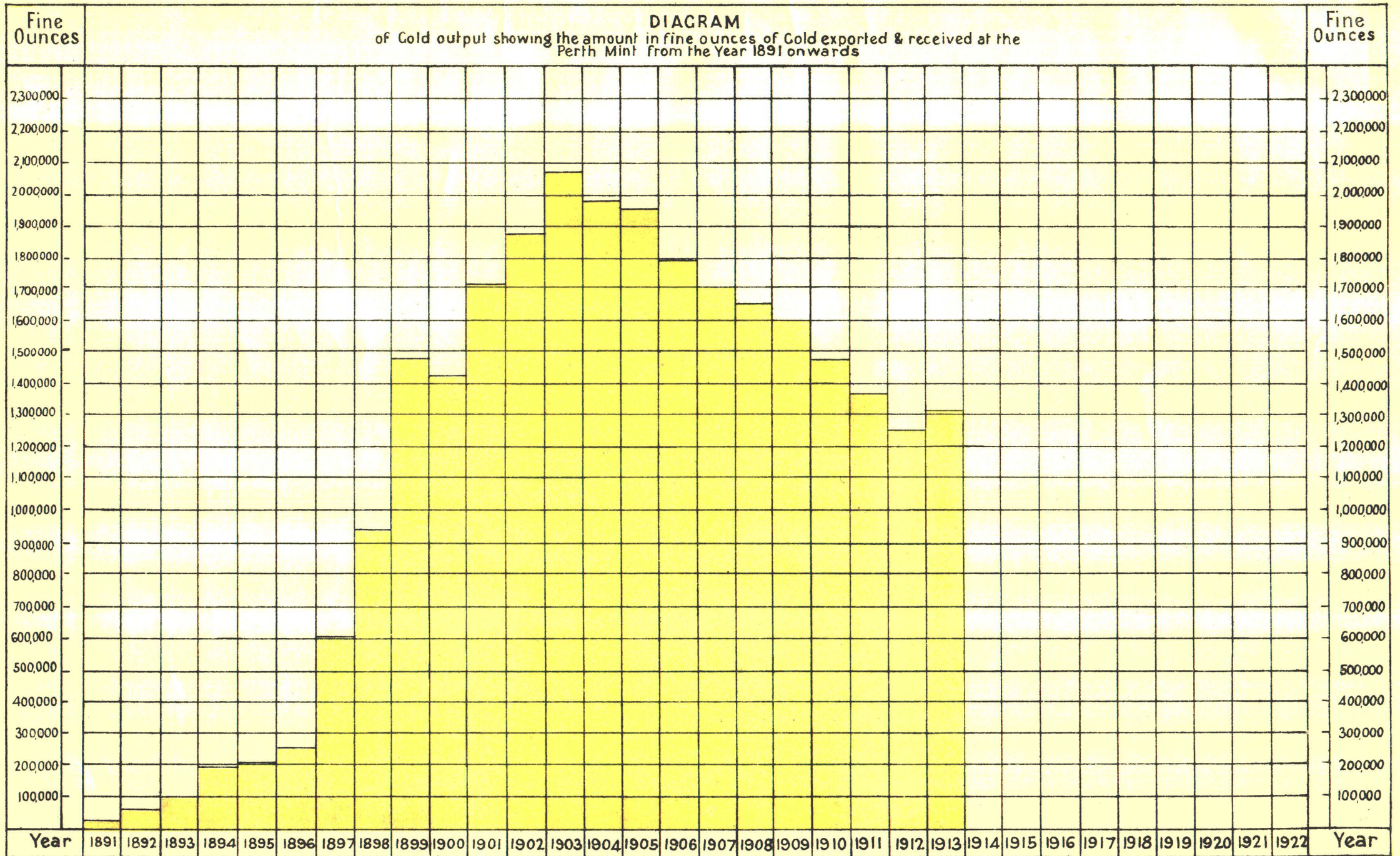
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STATE OF WESTERN AUSTRALIA.

**Report of the Department of Mines for the State of Western Australia
for the Year 1913.**

To the Hon. the Minister for Mines.

SIR,

I have the honour to submit the Annual Report of the Department for the year 1913, 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.,

M. J. CALANCHINI,

Acting Under Secretary for Mines.

Department of Mines, Perth, 31st March, 1914.

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 1913 was £6,036,265, being £267,698 more than that for the previous year, which in the last Annual Report was understated by £3,360, the correct figures being given in the Statistical tables this year.

All minerals excepting Tin show an improvement, the principal increases being Gold, £133,316; Copper, £82,689; Lead, £36,732; and Coal, £17,757.

The value of the gold yield was £5,581,701, being 92.46 per cent. of the total output.

The value of the copper output was £142,513, of lead £59,002, and of tin £72,142. The price of the latter fell a good deal during the year.

The dividends paid by mining companies amounted to £906,637, an increase of £92,545 as compared with the preceding year. The total dividends paid to the end of 1913 were £23,898,988.

To the same date the total mineral production was £119,371,135, and the total gold production £114,880,573.

GOLD.

The gold yield for the first time since the year 1903 shows an increase over the preceding year, the output being 133,316 fine ounces more than that for 1912, which was 88,209 fine ounces less than that for 1911.

The average value per ton of ore treated in the State as a whole has fallen from 39.64 shillings in 1912 to 39.19 shillings in 1913, and in the East Coolgardie Goldfield, from which comes over 50 per cent. of the State's yield, from 36.37 shillings to 35.64 shillings.

Comparing the tonnages of ore treated in 1912 and 1913, there is an increase of 98,493 tons in the latter year, during which 2,787,361 tons were treated.

The decreases were in East Coolgardie, Mount Margaret, North-East Coolgardie, Coolgardie, and East Murchison fields, the tonnages being 50,568, 38,793, 12,440, 8,668, and 117 tons respectively less than in the preceding year. Larger tonnages were treated in Broad Arrow, Yilgarn, Murchison, North Coolgardie, West Pilbara, Yalgoo, Peak Hill, Pilbara,

and Dundas, the increases being 85,544, 81,297, 27,489, 14,935, 1,123, 985, 817, 419, and 261 tons respectively.

Working costs show a slight 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.; and in 1913, 19s. 6.6d.

More than half of the increased gold production is attributable to the Yilgarn and Broad Arrow fields, and increases were also reported from Murchison, North Coolgardie, Yalgoo, Dundas, Peak Hill, West Pilbara, Gascoyne, and Kimberley.

In East Coolgardie, Mount Margaret, East Murchison, Coolgardie, North-East Coolgardie, Phillips River, Pilbara, and Ashburton there were decreases.

The area held under mining lease for all minerals is 53,543 acres, being a decrease of 3,059 acres when compared with 1912. The area leased for gold mining is less by 2,861 acres, and for minerals by 198 acres. The area held under prospecting areas is 47,562 acres, including 38,444 acres for coal and oil. This is an increase on the area held in 1912, of 8,498 acres.

The number of men engaged in all classes of mining is 14,780, a decrease of 181 as compared with the previous year. The number of men engaged in mining for minerals other than gold increased by 74. There were increased numbers mining for lead and coal, but slightly less for tin and copper. In mining for pyritic ore the number was the same. In gold mining there was a decrease of 255.

The average value of gold produced per man employed on gold mines has increased from £403.58 in 1912 to £419.59 in 1913. The average tonnage raised per man was 214.08 tons, and in the preceding year 203.64 tons.

In the East Murchison field there was a falling-off.

The Black Range district shows a reduced gold production, but an increased tonnage treated, indicating a diminution in the grade of ore produced. In the Lawlers District there was a decrease and all centres were very quiet.

In the Wiluna District the decrease was small, but prospectors were active throughout it, and an improvement is anticipated.

In the Murchison Goldfield there was an improvement, due principally to the excellent output from the Meekatharra centre, where the mines are opening up splendidly.

At Garden Gully the Kyarra Mine continues to develop well. Many of the centres in the Meekatharra district are looking better. In the Mount Magnet district there was a small decrease, but generally speaking it maintained its position.

The Boogardie centre had several sensational crushings. Lennonville was the scene of a great deal of activity and at Mt. Magnet the "Early Bird" and "New Year" leases had highly payable crushings. In

the Cue district things were very quiet, and nothing of note transpired. In the Day Dawn district the Great Fingall remains the principal producer, and other mines in the district are being actively developed.

The production of the Mt. Margaret field shows a decrease. In the Mt. Morgans district operations on the Westralia Mt. Morgans Mine were resumed after a long period of suspension. The revival at the old centre of Mt. Margaret continues and is very promising. In the Mt. Margaret district the Lancefield Mine remained closed down, but it has recently been purchased by another company, which proposes to actively work it. Good returns were obtained from the Nil Desperandum Mine at Burtville.

In the Mt. Malcolm district several of the smaller mines are looking well, but the Sons of Gwalia remains the chief producer.

The Coolgardie field shows a decrease, largely attributable to a reduced output from the Burbanks Birthday and Tindals Mines, and to a falling-off in the Kuranalling district which, however, showed a marked improvement towards the close of the year. In most of the centres of the field the outlook is promising.

The North Coolgardie field records an increased output, due to an improvement in each of the districts excepting Ularring, where matters were very quiet.

The Menzies Consolidated Mine, at Yunndaga, is looking extremely well in the lower levels and promises to become a big producer.

The mines at Comet Vale have been opening up well, and this is now a flourishing centre.

The North-East Coolgardie Goldfield had a small decrease, and there was little change in the various centres. The find in the previous year at Kurnalpi did not develop as anticipated, and this centre has practically relapsed into its former state of inactivity.

In the Kanowna centre there has been activity, and prospects are brighter.

The Broad Arrow Goldfield had an increased output, entirely attributable to the Ora Banda centre, where the mines are being vigorously developed.

The Victorious is still the chief producer. A State plant commenced crushing, and is of considerable assistance to the prospectors. The other centres of the field have been very quiet.

In the East Coolgardie Goldfield the number of men engaged in mining was 5,191, and in 1912 5,518; a decrease of 327. This goldfield gave employment to about 38 per cent. of the number of men employed in gold mining, and the reported production during the year was 719,929 fine ounces of gold, about 56 per cent. of the total reported yield. The tonnage treated was 1,712,697 tons, being less than in 1912 by 50,568 tons. The average grade of the ore fell from 36.37 shillings in 1912 to 35.64 shillings in 1913. The output shows a decrease, but most of the big mines have been steadily developing, with satisfactory results at depth in the Ivanhoe and Golden Horseshoe.

The North end of the field has been the scene of greater activity, as also the Randalls district, where two plants are in course of erection.

The Yilgarn Goldfield again had a substantial increase, the chief factors being the Bullfinch, Edna May, and Mountain Queen Mines. The whole field is looking well, and there has been considerable activity, especially at the Southern end.

Several new plants have been or are in course of erection, and a considerable amount of boring is being carried out on the old Fraser's Mine at Southern Cross by a local company assisted by the Government. It is hoped that the results will amply justify the large expenditure involved.

The Dundas field had a slight increase. The operations at depth on the Princess Royal Mine, referred to in last year's report, did not have the satisfactory result hoped for, and tributers are now working the property.

The other mines are doing steady work.

The Phillips River Goldfield shows a small decrease, attributable to the continued cessation of work at the mines formerly held by the Phillips River Gold and Copper Company, but which are now held by other owners, who have begun raising ore. The mines at Kundip are looking promising.

In the Northern Goldfields, Kimberley, Pilbara, West Pilbara, and Gascoyne, there has not been much alteration. In Pilbara the operations of the State mill at Bamboo Creek have been retarded owing to water difficulties, but these have now been overcome.

The Klondyke Boulder Mine at Warrawoona has been developing well, and gives much promise. At the close of the year the prospects of the field had greatly improved. In the West Pilbara field the output showed a small increase.

TIN.

The quantity of tin exported was less than in 1912 by 167 tons, and in value by £7,596. The Greenbushes Tinfield produced 458.48 tons, valued at £50,954, an increase on the previous year of 28.03 tons, and in value of £788; the Pilbara field, 139.10 tons, valued at £16,506, an increase in tonnage of 15.72 tons, and in value of £1,513; the Murchison field, 3.20 tons, valued at £242; and the Coolgardie field, .15 tons, valued at £15. The two latter had no production in the previous year.

The Greenbushes field is still being actively exploited, but tin mining is not as prosperous in Pilbara as it should be.

TANTALITE.

None of this metal was exported or reported.

COPPER.

The value of the copper exported was £142,513, being £82,689 more than in 1912. The quantity raised in the West Pilbara field was 12,621.73 tons, valued at £76,878, an increase in tonnage of 337.71 tons, and decrease in value of £27,411. The efforts of the Department to assist small mine owners in this field by making advances against the ore raised for shipment were not attended with the success desired, and were discontinued.

In the Phillips River field the decreased production will, it is hoped, be overcome by the assistance about to be rendered to the field by the Government. It has been decided to lease and run the smelters formerly owned by the Phillips River Gold and Copper Company and to make advances on the matte shipped for sale, and thus render as much assistance as possible to the various mine owners in the field.

There was not any production from any other field. The average number of men engaged in copper mining was 213, and in 1912, 223.

COAL.

Six coal mines are working on the Collie field, and the output for the year was 313,818 tons, being 18,739 tons more than in 1912.

This improvement is attributable to the installation of better plant and machinery and improved conditions generally. The field is looking well.

The number of men employed, 559, is greater by 17 than in 1912, and the output per man was, in 1912, 544 tons, and in 1913, 561 tons.

OTHER MINERALS.

The quantity of silver obtained as a by-product and exported was 188,020 ounces, valued at £23,420, and in the preceding year 165,371 ounces, valued at £19,725.

Lead ore to the extent of 3,169 tons, valued at £59,002, was exported, and 10,216 tons of pyritic ore, valued at £3,658. One (1) ton of wolfram, valued at £86, and one (1) ton of godolinite, valued at £112, were reported to the Department. The latter was raised in the Pilbara field.

No asbestos or mica was reported or exported.

MINING GENERALLY.

This year Western Australia is alone in its increased gold output, the other States, including the Northern Territory and Papua, all reporting de-

creased productions. New Zealand had an increased yield. The Western Australian output was 51.22 per cent. of the total for Australasia.

The work of the year was very encouraging. The continued improvement in the mines at Meekatharra and Westons; the all-round advance in the Yilgarn field; the satisfactory developments at depth in the Sons of Gwalia, Great Fingall, and Golden Horseshoe Mines, and the discoveries of new ore bodies in various parts of the State, are very pleasing.

The Government continues to assist bona-fide prospectors by the loan of equipment and means of transport, and all the outfit is in constant use.

The area held under prospecting areas for gold and minerals, viz., 9,118 acres, although less than the previous year by 526 acres, is an indication that the prospector is not idle.

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 is aimed at assisting in the development of partly opened-up mines, principally by their equipment with machinery, is evidence that the Government is continuing its efforts to foster the industry.

A good deal of diamond drilling was undertaken, and will be continued wherever there is a reasonable prospect of success.

PART II.—MINERALS RAISED.

TABLE 1.
Quantity and Value of all the Minerals produced during 1912 and 1913.

Description of Minerals.	1912.		1913.		Increase or Decrease for Year compared with 1912.	
	Quantity.	Value.	Quantity.	*Value.	Quantity.	Value.
1. Coal (raised), statute tons	295,079	£ 135,857	313,818	£ 153,614	+ 18,739	+ 17,757
2. Copper { Ore (exported), statute tons ...	9,536	58,688	4,339	136,622	- 5,197	+ 77,934
{ Ingot, Matte, etc. (exported), statute tons	28	1,136	82	5,891	+ 54	+ 4,755
3. Gold (exported and minted), fine ounces...	1,282,658	5,448,385	1,314,043	5,581,701	+ 31,385	+ 133,316
4. Lead Ore (exported), statute tons	1,868	22,270	3,169	58,002	+ 1,301	+ 36,732
5. Pyritic Ore (reported), statute tons	7,626	2,543	10,216	3,658	+ 2,590	+ 1,115
6. Silver (exported), fine ounces	165,371	19,725	188,020	23,420	+ 22,649	+ 3,695
7. Tin, Ore and Ingot (exported), statute tons	651	79,738	484	72,142	- 167	- 7,596
8. Wolfram (exported), statute tons ... ..	..	..	1	86	+ 1	+ 86
9. Zinc, Spelter, etc. (exported), statute tons	14	217	..	..	- 14	- 217
10. Godolinite (reported), statute tons ... ..	..	..	1	112	+ 1	+ 112
Unenumerated (exported) ... ..	..	8	..	17	..	+ 9
Total Values £	..	5,768,567	..	6,036,265	..	+ 267,698

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
13 Years Total	123,126,533	89,746,393	72.89

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 1913.

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

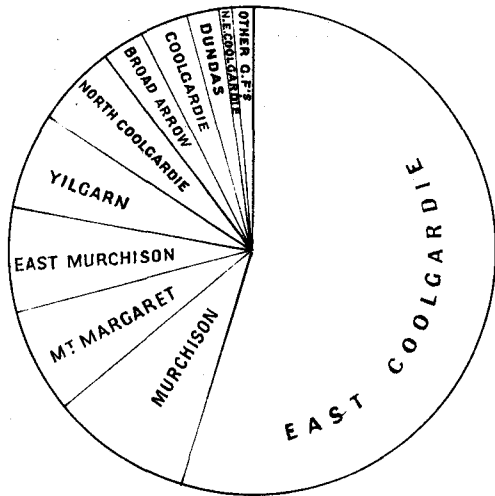


Fig. 2. Gold produced from various Goldfields as given by the Export and Mint Returns.

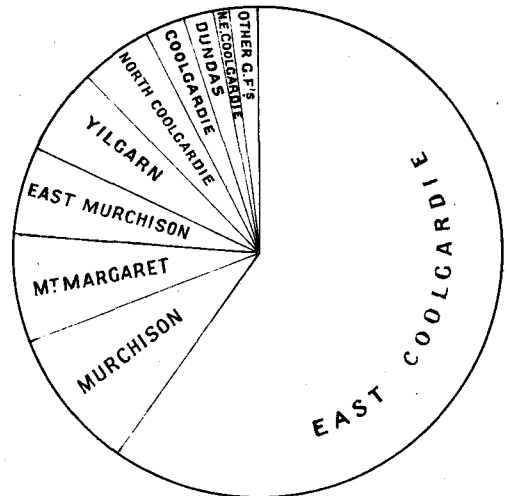


Fig. 3. Value of Gold and other Minerals.

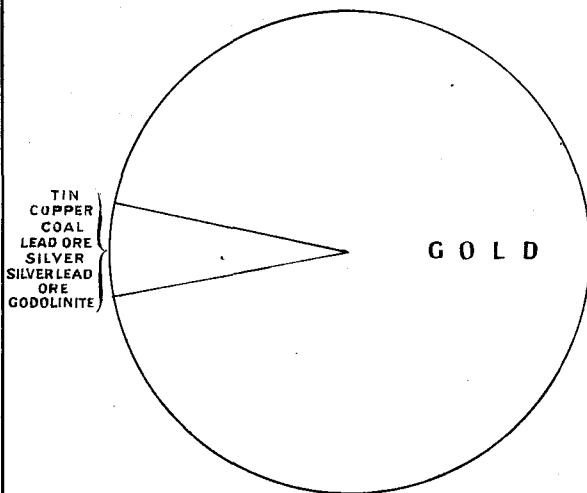


Fig. 4. Value of Minerals other than Gold.

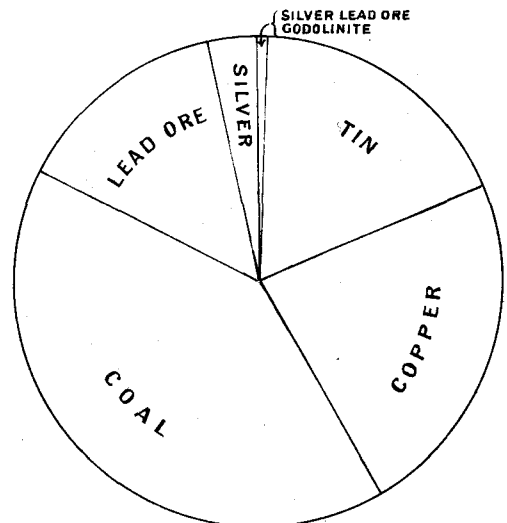


Fig. 5. Areas of Land leased for Goldmining on various Goldfields.

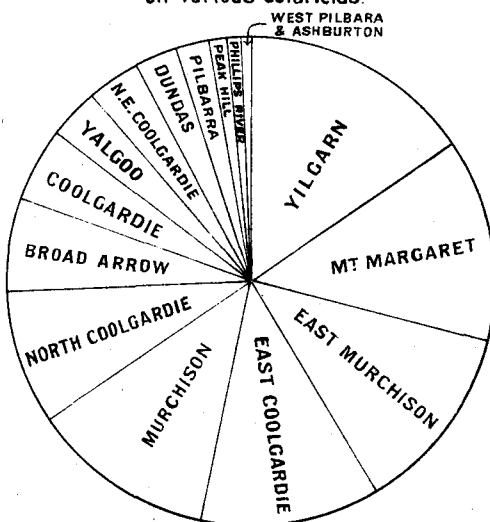
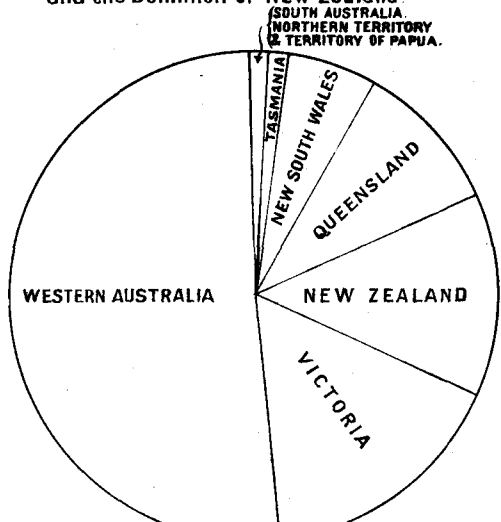
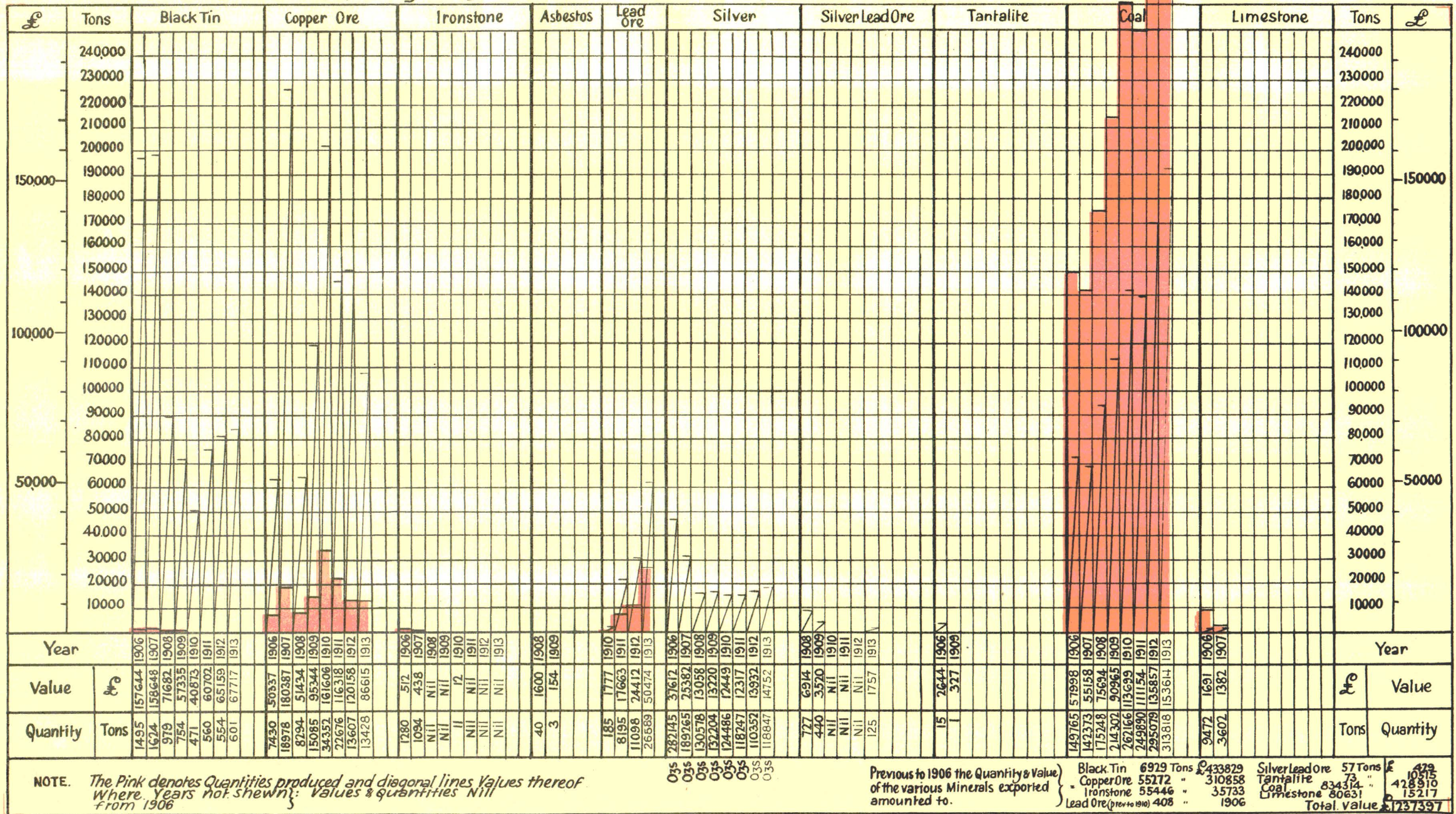


Fig. 6. Output of Gold in the States of Australia and the Dominion of New Zealand.



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

Previous to 1906 the Quantity & Value of the various Minerals exported amounted to.

Black Tin	6929 Tons	£433829
Copper Ore	55272 "	310858
Ironstone	55446 "	35783
Lead Ore (prev to 1910)	408 "	1906
Silver Lead Ore	57 Tons	£ 429
Tantalite	73 "	10515
Coal	834314 "	428910
Limestone	80631 "	15217
Total Value		£1237397

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.					
	1912.	1913.	Percentage for each Goldfield.		Average Value of Gold per ton of Ore treated.	
			1912.	1913.	1912.	1913.
	fine ozs.	fine ozs.			shillings.	shillings.
1. Kimberley	272		.02	..	..	..
2. Pilbara	5,999	5,598	.47	.43	123.25	113.85
3. West Pilbara	1,118	1,421	.09	.11	723.25	89.11
4. Ashburton	39	12	..	..	..	..
5. Gascoyne	7	31	..	..	..	339.96
6. Peak Hill	1,862	2,766	.15	.21	216.76	120.96
7. East Murchison	99,131	87,977	7.82	6.77	44.54	39.65
8. Murchison	105,373	122,028	8.31	9.39	49.90	49.67
9. Yalgoo	6,166	8,163	.49	.63	51.19	60.88
10. Mt. Margaret	102,970	91,273	8.12	7.03	40.00	43.22
11. North Coolgardie	58,270	68,527	4.60	5.28	61.88	61.29
12. Broad Arrow	13,375	34,739	1.05	2.67	40.23	25.74
13. North-East Coolgardie	13,856	12,393	1.09	.95	31.83	49.65
14. East Coolgardie	756,795	719,929	59.69	55.42	36.37	35.64
15. Coolgardie	42,182	31,892	3.33	2.46	58.05	50.66
16. Yilgarn	30,675	82,334	2.42	6.34	35.55	45.21
17. Dundas	25,314	27,039	2.00	2.08	39.45	40.52
18. Phillips River	4,201	2,788	.33	.21	42.53	53.12
State generally	240	179	.02	.02	..	..
Totals and averages	1,267,845	1,299,089	100.00	100.00	39.64	39.19

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 Broad Arrow, Dundas, Gascoyne, Murchison, North Coolgardie, Peak Hill, West Pilbarra, Yalgoo and Yilgarn each show increases.

TABLE 4.

Number of Gold-producing Mines in the several Goldfields and Districts during 1912 and 1913.

Goldfield.	District.	1912.		1913.		Increase or Decrease.
		District.	Goldfield.	District.	Goldfield.	
Kimberley .. .. .	.. .. .	..	..	..	..	..
Pilbara	Marble Bar	17	30	21	31	+
	Nullagine	13		10		
West Pilbara .. .. .	.. .. .	..	3	..	8	+
Ashburton .. .. .	.. .. .	..	..	..	..	..
Gascoyne .. .. .	.. .. .	..	..	..	..	..
Peak Hill .. .. .	.. .. .	..	5	..	8	+
East Murchison	Lawlers	23	75	17	62	-
	Wiluna	22		14		
	Black Range	30		31		
	Cue	17		18		
Murchison	Meekatharra	52	115	49	108	-
	Day Dawn	10		9		
	Mt. Magnet	36		32		
Yalgoo .. .. .	.. .. .	..	26	..	25	-
Mt. Margaret	Mt. Morgans	7	68	7	60	-
	Mt. Malcolm	34		29		
	Mt. Margaret	27		24		
	Menzies	31		35		
North Coolgardie	Ularring	23	101	23	96	-
	Niagara	17		13		
	Yerilla	30		25		
		
Broad Arrow .. .. .	.. .. .	..	28	..	35	+
North-East Coolgardie	Kanowna	30	38	29	37	-
	Kurnalpi	8		8		
East Coolgardie	East Coolgardie	60	64	63	67	+
	Bulong	4		4		
Coolgardie	Coolgardie	36	56	32	45	-
	Kunanalling	20		13		
Yilgarn .. .. .	.. .. .	..	101	..	71	+
Dundas .. .. .	.. .. .	..	22	..	23	+
Phillips River .. .. .	.. .. .	..	19	..	22	+
Totals .. .. .	.. .. .	..	751	..	698	-

TABLE 5.

Gold Yield from Registered Gold Mining Companies and Gold Mining Leases for the Years 1910, 1911, 1912, and 1913.

Goldfield.	REGISTERED COMPANIES PRODUCING OVER 12,000OZS.								REGISTERED COMPANIES PRODUCING UNDER 12,000OZS.								LEASES, EXCLUSIVE OF SUNDRY CLAIMS AND TREATMENTS.							
	1910.		1911.		1912.		1913.		1910.		1911.		1912.		1913.		1910.		1911.		1912.		1913.	
	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 ...	...	...	...	...	...	...	...	2	133	...	...	...	...	1	451	25	3,209	28	2,796	30	4,358	30	4,106	
West Pilbara ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5	1,269	5	820	3	1,020	8	1,300	
Peak Hill ...	...	...	...	...	...	...	...	2	3,189	1	1,134	1	1,047	...	...	6	883	4	330	4	339	8	972	
East Murchison ...	3	70,628	3	69,573	3	68,908	3	62,100	9	35,717	12	15,319	11	12,063	12	10,226	110	16,397	79	11,406	61	10,873	47	10,504
Murchison ...	1	44,895	1	36,767	1	27,199	2	40,174	11	24,433	10	20,476	8	17,681	7	16,316	174	49,420	141	57,459	106	47,979	99	56,494
Yalgoo ...	...	...	...	...	...	...	...	...	3	808	2	39	5	2,174	5	3,467	9	403	6	547	21	3,481	20	3,598
Mt. Margaret ...	2	102,400	2	107,918	1	60,893	1	63,313	9	27,484	16	24,982	13	30,256	12	14,895	80	23,966	67	15,571	54	8,818	47	8,117
N. Coolgardie ...	...	...	...	...	...	...	1	14,826	19	26,083	20	22,803	17	24,031	13	20,181	121	31,524	109	32,258	84	26,838	83	23,550
Broad Arrow ...	...	...	...	...	...	...	1	27,067	2	1,078	...	...	2	5,266	2	19	46	9,307	42	5,205	26	3,297	32	4,998
N.E. Coolgardie ...	...	...	...	...	...	...	...	...	6	11,517	7	9,710	7	5,597	5	5,706	32	5,119	32	4,771	31	6,139	32	3,908
E. Coolgardie ...	15	703,705	11	678,903	12	684,853	12	650,195	18	25,180	17	49,994	15	23,060	20	35,671	52	33,163	40	27,909	37	27,381	35	19,776
Coolgardie ...	...	...	...	...	...	...	...	...	11	19,310	17	20,591	10	24,761	5	19,008	72	13,796	49	9,502	46	12,766	40	9,084
Yilgarn ...	...	...	...	...	...	...	2	47,020	5	9,782	15	10,679	14	6,166	10	17,302	53	16,449	83	6,472	87	12,006	59	11,242
Dundas ...	1	13,626	1	16,521	1	14,902	1	13,825	7	9,011	5	2,947	4	4,247	2	4,034	31	4,537	35	8,260	17	4,996	20	7,570
Phillips River ...	...	...	...	...	...	...	...	...	6	4,695	5	1,324	3	151	7	210	18	3,018	19	3,886	16	3,850	15	2,429
Total ...	22	935,254	18	909,682	18	856,755	23	918,520	110	198,420	127	179,998	110	156,530	101	147,486	834	212,460	739	187,192	623	174,141	574	167,748

TABLE 6.

Increase or Decrease in Output of certain producing Gold Mines in 1913, as compared with 1912.

Goldfield.	District.	Name of Mine.	Gold Production.		Increase or Decrease for Year, compared with 1912.
			1912.	1913.	
East Murchison	Wiluna	1. Gwalia Consolidated, Ltd.	Fine ozs. 540.28	Fine ozs. 1,227.82	+ 687.54
Do.	Black Range	2. Black Range Mining Co., N.L.	21,821.47	16,894.76	- 4,926.71
Do.	do.	3. Yuanmi G.Ms., Ltd. (Sandstone)	27,688.22	24,931.34	- 2,756.88
Do.	do.	4. Yuanmi G.Ms., Ltd. (Youanme)	22,463.02	24,468.89	+ 2,005.87
Murchison	Cue	5. Hidden Treasure	2,477.84	2,795.02	+ 317.18
Do.	Meekatharra	6. Commodore G.M. Co., N.L.	2,543.64	3,639.74	+ 1,096.10
Do.	do.	7. Fenian leases	21,837.81	24,805.15	+ 2,967.34
Do.	do.	8. Ingliston Consols Extended leases	8,335.27	11,274.06	+ 2,938.79
Do.	do.	9. Ingliston Extended G.Ms., Ltd.	4,687.16	3,665.56	- 1,021.60
Do.	do.	10. Kyarra G.M., N.L.	335.71	6,821.08	+ 6,485.37
Do.	do.	11. Lake View and Oroya Exploration, Ltd.		14,469.39	+ 14,469.39
Do.	do.	12. Marmont	2,509.12	2,436.67	- 72.45
Do.	Day Dawn	13. Great Fingall Consolidated, Ltd.	27,199.21	25,704.12	- 1,495.09
Do.	Mt. Magnet	14. Empress	1,118.53	2,338.60	+ 1,220.07
Do.	do.	15. Long Reef: Great Boulder No. 1, Ltd.		1,762.33	+ 1,762.33
Do.	do.	16. Sirdar	256.23	1,193.91	+ 937.68
Mount Margaret	Mt. Malcolm	17. Sons of Gwalia, Ltd.	64,063.21	63,313.47	- 749.74
Do.	do.	18. North Star: Malcolm Prospecting Co., N.L.	2,047.91	1,706.50	- 341.41
Do.	Mt. Margaret	19. Ida H. G.M. Co., Ltd.	9,058.61	10,319.12	+ 1,260.51
North Coolgardie	Menzies	20. Gladsome leases	3,335.62	3,613.63	+ 278.01
Do.	do.	21. Sand Queen G.Ms., Ltd.	8,851.14	14,825.95	+ 5,974.81
Do.	do.	22. Menzies Consolidated G.Ms., Ltd.	10,169.49	11,612.75	+ 1,443.26
Do.	do.	23. Menzies	4,365.72	5,909.91	+ 1,544.19
Do.	Ularring	24. Riverina South leases	1,446.49	735.32	- 711.17
Do.	Niagara	25. Golden Butterfly G.M. Co., N.L.	1,384.66	2,838.37	+ 1,453.71
Broad Arrow		26. Associated Northern Blocks (W.A.), Ltd.	5,256.19	27,066.68	+ 21,810.49
N.E. Coolgardie	Kanowna	27. North White Feather G.Ms., Ltd.	5,091.19	4,503.91	- 587.28
East Coolgardie	East Coolgardie	28. Golden Ridge G.M. Co., Ltd.	14,718.50	13,063.33	- 1,655.17
Do.	do.	29. Associated G.Ms. of W.A., Ltd.	38,810.09	36,630.65	- 2,179.44
Do.	do.	30. Associated Northern Blocks (W.A.), Ltd.	19,119.01	15,889.11	- 3,229.90
Do.	do.	31. Golden Horseshoe Estates Co., Ltd.	91,342.51	97,918.59	+ 6,576.08
Do.	do.	32. Great Boulder Perseverance G.M. Co., Ltd.	62,932.23	59,625.27	- 3,306.96
Do.	do.	33. Great Boulder Proprietary G.Ms., Ltd.	134,678.93	132,700.32	- 1,978.61
Do.	do.	34. Idaho leases	4,213.46	3,115.94	- 1,097.52
Do.	do.	35. Ironsides North leases	6,126.81	10,889.39	+ 4,762.58
Do.	do.	36. Ivanhoe Gold Corporation, Ltd.	110,452.47	106,697.29	- 3,755.18
Do.	do.	37. Kalgurli G.Ms., Ltd.	58,444.63	59,178.57	+ 728.94
Do.	do.	38. Lake View and Star, Ltd.	63,980.06	62,803.27	- 1,176.79
Do.	do.	39. North Kalgurli (1912), Ltd.	4,702.04	4,833.46	+ 131.42
Do.	do.	40. Oroya Links, Ltd.	40,953.10	36,540.13	- 4,412.97
Do.	do.	41. South Kalgurli Consolidated, Ltd. (includes late South Kalgurli G.Ms., Ltd., and Hainault G.Ms., Ltd.)	49,421.84	31,024.92	- 18,396.92
Do.	do.	42. Golden Zone leases	7,398.68	9,626.43	+ 2,227.75
Do.	do.	43. Hannan's Reward, Ltd.	3,879.56	3,292.21	- 587.35
Coolgardie	Coolgardie	44. Burbanks Birthday G.Ms., Ltd.	10,409.71	6,169.95	- 4,239.76
Do.	do.	45. Burbanks Main Lode (1904), Ltd.	11,558.34	11,410.58	- 147.76
Do.	do.	46. Hidden Secret North leases	2,825.50	1,974.11	- 851.39
Do.	Kunanalling	47. Carbine leases	1,597.92	1,000.00	- 597.92
Yilgarn		48. Bullfinch Proprietary (W.A.), Ltd.		33,760.96	+ 33,760.96
Do.		49. Comet	1,253.84	2,022.86	+ 769.02
Do.		50. Corinthian North G.Ms., Ltd.		4,320.01	+ 4,320.01
Do.		51. Edna May G.M. Co., N.L.	919.27	8,975.21	+ 8,055.94
Do.		52. Great Unknown	1,374.63	1,094.05	- 280.58
Do.		53. Greenfinch Proprietary G.M., N.L.	1,547.93	585.82	- 962.11
Do.		54. Marvel Loch G.M. Co., N.L.	2,266.37	2,988.53	+ 722.16
Do.		55. Mountain Queen, Ltd.	9,589.25	13,259.36	+ 3,670.11
Dundas		56. Hampton Uruguay, Ltd.	3,273.07	3,496.65	+ 223.58
Do.		57. Mararoa G.M. Co., N.L.	14,901.68	13,825.24	- 1,076.44
Do.		58. Viking No. 1 leases	3,314.77	4,764.26	+ 1,449.49

TABLE 7.

Averages of Gold Ore raised and treated, and Gold produced therefrom, per man employed on the several Goldfields of the State, during 1912 and 1913.

Goldfield.	1912.				1913.			
	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	89·94	43·87	130·48	63·64	48·98	26·60	65·64	36·31
3. West Pilbara	39·95	9·99	340·14	85·03	77·65	44·37	81·45	46·54
4. Ashburton ... ..	...	...	...	...	...	...	...	...
5. Gascoyne ... ..	...	...	...	...	...	...	...	...
6. Peak Hill	44·23	25·00	112·85	63·79	139·22	69·61	198·24	99·12
7. East Murchison	304·50	168·18	159·65	88·18	320·69	177·10	149·67	82·65
8. Murchison	173·70	75·40	102·03	44·29	232·38	95·22	135·88	55·67
9. Yalgoo	171·95	85·98	103·62	51·81	189·24	87·78	135·61	62·84
10. Mt. Margaret	319·59	194·41	150·48	91·54	332·85	193·23	169·53	98·30
11. North Coolgardie	147·67	84·03	107·55	61·20	163·80	87·66	118·16	63·24
12. Broad Arrow	241·26	131·70	114·24	62·36	505·85	328·88	153·24	99·63
13. North-East Coolgardie	226·17	121·92	84·76	45·69	159·36	86·25	88·77	50·40
14. East Coolgardie	533·84	321·18	228·52	137·48	568·06	330·76	238·32	138·77
15. Coolgardie	162·98	100·05	111·37	68·37	124·90	78·73	74·48	6·95
16. Yilgarn	306·27	146·99	128·17	61·51	401·29	197·06	213·57	104·88
17. Dundas	332·00	199·20	154·17	92·50	357·91	212·77	170·72	101·49
18. Phillips River	126·94	72·38	65·55	36·23	114·19	63·62	71·40	39·78
Total Averages	365·14	203·64	170·37	95·01	393·36	214·08	181·50	98·78

The average value of gold produced per man employed above and below ground was £403·58 in 1912 and £419·59 in 1913. The average tonnage of ore raised shows an increase from 203·64 tons to 214·08 tons. The average tonnage raised per man is again highest in the East Coolgardie Field, viz., 330·76 tons, average value £589·46, the next being the Broad Arrow Field, with 328·88 tons, average value £423·20.

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 1913.

State.	Output of Gold.	Value.	Percentage of total Output of Australia.
1. Western Australia	Fine ozs. 1,314,043	£ 5,581,701	51·22
2. Victoria	434,932	1,847,475	16·95
3. Queensland	265,735	1,128,768	10·36
4. New South Wales	149,657	635,703	5·83
5. Tasmania	33,400	141,876	1·30
6. South Australia	6,556	27,800	·26
7. Northern Territory	3,119	13,250	·12
8. Territory of Papua (estimated)	14,681	62,362	·57
9. New Zealand	343,595	1,459,499	13·39
Total	2,565,718	10,898,434	100·00

TABLE 9.

Dividends paid by Western Australian Gold Mining Companies during 1913 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 1913.
		Authorised.	No. of Shares issued.	Par Value of Shares.	Paid up to.	Paid in 1913.		
						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	2	7,250	240,093
Do.	Yuanmi Gold Mines, Ltd.	350,000	350,000	1 0 0	1 0 0	2	43,750	61,250
Do.	Other Companies							133,000
Murchison	Great Fingall Consolidated, Ltd.	125,000	250,000	0 10 0	0 10 0	1	12,500	1,746,875
Do.	Other Companies							80,295
Mt. Margaret	Sons of Gwalia, Ltd.	350,000	325,000	1 0 0	1 0 0	4	65,000	892,863
Do.	Other Companies							362,095
North Coolgardie	Sand Queen G.Ms., Ltd.	15,000	60,000	0 5 0	0 5 0	12	23,250	35,250
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	703,833
Do.	Associated Northern Blocks (W.A.), Ltd.	350,000	350,000	1 0 0	1 0 0	2	35,000	726,250
Do.	Golden Horseshoe Estates Co., Ltd.	1,500,000	300,000	5 0 0	5 0 0	1	60,000	3,135,000
Do.	Golden Ridge G.M. Co., Ltd.	50,000	92,705	0 10 0	0 10 0	1	2,318	140,209
Do.	Great Boulder Perseverance G.M. Co., Ltd.	1,500,000	1,399,459	1 0 0	1 0 0	1	34,986	1,461,116
Do.	Great Boulder Proprietary G.M. Co., Ltd.	175,000	1,750,000	0 2 0	0 2 0	4	262,500	4,219,300
Do.	Ivanhoe Gold Corporation, Ltd.	1,000,000	200,000	5 0 0	5 0 0	4	170,000	3,188,750
Do.	Kalgurli G.Ms., Ltd.	120,000	120,000	1 0 0	1 0 0	4	96,000	1,372,500
Do.	Lake View and Star, Ltd.	200,000	1,000,000	0 4 0	0 4 0	3	32,000	64,000
Do.	Other Companies							3,987,036
Coolgardie	Burbanks Main Lode (1904), Ltd.	40,000	187,810	0 4 0	0 4 0	1	1,767	16,494
Do.	Other Companies							323,001
Yilgarn	Bullfinch Proprietary (W.A.), Ltd.	500,000	476,150	1 0 0	1 0 0	1	23,807	23,807
Do.	Edna May G.M. Co., N.L.	25,000	42,850	0 10 0	0 10 0	1	4,125	4,125
Do.	Other Companies							51,078
Dundas	Mararoa G.M. Co., N.L.	40,000	100,000	0 8 0	0 3 0	4	20,000	100,000
Do.	Other Companies							147,000
	Total Dividends paid during 1913						£906,637	
	Total Dividends paid to end of 1913							£23,898,988

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20/705 833/29

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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	906,637	16·2	4,528,106	20·0
Total ...	114,880,573	23,898,988	20·8	†34,901,256	†23·4

* Corrected from previous report.

† Seven last years only.

TABLE 11.

Quantity and Value of Minerals, other than Gold and Coal, reported to the Mines Department during 1913.

Goldfield, District, or Mineral Field.	1913.		Increase or Decrease for Year compared with 1912.	
	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£
BLACK TIN.				
Pilbara Goldfield (Marble Bar District)	139·10	16,506	+ 15·72	+ 1,513
Greenbushes Mineral Field	458·48	50,954	+ 28·03	+ 788
Murchison Goldfield (Cue District)	3·20	242	+ 3·20	+ 242
Coolgardie Goldfield (Coolgardie District)	·15	15	+ ·15	+ 15
Total	600·93	67,717	+ 47·10	+ 2,558
PYRITIC ORE.				
Mt. Margaret Goldfield (Mt. Morgans District)	10,216·18	3,658	+ 2,590·38	+ 1,115
COPPER ORE.				
West Pilbara Goldfield	12,621·73	76,878	+ 337·71	— 27,411
Phillips River Goldfield	806·95	9,737	— 511·43	— 6,078
Murchison Goldfield (Day Dawn District) .. .. .	..	..	— 4·80	— 54
Total	13,428·68	86,615	— 178·52	— 33,543
LEAD ORE.				
Northampton Mineral Field	26,589·53	50,474	+ 15,491·03	+ 26,062
WOLFRAM ORE.				
Murchison Goldfield (Cue District)	4·64	69	+ 4·64	+ 69
GODOLINITE.				
Pilbara Goldfield (Marble Bar District)	1·00	112	+ 1·00	+ 112

The output of Black Tin shows increases in tonnage of 47.10 tons, and in value of £2,558; and Pyritic Ore, increases in tonnage of 2,590.38 tons, and in value of £1,115. In Copper Ore there were decreases in tonnage of 178.52 tons, and in value of £33,543. Lead Ore shows increases in tonnage of 15,491.03 tons, and in value of £26,062.

The production of Tin was confined to the Greenbushes and Pilbara fields, and of Copper to the West

Pilbara, Phillips River, and Murchison fields. The output of Lead Ore is confined to Northampton.

It will be observed that the figures in this table differ from those in Table 1. The figures above are those reported to the Department, and this table is published as an index to the amount of mining in each field named.

TABLE 12.

Quantity of Coal raised during 1912 and 1913, 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	1912	tons. 295,079	£ 135,857	126	416	tons. 709	tons. 544
	1913	313,818	153,614	141	418	751	561

The number of men employed at collieries has increased by 17, and the output by 18,739 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, 1912 and 1913.

Description of Leases.	1912.		1913.	
	No.	Acreage.	No.	Acreage.
Gold mining leases on Crown land ...	1,635	24,237	1,463	21,376
" " private property ...	1	6	1	6
Mineral leases on Crown land ...	300	32,339	288	32,113
" " private property ...	1	20	1	48
	1,937	56,602	1,753	53,543

The total number of leases held for mining has decreased by 184 as compared with 1912, and the acreage by 3,059 acres. Leases for gold mining have decreased in number by 172 and in area by 2,861 acres.

The acreage held under mineral leases has decreased by 198 acres, and the number of leases by 12.

TABLE 14.

Number and Acreage of Gold Mining Leases in force each year for the Five Years ending the 31st December, 1913.

GOLDFIELDS.		DISTRICTS.		1909.		1910.		1911.		1912.		1913.		Percentage of Total Acreage.		Increase or Decrease for 1913 compared with 1912.		GOLDFIELDS.
Name.	Proclaimed.	Name.	Proclaimed.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	1912.	1913.	Increase.	Decrease.	
Kimberley	20-5-86																	Kimberley
Yilgarn	1-10-08			101	1,562	472	9,118	509	10,136	196	3,659	174	3,288	15-09	15-38			Yilgarn
Pilbara	1-10-88	Marble Bar	6-11-96	35	426	21	260	26	277	34	425	32	325	2-31	1-99			Pilbara
		Nullagine	6-11-96	22	252	16	140	14	122	14	135	10	100					135
Ashburton	11-12-90			3	48	3	48	2	30			2	48		22	48		Ashburton
		Cue	10-1-96	99	1,089	71	756	56	605	48	629	45	577					
Murchison	24-9-91	Meekatharra	7-12-94	177	2,288	205	2,670	177	2,350	117	1,497	93	1,226	12-54	11-99			477
		Day Dawn	10-1-96	58	541	49	474	49	445	48	453	40	376					
		Mount Magnet	7-12-94	59	622	51	618	42	485	44	461	40	384					
Dundas	31-8-93			74	997	71	872	70	862	56	674	54	631	2-78	2-95			Dundas
Coolgardie	6-4-94	Coolgardie	1-9-97	115	1,525	100	1,372	68	889	57	733	59	773	4-52	4-93			43
		Kunanalling	1-9-97	35	436	37	488	31	462	26	364	22	281					
East Coolgardie	21-9-94	East Coolgardie	21-9-94	209	2,948	200	2,868	179	2,596	171	2,417	168	2,353	10-42	12-02	44		East Coolgardie
Yalgoo	23-1-95	Bulong	13-11-96	19	245	11	45	10	145	7	109	12	217	3-31	3-33			90
		Menzies	20-3-96	78	1,115	76	1,053	64	897	54	759	54	771					
North Coolgardie	28-6-95	Ularring	23-9-96	65	815	55	720	42	562	33	412	30	383	8-23	8-98			74
		Yerilla	20-3-96	55	784	46	669	40	573	34	489	42	542					
		Niagara	12-3-97	70	960	46	580	47	560	24	334	15	224					
East Murchison	28-6-95	Lawlers	1-7-04	183	2,756	86	1,107	61	914	32	433	22	277	12-97	12-59			452
		Black Range	1-7-04	157	2,397	151	2,282	127	1,923	109	1,598	106	1,512					
North-East Coolgardie	20-3-96	Wiluna	1-3-10			70	1,181	61	1,027	67	1,113	53	903	8-14	3-21			1,287
		Kanowna	13-11-96	74	908	58	682	44	555	57	908	46	602					
Broad Arrow	17-11-96	Kurnalpi	13-11-96	5	48	2	18	4	27	62	1,065	6	84					Broad Arrow
				71	939	63	803	117	1,912	57	904	79	1,296	3-73	6-06	392		
Peak Hill	19-3-97			46	402	52	552	50	559	20	279	23	299	1-15	1-40	20		Peak Hill
Mount Margaret	12-3-97	Mount Margaret	12-3-97	75	1,307	72	1,197	71	1,248	70	1,170	59	1,043	13-13	13-56			284
		Mount Malcolm	12-3-97	113	2,030	126	2,314	131	2,415	89	1,657	83	1,535					
		Mount Morgans	2-4-02	35	593	47	815	34	650	21	356	20	321					
West Pilbara	20-9-95	Crown Lands		10	128	7	72	7	78	9	108	7	82	4-5	3-8			26
		Private Property				1	6	1	6	1	6	1	6					
Phillips River	21-9-00			17	240	15	237	26	409	17	257	13	210	1-06	1-98			Phillips River
Other Localities				1	24													Other Localities
Gascoyne	15-4-97									2	36			1-15				Gascoyne
Totals				2,105	28,919	2,318	34,544	2,199	34,219	1,636	24,243	1,464	21,382	100-00	100-00		2,861	

Decrease for 1913: 172 leases, 2,861 acres.

TABLE 15.

Number and Acreage of Mineral Leases in force 31st December each year, for the Five Years ending 31st December, 1913.

MINING DISTRICTS.		SUB-DISTRICTS.		1909.		1910.		1911.		1912.		1913.		Increase or Decrease for 1913, compared with 1912.		DISTRICTS.	
Name.	Proclaimed.	Name.	Proclaimed.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Increase.	Decrease.		
Ashburton	11-12-90	Cue	7-12-94	5	131	5	131	4	83	4	83	4	83	...	...	Ashburton
Murchison	24-9-91	Meekatharra	7-12-94	1	3	...	...	...	...	21	615	9	255	...	...	Cue
		Day Dawn	10-1-96	1	6	1	6	1	6	1	6	1	6	...	372	Meekatharra	
		Mt. Magnet	7-12-94	1	5	...	...	...	...	...	...	...	...	...	...	Day Dawn
Greenbushes	7-4-92	...	...	47	727	49	753	51	751	58	859	51	761	...	98	Mt. Magnet
Pilbara	16-6-92	Marble Bar	16-6-92	36	1,142	16	567	31	868	37	1,033	21	771	...	265	Greenbushes	
		Nullagine	6-11-96	1	48	1	48	1	18	1	3	...	...	...	...	Nullagine
Yalgoo	23-1-95	...	...	2	72	1	48	1	48	1	24	11	320	296	...	Yalgoo
Yilgarn	22-3-95	...	...	2	96	2	96	...	...	2	23	1	12	...	11	Yilgarn
Coolgardie	22-3-95	Coolgardie	22-3-95	2	21	2	21	...	...	...	...	...	...	...	...	Coolgardie
		Kunanalling	1-9-97	Kunanalling
East Coolgardie	22-3-95	East Coolgardie	22-3-95	6	50	7	33	9	45	8	40	6	29	...	11	East Coolgardie	
		Bulong	15-4-96	Bulong
East Murchison	28-6-95	Lawlers	1-7-04	10	260	5	104	4	96	4	96	1	24	...	65	Lawlers	
		Black Range	1-7-04	2	4	2	6	2	6	4	24	3	31	...	...	Black Range
		Wiluna	1-3-10	1	10	Wiluna
North Coolgardie	16-8-95	Menzies	15-4-96	1	48	...	...	...	...	...	...	...	...	...	...	Menzies
		Ularring	15-4-96	Ularring
		Yerilla	15-4-96	Yerilla
West Pilbara	1-11-95	Niagara	1-3-97	...	...	...	...	...	...	...	...	...	...	...	...	Niagara
Dundas	27-12-95	...	...	17	666	20	668	14	537	16	552	16	588	36	...	West Pilbara
Collie	21-2-96	...	...	1	6	1	6	...	...	1	48	1	48	...	...	Dundas
North-East Coolgardie	15-4-96	Kanowna	15-4-96	79	24,495	88	27,255	88	27,125	88	27,126	89	27,417	291	...	Collie	
Broad Arrow	20-11-96	Kurnalpi	15-4-96	...	...	...	...	...	...	...	...	...	...	...	...	Kanowna
Northampton	1-1-97	Crown Lands	...	1	20	1	20	...	...	1	20	1	20	...	...	Kurnalpi
		Private Property	...	4	60	1	10	1	10	1	10	13	212	202	...	Broad Arrow	
Peak Hill	1-4-97	...	...	1	20	...	...	1	20	1	20	1	48	28	...	Northampton
Mt. Margaret	1-4-97	Mt. Margaret	1-4-97	...	...	...	...	...	...	...	...	4	108	108	...	Peak Hill
		Mt. Malcolm	1-4-97	1	48	Mt. Margaret
		Mt. Morgans	2-4-02	1	6	Mt. Malcolm
Gascoyne	15-4-97	...	...	5	129	5	129	6	134	6	134	6	134	...	...	Mt. Morgans
		Crown Lands	...	2	40	2	40	2	40	2	40	Gascoyne
Yandanooka	1-12-97	Private Property	...	2	50	2	50	...	...	...	...	...	...	...	...	Yandanooka
Phillips River	1-7-99	...	...	2	50	2	50	...	...	...	...	...	...	...	...	Phillips River
Other localities	...	Crown Lands	...	46	1,283	30	782	22	613	21	607	22	561	...	46	Phillips River	
		Private Property	...	21	860	18	772	15	648	22	984	28	733	...	251	Other Localities	
Totals	...	...	...	300	30,326	261	31,567	253	31,049	301	32,359	289	32,161	...	198	Other Localities

Decrease for 1913: 12 leases, 198 acres.

In the Collie field the largest area is held, viz., 27,417 acres, occupied entirely for coal mining, then follow: Pilbara with 771 acres, principally for tin and copper, then Greenbushes 761 acres, outside localities, 733 acres, West Pilbara, 588 acres, and Phillips River 561 acres.

Taking all the goldfields, the largest percentage of the area leased for gold mining is in the Yilgarn Goldfield, viz., 15.38; then Mt. Margaret, East Murchison, East Coolgardie, Murchison, and North Coolgardie, with percentages of 13.56, 12.59, 12.02, 11.99, and 8.98 respectively.

TABLE 16.

Number and Acreage of Mineral Leases in force on 31st December, 1913, showing Minerals for which they are worked.

Goldfield or Mineral Field.	District.	MINERALS.																					
		Coal.		Tin.		Copper.		Iron.		Clay.		Limestone.		Wolfram.		Silver and Lead.		Scheelite.		Galena.		Godolinite.	
		Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.
Pilbara	Marble Bar .. ..	..	..	6	163	1	40	..	..	..	..	..	..	..	..	2	96	1	20	8	384	1	48
West Pilbara .. ..	.. ..	..	..	..	..	15	564	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Ashburton .. ..	.. ..	..	..	..	..	1	48	..	..	..	..	..	..	..	..	3	35	..	..	..	..	..	..
East Murchison	Lawlers .. ..	..	..	..	..	1	24	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
.. ..	Black Range .. ..	..	..	..	..	1	25	..	..	2	6	..	..	..	..	..	..	..	..	..	..	..	..
Murchison	Cue .. ..	..	..	2	93	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
.. ..	Day Dawn .. ..	..	..	..	..	..	..	..	..	1	6	..	..	..	..	..	..	..	..	..	..	..	..
Yalgoo .. ..	.. ..	..	..	..	..	7	204	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Mt. Margaret	Mt. Morgans .. ..	..	..	..	..	5	129	..	..	..	..	1	5	..	..	..	..	..	..	..	..	..	..
Broad Arrow .. ..	.. ..	..	..	..	..	1	20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
East Coolgardie	East Coolgardie .. ..	..	..	..	..	..	..	..	..	3	11	..	..	..	..	..	..	..	..	..	..	..	..
Yilgarn .. ..	.. ..	..	..	..	..	..	..	..	..	..	..	1	12	..	..	..	..	..	..	..	..	..	..
Dundas .. ..	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Phillips River .. ..	.. ..	..	..	..	..	20	511	1	10	..	..	1	40	..	..	..	..	..	..	..	..	..	..
Collie .. ..	.. ..	89	27,417	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Greenbushes .. ..	.. ..	..	..	51	761	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Northampton .. ..	.. ..	..	..	..	..	4	68	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Northampton	(Private Property) .. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Peak Hill .. ..	.. ..	..	..	..	..	4	108	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Outside Proclaimed Fields .. ..	.. ..	..	..	..	..	9	174	8*	352	..	..	..	..	1	48	..	..	..	..	..	..	..	..
Totals .. ..	.. ..	89	27,417	59	1,017	69	1,915	9	362	6	23	3	57	1	48	5	131	1	2	8	384	1	48

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.		Bismuth Carbonate.		Lead.		Mica.		Graphite.		Building Stone.		Gravel.		Antimony.		Beryl.		Emerald.		Cobalt and Manganese.			
		Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.		
Pilbara	Marble Bar	2	20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	21	771
West Pilbara .. ..	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	16	588
Ashburton .. ..	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	83
East Murchison	Lawlers .. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	24
.. ..	Black Range .. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	31
Murchison	Cue .. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	9	255
.. ..	Day Dawn .. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	6
Yalgoo .. ..	.. ..	..	..	3	96	1	20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	11	320
Mt. Margaret	Mt. Morgans .. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6	134
Broad Arrow .. ..	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	20
East Coolgardie	East Coolgardie .. ..	..	..	..	..	..	..	..	..	..	..	..	2	11	1	7	..	..	..	..	..	..	..	..	..	6	29
Yilgarn .. ..	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	12
Dundas .. ..	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	48
Phillips River .. ..	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	22	561
Collie .. ..	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	89	27,417
Greenbushes .. ..	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	51	761
Northampton .. ..	.. ..	..	..	..	..	..	..	9	144	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	13	212
Northampton	(Private Property) .. ..	..	..	..	..	..	..	1	48	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	48
Peak Hill .. ..	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	108
Outside Proclaimed Fields .. ..	.. ..	..	..	..	..	..	..	..	..	9	119	1	40	..	..	..	..	..	..	..	..	..	..	..	..	28	733
Totals .. ..	.. ..	2	20	3	96	1	20	10	192	9	119	1	40	2	11	1	7	1	24	3	60	4	102	1	48	289	32,161

TABLE 17.
Number and Acreage of Miscellaneous Leases in force 31st December, 1913.

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 .. .. .	..	..	..	..	1	5	..	..	..	..	1	5
N. E. Coolgardie	Kanowna .. .. .	..	..	1	2	..	..	..	..	..	..	1	2
East Coolgardie	East Coolgardie	14	296	..	..	2	47	4	51	1	2	21	396
Coolgardie	Coolgardie .. .. .	..	..	..	..	1	13	..	..	..	..	1	13
Phillips River .. .. .	.. .. .	..	..	3	7	..	..	..	..	..	..	3	7
	Total	47	352	6	34	4	65	5	75	3	15	35	541

TABLE 18.

Claims and Authorised Holdings under "The Mining Act, 1904," and Regulations existing on 31st December, 1912, and 1913.

GOLDFIELD OR MINERAL FIELD.	DISTRICT.	Prospecting Areas.				Water Rights.				Lode Claims.		Alluvial Claims.	
		Number.		Acreage.		Number.		Acreage.		1912.	1913.	1912.	1913.
		1912.	1913.	1912.	1913.	1912.	1913.	1912.	1913.	1912.	1913.	1912.	1913.
Northampton .. ..	.. ..	3	7	18	99	..	..	..	..	..	..	..	..
Pilbara	Marble Bar	15	11	239	130	1	1	1	1	5	1	..	2
Do.	Nullagine	3	6	57	79	3	1	5	2	10	7	..	..
West Pilbara .. ..	.. ..	7	5	84	57	1	4	5	22	..	..	..	..
Ashburton .. ..	.. ..	1	4	18	72	..	..	..	..	..	..	..	..
Peak Hill .. ..	.. ..	24	17	345	249	8	2	58	15	..	1	..	..
East Murchison	Lawlers	15	17	189	230	21	16	30	16	..	..	..	..
Do.	Wiluna	16	31	271	502	9	9	22	22	..	..	..	..
Do.	Black Range	19	27	293	395	4	3	8	7	..	..	..	1
Murchison	Cue	25	22	384	286	2	2	4	3	2	2	..	..
Do.	Meekatharra	30	29	326	393	2	1	6	1	..	..	..	..
Do.	Day Dawn	8	7	104	99	14	12	23	14	..	..	..	..
Do.	Mt. Magnet	27	22	308	203	2	2	2	2	..	..	..	..
Yalgoo .. ..	.. ..	6	16	108	202	1	1	1	3	..	..	..	..
Mt. Margaret	Mt. Morgans	4	6	63	84	17	10	47	30	..	..	..	..
Do.	Mt. Malcolm	30	26	471	408	38	30	215	00	..	..	..	..
Do.	Mt. Margaret	24	35	324	462	22	26	59	64	..	..	4	4
North Coolgardie	Menzies	53	28	777	382	9	10	30	31	..	..	..	..
Do.	Ularring	17	23	215	271	7	4	20	10	..	..	..	..
Do.	Niagara	9	6	114	84	2	14	4	66	..	..	..	..
Do.	Yerilla	34	36	497	575	1	8	1	15	..	1	..	..
Broad Arrow .. ..	.. ..	40	46	582	693	8	7	27	25	..	9	..	..
N.E. Coolgardie	Kanowna	12	16	170	239	5	3	11	5	7	3	4	..
Do.	Kurnalpi	21	6	582	35	..	..	..	..	1	..	..	..
East Coolgardie	East Coolgardie	33	38	459	507	11	10	37	35	3	3	4	4
Do.	Bulong	15	8	227	132	1	..	12	..	6	6	..	1
Coolgardie	Coolgardie	58	67	804	82	10	9	5	30	2	4	..	..
Do.	Kunanalling	11	10	155	162	8	7	46	42	..	..	..	..
Yilgarn .. ..	.. ..	48	45	760	701	3	3	6	5	..	..	..	..
Dundas .. ..	.. ..	17	9	231	106	11	10	29	29	..	1	..	..
Phillips River .. ..	.. ..	14	10	249	141	4	7	9	32	..	..	..	..
Collie .. ..	.. ..	5	2	10,780	4,000	..	..	..	..	..	..	..	..
Greenbushes .. ..	.. ..	5	4	90	72	12	14	72	83	..	..	23	25
Gascoyne .. ..	.. ..	..	2	..	24	..	..	..	..	..	..	..	..
Outside Proclaimed Fields .. ..	.. ..	12	17	18,770	34,596	..	..	..	..	..	..	..	..
Totals .. ..	.. ..	661	661	*39,064	†47,562	237	226	825	810	36	38	35	37
Increase or Decrease for 1913, compared with 1912 .. ..	.. ..	..	..	+ 8,493	..	- 11	..	- 15	..	+ 2	..	+ 2	..

GOLDFIELD OR MINERAL FIELD.	DISTRICT.	Dredging Claims.		Residence Areas.		Business Areas.		Machinery Areas.		Tailings Areas.		Garden Areas.		Washing Areas.	
		1912.	1913.	1912.	1913.	1912.	1913.	1912.	1913.	1912.	1913.	1912.	1913.	1912.	1913.
Northampton .. ..	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pilbara	Marble Bar .. ..	..	..	4	2	13	11	1	1	1	..	5	5	..	..
Do.	Nullagine	1	..	4	2	3	2	1	1	1	1	5	5	..	..
West Pilbara .. ..	.. ..	..	..	16	13	13	17	1	1	..	..	3	3	..	..
Ashburton .. ..	.. ..	..	..	..	..	1	1	..	..	..	..	..	..	..	..
Peak Hill .. ..	.. ..	..	..	18	..	6	8	3	3	1	1	1	..	..	..
East Murchison	Lawlers .. ..	..	..	2	1	2	1	3	4	..	1	3	2	..	..
Do.	Wiluna .. ..	..	..	1	1	1	1	1	..	..	..	5	4	..	..
Do.	Black Range .. ..	..	..	213	196	11	10	2	2	1	1	11	11	..	..
Murchison	Cue .. ..	..	..	9	9	4	3	1	..	3	1	2	2	..	..
Do.	Meekatharra .. ..	..	..	13	10	8	9	1	4	6	4	2	2	..	..
Do.	Day Dawn .. ..	..	..	32	32	..	..	..	..	..	..	5	5	..	..
Do.	Mt. Magnet .. ..	..	..	4	2	3	2	..	..	2	2	7	7	..	..
Yalgoo .. ..	.. ..	..	..	7	5	21	18	2	2	2	2	2	2	..	..
Mt. Margaret	Mt. Morgans .. ..	..	..	1	..	2	..	..	2	..	..	2	5	..	..
Do.	Mt. Malcolm .. ..	..	..	2	2	4	4	..	..	3	1	15	16	..	..
Do.	Mt. Margaret .. ..	..	..	4	4	16	16	4	5	..	..	8	5	..	..
North Coolgardie	Menzies .. ..	..	..	2	15	20	16	1	1	4	2	7	7	..	..
Do.	Ularring .. ..	..	..	..	..	2	1	1	1	..	..	1	..	..	..
Do.	Niagara .. ..	..	..	..	2	1	1	..	2	1	2	..	3	..	..
Do.	Yerilla .. ..	..	..	..	..	3	..	..	2	..	1	..	..	..	..
Broad Arrow .. ..	.. ..	..	..	..	4	16	17	5	5	3	3	..	1	..	..
N.E. Coolgardie	Kanowna .. ..	..	..	1	1	4	2	3	4	2	2	3	4	..	..
Do.	Kurnalpi .. ..	..	..	..	..	1	1	2	1	..	..	..	..	..	..
East Coolgardie	East Coolgardie .. ..	..	..	28	28	10	9	5	6	6	6	25	24	..	..
Do.	Bulong .. ..	..	..	..	23	5	2	2	1	..	..	..	..	..	..
Coolgardie	Coolgardie .. ..	..	..	2	2	4	3	3	3	4	2	4	3	..	..
Do.	Kunanalling .. ..	..	..	1	1	5	4	2	2	..	..	..	..	..	..
Yilgarn .. ..	.. ..	..	..	36	22	20	15	2	2	4	4	3	3	..	..
Dundas .. ..	.. ..	..	..	..	..	1	1	3	3	1	1	2	3	..	..
Phillips River .. ..	.. ..	..	..	..	..	..	..	2	2	3	2	6	5	..	..
Collie .. ..	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Greenbushes .. ..	.. ..	4	7	30	31	4	4	8	7	2	..	7	8	1	2
Gascoyne .. ..	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Outside Proclaimed Fields .. ..	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Totals .. ..	.. ..	5	7	430	408	196	185	59	68	50	39	134	135	1	2
Increase or Decrease for 1913, compared with 1912 .. ..	.. ..	+ 2	..	- 22	..	- 11	..	+ 9	..	- 11	..	+ 1	..	+ 1	..

* 1912 including 12 for coal and oil—29,420 acres.

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

Last year the number of Prospecting Areas held was 661, the total acreage being 39,064 acres (which included 12 areas of an acreage of 29,420 for coal and oil). This year shows an equal number of areas to that of last year for the total acreage 47,562 acres, including 14 areas of 38,444 acres for coal and oil.

TABLE 19.

Miners' Rights issued during 1912 and 1913.

Place of Issue.	Miners' Rights.		Place of Issue.	Miners' Rights.	
	1912.	1913.		1912.	1913.
Albany	9	4	Mt. Jackson .. .. .	..	4
Ashburton	36	..	Menzies	155	154
Boulder	29	11	Mount Egerton	5	9
Bridgetown .. .. .	..	7	Mount Magnet	202	123
Broad Arrow	137	171	Mount Morgans	43	41
Broome	8	6	Mulline	20	23
Bulong	2	..	Nannine	132	84
Bullfinch	44	16	Narrogin	7	1
Bunbury	5	..	Norseman	92	89
Burtville	11	16	Northampton	26	44
Busselton	1	5	Northam	1	7
Carnarvon	30	70	Nullagine	51	49
Collie	6	10	Onslow	36	41
Coolgardie	289	252	Ora Banda .. .. .	..	26
Cue	200	171	Payne's Find	26	36
Davyhurst	41	26	Peak Hill	105	102
Derby	12	4	Perth	151	239
Esperance	2	..	Pinjin	5	2
Geraldton .. .. .	..	4	Port Hedland	10	2
Greenbushes	224	169	Ravensthorpe	85	74
Hall's Creek	25	19	Roebourne	120	94
Kalgoorlie	445	400	Sandstone	315	246
Kanowna	204	110	Southern Cross	279	289
Kookynie	125	88	Wagin	1	17
Lake Darlot	17	4	Waverley	25	5
Laverton	185	130	Wiluna	95	99
Lawlers	83	64	Wodgina	19	18
Leonora	168	137	Wyndham	1	3
Linden	36	45	Yalgoo	68	46
Marble Bar	166	127	Yarri	15	3
Marvel Loch	45	96	York	2	40
Meekatharra	147	180	Youanme	70	81
			Total	4,894	4,323

TABLE 20.

Number and Acreage of Miners' Homestead Leases in force on 31st December, 1912 and 1913.

Goldfield.	District.	1912.		1913.		Increase.		Decrease.	
		Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.
West Pilbara .. .. .	..	1	30	1	30	..	..	..	..
Greenbushes .. .. .	..	7	912	7	931	..	19	..	..
Pilbara	Marble Bar	6	77	5	71	..	..	1	6
	Nullagine .. .. .	..	..	..	..	..	..	..	..
Dundas .. .. .	..	23	1,274	26	1,317	3	43	..	..
Broad Arrow .. .. .	..	2	30	1	20	..	..	1	10
Yilgarn .. .. .	..	32	2,542	33	2,252	1	..	..	290
Mt. Margaret	Mt. Morgans	4	160	3	140	..	..	1	20
	Mt. Malcolm	7	1,264	6	1,244	..	..	1	20
	Mt. Margaret	15	644	16	664	1	20	..	..
	Cue	9	1,232	7	1,212	..	..	2	20
Murchison	Day Dawn	10	130	10	130	..	..	..	..
	Meekatharra	17	1,913	15	1,853	..	..	2	60
	Mt. Magnet	2	40	3	40	1	..	..	..
Yalgoo .. .. .	..	1	200	2	280	1	80	..	..
Coolgardie	Coolgardie	40	3,915	38	4,370	..	455	2	..
	Kunanalling	2	520	2	520	..	..	..	..
East Coolgardie .. .. .	..	107	4,210	104	3,671	..	..	3	539
Phillips River .. .. .	..	150	21,556	151	22,373	1	817	..	..
Peak Hill .. .. .	..	6	720	7	740	1	20	..	..
North-East Coolgardie	Kanowna	21	875	20	862	..	..	1	13
	Menzies	10	405	9	395	..	..	1	10
	Yerilla	1	10	1	10	..	..	..	..
North Coolgardie	Niagara	7	419	5	80	..	..	2	339
	Ularring	1	20	1	20	..	..	..	..
	Lawlers	5	1,110	5	1,110	..	..	..	..
East Murchison	Black Range	26	1,608	21	1,522	..	..	5	86
	Wiluna	5	89	5	89	..	..	..	..
	Total	517	45,905	504	45,946	..	41	13	..

As compared with the year 1912, there is a decrease in the number of leases by 13, and an increase in acreage by 41 acres.

PART IV.—MEN EMPLOYED.

TABLE 21.

Average Number of Men engaged in Mining during 1912 and 1913.

Goldfield.	District.	Reef or Lode.		Alluvial.		Total.	
		1912.	1913.	1912.	1913.	1912.	1913.
1. Kimberley ...	...	...	...	11	10	11	10
2. Pilbara ...	Marble Bar ...	82	114	32	23	114	137
	Nullagine ...	32	37	18	16	50	53
3. West Pilbara ...	...	12	28	4	2	16	30
4. Ashburton ...	...	...	...	11	9	11	9
5. Gascoyne ...	...	...	...	2	3	2	3
6. Peak Hill ...	...	23	20	8	3	31	23
7. East Murchison ...	Lawlers ...	123	116	8	11	131	127
	Wiluna ...	192	179	1	...	193	179
	Black Range ...	784	748	9	6	793	754
	Cue ...	175	117	10	11	185	128
8. Murchison ...	Meekatharra ...	1,561	1,525	38	29	1,599	1,554
	Day Dawn ...	382	345	18	13	400	358
	Mt. Magnet ...	211	146	5	13	216	159
9. Yalgoo ...	...	114	123	9	11	123	134
	Mt. Morgans ...	63	49	29	30	92	79
10. Mt. Margaret ...	Mt. Malcolm ...	699	632	18	13	717	645
	Mt. Margaret ...	346	233	55	30	401	263
	Menzies ...	446	449	10	16	456	465
11. North Coolgardie ...	Ularring ...	157	154	4	11	161	165
	Niagara ...	140	166	24	15	164	181
	Yerilla ...	206	311	30	29	236	340
12. Broad Arrow ...	...	207	343	60	68	267	411
13. North-East Coolgardie ...	Kanowna ...	231	205	18	16	249	221
	Kurnalpi ...	38	31	14	8	52	39
14. East Coolgardie ...	East Coolgardie ...	5,445	5,129	25	10	5,470	5,139
	Bulong ...	45	49	3	3	48	52
	Coolgardie ...	492	556	7	2	499	558
15. Coolgardie ...	Kunanalling ...	114	104	6	2	120	106
16. Yilgarn ...	...	498	784	5	12	503	796
17. Dundas ...	...	270	254	4	...	274	254
18. Phillips River ...	...	114	70	...	...	114	70
State generally	...	2	3	...	...	2	3
Total—Gold Mining		13,204	13,020	496	425	13,700	13,445
MINERALS OTHER THAN GOLD.							
Tin ...	Greenbushes ...	244	256	*50	*21	294	277
	Cue ...	14	2	*3	...	17	2
	Marble Bar ...	21	17	*77	*107	98	124
	West Pilbara ...	186	149	...	...	186	149
Copper ...	Ashburton ...	...	3	...	...	...	3
	Phillips River ...	36	61	...	...	36	61
	Marble Bar ...	1	...	...	...	1	...
Pyritic Ore	Mt. Morgans ...	27	27	...	...	27	27
Lead ...	Northampton ...	60	132	...	...	60	132
Coal ...	Collie River ...	542	559	...	...	542	559
Wolfram ...	Cue ...	...	1	...	...	...	1
Total—Other Minerals ...		1,131	1,207	130	128	1,261	1,335
GRAND TOTAL		14,335	14,227	626	553	14,961	14,780

* Classified elsewhere as employed at mines.

TABLE 22.
Average Number of Men employed at Mines during 1913.

Mineral.	Above Ground.	Under Ground.	Total.	Percentage of total men employed.	Increase or decrease compared with 1912.	
Coal	141	418	559	3'89	+	17
Copper	110	103	213	1'48	-	10
Gold	5,934	7,086	13,020	90'70	-	184
Lead	49	83	132	'92	+	72
Pyritic Ore	7	20	27	'19	...	
Tin	*375	28	403	2'81	-	6
Wolfram	1	...	1	'01	+	1
Total	6,617	7,738	14,355	100'00	-	110

*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. The percentage employed shows increases in coal, lead, and wolfram; pyritic ore remains the same, and decreases in all others.

TABLE 23.

Average Number of Men employed at Gold Mines during 1913, 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 1912.	Percentage of total men employed.	
					1912.	1913.
1. Kimberley ... ..	...	...	...	...	...	...
2. Pilbara	69	82	151	+ 37	'86	1'16
3. West Pilbara	12	16	28	+ 16	'09	'22
4. Ashburton ... ..	...	...	...	...	...	...
5. Gascoyne ... ..	...	...	...	...	...	...
6. Peak Hill	10	10	20	- 3	'17	'15
7. East Murchison	467	576	1,043	- 56	8'32	8'01
8. Murchison	1,259	874	2,133	- 196	17'64	16'38
9. Yalgoo	66	57	123	+ 9	'86	'95
10. Mt. Margaret	384	530	914	- 194	8'39	7'02
11. North Coolgardie	502	578	1,080	+ 131	7'19	8'29
12. Broad Arrow	120	223	343	+ 136	1'57	2'64
13. North-East Coolgardie	102	134	236	- 33	2'04	1'81
14. East Coolgardie	2,163	3,015	5,178	- 312	41'58	39'77
15. Coolgardie	244	416	660	+ 54	4'59	5'07
16. Yilgarn	399	385	784	+ 286	3'77	6'02
17. Dundas	103	151	254	- 16	2'05	1'95
18. Phillips River	31	39	70	- 44	'86	'54
State generally	3	...	3	+ 1	'02	'02
Total	5,934	7,086	13,020	- 184	100'00	100'00

TABLE 24.
Alluvial Gold Workers.

Goldfield.	1912.	1913.	Increase or decrease compared with 1912.	
1. Kimberley	11	10	-	1
2. Pilbara	50	39	-	11
3. West Pilbara	4	2	-	2
4. Ashburton	11	9	-	2
5. Gascoyne	2	3	+	1
6. Peak Hill	8	3	-	5
7. East Murchison	18	17	-	1
8. Murchison	71	66	-	5
9. Yalgoo	9	11	+	2
10. Mt. Margaret	102	73	-	29
11. North Coolgardie... ..	68	71	+	3
12. Broad Arrow	60	68	+	8
13. North-East Coolgardie	32	24	-	8
14. East Coolgardie	28	13	-	15
15. Coolgardie	13	4	-	9
16. Yilgarn	5	12	+	7
17. Dundas	4	...	-	4
18. Phillips River ... ..	...	...	...	...
Total	496	425	-	71

TABLE 25.

RATES OF WAGES IN THE GOLD MINING INDUSTRY.

Table showing Wages payable to Mining Employees under various Arbitration Awards and Industrial Agreements.

Locality in which Award or Agreement has effect.	Date of Award or Agreement.	Date of Expiration.	Rock-drill men in shafts.	Rock-drill men in rises.	Rock-drill men elsewhere.	Miners (Hand Labour). +	Miners (wet ground extra allowance).	Bracemen and Platmen.	Skipmen.	Mullockers and Shovelers.	Truckers—Filling and trucking.	Men working in Cyanide Vats, and Filter-press men.	Timbermen.	Surface Labourers.	Boiler Cleaners.	Horse-drivers (including feeding and grooming).	Drill and Tool Sharpeners.	Mechanics' Labourers.	Oilers and Greasers.	Riggers.	Firemen.	Pipe Fitters (underground).	Pitmen.	Fitters, Turners, and Blacksmiths.	Pattern makers.	Stationary Engine-drivers.		Hours of work per week.			
																										Surface winding Engines.	All other classes of Engines.	Up to four hours.	After four hours.	Men on Surface.	Men underground.
Abbotts	30th Aug., 1910	30th Aug., 1911	s. d. 15 0	s. d. 14 6	s. d. 13 10	s. d. 13 0	s. d. 0 10	s. d. 12 6	s. d.	s. d. 11 10	s. d. 11 10	s. d. 12 6	s. d. 12 6	s. d. 13 0	s. d. 12 6	s. d. 12 4	s. d. 14 3	s. d. 12 4	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	48	47
Black Range	13th July, 1905	1st Feb., 1907	15 4	14 10	14 2	15 0	1 3	13 6		12 0	12 0	13 10	15 0	11 8	14 0	12 8	14 4						15 0							48	47
	17th May, 1907	31st May, 1910				14 0																								47	47
	20th May, 1908	31st May, 1910	15 4	14 10	14 2	13 4	1 3																							48	47
	14th Aug., 1908	31st May, 1910																												47	47
Broad Arrow, Pad-dington, & Kanowna	19th Dec., 1904	19th June, 1906	14 4	13 10	13 4	11 8	1 8	11 8		10 6	10 6	11 8	13 4	10 0	11 10	11 0	12 8													48	47
Bulong	13th July, 1905	1st Feb., 1907	14 4	13 10	13 4	11 8		11 8		10 6	10 6	11 8	13 4	10 0																48	47
	13th July, 1905	31st Dec., 1905	14 4	13 10	13 4	11 8		11 8		10 6	10 6	11 8	13 4	10 0																48	47
	1st July, 1905	1st Feb., 1907	14 4	13 10	13 4	12 8		11 8		11 0	11 0		13 4	10 0		11 8														48	47
Bullfinch	* 28th July, 1911	28th August, 1911	14 4	13 10	13 4	11 8		11 8		11 0	11 0		13 4	10 0		11 8														47	47
Burtville	* 4th Sept., 1909	7th March, 1911				11 8		12 4		13 4	13 4	13 4		13 4		14 4														47	47
Comet Vale	31st Oct., 1912	14th March, 1913				13 4		12 4		13 4	13 4	13 4		13 4		14 4														47	47
Cue-Nannine	* 17th Oct., 1904	30th Jan., 1906	14 6	14 0	13 4	12 6	0 10	12 0		11 4	11 4	12 0	13 4	10 10	12 6	11 10	13 9													48	47
	18th Dec., 1908	1st Jan., 1910																												48	47
Dundas (Norseman)	13th July, 1905	1st Feb., 1907				a13 0		12 0	13 8	11 4	11 4	12 0	13 8	10 9	12 2	11 9	13 4	11 8												47 & 48	47
	16th June, 1910	16th June, 1911				b12 6	1 8	12 0	13 8	11 4	11 4	12 0	13 8	10 9	12 2	11 9	13 4	11 8												47 & 48	47
	11th Dec., 1913	10th Dec., 1916	14 8	14 2	13 8	c12 0																								47 & 48	47
Gindalbie	10th Nov., 1908	16th Nov., 1911																												48	47
Higginsville	5th Oct., 1906	1st May, 1908	15 0	14 6	14 0	13 4	1 8	12 4		11 4	11 4	12 4	14 0	10 10	12 6	11 10	13 4	11 10												48	47
Kalgoorlie	13th July, 1905	1st Feb., 1907	14 4	13 10	13 4	11 8		11 8		11 2	11 2		13 4																	48	47
Do.	* 7th August, 1913	16th April, 1916										11 8		10 9																48	47
Do.	7th August, 1913	16th April, 1916																												47 & 48	48
Do. Engineers	21st Dec., 1911	30th Sept., 1912																												47 & 48	48
Kanowna (for Miners' rates see Broad Arrow, etc.)	10th Nov., 1908	16th Nov., 1911																												47 & 48	48
Kunanalling	* 21st Feb., 1910	30th Sept., 1912																												47 & 48	48
Lawlers and Mt. Samuel	10th July, 1905	1st Feb., 1907	13 4	12 10	12 4	12 8	1 3	12 0	12 0	11 4	11 4	11 8	13 0	10 10	12 6	11 10	13 4	11 0												48	47
	13th July, 1905	1st Feb., 1907				12 4																								48	47

Leonora, Kookynie, Laverton, etc.	13th July, 1905	28th February, 1906	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	11 8	...	...	...	...	...	...	...	...	...	48
	13th July, 1905	1st February, 1907	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	48
Marvel Loch	19th Jan., 1909	1st Jan., 1910	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	48
	21st Oct., 1912	31st May, 1914	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	47
Meekatharra	30th Aug., 1910	30th Aug., 1911	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	47
Menzies	16th Dec., 1904	28th Feb., 1906	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	47
	19th Dec., 1904	28th Feb., 1906	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	47
Mt. Magnet	13th July, 1905	28th Feb., 1906	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	48
	18th Dec., 1908	1st Feb., 1907	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	48
Mt. Morgans	18th Dec., 1908	1st Jan., 1910	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	48
	28th Nov., 1909	16th Nov., 1910	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	48
Nullagine	13th July, 1905	28th Feb., 1906	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	48
	19th Jan., 1909	1st Jan., 1910	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	47
Peak Hill	19th Jan., 1909	1st Jan., 1910	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	47
Southern Cross	*16th Jan., 1905	1st Feb., 1907	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	44
Wiluna	6th Dec., 1906	1st Oct., 1909	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	47
	13th July, 1905	1st Feb., 1907	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	48
*Youanme	6th Dec., 1908	1st Jan., 1910	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	48
	22nd July, 1912	7th May, 1915	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	48

Addenda Youanme.
 Rock Breakermen, 12s. 6d.
 Amalgamators, 15s. 6d.
 Smeltersmen, 12s. 6d.
 Roper (?Rigger), 15s.
 Slime Charger, 15s.
 Slime Chargers Assistant, 13s. 4d.

* Industrial Agreement. (NOTE—An Industrial Agreement continues in operation until 30 days after the parties or any of them give notice of retirement therefrom). † Hours of Labour for engine-drivers and battery feeders agreed to at 47 per week.
 § Special rate for large surface winding-engines. ¶ Overtime rates do not apply to continuous process mills, to pumping and bailing, or to work necessitated by breakdown of machinery. + Where three rates are shown for Miners (Hand Labour) they refer respectively to work in (a) Shafts, (b) Rises, and (c) other parts of the mine. (a) Applicable only to Sons of Gwalia, Sons of Gwalia South, and Murrin Murrin Proprietary Mines. (b) Applicable to Fenian Mine only. † Rises and winzes.

PART V.—ACCIDENTS.

TABLE No. 26.

Men employed in Mines killed and injured in Mining Accidents during 1912 and 1913.

A.—According to Locality of Accident.

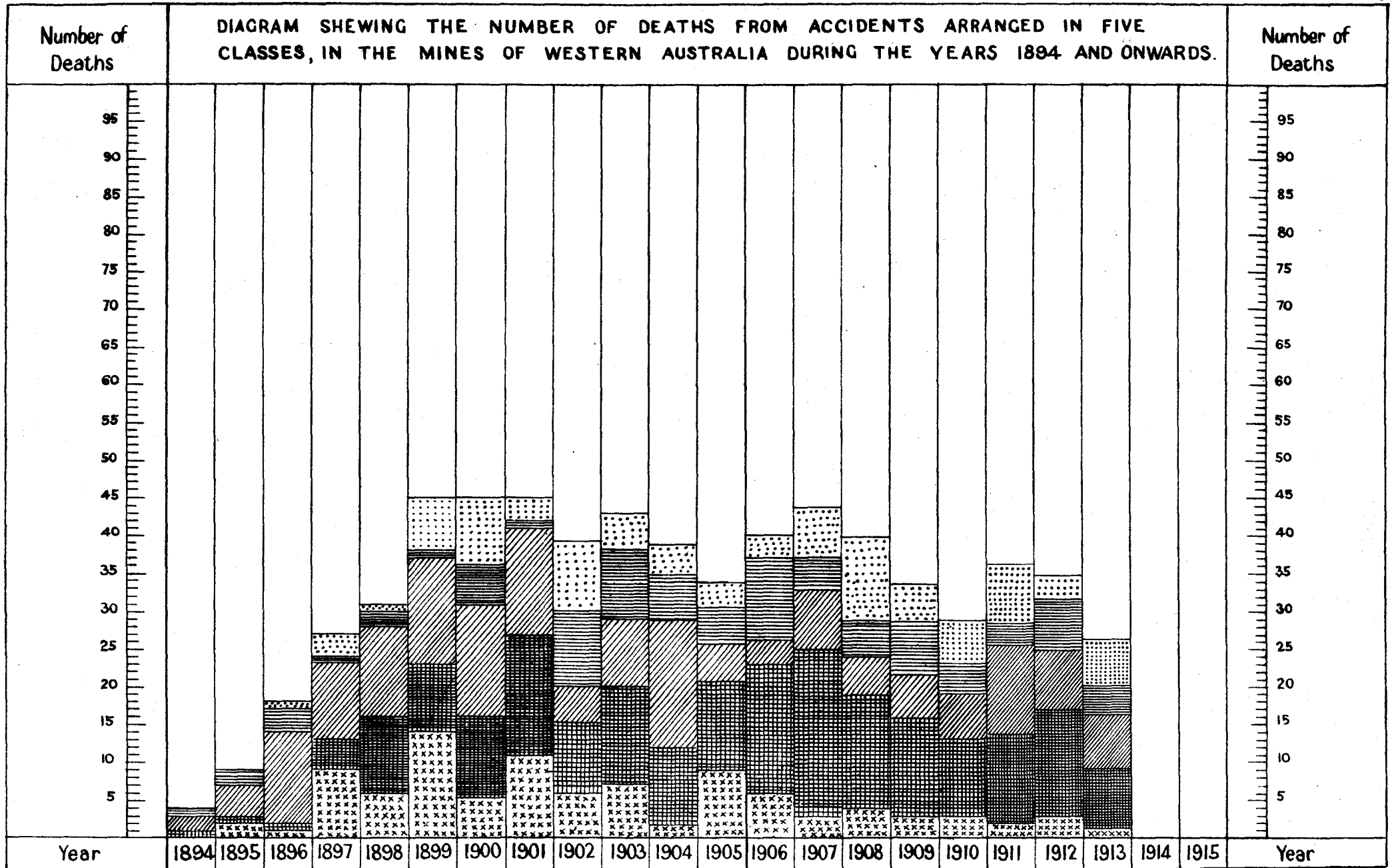
Goldfield.	Killed.		Injured.		Total killed and injured.	
	1912.	1913.	1912.	1913.	1912.	1913.
1. Kimberley .. .. .	..	..	..	..	..	..
2. Pilbara	1	..	..	..	1	..
3. West Pilbara	1	..	..	1	1	1
4. Ashburton .. .. .	..	..	..	..	..	..
5. Gascoyne .. .. .	..	..	..	..	..	..
6. Peak Hill .. .. .	..	..	..	..	..	..
7. East Murchison	1	4	5	13	6	17
8. Murchison	5	..	27	47	32	47
9. Yalgoo .. .. .	..	1	..	6	..	7
10. Mt. Margaret	2	1	36	77	38	78
11. North Coolgardie .. .. .	..	1	4	3	4	4
12. North-East Coolgardie	1	1	4	5	5	6
13. Broad Arrow	1	1	..	4	1	5
14. East Coolgardie	23	11	329	463	352	474
15. Coolgardie .. .. .	..	2	12	18	12	20
16. Yilgarn .. .. .	..	2	8	12	8	14
17. Dundas .. .. .	..	..	6	3	6	3
18. Phillips River .. .. .	..	..	1	..	1	..
MINING DISTRICTS.						
Northampton .. .. .	..	1	..	5	..	6
Yandanooka .. .. .	..	..	..	..	..	..
Greenbushes .. .. .	..	1	1	..	1	1
Collie .. .. .	..	..	58	84	58	84
Total	35	26	491	741	526	767

During the year 1913, 26 fatal accidents occurred as against 35 in 1912. The number of injured shows an increase of 250, 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.


	1912.		1913.		Comparison with 1912.	
	Fatal.	Serious.	Fatal.	Serious.	Fatal.	Serious.
1. Explosives	3	11	1	22	- 2	+ 11
2. Falls of Ground.. .. .	14	62	8	75	- 6	+ 13
3. In Shafts.. .. .	8	20	7	29	- 1	+ 9
4. Miscellaneous Underground	7	234	4	416	- 3	+ 132
5. Surface	3	114	6	199	+ 3	+ 85
Totals	35	491	26	741	- 9	+ 250

Of the fatal accidents, one occurred at a Tin Dredging mine, one at a Lead mine, and the remaining 24 in Gold Mines. The death rate per 1,000 men employed on Gold Mines was 1.79, as against 2.48 in 1912.



 EXPLOSIONS

 FALLS OF GROUND

 IN SHAFTS

 MISCELLANEOUS UNDERGROUND


 ON SURFACE INCLUDING MACHINERY

TABLE NO. 27.

Deaths of Persons employed at Mines from Accidents during 1912 and 1913.

	1912.						1913.					
	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 ...	(126)	(416)	(542)	...	...	...	(141)	(418)	(559)	...	...	...
Gold Mines ...	2	32	34	·32	4·35	2·48	5	19	24	·79	2·68	1·79
Men employed ...	(6,336)	(7,364)	(13,700)	...	...	...	(6,359)	(7,086)	(13,445)	...	...	...
Other Mines ...	1	...	1	1·87	...	1·40	1	1	2	1·85	4·27	2·58
Men employed ...	(535)	(184)	(719)	...	...	...	(542)	(234)	(776)	...	...	...
Total for all Mines ...	3	32	35	·43	4·02	2·34	6	20	26	·85	2·58	1·76
Total number of men employed	(6,997)	(7,964)	(14,961)	...	...	...	(7,042)	(7,738)	(14,780)	...	...	...

TABLE 28.

Deaths from Accidents of persons employed in Gold Mines during 1913, and the Death Rate per 1,000 men employed, and per 1,000 tons of Gold Ore raised during 1912 and 1913 (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.	
	1913.			1913.			1912.	1913.	1912.
	Above Ground.	Under Ground.	Total.	Above Ground.	Under Ground.	Total.	Total.		
1. Kimberley .. .. .	..	..	..	..	..	..	..	..	..
2. Pilbara .. .. .	..	..	..	..	..	..	8·77	..	·278
3. West Pilbara .. .. .	..	..	..	..	..	..	..	..	..
4. Ashburton .. .. .	..	..	..	..	..	..	..	..	..
5. Gascoyne .. .. .	..	..	..	..	..	..	..	..	..
6. Peak Hill .. .. .	..	..	..	..	..	..	..	..	..
7. East Murchison .. .. .	..	3	4	2·14	5·21	3·84	·91	·022	·005
8. Yalgoo	1	..	1	15·15	..	8·13	..	·093	..
9. Mt. Margaret	1	..	1	2·60	..	1·09	1·81	·006	·009
10. North Coolgardie .. .. .	..	1	1	..	1·73	·93	..	·011	..
11. North-East Coolgardie .. .. .	..	1	1	..	7·46	4·24	3·72	·049	·030
12. Broad Arrow .. .. .	..	1	1	..	4·48	2·92	4·83	·009	·036
13. East Coolgardie	2	9	11	·92	2·99	2·12	4·19	·006	·013
14. Coolgardie .. .. .	..	2	2	..	4·81	3·03	..	·038	..
15. Murchison .. .. .	..	..	..	..	..	..	2·15	..	·028
16. Yilgarn .. .. .	..	2	2	..	5·19	2·55	..	·013	..
17. Dundas .. .. .	..	..	..	..	..	..	..	..	..
18. Phillips River .. .. .	..	..	..	..	..	..	..	..	..
Total	5	19	24	·84	2·68	1·84	2·57	·009	·013

The number of deaths per 1,000 men employed shows a decrease from 2·57 in 1912, to 1·84 in 1913, and that per 1,000 tons of gold ore raised also shows a decrease, being ·009 as against ·013 for the preceding year.

PART VI.—STATE AID TO MINING.

The number of State batteries existing at the close of the year was 40 (of which 3 are leased), as compared with 35 in 1912. New plants were erected at Bamboo Creek, Ora Banda, and Mt. Keith. A Tin Plant was also leased at Wodgina.

From inception to the end of 1913, gold and tin to the value of £4,189,955.12 have been recovered at the State Plants.

960,989.44 tons of gold ore were treated and produced £3,528,996.24 worth of gold by amalgamation, £478,383.17 worth by cyanidation, £101,942.5 from slime treatment, and 64,919.75 tons of tin ore produced tin to the value of £80,835.31.

During the year the gold ore treated was 60,572 $\frac{3}{4}$ tons for 52,515.55 fine ounces.

The working expenditure for all plants during the year totalled £55,361 16s. 7d., and the revenue £47,990 12s. 6d., which, after including £340 7s. 9d. for additions, etc., and paid from revenue, shows a loss of £7,711 11s. 10d. on the year's operations.

The capital expenditure from the inception of the scheme was £332,377 16s. 9d., £91,981 1s. 8d. being paid from Revenue and £240,396 15s. 1d. from Loan.

The cost of administration for the year was £3,427 19s. 9d., as against £3,627 15s. 4d. for 1912.

The working expenditure from inception to the 31st December, 1913, exceeds the receipts by £48,112 7s. 8d.

GEOLOGICAL SURVEY.

The work of this Division of the Department has in general followed the lines along which its activities have been directed in the past, and, during the year under review, consisted of:—

- (a.) Reconnaissance surveys and explorations, covering in a general way large tracts of country.
- (b.) Systematic mapping and description in detail of less extensive mining areas.
- (c.) The systematic investigation of the South-West Division in the interests of the agricultural industry.

The work of the year has been carried out by 18 classified officers.

The field work, full details of which will be found set out at length in the report of the Government Geologist, embraced *inter alia*:—

- A systematic survey of the lime and phosphate deposits of the South-West Division.
- A detailed geological survey of the gold belt of the Southern portion of the Yilgarn Goldfield.
- An investigation of the mining centres of Kookynie and Niagara.
- A flying geological survey of the country Northwards from Lawlers as far as the Ophthalmia Range along the 120th parallel of East longitude.

The completion of the detailed survey of Meekatharra, and a minute geological investigation of the mines on the field.

The underground survey of Kalgoorlie.

The survey of the Southern portion of the East Coolgardie Goldfield, and

A reconnaissance survey of the vicinity of the Bremer Range on the Dundas Goldfield.

Six Bulletins and the Annual Report were issued to the public during the year, six are in the printer's hands, and a number of others are approaching completion.

The Chemical and Physical Investigations, required by the Department and the general public, have been carried out in the Survey Laboratory, and amounted to 2,092.

Several new mineral occurrences have been recorded during the year.

In addition to the ordinary scientific work of the survey, several special reports on land classification and subsidies under the Mining Development Act have been made.

ASSISTANCE UNDER THE MINING DEVELOPMENT ACT, 1902.

The following statement shows the sums advanced during the year 1913 under the provisions of the Mining Development Act:—

	£	s.	d.
Advances in aid of mining work and equipment of mines with machinery	6,245	12	5
Advances in aid of erection and equipment of crushing plants, including subsidies paid on stone crushed for the public	5,561	18	7
Advances in aid of boring ..	3,293	5	1
Providing means of transport ..	215	10	7
	£15,316	6	8

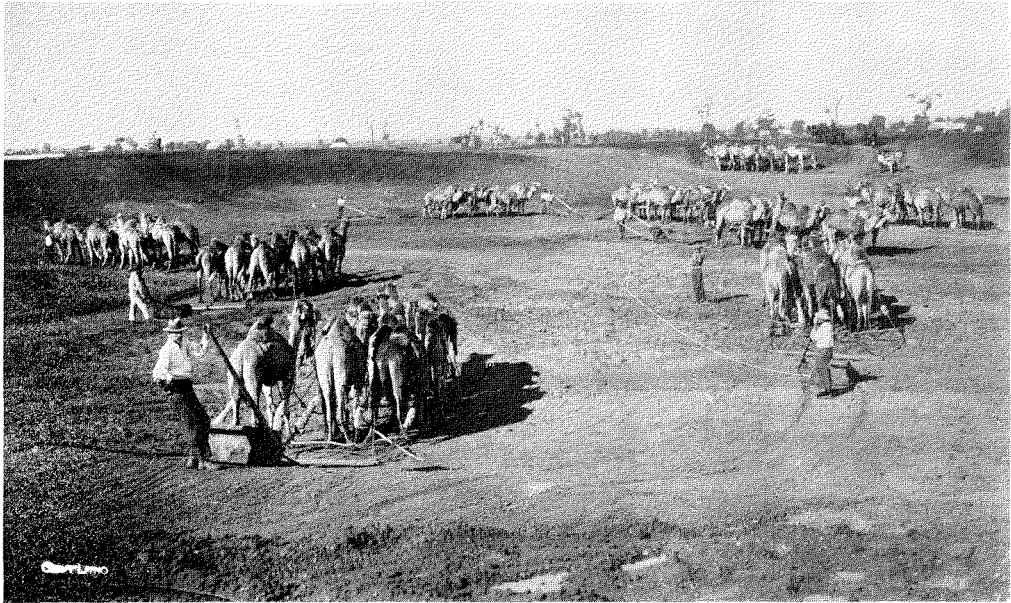
In addition to the above, amounts totalling £12,215 19s. 2d. were expended from the Mining Development Vote on various matters for the assistance of mining, such as Water Supply, Roads, Subsidies to assist cartage of ore long distances, and subsidies for development work done below 100ft. level in small mines.

Included in the amount of £12,215 19s. 2d. is the sum of £10,430 19s. 2d. on account of the purchase of tailings which is now charged against the Mining Development Vote.

Included in the amount set against Advances in aid of Erection, etc., is the sum of £1,449 19s. 2d., 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 14,761 tons.

The receipts under Mining Development Act, exclusive of interest payments, amounted to £14,193 4s. 3d., made up as follows:—

	£	s.	d.
Refunds of Advances ..	2,102	12	1
Sales of Securities ..	212	8	0
Miscellaneous	11,878	4	2



Water Conservation. Camels being used for Reservoir excavation at Kalgoorlie.



“Santa Claus,” a Mine in the Randall’s District, which promises “to come into its own again.”



Sandstone Townsite. A flourishing Mining Centre.

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

ASHBURTON GOLDFIELD.

The output of gold was 12 fine ounces, and for the preceding year 39 fine ounces; a decrease of 27 fine ounces.

There is little or no mining in this field at present.

BROAD ARROW GOLDFIELD.

The output of gold for the year was 34,739 fine ounces, and for the preceding year 13,375 fine ounces; an increase of 21,364 fine ounces. As in last year this improvement is entirely attributable to the Ora Banda district, where the Victorious Mine has continued to be the chief producer. The older centres of Bardoc, Black Flag, Broad Arrow and Paddington have not shown any signs of a revival nor of anything to justify hope of improvement.

COLLIE COALFIELD.

The output of coal for the year was 313,818 tons, and in the preceding year 295,079 tons; an increase of 18,739 tons. The coal bunkered at the ports of Fremantle and Bunbury has shown increases, but not as large as anticipated, probably owing to a considerable rise in freights and a bigger demand on steamers for general merchandise space. The improved output is attributable to the installation of better plant and machinery and improved working conditions generally.

Towards the close of the year a "creep" occurred in the Premier Mine, necessitating a cessation of coal raising and a reduction of hands, but everything has again been put into a safe working condition, and work is proceeding as usual. The district remains prosperous and the outlook is good.

COOLGARDIE GOLDFIELD.

The output of gold for the year was 31,892 fine ounces, and for the preceding year 42,182 fine ounces; a decrease of 10,290 fine ounces.

Black tin to the value of £15 was also reported.

The decrease in gold is largely attributable to a considerably reduced output from the Burbanks Birthday Mine and to Tindall's Mine being under exemption for a large portion of the year, also to a falling off in the Kunanalling district which, however, showed a marked improvement towards the close of the year.

In the Bonnievale centre matters have remained dormant.

In the Burbanks centre vigorous operations have been pursued on most of the mines, and prospects are encouraging.

In the Coolgardie centre a large number of prospecting areas has been taken up which is indicative of activity, and matters are looking brighter.

At Eundynie tributaries on the Hidden Secret had a successful year and the property is looking excellent.

At Gibraltar, Higginsville, Londonderry, Red Hill, and Widgiemooltha, nothing of note has transpired, but at the latter centre there has been increased activity.

In the Kunanalling district there has been a falling off, principally owing to a decreased yield from the Carbine Mine, the result of operations on the mill

being retarded on account of a restricted water supply. This has now been overcome. At Jourdie Hills fair returns have been got. At the 25-Mile practically all the mines working last year have produced gold during this. The outlook for the field is good.

DUNDAS GOLDFIELD.

The output of gold was 27,039 fine ounces, and for the preceding year 25,314 fine ounces; an increase of 1,725 fine ounces. The assisted operations on the Princess Royal Mine referred to in last year's report did not have the satisfactory result that was hoped for, and the mine is at present let on tribute. The tributaries are reported to be doing fairly well. The other mines in the field have been doing steady work, and the outlook is promising.

EAST COOLGARDIE GOLDFIELD.

The output of gold was 719,929 fine ounces, and for the preceding year 756,795 fine ounces; a decrease of 36,866 fine ounces. Encouraging developments occurred in the Golden Horseshoe and Ivanhoe Mines, which have improved the outlook at depth. The other large mines have not reported anything to materially alter the outlook. The North end of the field has had increased activity, and there have been a few good returns.

In the Randalls district there has been a revival, and two plants are in course of erection. The other outside centres have not shown any improvement.

EAST MURCHISON GOLDFIELD.

The output of gold was 87,977 fine ounces, and for the preceding year 99,131 fine ounces; a decrease of 11,154 fine ounces.

In the Black Range district there was a falling off in output of over 8,000 ounces, but an increase in the tonnage treated of over 4,000 tons, showing a diminution in the grade of the ore produced. The mines generally in this district are looking well.

In the Lawlers district there was a decrease in both the yield and the tonnage treated, and all the centres were very quiet.

In the Wiluna district there were also small decreases, but throughout the field there has been vigorous prospecting and a large number of prospecting areas taken up, so that better hopes are entertained for the coming year.

GASCOYNE GOLDFIELD.

In this field two prospecting areas for gold were granted, and outside its boundaries several mineral leases for mica were taken up, but, apart from these, mining is at a standstill. Thirty-one (31) fine ounces of gold were reported, and in the preceding year seven (7).

GREENBUSHES MINERAL FIELD.

The output of black tin for the year was 458.45 tons, valued at £50,954, and in the preceding year 430.45 tons, valued at £50,166; an increase of 28.03 tons, and of value £788. This, in view of the somewhat lower price of tin, is very satisfactory, and is attributable mainly to the improvements in dredging and sluicing plants and the increased area treated.

As in the past, nearly the whole of the mining is alluvial, but work is still being continued on the South Cornwall mine, which has been recently purchased from the Government by a local party. The prospects of the field are good.

KIMBERLEY GOLDFIELD.

The output as reported by the warden was approximately 300 fine ounces of alluvial gold, and in the preceding year 272 fine ounces. This report came to hand too late for inclusion of the figures in this year's statistical tables.

There were only about 15 fossickers at work during most of the year, and there is not any indication of an improvement in the immediate future.

MOUNT MARGARET GOLDFIELD.

The output of gold was 91,273 fine ounces, and for the preceding year 102,970 fine ounces; a decrease of 11,697 fine ounces. In addition, 10,216.18 tons of pyritic ore valued at £3,658 were raised; an increase on the preceding year in tonnage of 2,590.38 tons, and in value of £1,115.

In the Mt. Margaret district the anticipated re-opening of the Lancefield Mine did not eventuate, but it has now been purchased by another company, which intends to commence operations at the earliest possible moment. Good returns were obtained from the Nil Desperandum mine at Burtville, and operations were resumed on the Westralia Mt. Morgans mine after a long period of suspension. The revival at the old centre of Mt. Margaret continues and it promises to become a thriving place. In the Mt. Malcolm district, the Sons of Gwalia mine is still the main producer, but several of the smaller mines are looking fairly well.

The outlook for this field is good.

MURCHISON GOLDFIELD.

The output of gold was 122,028 fine ounces, and for the preceding year 105,373 fine ounces; an increase of 16,655 fine ounces. Black tin to the extent of 3.20 tons, valued at £242, and 4.64 tons of wolfram, valued at £69, were also reported, but none in the preceding year.

In the Meekatharra district, formerly officially known as the Nannine district, there was an increase of over 22,000 ounces, for which the Meekatharra and Garden Gully centres were chiefly responsible, the production from the former being a record since the inception of the field.

The district generally is fairly prosperous, many of the centres showing increases. At Garden Gully the Kyarra mine remains the principal producer. At Yaloginda the Chunderloo mine has shown an improvement, and steady work is in progress. At Nannine and Quinn's, matters remain quiet, also at Gum Creek, Abbott's, Burnakurra, Chesterfield, Stake Well and Jillararra. In the Mt. Magnet district there was a small decrease, but generally speaking it has maintained its position. In the Boogardie centre there have been several sensational crushings, and a large production of "dolloid" gold. At Lennonville there is a good deal of activity in evidence. At Mt. Magnet the Morning Star mine has been worked by tributers and from the Early Bird and New Year leases there have been highly payable crushings, some going as high as four (4) ounces per ton.

In the Cue district mining has been quiet and nothing worthy of note has transpired.

In the Day Dawn district the Great Fingall mine remains the principal producer, and development is proceeding on several other properties, but nothing worthy of special mention has transpired.

The outlook for the field is good.

NORTHAMPTON AND YANDANOOKA MINERAL FIELDS.

No minerals are reported from Yandanooka.

In the Northampton field the revival which commenced in 1912 has continued, and in addition to vigorous working of the existing mines, several new leases were applied for.

The output was 26,589.53 tons of lead ore valued at £50,474, and in the preceding year 11,098.50 tons, valued at £24,412; an increase in tonnage of 15,491.03 tons, and in value of £26,062.

There is every reason to anticipate an increased production during the coming year, as many mines are at present only in the prospecting stage and may be expected to become steady producers.

NORTH COOLGARDIE GOLDFIELD.

The output of gold was 68,527 fine ounces, and in the preceding year 58,270 fine ounces; an increase of 10,257 fine ounces. In the Menzies district there was a substantial increase, and the Menzies Consolidated mine at Yunndaga is looking extremely well in the lower levels. Several of the smaller mines have also been doing well.

At Comet Vale many propositions have been doing excellently, and it has now become a thriving centre. At Mt. Ida there was not any improvement.

In the Ularring district there was a decrease and nothing of note occurred.

In the Niagara district there was a small increase, and the work on the principal mines has been satisfactory.

In the Yerilla district there was a good increase, and the centres of Linden, Yerilla, Yarri, Pingin and Edjudina have each contributed, and been the scene of a good deal of activity.

The outlook for the field is good.

NORTH-EAST COOLGARDIE GOLDFIELD.

The output of gold was 12,393 fine ounces, and for the preceding year 13,856 fine ounces; a decrease of 1,463 fine ounces. In the Kanowna centre there has been a good deal of activity and prospects are brighter. In the other centres matters remained practically stationary, and the find at Kurnalpi reported in the previous year did not develop as hoped.

The outlook is considered hopeful.

PEAK HILL GOLDFIELD.

The output for the year was 2,766 fine ounces, and for the preceding year 1,862 fine ounces; an increase of 904 fine ounces. At Ruby Well a battery commenced operations, and it is expected will serve to prove the locality. A new find was made at a spot about 20 miles from Ruby Well, known as "Holden's," but it is too early to predict its permanence or otherwise. Mt. Egerton is still being opened up, but nothing worthy of note has transpired.

Copper discoveries were made at about 98 miles and 130 miles N.E. of Peak Hill, and the Department is assisting the prospectors by way of cartage subsidy to endeavour to prove the deposits which are in very isolated localities.

The outlook for this field is encouraging.

PHILLIPS RIVER GOLDFIELD.

The output of gold was 2,788 fine ounces, and for the preceding year 4,201 fine ounces; a decrease of 1,413 fine ounces. The production of copper ore was 806.95 tons, valued at £9,737, and in the preceding year 1,318.38 tons, valued at £15,815; a decrease in tonnage of 511.43 tons, and in value of £6,078. The decreases are attributable to the continued cessation of operations at the mines formerly held by the Phillips River Gold and Copper Company, which have now been acquired by other holders who have recently been raising ore.

The Government has decided to lease and run the Smelters formerly owned by the Company and make advances against the ore, in order to render as much assistance as possible to the district. This, it is expected, will give a great flip to the district, including Kundip, where there are some very promising mines.

The outlook is therefore much more promising.

PILBARA GOLDFIELD.

The output of gold was 5,598 fine ounces, and in the preceding year 5,999 fine ounces; a decrease of 401 fine ounces. Black tin to the amount of 139.10 tons, valued at £16,506 was raised, and in the preceding year 123.38 tons, valued at £14,993; an increase in tonnage of 15.72 tons, and in value of £1,513. The production of one ton of godolinite, valued at £112, was also reported.

In this field there has not been much alteration, but steady work has been carried out, and at the end of the year things were looking much brighter than at the close of the previous one. The State plant at Marble Bar was kept going well, indicating that the leases at that centre are maintaining their output.

At Bamboo Creek the new State plant commenced operations in July, but has had a good deal of difficulty to overcome in connection with its water supply which, however, has almost been surmounted. When crushing operations are resumed it is expected that this will become an active mining centre.

At Warrawoona the Klondyke Boulder Company had many difficulties during the year which they have succeeded in overcoming, and the mine is looking very well. Considerable assistance has been given to the Company by the Government. In tin mining there has not been any notable development. During the year a discovery of silver lead was reported from Gregory Ranges, and several leases applied for, but nothing definite is yet known regarding it.

In the Nullagine district matters remain unchanged. The State plant at 20-Mile Sandy crushed about the same amount of ore as in the preceding year, and at Eastern Creek operations were retarded by the absence of rain which, however, fell at the close of the year.

The outlook for the field is good.

WEST PILBARA GOLDFIELD.

The output of gold was 1,421 fine ounces, and in the preceding year 1,118 fine ounces; an increase of 303 fine ounces. Copper ore to the extent of 12,621.73 tons, valued at £76,878 was raised, and in the preceding year 12,284.02 tons, valued at £104,289; an in-

crease in tonnage of 337.71, and decrease in value of £27,411, attributable to the fall in the price of copper.

The efforts of the Department to assist the district by making advances on ore ready for shipment, referred to in last year's report, were not attended with the success hoped for, and the officers sent to the district had to be recalled.

The outlook for the district from a mining point of view remains unchanged.

WEST KIMBERLEY MAGISTERIAL DISTRICT.

The Company working the Reward Lease, referred to in last report, abandoned the property during the year owing to unfavourable developments. There was little or no mining throughout the field, and the Iron leases at Yampi Sound are still unworked.

Nothing transpired to justify hope of any immediate improvement.

YALGOO GOLDFIELD.

The output of gold was 8,163 fine ounces, and for the preceding year 6,166 fine ounces; an increase of 1,997 fine ounces.

Nearly the whole of the many centres in this field show a slight improvement, and a new find near Warriedar Hill, 17 miles west of Field's Find, is attracting some attention.

The leases at Payne's Find continue to produce good crushings and the grade of ore is high.

The Royal Standard Mine at Yuin closed down towards the end of the year, but it is reported to be only temporary.

A discovery of Bismuth and Molybdenite at Noon-gal, about 17 miles North of Yalgoo, was reported, but sufficient work has not yet been done to enable an opinion to be formed as to its value.

The outlook for this field is good.

YILGARN GOLDFIELD.

The output of gold was 82,334 fine ounces, and in the preceding year 30,675 fine ounces; an increase of 51,659 fine ounces. The chief contributors to this increase were the Bullfinch Proprietary, the Edna May and Mountain Queen Mines, but there were also a number of smaller mines that were steady producers. The whole of this field has been looking well, but the greatest activity has been at the South end, particularly in the vicinity of Burbidge.

There the Great Victoria and Broncho Horseshoe Mines are being systematically opened up. Each has an enormous lode, and if proved payable the possibilities are very great.

At Westons the Edna May is equipped with a ten (10) head mill which commenced running about the middle of the year. This mine is a most promising one.

The Bullfinch Proprietary has been the biggest and most consistent producer. The Corinthian North and Maori Lass have each been equipped with plants, and should materially add to the output. At Mt. Jackson there has not been much change, but at Marda some satisfactory developments have been recorded and a plant will probably be erected, with Government assistance, on the Great Unknown, early in the coming year.

The Government is assisting a local company in boring on the old Fraser's mine at Southern Cross, and up to the end of the year a fair amount of work had been done. It is hoped and anticipated that the results will be such as to justify further capital being spent in developing this property.

The outlook for this field is very promising.

TABLE 29.

Value of Mining Machinery and Number of Stamps and other Mills erected on the 31st December, 1913, compared with the previous Year.

Goldfield.	District.	Value of Mining Machinery.		Batteries, Number of Stamps.		Mills.																						
		1912.	1913.	1912.	1913.	1912.								1913.														
						Prospecting.	Ball.	Krupp Ball.	Griffin.	Huntington.	Tremain.	Flint.	Other Crushers and Grindings Pans.	Fuddlers.	Prospecting.	Ball.	Griffin.	Huntington.	Tremain.	Fuddlers.	Other Crushers.	Flint.	Grinding Pans.					
1. Kimberley ...	...	£ 5,000	£ 5,000	45	45	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2. Pilbara ...	Marble Bar	11,355	13,457	60	50	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3. West Pilbara ...	Nullagine	4,507	4,924	30	30	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4. Ashburton ...	...	4,850	3,850	30	25	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
5. Gascoyne ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
6. Peak Hill ...	...	9,915	9,943	40	40	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
7. East Murchison ...	Lawlers	42,474	40,461	148	148	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Wiluna	88,133	93,972	80	95	3	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Black Range	119,080	157,153	125	135	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Cue	30,135	32,949	93	70	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
8. Murchison ...	Meekatharra	99,113	134,929	209	211	...	...	...	...	...	...	...	13	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Day Dawn	207,400	204,250	60	60	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Mt. Magnet	37,401	38,041	55	55	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
9. Yalgoo ...	...	27,580	41,239	73	83	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Mt. Morgans	32,900	14,100	132	65	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Mt. Malcolm	199,494	210,730	235	215	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
10. Mt. Margaret ...	Mt. Margaret	126,278	121,053	163	154	...	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Menzies	68,248	66,574	135	90	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Ularring	31,277	26,879	85	65	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
11. North Coolgardie ...	Niagara	24,343	18,565	75	70	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Yerilla	25,067	19,906	81	50	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	45,106	41,180	93	88	1	...	...	...	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
12. Broad Arrow...	Kanowna	27,220	26,910	138	138	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
13. North-East Coolgardie ...	Kurnalpi	355	150	5	5	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	East Coolgardie	1,700,485	1,636,548	665	655	1	21	28	13	9	...	33	215	3	1	42	18	12	...	2	42	33	189	...	...	...	...
	Bulong	3,000	3,500	10	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
15. Coolgardie ...	Coolgardie	101,472	106,671	302	253	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Kunanalling	18,355	12,350	85	85	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
16. Yilgarn ...	...	84,189	166,378	125	177	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
17. Dundas ...	...	192,525	183,958	135	130	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
18. Phillips River ...	...	19,109	12,880	61	40	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
State generally ...	...	58,000	50,000	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total Gold-extracting Machinery	...	3,444,386	3,498,500	3,573	3,337	14	30	30	13	20	3	33	396	9	11	49	19	22	2	8	81	39	385	...	...	...	...	...
Total Machinery, other than Gold-extracting	...	282,885	299,614	5	10	...	2	...	...	4	...	...	22	...	1	...	2	...	...	4	14	...	2	...	...	...	...
TOTAL MINING MACHINERY	...	3,727,271	3,798,114	3,578	3,347	14	32	30	13	24	3	33	418	9	11	50	18	24	2	12	95	39	387	...	...	...	...	...

PART VIII.—EXISTING LEGISLATION.

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

1. "The Mining Act, 1894."
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 Regulations were gazetted:—

- Under "The Mining Act, 1904"—
 Amendments to Regulations Nos. 73 and 160.
 An additional Regulation No. 70b. relative to the sale of liquor on Business Areas.
- Under "The Coal Mines Regulation Act, 1902"—
 An amendment and addition to General Rule 12.
- Under "The Mining Development Act, 1902"—
 An addition to Regulation 3, relative to subsidies for crushing at State batteries.

PART IX.—INSPECTION OF MACHINERY.

The Chief Inspector of Machinery reports that the number of useful boilers at the end of the year totalled 2,980 against 2,992, total for the preceding year. This shows a decrease of 12, which is attributable to the fact that many boilers have been permanently condemned and therefore deducted from the total. The Goldfields districts continue to show a decrease all round, but the districts comprised in the South-Western Division are rapidly on the increase.

Of the total 2,980 useful boilers, 1,372 were out of use at the end of the year. 1,664 thorough and 187 working inspections were made, whilst 1,589 certificates were granted.

Permanent condemnations totalled 45, and temporary condemnations 49. Conversions and exportations reduce the original figure by 13.

The total number of machinery plants in use was 3,425 against 3,113 for the previous year. Inspections made and certificates granted total 2,137 against 1,725 in the previous year.

Two hundred and three (203) engine-drivers' applications were received and dealt with by the Board during the year, and 163 certificates granted as follows:—

First Class Competency	15
Second Class Competency	34
Third Class Competency	45
Locomotive Competency	8
Traction Competency	19
Interim Competency	18
Copies of lost and destroyed certificates	24
Total	163

In carrying out inspection and other work the total mileage travelled during the year was 48,173 against 45,956 for the previous year, showing an increase of 2,217 miles.

PART X.—SCHOOL OF MINES.

Steady progress has been maintained at the School during this, the tenth year of its existence.

The same high standard of class work has been continued and the attendance, excepting for an increase consequent on a number of new students joining the Gas engine classes, has been practically the same as in the preceding year.

During the year the Government decided that, in future, tuition at the School should be free. This will operate from the beginning of the new year, and will probably result in a considerable increase in attendance.

The gas producer plant and experimental engine erected have attracted to the School a considerable number of men engaged in working such plants, and have been the means of enabling them to gain a large amount of useful information. This will undoubtedly result in more efficient working of gas plants generally.

The system of free assays for prospectors has been continued, and a total of 351 assays and determina-

tions was made. Although this total is less than usual a large amount of valuable information has been given to prospectors, and the assays and determinations have been performed in a careful manner.

CONCLUSION.

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 VII. of this report.

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

M. J. CALANCHINI,
 Acting Under Secretary for Mines.

Department of Mines,
 Perth, 31st March, 1914.

DIVISION II.

REPORT OF THE STATE MINING ENGINEER FOR THE YEAR 1913.

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

Office of the State Mining Engineer,
Mines Department, Perth, W.A.,
21st March, 1914.

Sir,—

I have the honour to submit, for the information of the Hon. the Minister for Mines, the following report on the work immediately directed by this office during the year 1913.

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

There have been several alterations in the staff of the Inspection of Mines Branch. Mr. Colbran having retired from the Public Service, Mr. A. W. Winzar was appointed (on probation) in his stead to take charge of the East Murchison Field, with headquarters at Sandstone instead of Lawlers as formerly. Mr. S. Cullingworth was appointed Relieving Inspector of Mines, with his headquarters at Perth, Mr. H. P. Rockett being allotted the Mt. Margaret District. Mr. W. M. Deeble was transferred from the East Coolgardie District to the Murchison. Messrs. W. Phoenix and E. J. Gourley were appointed Inspectors of Mines (on probation) to assist in the work of the East Coolgardie Field. The vacancy at Collie, through Mr. T. D. Briggs' resignation, was filled by appointment of Mr. R. McVee.

Inspectors' Reports.—Annual Reports have been received from the various 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 for publication:—

CENTRAL GOLDFIELD.

Mr. W. M. Deeble, Inspector of Mines, report dated 28th February, 1914:—

I herewith beg to submit my Annual Report on the Peak Hill, Murchison, and Yalgoo Goldfields.

Generally throughout the above Goldfields mining prospects may be said to be looking bright, the most promising district at present being Meekatharra.

The increase of ore crushed during 1913 was 56,957 tons more than 1912, and the yield of fine gold for 1913 was 22,084ozs. over the preceding year. This is a very substantial increase, and I am expecting it to continue during the coming year.

The owners of the Fenian G.M. which is one of the main producers of the district, are enlarging their plant, the estimated expenditure being over £10,000, and the Ingliston G.M., from which small parcels of ore only have been crushed during the year, is erecting winding and crushing machinery.

Very good reports have been made on the mining possibilities of the north end of the district. About one hundred miles from Peak Hill rich copper ore was discovered, as proved by several tons brought in and treated, but distance has militated against its being given a chance. The same may be said also of the Egerton district generally.

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

Ruby Well is also very quiet. A five-head mill was erected towards the end of the year on the "Harder to Find" G.M. but I understand there has been a little difficulty with the water supply.

Holden's Find, which is about fourteen miles from Ruby Well, was discovered in the latter part of the year, and an option has since been taken over the main discovery by a South Australian syndicate. As only development work has been carried out and the ore assayed, one can only judge by that, and the results seem to be very promising. The assay results published show that the mine is highly payable.

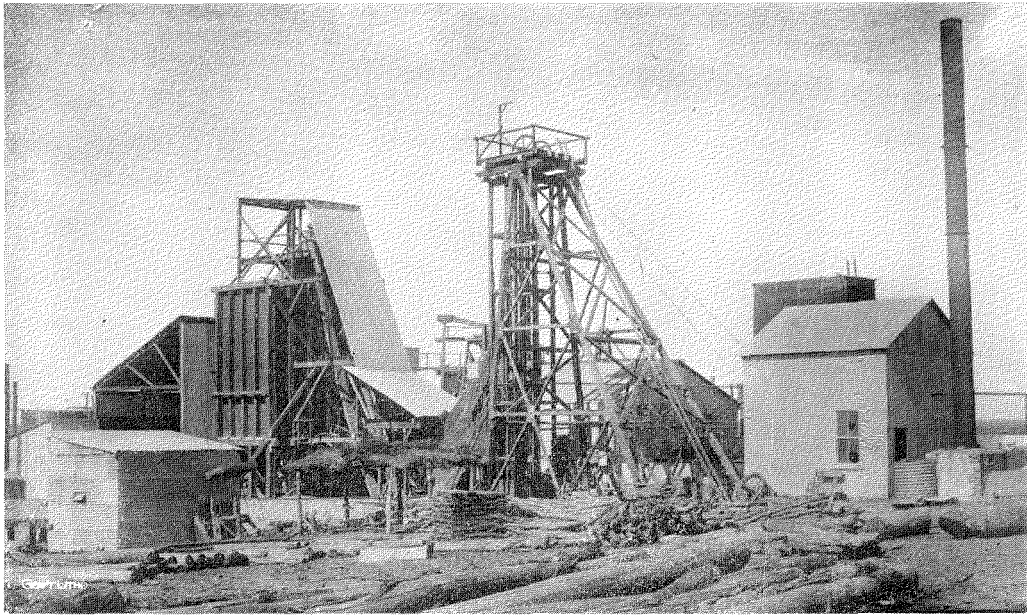
The foregoing, together with other reports of several new finds of late, tend to make one hopeful that the year 1914 will be very satisfactory from a mining point of view.

MEEKATHARRA.

The following is a *resumé* of work done:—

"Queen of the Hills" G.M.—The work carried out underground in this mine has been chiefly in the oxidised zone, and the ore came from there. The lode has been cut at No. 4 level and driven on for a distance of 100ft. north and south, and the values are said to be satisfactory. Preparations are being made to continue the main shaft down to the 500ft. depth. In the early part of the year the erection of a plant, consisting of two Holman pneumatic stamps, tube mill, and vacuum filter plant, driven by a 220 B.H.P. Kynoch gas engine running on gas from a charcoal producer, was completed and started crushing in February. In July last a 250 H.P. Down draught wood gas producer was put in to take the place of the charcoal one, and it has been in continuous operation ever since. During the ten months work 35,357 short tons were treated for a return of 14,469.4 fine ounces, valued at £61,462 ls. 9d., the whole of the ore was mined above the 248ft. level.

"Fenian" G.M.—The total depth of the main shaft on this mine is 750ft., and the ore crushed during the year has been broken from the stopes above Nos. 3, 4, 5, 6, 7, and 8 levels, and gave an average yield



The "Queen of the Hills," Meekatharra.



View of the Meekatharra Belt from Ingliston Extended.



Meekatharra, a prosperous mining town in the Murchison Goldfield.

of over 60/- per ton. The total tonnage crushed was 34,565 tons for a yield of 24,864.07 fine ounces, valued at £105,163 16s. 6d. During the year new agitators, slime settlers, extraction house, gallows frame rockbreaker, change-house, and assay building have been erected, and a gas power plant and compressor are in course of erection.

"Ingliston" G.M.—The main shaft is being sunk, and is now down 200ft. When sinking this for the purpose of opening up the lode on which the main work has been done up to the present, two new lodes were cut, one at 60ft. depth, which seems to be a very large formation. The hanging wall portion is the richest, being in places worth two ounces per ton, and the whole is said to be payable with a mill on the ground. A second vein was cut which, although small, is rich at a depth of 170ft. During the year 433½ tons of ore have been crushed for a total value of £4,353 17s. 10d., or an average of over £10 per ton. The owners have now decided to erect machinery during the coming year. The manager reports that a winding plant and a poppet head have been bought, which will be erected as soon as delivered, and a new Fraser and Chalmers' ten-head battery is on order, the stampers to be 1,250lbs. each, and the power will be supplied by a suction gas engine. This property seems to have a bright future, and the owners are showing their faith by erecting up-to-date machinery.

"Ingliston Extended" G.M.—The main shaft in this mine is down a total depth of 440ft., and the greater part of the ore treated during the year has come from 400ft. depth. The ore chutes in this mine are very much knocked about and difficult to follow. During the year 7,384 tons of ore were treated for a return of 3,713ozs., valued at £16,201, and for the same period the following development has been done:—

Rising	..	..	..	304ft.
Winzing	..	..	..	315ft.
Driving	..	..	..	578ft.
Crosscutting	..	..	..	211ft.
Total	..	..	..	1,408ft.

The "Globe" G.M. is situated four miles south of Meekatharra; the main shaft is down a total depth of 220ft. A fair amount of ore was obtained at one time above the 70ft. level, but, unfortunately, the chute has not been found at a deeper level yet. The last crushing of 27½ tons gave a return of 24ozs. 15dwts. over the plates.

"Commodore" G.M.—During the year this mine has produced 11,070 tons which gave a return by amalgamation of £12,707. Out of this tonnage, 5,550 tons of sands were treated by cyanide for a return of £2,758. The slimes from the ore have not been treated, and are of assay value 18s. per ton. The ore was mixed from Nos. 1, 2, and 3 levels, the deeper level being 300ft. A winze has been sunk 75ft. below No. 3 level, and is said to be in payable values. The total depth of main shaft is 425ft. and a crosscut has been put out to the lode. A three-drill Ingersoll Rand belt driven air compressor is in course of erection on the mine, and additional power in the shape of a 32 h.p. Hornsby gas engine is to be erected.

YALOGINDA.

There are a number of prospectors in this district, but on the whole mining is very quiet.

On the "Chunderloo" G.M. a mill has been erected, but the owners have not found sufficient water to keep it going. Judging from the ore crushed

the owners seem to have a fair prospect. The Hornsby mill has been kept going chiefly from ore from the "Romsey" G.M., which has been rather low grade. Other small shows are being worked by miners in the district, but in no case has anything worth recording been discovered.

NANNINE.

The "Nannine" G.M. is practically the only mine in this district; the work having been carried out on day shift only, the mine output has been very limited. This mine has a large amount of ore opened up by the drives, and the manager states the greater part is payable. About two months ago some rich alluvial was discovered near the townsite, but the find was kept very quiet, and I was unable to discover the total amount obtained.

QUINN'S AND GABANINTHA.

Mining has been very quiet in these places. Several parcels of gold-copper ore have been sent away for treatment from Gabanintha, but I have not seen what the returns were.

At Quinn's practically all the mining is being carried out by small working parties of miners, and nothing out of the ordinary has been found during the year.

DAY DAWN.

"Great Fingall" G.M.—Nearly the whole of the development work done in this mine has been below the No. 13ft. level, where it is reported the continuation of payable values have been followed down. The top of the internal shaft is at No. 13ft. level, and it has been completed to a depth of 949ft.

The following developments have been carried out during the year:—

Driving, rising, and cross-cutting	1,099ft.
Winzing	517ft.
Sinking internal shaft	87ft.
Stripping internal shaft	218ft.
Total	1,921ft.

The total tons crushed during the year (2,000lbs.) 66,131—Fine gold produced as follows:—

Mill	13,674.858 fine ozs.
Concentrates	3,680.515 "
Sands	2,037.282 "
Slimes	2,781.328 "
Accumulated sand	6,377.898 "
Slags	303.889 "
Total	28,855.770 fine ozs.

Included in the ore milled are 1,876 tons treated for the public, from which the following amount of gold was obtained:—

Customs ore	1,146.374 ozs.
Concentrates purchased	2,005.209 ozs.
Total	3,151.583 ozs.

Owing to the way this mine has been worked the ventilation is not all that could be desired. To try to improve the air circulation throughout the mine a Sirocco fan has been procured, and I hope to see it soon in work.

The Crème D'or G.M. being worked by Cairns Bros., has crushed 1,339.24 tons of ore during the year for a return of 614.94 ozs. fine gold. The reef in this mine looks very promising.

The "Parisian" is situated on the South of the Great Fingall G.M. The reefs in this show are rather of a patchy nature, and this year only 97.89 tons were crushed for 47.9 ozs. of fine gold.

The "Eclipse" G.M. is situated about twelve miles away in the direction of Webb's Patch. The reef is about five feet in width, and when I visited the mine last about twenty tons of ore had been taken out in sinking the shaft. Since then a parcel of 30 tons has been brought in and crushed for a return of 27.36 ozs. of fine gold. This is very promising for the amount of work done.

PATON'S GROUP.

In the latter part of the year a new discovery was made at a place once known as the Blue Bell G.M. The find has been named the Big Bell G.M. The formation is about sixty feet in width. A shaft has been sunk 50 feet in the lode, and a crosscut put out to the walls. Two hundred tons have been crushed for a yield of 81.32 ozs. of fine gold; the country around this part is highly mineralised. About two miles North is the ground pegged and worked for Tin; Molybdenite, Carbonate of Bismuth, Scheelite and Wolfram were found, but not in payable quantities. There is a considerable area of granite country from this down through Poonah and on towards Melville, through which traces of the above metals have been found. Mineral lease No. 45 is situated at Poonah and is being worked for emeralds. A shaft was sunk on a pegmatite lode to a depth of 60 feet, but no traces of emeralds were found below ten feet. A second shaft is now being sunk on what appears to be a pipe of emerald material; up to the present all the emeralds have either been wanting in colour, or full of flaws. From what I can learn it is very rare to find an emerald without a flaw, and when found such commands a high price.

CUE.

Mining in Cue has been very quiet, but towards the end of the year a start was made to open up two mines that have given good returns but ceased operations at about water level.

"Light of Asia" G.M.—This mine has been taken up by a Perth Syndicate, and a new shaft is being sunk to cut the reef at a depth below the old workings, where the ore gave excellent results.

The "Agamemnon" G.M. has also been re-started, but there has not been sufficient work done to prove anything.

"Gem of Cue."—The reef in this show is small, but easily worked. During the year two men have broken 534½ tons, from which 489ozs. 5dwts. were obtained.

The "Vera" G.M. is situated in the townsite of Cue. The reef is large and easily worked; during the year 287 tons of ore have been crushed for a yield of 350.83 fine ozs.

"The Starlight" is situated about one mile north of the town. It has produced 207.81 fine ozs during the year from 159½ tons. The shaft was sunk to water level and a considerable amount of prospecting work done off the chute of stone.

The "Bob Bell," being worked by two men, has given very good results for the amount crushed, viz., 169 tons 415.32 ozs.

"St. Catherine's Banks."—The reef in this mine is large but of a patchy nature. The main shaft is down 130 feet and the ore taken out near the bottom gave 44.82 ozs. fine gold from 64½ tons.

At Cuddingwarra the dumps on a mine, known at one time as the "Victory," have been overhauled and the fines crushed. 150 ozs. were obtained from 184 tons. This mine was shut down before I came to the district, but judging from the results obtained

from the dumps it would almost appear as if something had been overlooked in the mine.

The "Belltopper" was at one time known as the "City of Chester." The reef is large and generally low grade. A five-head mill has been erected lately on it driven by a suction gas engine. A crushing of 250 tons returned 43.86ozs. fine gold.

"Princess Royal."—This has been shut down the greater part of the year. A party of tributors took out 34 tons of ore which gave 71.13 ozs. fine gold valued at £303 16s.

MOUNT MAGNET DISTRICT.

Although there has been a decrease in the gold return during 1913, owing to the closing down of one of the larger mines, I consider the yields generally are very good. The average value of ore treated was very high, being 145.9 shillings per ton.

The "Early Bird" and "New Year" G.Ms. are owned by Young & party, and have given some excellent returns during the year. There is a large area of country around these which has received very little attention from the prospector. At Boogardie some very rich patches have been found during the year by miners working for themselves. A miner may work a year without getting on a patch, but when found the patches are good. I consider it the best place I know of in the State for the working miner who has a little money to keep him going, to prospect.

LENNONVILLE.

The "Empress" G.M. has been the main producing mine in the district during the year. The mine has not been opened up as it should have been, owing I understand to the owners not being in a position to incur the heavy outlay required to carry out the necessary development work. A new suction gas plant has been installed, and I am expecting an increased output during the coming year.

YALGOO GOLDFIELD.

During the year there has been an increase in the gold yield in this field. New finds have been found in several places, the main place to which attention is being paid being a line of country South of Field's Find towards Goodenow. I have seen samples brought in, but as it was reported late in the year I have not had time to visit the places since.

"Royal Standard" G.M.—This has been the only mine around Yalgoo that has been yielding regular returns during the year, and as these have been reported regularly, there is no necessity to repeat them here.

MESSENGER'S PATCH.

Mining has been very quiet at this place, only one party getting gold, and this chiefly in dollying stone.

FIELD'S FIND.

The old Field's Find mine has been receiving an overhaul, and fair assays were reported on my last visit, but as the best results were obtained from a new reef on the surface it will take some time to develop and prove it.

There are a number of small shows being worked to the South of Field's Find by small parties, and although progress is being made it is of necessity slow.

From Field's Find for about fifteen miles towards Goodenow the country seems to be a very promising reefing district, and thence onwards the rock is mostly

granite until close to Goodenow. At Goodenow the various shows are being worked by parties of miners with excellent results, and during the year a large amount of ore has been put through the Government mill at this place. During the early part of the year a small rush occurred at a place about four miles South of Goodenow. The find was in granite country, and the leaders in which the gold was found were very small. Prospectors report favourably of the country further South again, but I did not have time to visit that part of the district.

ACCIDENTS.

Since I came to the Peak Hill, Murehison, and Yalgoo Goldfields, I have followed the accidents reported closely, so that by knowing the causes I may take steps, and possibly suggest something to prevent similar accidents from occurring, but with all that can be done the average seems to keep up. More accidents have been reported in 1913 than in 1912, but in no case in the past year can it be said that a

man had died in the above three goldfields as the result of a purely mining accident. One man was killed by a horse and dray owned by a mining company. He seems to have been sitting on the shaft of the dray and fallen off, one of the wheels running over him.

One particular feature in the accident returns is the number of foreigners injured during the year. There were 75 British and 37 foreigners injured. As this seemed to be large, I made out a table on a mine on which I knew the average number of British and foreigners employed, and was surprised to find the percentage of accidents amongst the foreigners over double that of the British workmen. This cannot be accounted for by the want of knowledge on the part of the foreigner of how to speak English, as I examined each one, and was quite satisfied that any miner could understand them. They are employed at all classes of work similar to the British miner, and I can see no reason why there should be a larger percentage injured.

ACCIDENTS, 1913.

	Total Employed.	British.	Foreigners.	British Percentage.	Foreigners Percentage.
1913. September 5th	312	215	97	68.8%	31%

	Total Injured.	Serious.	Minor.	Percentage injured men employed.	
				Serious.	Minor.
British	215.24	12	12	5.12	5.12
Foreigners	97.26	12	14	12.3	14.4

No.	British.	Foreigners.	No.	British.	Foreigners.	No.	British.	Foreigners.
1	..	1	39	..	1	77	..	1
2	..	1	40	1	..	78	1	..
3	..	1	41	1	..	79	..	1
4	1	..	42	..	1	80	1	..
5	..	1	43	1	..	81	..	1
6	..	1	44	1	..	82	1	..
7	..	2	45	Machinery	..	83	1	..
8	1	..	46	1	..	84	1	..
9	1	..	47	..	1	85	..	1
10	..	1	48	1	..	86	..	1
11	1	..	49	1	..	87	1	..
12	1	..	50	..	1	88	1	..
13	1	..	51	1	..	89	..	1
14	1	..	52	..	..	90	..	1
15	1	..	53	1	..	91	..	1
16	..	1	54	1	..	92	1	..
17	1	..	55	1	..	93	1	..
18	1	..	56	1	..	94	1	..
19	1	..	57	1	..	95	..	1
20	1	..	58	1	..	96	1	..
21	1	..	59	1	..	97	..	1
22	1	..	60	1	..	98	1	..
23	1	..	61	1	..	99	1	..
24	1	..	62	1	..	100	..	..
25	..	1	63	1	..	101	..	1
26	1	..	64	1	..	102	..	1
27	1	..	65	..	1	103	1	..
28	..	1	66	1	..	104	1	..
29	..	1	67	..	1	105	1	..
30	..	1	68	1	..	106	1	..
31	1	..	69	..	1	107	1	..
32	1	..	70	1	..	108	1	..
33	1	..	71	1	..	109	1	..
34	..	1	72	1	..	110	..	1
35	..	1	73	1	..	111	1	..
36	..	1	74	1	..	112	1	..
37	1	..	75	1	..	113	1	..
38	..	1	76	1	..			
..	..	..				Total	75	37

EAST MURCHISON GOLDFIELD.

Mr. A. W. Winzar, Inspector of Mines, reported on 27th January, 1914:—

I took charge of the above goldfield at the end of October, and, consequently, owing to the short period remaining of the year, the contents of this report were gathered from information obtained from the owners and officials at the various mines, and from the files in the offices. I have visited the chief mines, and, where time permitted, the smaller shows. The report is not as complete in detail as I should have wished it to be, nor as it would have been had I been in touch with the mines during the whole year and could have followed their work. The total mileage travelled amounted to 4,826, and the mine inspections numbered 111. Other work consisted of reports on various shows for subsidy, inquiries into accidents, etc. The office, which previous to last November was situated at Lawlers, has now been transferred to Sandstone, which is the centre of the principal mines. Mining in the goldfield is very quiet, and no new finds of importance have been made. The sulphide problem at Wiluna remains unsolved, and consequently that centre has not shown much alteration either way. At Mt. Keith mining is brisk since the Government battery started operations. Lawlers shows no improvement for the year, and Darlot is the same. Black Range shows a decrease in the gold yield, though mining is going on on a large scale, and a fair amount of prospecting is being done.

Black Range.—This is the principal centre in the East Murchison Goldfield, and yielded a return of 74,093 oz. from 163,932 tons, as against 84,087 oz. for 1912.

The Oroya Black Range G.M. gave a return of 24,931 oz. from 60,129 tons, showing an increase on tonnage and gold won on the 1912 yield. The prospects of this mine are fair, and the work of getting ready to stope ore from the Juno shaft on the north end of the property is being pushed on. In the main shaft workings the main internal underlay shaft has been sunk to a point about 600 ft. vertical from surface, but values are poor as yet. During the year the company has worked the Sandstone Development Co.'s property with satisfactory results.

The Black Range Mining Co., N.L., has done a lot of development work during the year for satisfactory results. The main internal underlay shaft is now down 1,000 ft. vertical from the surface, and at that point the reef, which was in the hanging wall, came into the shaft, and showed at the time of my visit very good gold, and can be looked upon as a splendid development, and should encourage the other mines to sink, as the company had passed through a large section of barren rock. This mine crushed for the year 31,330 tons for a yield of 16,894 fine ounces, showing a decrease of nearly 5,000 oz., but with the new development should have a prosperous year ahead.

Black Range West has been doing a lot of development work during the year, and is at present sinking the shaft below the 500ft. level. The reef shows in the shaft, but is of low value. In driving south through a crosscourse a patch was struck which returned 199.72 fine ounces. I consider the prospects of this mine good, as it adjoins the Black Range Mine on the South, and should eventually pick up the run of gold if they continue sinking.

The Royal Oak (at Hancocks) is at present employing about 12 men cleaning out the drives, etc. They have been pumping mostly, and have a big volume of water to contend with. The shaft is down

200 ft., and a fair amount of stone appears in the workings. This is a difficult proposition to work owing to rotten ground, and needs close timber till the ground is drained. The present work is clearing up the levels, when the company intend taking out a bulk parcel as a sample.

The smaller shows around Hancocks have been working fairly consistently during the year, and the centre has yielded 2,423 oz. from 1,050 tons. The Lady Ellen dollied 806.67 oz. for the year, whilst the Comedy King crushed 356 tons for a yield of 580 oz. and dollied 105 oz. The reefs in these shows are small but fairly consistent in values.

About one mile west of Sandstone is situated the Wanderie group of mines. These comprise the Pyx, which is down 193ft., and is driven 129ft. north and 12 ft. south on stone averaging 2 ft. and worth 1 oz. per ton. This mine looks well, and should be a payable proposition for the owners, who have a two-throw pump, operated by an oil engine, to cope with the water. The yield has been 163.5 oz. from 189 tons.

The Wanderie, Wanderie East, and Trafalgar are owned by the one party. The reef in the Trafalgar gives promise of turning out well, and has yielded 718 oz. from 390 tons.

The Havilah Mine, at Maninga Marley, is now owned by the Tailings Treatment Co., who are cyaniding the slimes. Only an odd tribute party has worked the mine during the year, taking out old blocks. The tributers crushed 371 tons for 298 oz., and 9,900 tons were cyanided by the company for 1,376 oz.

The Maninga Marley milled for the year 273 tons for 186 oz. Very little work has been done, and the owner is endeavouring to raise capital to further prospect the mine.

Havilah Development Syndicate are sinking to cut the chute worked by the Havilah Co. Owing to having to instal more powerful machinery 60ft. only were sunk for the year. This mine makes about 10,000 gallons of water per day. The present depth is 250ft. The owners expect to cut stone at 280 ft.

Nunngarra.—The Junction mine was worked during the year below water level. A crushing of 244 tons yielded 137 oz., but owing to the stone breaking up the owners ceased work.

Youanmi Centre.—The Youanmi Gold Mines have crushed 64,060 tons for 24,468 oz., showing an increase of 10,824 tons for an increase of 2,008 ozs. The lower level, 400ft., is now in refractory sulphide, and this portion of the ore is roasted. The percentage of extraction is said to be between 80 and 90 per cent. The mine looks fairly well underground, and has a very compact and up-to-date plant. The oxidised ore is crushed by stamps, slimed with tube mills and cyanided, and the gold precipitated with zinc fume. The sulphides are dried by rotary drier, crushed in a ball mill, and roasted in an Edwards duplex furnace fired by wood. The management is now putting in apparatus to fire the furnace with producer gas. The whole of the mill is run by gas engines with wood producers.

The United G.M. is a large low-grade proposition north of the Youanmi and in the same line. This is still in oxidised ore, and crushed 2,362 tons for 642oz. I understand this show is under offer to an English mining firm.

The Hill End is another low-grade mine, which has crushed 865 tons for 161 oz.

Curran's Find.—Very little has been done around this centre, which is about 14 miles south of Youanmi. The Government have erected a mill, driven by gas engine, for the Red White and Blue Mine. The plant will be ready for work early in 1914, and several small shows are waiting for the mill. I was unable to get below at the above mine on my visit.

The Result is about half a mile north of the Red White and Blue, and has a shaft 70 ft. deep and driven about 50 ft., with 100 tons at grass. There are a few other prospecting shows which show more or less promise.

Birrigrin.—At the date of my visit practically no work was being done at this centre. The Pelerin took out an underhand stope and crushed 60 tons for 96 oz.

Montagu.—Nothing being done at this centre at present. The Montague Boulder crushed 210 tons for 95 oz.

Mt. Marion.—A find was made here early in 1913 and 11½oz. of alluvial obtained. A lode 4ft. wide with a quartz vein running through it, appears at the head of this alluvial. Several shafts have been sunk on the line, one being 70ft. deep. A few ounces have been dollied, and 8 tons yielded 12 oz. The present appearance of the find does not point to anything big. Several leases are pegged, but one only is working. The place is about 19 miles north of Montagu.

Barrambie.—At the Barrambie Ranges G.M. tributaries have worked in the upper levels, picking out the small quartz vein. 31.49 tons yielded 408.4 oz. A few prospectors are at work in the district. A party is treating the old slimes, of which there appear to be about 6,000 tons, and recovered 70 oz. from 726 tons in December last.

At *Luptons* very little is doing. The Luptons G.M. cyanided 1,514 tons for 364 oz.

Wiluna.—Mining in this district has not varied considerably from last year, the amount of gold won being 7,418 fine ounces, showing a decrease of 307 oz. compared with 1913.

The chief producer was the Moonlight G.M., with 1,965.47 oz. This mine is down some 95 ft. in oxidised ore, of which there appears to be a large quantity in sight of a soft, friable nature, and appears to me to be more of a proposition for Huntington mills whilst in the oxidised zone.

The Wiluna Mines, Ltd., which comprised the Bulletin, Happy Jack, and W.A. Leases, ceased operations in June last, and treated to that time 2,969 tons for 963 oz.

Gwalia Consolidated.—Great expectations were entertained that this group would be in full swing with a new treatment process, but after spending some considerable sums in experimental work and plant it was found to be unsuccessful. The ore bodies have been of an immense size, as shown by open-cuts on the surface, and are said to be large below water level, but owing to the presence of sulphides of antimony, arsenic, etc., are not amenable to ordinary methods of treatment. During the year experiments were carried on, the principle of which was roasting with salt and volatilisation of the gold as chloride, and recovering from the fumes. However, it was found impossible to recover the gold after volatilisation, and the company went into liquidation and sold the plant and leases. The purchasers have let tributes, and three parties are working about the old open-cuts, and get some satisfactory crushings.

Caledonia G.M.—Prospects are said to be good on this show, which has to contend with a heavy influx of water; six men are employed.

Titanic G.M.—The holders of this lease have 150 tons of ore at grass said to be worth 15 dwt. per ton.

Kingston.—Cameron and party crushed 5 tons for 7.07 oz. from a prospecting area at Kingston during the year, but the place is now deserted.

New England.—No work is being done here at present. The May Queen Reward ceased operations after crushing 696 tons for 240 oz., mainly got by tributaries.

Osborn's P.A. crushed 30 tons for 21.47 oz.

Mount Keith.—A Government mill was erected, and started in July last, and has put through 1,981 tons for 1,479 oz. The group of mines here were looking well on my last visit.

Aurora G.M. is down 160 ft. to water level, and stoping has been carried on at 50 ft. The average width is 4 ft., and crushings have ranged about the ounce. Four shafts have been sunk on the 24 acres, and each has cut the reef. The yield for the year has been 734 ozs. from 764 tons.

The Grand Schlam, a lease south of the Aurora, is down to 80 ft., the reef varies from 18 in. to 24 in., and has crushed for the year 718 tons for 421 ozs. The line of reef can be traced for 7 miles, and there are at present 10 leases working, all appearing to have payable propositions, with a width of reef varying from 6 in. to 6 ft.

At a distance of about two and a half miles north of Mt. Keith a find was made and a shaft sunk 40 ft. on a reef and formation 7 in. to 8 ft. in width. A crushing taken out returned 15 dwts. per ton, whilst present prospects are said to be fair. The prospectors at this centre seem well pleased with their shows, and good yields can be expected for some time.

Lawlers.—This district has shown improvement for the year. The Sunrise crushed 480 tons for 97 ozs., and are about to erect a ten-head mill and gas plant.

The Vivien has been worked by tributaries, who recovered 512 ozs. from 1,606 tons. Most of this came from the open-cut.

The Queen crushed 235 tons for 260 ozs.

The Northern Mines have been worked by tributaries, and crushed 812 tons for 279 ozs.

At Kathleen Valley the Yellow Aster returned 129 ozs. from 132 tons.

Sir Samuel.—Brown and Polla's lease crushed 84 tons for 253 ozs., whilst Bluey's Release gave 122 ozs. from 122 tons.

Lake Darlot.—This centre crushed a total of 1,381 tons for 724 ozs., of which the King of the Hills contributed 101 ozs. and the British King 485 ozs. Metzke and party sunk two shafts and drove some distance in the deep alluvial, but so far nothing payable has been found.

The total yield for Lawlers district was 4,842 ozs., as against 7,338 ozs. for 1912. Although the centre has been very quiet, the latter end of the year has shown an increased amount of activity, and there appear to be indications of a more prosperous time ahead. The May Bee are laying on water, and the intention is to erect a 10-head mill driven by gas power.

A party of practical miners has secured the Great Eastern, and has good prospects.

ACCIDENTS.

During the year 36 accidents were reported, made up as follows:—Four fatal, 10 serious, 22 minor.

Of the fatal accidents, one was caused by an explosion in a winze, one by a fall of ground, one occurred on the surface, and one in a shaft. The circumstances of the last-mentioned were as follows: A man got into the shaft at the Youanmi Mine and was drowned; at the inquest a verdict was brought in of accidental death. Of the 36 accidents 21 occurred underground and 15 on the surface.

The provisions of the Mines Regulation Act have been fairly well complied with during the year, both management and men being keen on keeping the various rules and regulations, also the mines and machinery in safe condition.

There were five prosecutions by the Inspector under the Mines Regulation Act. In all instances convictions were obtained and various fines inflicted.

MT. MARGARET GOLDFIELD.

Mr. H. P. Rockett, Inspector of Mines: Report dated 4th February, 1914:—

I have the honour to submit my report on those parts of the Mt. Margaret and North Coolgardie Goldfields included in my inspectorate. No sensational discoveries of gold were made during the year, but there is evidence that a slight improvement in the industry may be expected in the near future at one or two centres, as at Laverton and Morgans.

LEONORA.

The largest producer in this goldfield is the Sons of Gwalia Mine.

Sons of Gwalia, Ltd.—For the year, 10,073 feet of development work, including 2,433 feet of diamond drilling, were completed, made up as follows:—

Shaft sinking	.. ..	203 feet.
Winzing	.. ..	933 "
Crosscutting	.. ..	1,307 "
Rising	.. ..	1,739 "
Driving	.. ..	3,458 "
Diamond drilling	.. ..	2,433 "
		10,073 "

The total depth of the main shaft is now 2,825 feet on the incline, and 1,924 feet vertically.

The tonnage crushed for the year was 162,101 tons (short) for £270,434, bringing the total output to date to 1,915,726 tons for the yield of £2,741,867.

A great number of depleted stopes were filled with residues from the surface, and where now it is impracticable to fill on account of inaccessibility of workings or other reasons, pillars are being left on a satisfactory system.

Electric light is now provided on all plats, and for the more efficient examination of the ground being worked all shift-bosses and other officials are provided with acetylene hand-lamps.

During September and October air-doors were erected in the return air-ways from No. 8 to No. 19 levels south of the main shaft. These have had the effect of improving the ventilation to a very satisfactory condition, and lowering the temperature of all working places to well within the limits prescribed by "The Mines Regulation Act, 1906."

Horse traction was introduced into the mine, and seven (7) horses are now employed underground.

Surface.—Considerable additions and improvements have been made to the surface plant, among which the following are completed, or nearly so:—

A Fraser & Chalmers' direct acting winding engine, 27in. cylinders, with 10ft. drums. (Replacing old winding engine at main shaft.)

One 660 h.p. Kynoch gas engine.

Three 380 h.p. wood gas generators and scrubbers.

One 110 k.w. generator.

Cooling tower for 660 h.p. gas engine.

Three Tube mills for regrinding.

Fire service, pumps, hose, etc.

Leonora Gold Blocks.—The ten-head mill on this mine has run intermittently throughout the year and crushed 971 tons for a return of 427 fine ounces.

The main incline shaft has been sunk 40 feet, and the south drive extended 40 feet. Two Cornish boilers were added to the plant, and it is expected that a further addition of a larger air-compressor will be made shortly.

Mt. Gerमतong.—During the latter part of the year much interest was taken in the Mt. Gerमतong, situated about four miles north-east of Leonora, where a considerable amount of money was expended in erecting head frame, friction hoist, Huntingdon mill, gas engine, and accessories. Fifty feet of sinking and about 200 feet of driving were done, while a couple of hundred tons of ore were crushed. Unfortunately the return was not satisfactory, and work has been stopped temporarily.

Early in the year the Sons of Gwalia obtained an option over Prospecting Area No. 815E, which adjoins the big mine on the north. The P.A. did not develop satisfactorily and the company abandoned its option. Crushings amounting to 73 tons, yielding 73 fine ounces, were taken out.

The Trump Mine has obtained the satisfactory return of 1,130 fine ounces from 232 tons of ore.

The Nil Desperandum, adjoining the Trump on the south end, and about 3½ miles from Leonora, crushed 59 tons for 212 fine ounces.

The Rajah crushed 72 tons for 311 fine ounces.

The Ping Pong crushed 25 tons for a return of 43 fine ounces.

The Federal Mint crushed 56 tons for a return of 118 fine ounces.

These five mines, which adjoin each other, produced between them 444 tons of ore yielding 1,810 fine ounces gold.

Some other producers near Leonora centre are:—

Casino crushed 261 tons for 354 fine ounces.

Auckland crushed 153 tons for 156 fine ounces.

Victor crushed 85 tons for 327 fine ounces.

At Dodger's Well the Ivy produced 102 tons, yielding 52 fine ounces, and in the Diorite King neighbourhood the King of the Hills Mine treated 299 tons for 241 fine ounces, and 508 tons of sand for a return of 128 fine ounces, while the adjoining Artful Dodger obtained 146 fine ounces from 34 tons of ore.

MALCOLM.

North Star.—This mine continued a steady producer throughout the year, crushing 3,370 tons for £7,211, making the total output of which there is authentic record 22,158 tons for £50,980.

One shift only per day is worked in the mine. Four machine drills were employed doing, in addition to the necessary stoping, 800 feet of driving and 25 feet of rising.

The depth of the main shaft is 330 feet, but the workings are carried down to 430 feet by secondary haulage through an incline shaft.

At Cardinia Creek, Messrs. Evans and Robinson are erecting a two-stamp battery with gas engine and accessories on their Never Tire Lease. It is expected that the plant will soon be in working order. This party obtained the very rich return of 211 fine ounces from less than one ton of ore from their Triangle Lease, a couple of miles north of the Never Tire.

MURRIN.

In the neighbourhood of Murrin the principal mines are the Nangaroo and Eulaminna Copper Mines.

The Nangaroo produced 1,740 tons of copper ore valued at approximately 40s. per ton. The main shaft is 185 feet deep, at which depth the lowest level is driven.

Development work amounting to 145 feet was done as follows:—

Crosscutting	..	..	60 feet.
Driving	..	..	20 "
Rising	..	..	30 "
Winzing	..	..	35 "
			—
			145 "

The Eulaminna Mine, formerly known as the Anaconda, produced 8,000 tons of copper ore valued at approximately 30s. per ton. The main shaft is 400 feet deep, but the lowest level is driven at 300 feet. For the year 140 feet of driving and 166 feet of rising were completed.

MORGANS.

In the vicinity of Morgans very little mining or prospecting has been done since last report.

The Westralia Mount Morgans Mine has reopened, and is now working on a small scale. One hundred and fifty feet of development work were completed as follows:—

Shaft sinking	..	..	30 feet.
Crosscutting	..	..	105 "
Winzing	..	..	15 "
			—
			150 "

Owing to the collapse of some of the upper stopes there has been considerable subsidence at the surface, entailing a large amount of damage to the plant through failure of foundations.

In the mill two units of 10 heads of stamps each have been put in order, and it is hoped that these will be started early in 1914 and run continuously.

The yield for 1913 was £515 from 400 tons of ore.

The Mt. Morgan Mine (formerly the Mount Margaret Reward), situated about eight miles east from Morgans, returned £960 for 428 tons of ore treated. A cyanide plant consisting of six 20-ton vats was erected, and is obtaining yields from the accumulated sands and slimes on the lease.

LAVERTON.

The district in the vicinity of Laverton is very quiet. The hope that work would be resumed on the Lancefield Mine was not realised, but it is confidently expected that the mine will be re-opened during 1914. This centre, in which is included the Ida H., produced 11,786 ounces fine gold from 18,802 tons of ore.

Ida H. G.M., Limited.—In the early part of the year very little development work was done, but

during the last four months a vigorous policy was pursued, resulting in a total of 1,172 feet, comprising—

Shaft sinking	..	..	..	122 feet.
Driving	..	..	..	546 "
Crosscutting (including cutting plats, etc.)	..	..	..	231 "
Rising	..	..	..	158 "
Winzing	..	..	..	115 "
				—
				1,172 "

The depth of the main vertical shaft is 504 feet.

Depth inclined shaft on incline, 640 feet.

Depth inclined shaft vertically, 593 feet.

Depth lowest level on incline, 1,233 feet.

Depth lowest level vertically, 1,183 feet.

The stopes are being kept well filled, and of late the ventilation has been much improved.

During the year 16,149 tons were treated for bullion worth £43,158, while the value of 430 tons of concentrates on hand produced during the same period is estimated at a further £2,200.

The reduction works have been considerably extended, provision being made for the treatment of the concentrate formerly shipped to England. The new plant provides for fine grinding, and air-agitation in cone-shaped vats, and is giving great satisfaction. The addition, also, of another air-compressor of five-drill capacity and two Cornish boilers was made to the compressor plant, which is now equal to supplying air for 10 machine drills and a number of small pumps and hoists.

In September work underground at the *Augusta* ceased pending the arrival of machinery from England.

Three hundred and fifty tons of ore were treated for 92 ounces.

The *Lady Harriet* Company has ceased operations on its own account and has let the mine contribute to Messrs. Hunt and Tasker, who are now employing 25 men on the mine, and are running the mill continuously. The ore is being taken almost entirely from a new find in an open-cut in the hill, about 500 feet north of the mill. The return for the year was 1,551 tons for 330 ounces.

The *Mary Mac* ceased operations after obtaining 479 ounces from 323 tons of ore and residues.

The *Bega* crushed 24½ tons for 128 ounces.

A number of prospecting areas in this locality contributed together 198 tons, from which 260 fine ounces were obtained.

BURTVILLE.

As compared with that of 1912, this year's yield from the Burtville centre shows an improvement, 4,256 ounces of fine gold being obtained from 1,956 tons of ore.

Towards this result the principal contributor is the *Nil Desperandum*, which produced 451 tons of ore yielding 914 ounces of fine gold. This mine has been worked continuously for the last ten years, and has returned, so I am informed, 8,857 ounces of fine gold from 4,318 tons of ore crushed.

The year's work included:—Driving, 300 feet; sinking, 150 feet.

The present workings are south and west of the old working, and extend from the 50ft. level upwards.

At the Black Swan, situate 4½ miles south from Burtville, 260 feet of driving and 50 feet of rising

comprised all the development work for the year. A battery of one 1,000lb. stamp was erected, and crushed 255 tons for 459 fine ounces. In December the mine was purchased from the late owner, Mr. Faull, by a small local syndicate.

Some other returns from this centre are:—

Golden Bell North, 262 tons, 276 fine ounces.

Nulla Nulla, 151 tons, 172 fine ounces.

Boomerang, 117 tons, 181 fine ounces.

Redeemed, situate near the Edinbro' Castle, about twelve miles from Burtville, 149 tons, 161 fine ounces.

Specimen Hill, 483 tons, 215 fine ounces.

The Westralia United Goldfields, Ltd., has done some prospecting at the Sailor Prince, and several other prospectors are at work in the neighbourhood.

ERLISTOUN.

There has been a slight revival in mining about this centre.

The Mulga Queen re-opened, and is being worked by a Glasgow syndicate. During the year 300 tons were treated for a return of 54 fine ounces. The work underground has been confined principally to driving on the lode at the 200ft. level.

Near Duketon the Limonite produced 33 tons of ore which yielded 424 fine ounces gold, while 382 ounces were dollied from the Great Dolerite.

The Westralia Tasmania closed down after crushing 650 tons for 84 ounces.

NORTH COOLGARDIE GOLDFIELD.

Several small mines have been worked, under option of purchase, by larger concerns for varying periods, but the purchases were not completed.

KOOKYNIÉ.

Golden Butterfly.—This mine has been a regular producer throughout the year. The output was 11,300 tons for bullion valued at £12,220, making the total output to date 17,120 tons for £18,929.

Five hundred and seventy-five feet of development work were completed, comprising:—

Crosscutting	..	30 feet.
Driving	.. ..	382 "
Rising	.. ..	108 "
Winzing	.. ..	55 "
		—
		575 "

The depth of the main shaft is 350 feet on the incline and 220 feet vertically, the lowest level being at 300 feet on the incline.

It is expected that a better grade of ore will be treated during 1914.

Considerable additions were made to the plant, including the following:—

A complete electric light equipment.

A Cornish boiler.

A complete slime treatment plant, comprising: two 2½-ton Dehne filter-presses, three agitators, three settlers, one mixer, and all necessary clarifiers, pumps, and other gear.

Cosmopolitan.—This mine is let on tribute. The yield for the year was 389 ounces from 327 tons of ore.

Champion.—This mine crushed 123 tons for a return of 145 ounces.

The Orion Gold Mine, near Niagara, is sinking a new inclined shaft to the east and north of the old working, and is now down 80 feet.

The Cosmopolitan No. 2 (formerly Altona) crushed 300 tons for 388 ounces. This mine was flooded by local rains in November last, and it was found necessary to erect a gas engine and friction hoist to bail out the water. The main shaft is being straightened preparatory to laying down a skip-way.

The Lubra Queen treated 2,767 tons of ore for a return of 1,000 ounces of gold. Several additions have been made to the plant, among which is a drill air-compressor. A 6in. lift is being put into the main shaft to replace a small steam pump in handling the water from the mine. A No. 2 Gates rock breaker, an ore-elevator, and battery bin, were added also to the plant.

Development work includes:—

Driving	.. ..	480 feet.
Rising	.. ..	100 "
Winzing	.. ..	300 "

The main shaft is 230 feet deep on the incline and 160 feet vertically.

Among other yields from the locality of Kookynie are:—

Kerston and party, 158 tons for 59 fine ounces.

Carpathian, 129 tons for 67 fine ounces.

Lone Hand, 224 tons for 104 fine ounces.

May, 33 tons for 52 fine ounces.

YERILLA.

Yerilla King.—The output from this mine was 960 tons for 849 ounces of fine gold. A winding engine and boiler were erected, and it is hoped that the output will be nearly, if not quite, sufficient to keep the State battery at Yerilla going constantly.

Some other crushings from this vicinity were:—

Viola, 405 tons for 379 fine ounces.

Westward Ho, 407 tons for 134 fine ounces.

Queen of the Earth, 39 tons for 34 fine ounces.

In the early part of the year there was some activity in the locality of Linden, and hopes of a marked revival in the industry were entertained. Unfortunately, a couple of the shows which, in the earlier stages, promised great things failed in the end, and with the stoppage of work at two of the principal producers, the Devon Consols and the Great Carbine, the centre became very quiet. There is still, however, a considerable number of prospectors in this locality.

The principal producers were:—

Danube, 334 tons for 324 fine ounces.

Democrat, 347 tons for 449 fine ounces.

Great Carbine, 672 tons for 294 fine ounces.

Devon Consols, 1,459 tons for 997 fine ounces.

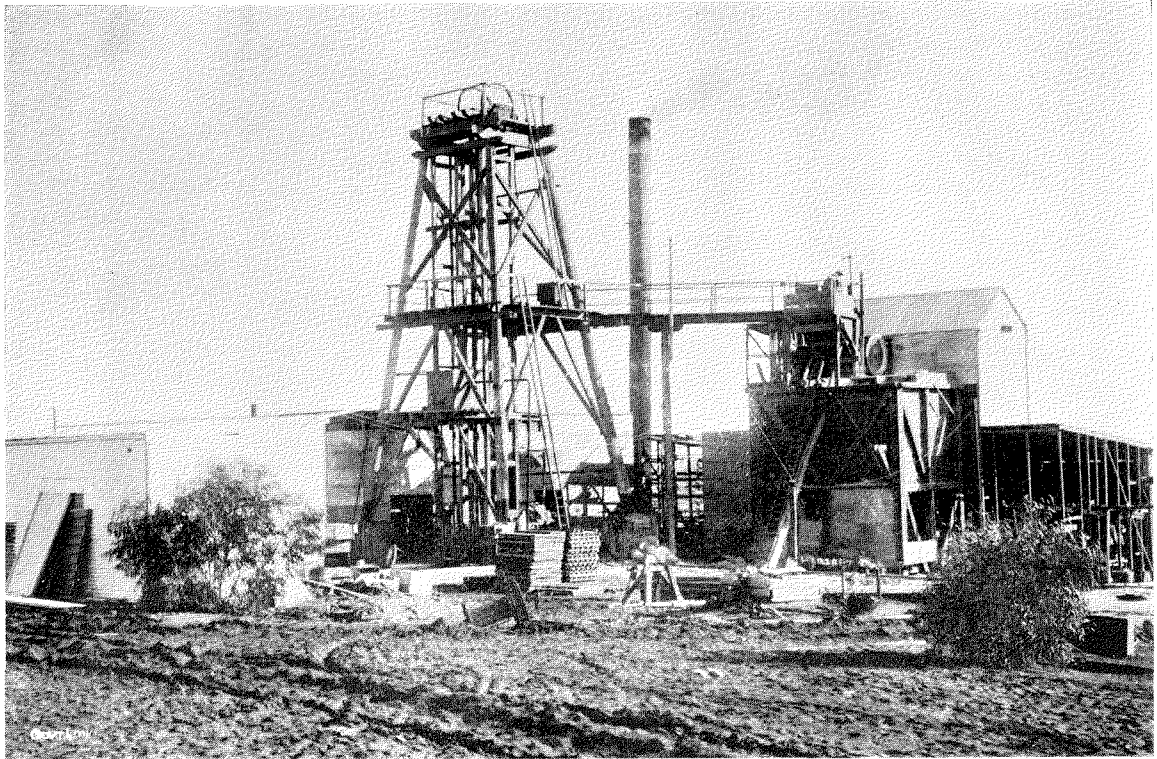
Bindah, 406 tons for 208 fine ounces.

At Yundamindera one mine only, the Battlesville, is working regularly. For 1913, 786 tons of ore were treated, yielding 217 ounces. A cyanide (leaching) plant, capable of treating 80 to 100 tons per week, has recently been erected for the treatment of some 4,000 tons of accumulated sand and slime.

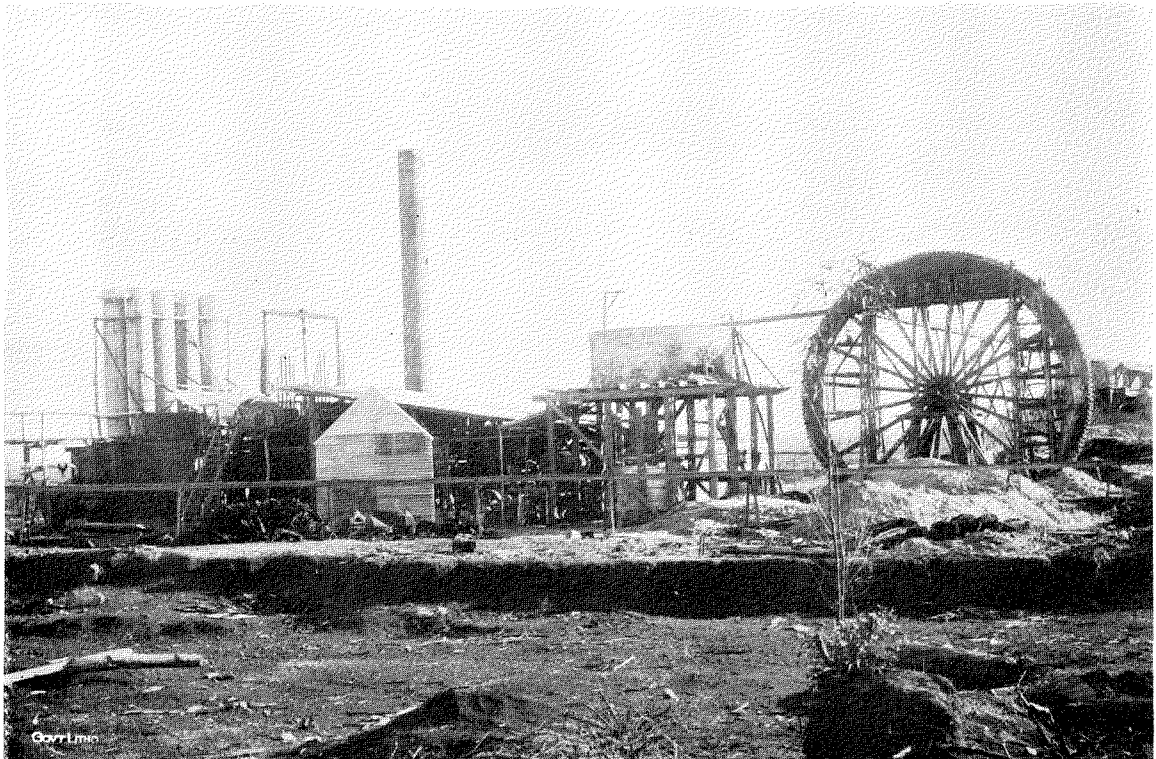
NORTH COOLGARDIE GOLDFIELD.

Mr. Greenard, Inspector of Mines: Report dated 13th February, 1914:—

I have the honour to submit my annual report for the information of the Hon. the Minister for Mines on the administration of the "Mines Regulation Act, 1906," on the Menzies, Ularring, and Comet Vale districts (North Coolgardie); also Broad Arrow, together with portion of the N.E. Coolgardie Goldfields.



The "Sand Queen," the principal producer in the flourishing centre of Comet Vale.



The "Gladstone," a steady contributor towards the gold yield of Comet Vale.

A continuous and systematic inspection has been maintained throughout the year 1913 of all the mines situated on the above areas.

Two fatal accidents occurred during the year. Denis Donovan was killed whilst removing ladders from a shaft on the Unification Mine, Pingin. John Terrill was killed in the leading stope from the intermediate level below No. 4 level of the Victorious Mine, Ora Banda. Both of these accidents were fully enquired into.

There were four serious and two minor accidents, which were carefully enquired into. At the enquiries no contravention of the Mines Regulation Act, 1906, was disclosed.

A few foreigners were employed at the Menzies Consolidated Mine, Woolgar, and the Sand Queen Mine, Comet Vale, numbering about twelve (12) at each mine; the language test is strictly enforced.

The storage of dynamite above and below ground is in accordance with the Act. The burning speed of fuse is carefully tested from each barrel when opened and posted at the mouth of shaft.

The cutting and reshoeing of ropes every six months, or oftener, is carried out on every mine, and the lubricating of same with hot castor oil and lime, which is found to give excellent results.

Special attention is given to ventilation, sanitation, and the temperature of all underground workings.

Change Rooms.

A new change room is to be built on the Sand Queen Mine, Comet Vale, to accommodate 80 men; there will be a drying room, clean clothes room, and a washing room.

The change room at the Gladsome Mine, Comet Vale, has been the source of considerable correspondence during the year. I recently had it white-washed out, and it is now being kept in better order. I have approved of the room until the end of June, when, if the mine engages more men, a new modern room will have to be considered; the management are now aware of what is required.

The change rooms on the various mines have been kept in fair order.

Any complaints received during the year from managers, workers, or secretaries of workers' unions have been immediately attended to.

In conclusion, a strenuous enforcement of the Mines Regulation Act, 1906, in the interest of safety, has been carried out in the district under my control.

MINING.

The Menzies Consolidated Mine, Woolgar, has continued to develop satisfactorily, the developments at the 15 level being of a decidedly reassuring character, and preparations are now being made to sink to the 16 level. A winze has already been started. It is quite probable this mine may join the dividend payers during the year 1914.

Mining in the immediate vicinity of Menzies is depressed, and there is no immediate prospect of matters improving; still, there are large auriferous deposits at Menzies well worth the attention of prospectors and small developing companies.

COMET VALE.

The developments at the Sand Queen Mine and Gladsome Mine have been consistently good. The

Sand Queen has made considerable additions to its plant; its crushing plant has been increased from ten stamps to twenty. The Gladsome Mine has also additions in a modern air compressor and a new battery engine.

The developments below the 400 and 500 feet in these mines are undoubtedly of a reassuring nature. Dividends have been paid regularly by the Sand Queen.

GOONGARRIE.

Several parties are prospecting this old goldfield. Mr. Kernan has continued to find rich pockets in the old Boddington lease. Mr. Campbell has also had one or two rich "dabs" near the old Caledonian Mine. A number of prospectors have recently returned to Goongarrie with a view of further prospecting.

Davyhurst, Mulwarrie and Mulline are depressed, but prospectors continue to work several properties from which small parcels of ore give high values.

RIVERINA.

The Riverina Mine has been developed by Mr. Evans during the year with assistance from the Mining Development Vote. The developments, though good, are not giving that margin of profit which Mr. Evans anticipated; hard country is very expensive to work with hand labour. Were the mine equipped with an air-compressor better results might reasonably be anticipated.

The Riverina South Mine, owned by Messrs. Hood and party, has been equipped with a new 80 H.P. producer gas engine and air-compressor, and excellent equipment which has been remarkably well erected and is running well; the shaft has been sunk to the 300ft., and a good width of ore highly payable has been exposed. The future of this mine is highly promising.

MT. IDA.

Mining has been very depressed during the year, still, the Forrest Belle, Unexpected, Unexpected South, and Copperfield Mines continue to turn out small parcels of high grade ore. Mt. Ida and Ularring districts contain auriferous lodes; with cheap and efficient crushing these centres must become large mining centres.

BROAD ARROW, BARDOC, AND PADDINGTON.

Very little prospecting has been done in these centres during the year, and mining is very dull.

SMITHFIELD.

Several parties have been doing good prospecting work, and several crushings of high grade ore have been won. The prospects are promising.

ORA BANDA.

A new five-head State mill was erected during the year. A considerable tonnage has been crushed from the various lodes. The ore crushed in many cases was extremely low grade, which was, from my standpoint, fully expected.

The soft lodes at Ora Banda are peculiar, and require a lot of working. The Victorious, Gimlet, and Gimlet South were also very low grade propositions until they were fully developed.

SIBERIA.

Mining at Siberia is depressed. Developments in the Siberia Consols Mine are not too satisfactory, nevertheless much more work requires to be done before the mine is proved.

Prospecting is not very energetically carried on at present.

Yarri, Edjudina, Pingin, Mulgabbie, Kurnalpi, Jubilee, Kalpini, Gindalbie and Mulgarrie are extremely quiet, and very little prospecting is being done.

For eight months of the year 1913 I have had charge of the Mt. Margaret Goldfield.

A number of prosecutions were undertaken against the Sons of Gwalia G.M. for contravening Sec. 42, the employment of foreigners having practically stopped the employment of British labour underground on this mine. The prosecutions undertaken have undoubtedly restored the balance, and the Britisher has now an equal chance with the English-speaking foreigner when seeking employment.

The ventilation of the Sons of Gwalia was, when I took it over, in a deplorable condition. I immediately advised the centreing of mine, which has somewhat improved underground conditions. If the ventilation and temperature have not considerably improved, the question of an exhaust fan large enough to circulate sufficient air for the proper working of the mine should be considered.

At the Ida H. mine a considerable number of foreigners were employed. A number of actions were taken and fines inflicted, which restored the balance, and now there is an equal chance for Britishers with English-speaking foreigners to obtain employment.

The ventilation of this mine is bad, and a new shaft is urgently required.

The underground workings in both the Sons of Gwalia and the Ida H. Mine required to be secured by pillars and bulkheads. This method of securing the back should be distinct and clear between manager and inspector.

EAST COOLGARDIE GOLDFIELD.

Mr. J. O. Hudson, Inspector of Mines: Report dated 21st February, 1914:—

I have the honour to submit for your information, annual report for the year 1913 on the East Coolgardie and portion of the North-East Coolgardie Goldfields.

The mines have been regularly inspected, and where defects likely to cause danger have been noticed steps have been taken to have them remedied. The appointment of an additional inspector has made it practicable to keep in closer touch with the workings of the mines. Where the attention of managers has been drawn to anything of a dangerous nature, I am pleased to state that in nearly all cases the matter has received immediate attention.

Explosives.

The explosives used on the mines during the year have been of good quality. The accidents due to explosions were:—Fatal, none; serious, 7; minor, 9. When the large amount of explosives used in the mines is taken into consideration, this result must be considered very satisfactory.

In the early portion of the year it was found that the employees were not using the care with explosives which was necessary for their safety. After warnings had been given and the practice still continued, it was found necessary to prosecute in several cases. In all cases fines were recorded, and as a result considerably more care is being taken. Provision has been made by the introduction of smaller canisters to safeguard the men carrying explosives to their working faces.

Gates on Cages.

These gates have now been in use for two years, and are giving great satisfaction. There has been no accident due to their installation during the year, and they are proving a great source of safety for men riding to and from their work. In deep shafts, and especially in shafts timbered with frame sets, the risk of riding in full cages is very great, and in nearly every case accidents prove fatal. The introduction of the gates seems to have eliminated this risk.

Fixed Chairs in Shafts.

For a considerable time the use of fixed chairs in shafts has been considered a source of danger, and several of the mines discontinued their use, adopting travelling chairs attached to the cages.

On one mine where between twenty and thirty of these chairs were in use an accident occurred owing to one of the eye-bolts breaking, the descending cage, on which two men were riding, struck the chair, and both men were seriously injured.

On another mine the platman left the chairs in the shaft in error. There was, fortunately, no one on the descending cage. The platman was prosecuted and fined for his neglect. These mines have removed the fixed chairs and adopted the travelling chairs on the cages.

Ventilation.

During the year this very important matter has received careful attention. It was found in one mine that the provisions of the Act were not being complied with, the attention of the management was directed to it, and the matter was remedied.

It is to be regretted that more attention is not given to this matter, which is really of the greatest importance in obtaining cheap costs, and ensuring the comfort and health of the employees when carrying out their work. There is no doubt that in nearly all the mines considerable improvement could be made by giving more attention to the training of the air currents, and not being satisfied to comply with the regulations only.

In a large number of cases no provision is made to prevent the intake air from circulating through the old workings of the upper levels where men are employed, and in preventing short circuits in the workings.

The large mines are now reaching such depths that in the near future it will be necessary to make provision for more systematic methods of ventilation.

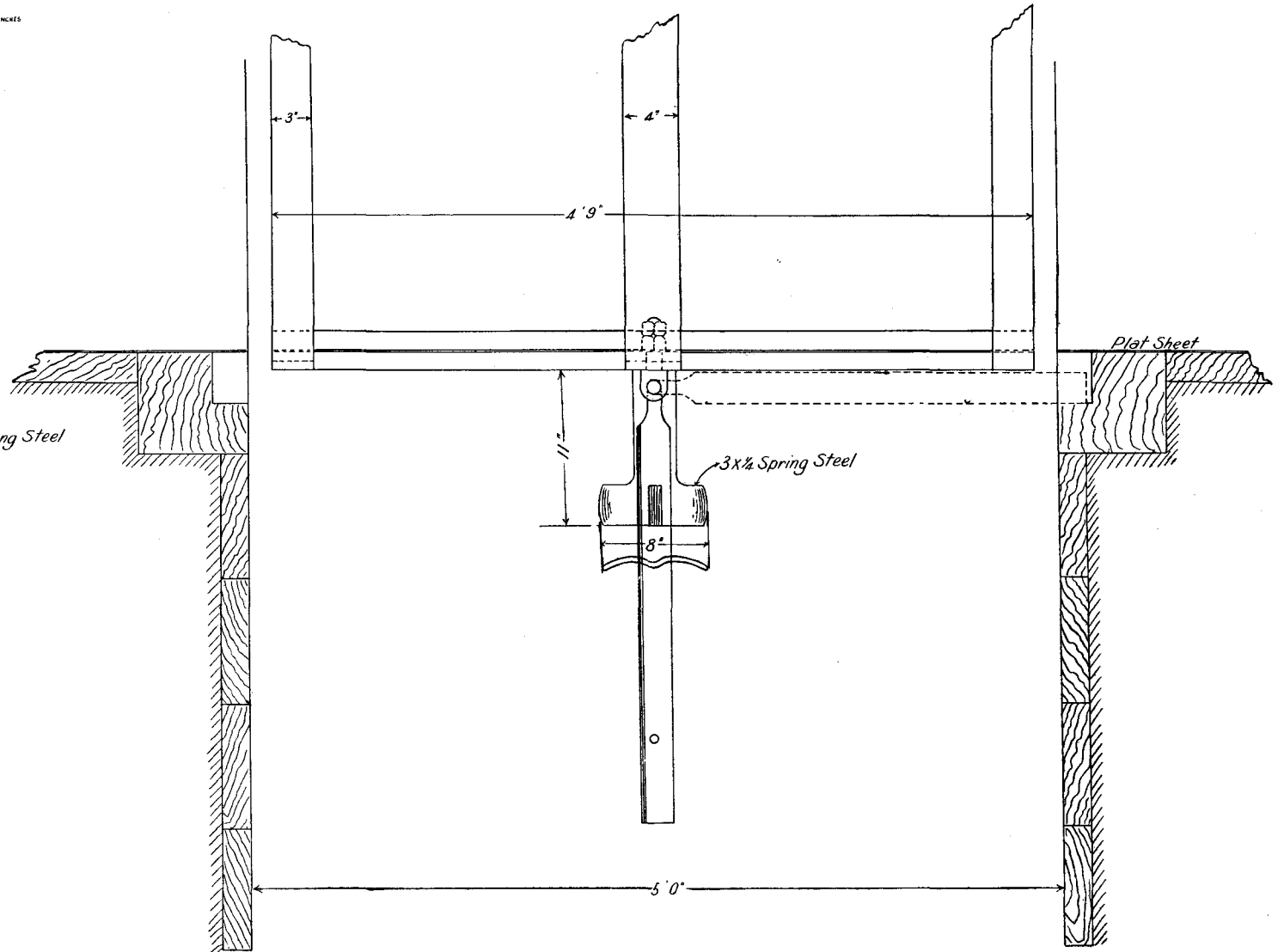
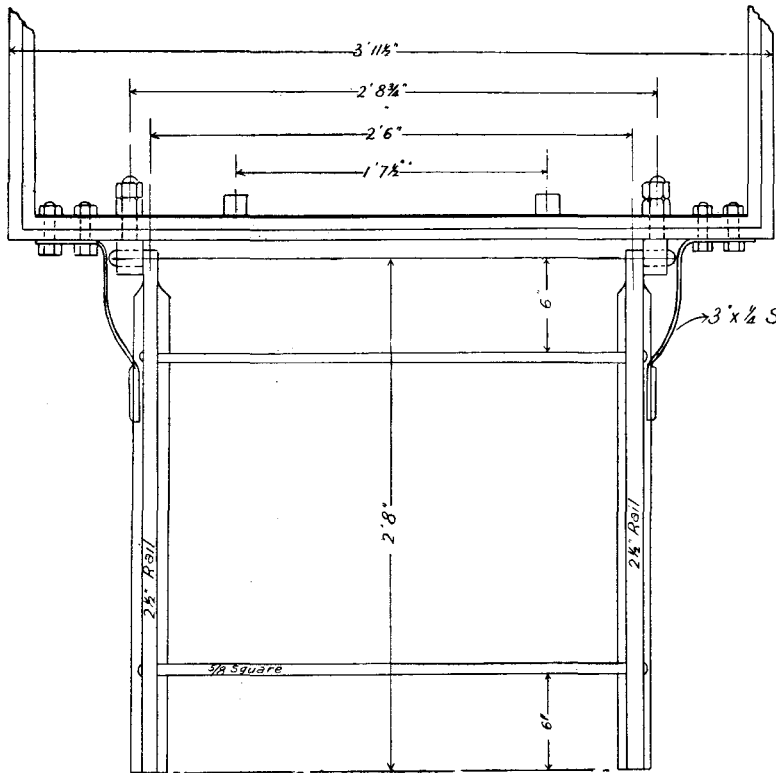
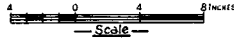
Accidents.

During the year there were nine fatal, four hundred and thirty-seven serious, and five hundred and seventy-two minor accidents reported to inspectors of mines, in addition to those reported to Inspectors

G.B. PERSEVERANCE C.M. C^o

N^o 6 SHAFT

CHAIRS ATTACHED TO CAGES



of machinery. The nine fatal accidents occurred on the following mines:—

Ivanhoe G.M.	..	..	..	4
Golden Horseshoe	..	..	..	1
Corn Cob Lease	..	..	..	1
Great Boulder Proprietary	..	..	..	2
Great Boulder Perseverance	..	..	..	1

Three of the accidents were caused by falls of ground in stopes; two by men falling down ore passes; one by falling from a battery platform; one while barring down ground; one by a stone falling down a shaft, apparently from an ascending bucket; one by being forced against an ore pass by a rush of sand filling.

There has been a reduction of fatal accidents compared with the year 1912, and an increase in the number of serious accidents. The return shows a marked increase in the number of men injured by falls of ground; this is greatly to be regretted. The matter has received close attention, and it is very difficult to deal with. It is found in most cases the injuries are caused in places where the ground is within easy reach for examination, and that a very large proportion of the falls of ground occur on two mines.

On these mines special men are employed to examine the ground, and every precaution seems to be taken to prevent accidents of this nature. One is forced to the conclusion that on these mines this class of accident is largely due to a want of individual care in examining and working down loose ground.

Ropes, Cages, etc.

The system of examination appears to be very satisfactory, and there is no record of a rope breaking, or any accidents due to the unsafe working of the appliances on cages.

Prosecutions.

During the year there were sixty-six prosecutions for breaches of the Act. In sixty-three cases convictions were obtained, two cases were dismissed, and one charge withdrawn.

Developments.

There have been very few developments of note during the year. The large mines continue to maintain their output in a regular manner.

The main shaft of the Lake View Consols was carried from the 1,900ft. to 2,100ft., and the west crosscut intersected the Bullfinch lode, carrying high values.

The Hannans Star Lease, the property of the same company, is developing in a very satisfactory manner. The most interesting development of the year was that on the Chaffers mine. Crosscuts west at the 1,537ft., 1,687ft., and 1,837ft. levels have located lodes which are considered payable. These lodes are new to the mine, and are the southern extension of the ore bodies worked in the Golden Horseshoe. A new mill is being erected, and this mine should again be a producer during the coming year.

The Oroya Links Co. have equipped the C.P. shaft of the Eclipse Lease with a fine set of head gear and new winding engine. It is the intention to open out at 900ft. and develop the ore body which has been worked with payable results in the higher levels.

Patterson shaft of the Ivanhoe Gold Corporation is now the deepest on the field, being 2,960ft.

At the Hannans Reward North, on the north end of the field, a new ore body has been located carrying high values.

RANDALLS.

A battery is in course of erection on the Santa Clause mine, and should be running by the end of February.

It is the intention to equip the Harcastle lease with a treatment plant.

A local syndicate is working the Flagship Lease, and obtaining satisfactory values.

The Comstock Lease owners are crosscutting west at one hundred and fifty feet. This is the deepest working in the district, and the result of the work will be of great interest.

KANOWNNA.

There have been no developments of importance, except the discovery of payable alluvial on the north end of the Moonlight Lead.

COOLGARDIE, YILGARN, AND DUNDAS GOLDFIELDS.

Mr. J. Crabb, Inspector of Mines: Report dated 30th November, 1913:—

I beg to submit my Annual Report ending 30th November, 1913, regarding the progress of mining and working of the Mines Regulation Act, in the Coolgardie, Yilgarn, and Dundas Goldfields.

COOLGARDIE GOLDFIELD

There have not been any new discoveries of much importance during the period under review, and the yield of gold is somewhat less than that produced in the previous year.

This is due in a large measure to the decrease in the yield from the Burbanks Birthday G.M., and to a smaller output in the Kunanalling District generally. In taking a general view of the field, however, I anticipate that the returns for 1914 will exceed the present year by a considerable amount.

HIGGINSVILLE.

The Hidden Secret North at Eundynie is looking well. In the bottom working the lode is increasing in length northerly, and the owners, being of opinion that it is likely to continue in this direction, have secured another lease. The yield from this mine promises to be a record in the forthcoming year.

A very promising belt of auriferous country is being prospected at a point about 20 miles from Higginsville in a north-easterly direction. Very little is known of this belt as yet, and at the present time there are only two men working there.

I paid a visit to the locality during the latter part of September, but, owing to a limited amount of time, was unable to make a very close inspection of the country. From what I saw, however, I was rather favourably impressed, and concluded it to be worthy of attention.

There is a good road leading to it from Higginsville, which was made some years ago by sandalwood carting. There is also a good supply of water at what is known as Binnergia Soak, which is about seven miles from where gold is being got at present.

Widgiemooltha.

At Widgiemooltha very little mining is being done.

Coolgardie.

Mining at Coolgardie has been somewhat dull. This of course was due to the small amount of work done at Tindal's G.M. The prospects of Tindal's Mine are reported to be improving.

A fair number of prospectors are trying their luck at different shows, and in some cases very gratifying results are being obtained.

A good deal of work has been done at New Bayleys by tributers, but nothing of a sensational nature was discovered.

The Prosperity Lease (late Lindsay's), on which a considerable amount of tributing has been done, is likely to be sold to a company who intend dealing with the huge deposit with Huntingdon mills.

The introduction of Huntingdon mills to Coolgardie, for the purpose of treating the large low-grade deposits, is, I think, a step in the right direction. It would also, in my opinion, cause in no small measure a revival of mining, if proper economic methods are applied in handling the ore.

Bonnievale.

At Bonnievale the tributers on the Vale of Coolgardie have done a good deal of development work, but owing to the ore being somewhat low grade they have not done so well as expected.

Kunanalling.

The Star of Fremantle is looking rather well. During a recent visit to the mine ore reckoned to be worth 18 dwts. per ton was being raised.

Carbine.

Good progress has been made at the Carbine G.M. notwithstanding the fact that the mill has only been able to crush about half-time owing to scarcity of water, but now that a good supply of water has been obtained, it is only reasonable to expect the output will be more than doubled during the coming year.

The ore is still caving to No. 3 level. As it has not cost anything to cause additional caving during the year, it can, I think, be claimed that this mine holds a record for cheap mining in this State. The thousands of tons of ore taken from above the No. 3 level have not cost the owners one penny as far as actual mining of ore is concerned.

Chadwin.

At Chadwin a fair amount of prospecting has been done, and encouraging results obtained. The principal mine in this centre is the Resolute G.M., which to date has produced 250 tons for a yield of 1,050 ozs. by amalgamation. The tailings are said to contain 10 dwts. to the ton.

It is owned by Geddes and party, who have developed the property in a thorough and systematic manner. The vein, which has a north-westerly strike, dips south-westerly at a very sharp angle, and is reckoned to range from 1 ft. to 2.5 ft. wide. The country rock on the footwall consists principally of hornblende, whilst that on the hanging wall is micaceous schist. The vein-filling consists principally of quartz, which occurs in lenses of varying sizes.

Three shafts have been sunk in the lode at distances of about 100 ft. apart. No. 1, the most north-

erly, is 180 ft.; No. 2 (middle shaft) 110 ft., and No. 3 is 100 ft.

At 110 ft. No. 1 shaft a level has been driven 120 ft. in lode material northerly, and connects with No. 2.

At No. 3 shaft a level has been driven at a depth of 73 ft. northerly in lode material.

At present there are 20 tons at grass reckoned to contain 8 ozs. per ton.

The property is being worked at a slight disadvantage at present owing to the ore having to be carted a considerable distance for treatment, and the breaking of ore by means of hand-drilling.

The vein material has every appearance of continuing to a considerable depth, and if the mine were provided with better facilities for carrying on mining operations it should enable the owners to work much more profitably than at present.

Burbanks.

At Burbanks Main Lode a good deal of development work has been done; the usual production is likely to be maintained for a considerable time.

The production from the Burbanks Birthday has not been so large this year, this being due to developments being somewhat behind; the output for the coming year, however, should show a marked increase.

DUNDAS GOLDFIELD.

The yield for this field is much about the same as that for last year, and the outlook for mining has not materially altered.

The Mararoa G.M. has been the principal producer, and is likely to remain so for some time. Although a great deal of development work has been done, nothing of importance was discovered. The company have secured the leases adjoining the Mararoa on the east, and are now sinking an incline in what is known as the Sydney Norseman reef.

The Viking No. 1 is opening up well in the bottom workings, in fact the vein at No. 6 level looks better than it has ever done in any other part of the mine.

The main incline is now down 600 ft., and it is intended to sink it to 700 ft. very soon.

The mine is equipped with a ten-stamp mill, air-compressor, and a 50-h.p. producer gas plant.

To date the production is 18,000 tons, from which an average yield of 1 oz. 7 dwts. per ton by amalgamation has been obtained. The tailings are estimated to contain 4 dwts. per ton.

Lady Miller.—Operations at the Lady Miller have not quite come up to expectations, and in consequence a large number of men were recently put off.

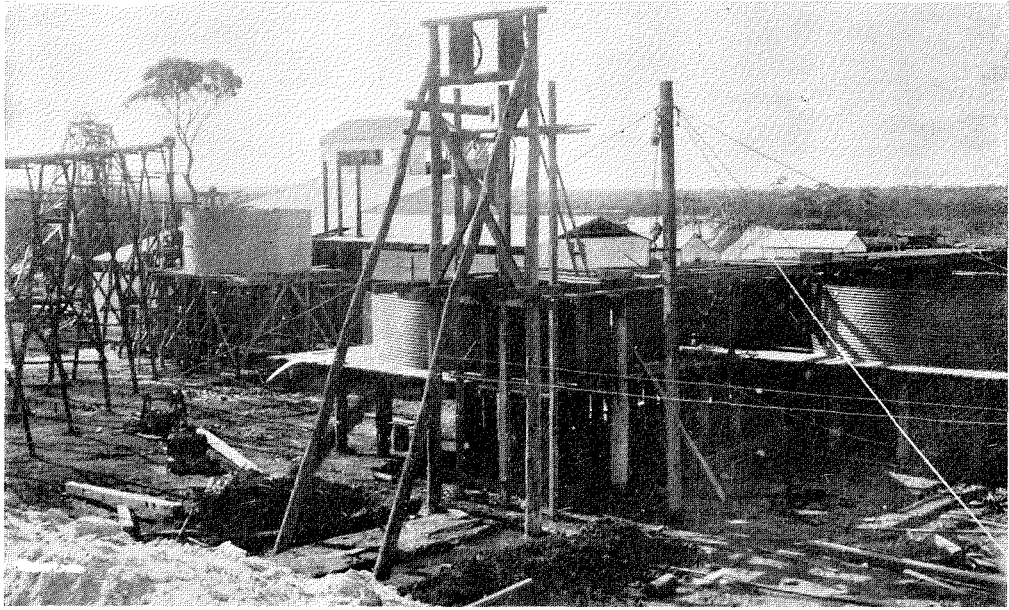
The Princess Royal is being worked by a party of tributers, who are taking out fair quantities of ore from different points in the upper workings.

YILGARN GOLDFIELD.

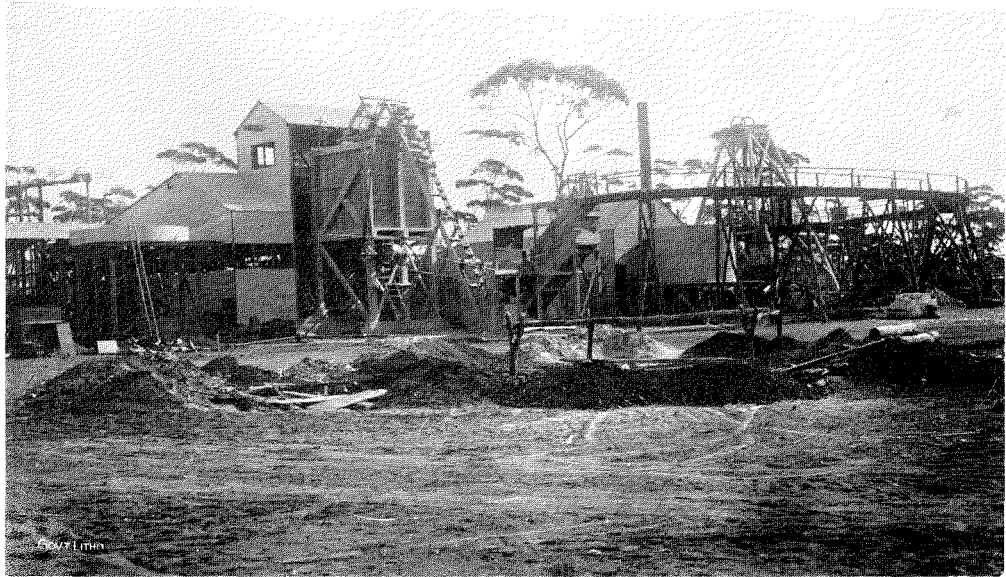
The yield of gold from this field increased considerably during the period under review, the output per month now being almost equal to the yearly production of 1911. The output for 1912 amounted to 30,032 fine ozs., but I anticipate the yield for this year will almost double this amount.

In the vicinity of Southern Cross mining has been rather quiet, but the outlook at present shows signs of improvement.

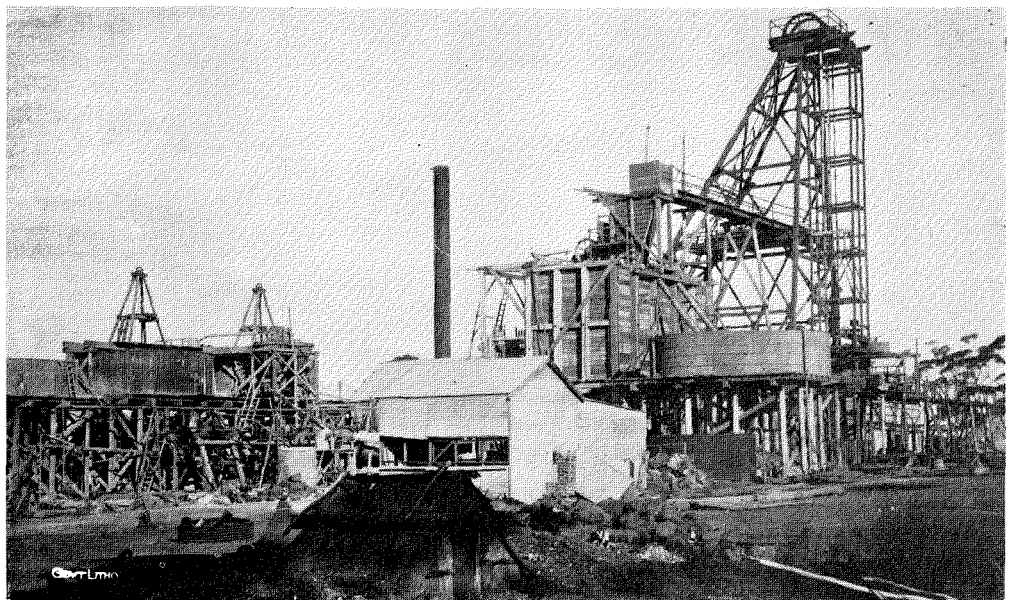
Transvaal G.M.—Steady progress has been made at the Transvaal G.M., and it is said that a plant



The "Edna May," at Westonia, a prominent producer with a reputation for good values.



Another view of the "Edna May."



The Corinthian Mine, a proposition of the Yilgarn Field, with favourable prospects.

estimated to cost £50,000 is to be erected. As the ore contains a large percentage of arsenic, the plant has been designed to save it as a by-product, as well as to recover the gold contents.

Fraser's G.M.—The bore holes put down along the Fraser's line of lode have not yet penetrated ore of high grade, but I am of the opinion that better results are likely to be obtained in the next few holes, as this particular portion is one of the most promising sections throughout the whole line.

MARDA.

Butcher Bird G.M.—A good supply of stock water was struck at the Butcher Bird recently, but whether it is sufficient for a five-head mill has not yet been determined. It is the intention of the owners of the Butcher Bird to erect a ten-head stamp mill, provided a sufficient supply of water can be obtained.

Great Unknown G.M.—The Great Unknown is looking well. The vein on this property is reckoned to range from 1ft. to 2.5 ft. wide, and to be worth about 4 ozs. per ton.

Allen's Find is also looking well. The vein on this property is reckoned to average 2 ft. wide, and to be worth a little over 1 oz. per ton.

Athlone G.M.—A little work was done on the Athlone G.M. by a small party, but owing to vein being narrow and short, and a considerable amount of water having to be contended with, the returns obtained were not sufficient to pay working expenses.

BULLFINCH.

The Bullfinch Proprietary added very materially to the gold yield, and it is likely to continue to be a large and consistent producer for a considerable time.

Corinthian North G.M.—A fine milling and slime plant has been brought into operation at the Corinthian North G.M., and the yield from this property should be largely increased during the coming year.

WESTONS.

Edna May G.M.—Considerable progress has been made at Westons. A new main shaft has been sunk on the Edna May to a depth of 150 ft., and a cross-cut is now being driven from this depth, which is expected to intersect the rich shoot of ore in which a winze has been sunk.

The Mountain Queen has been treating ore obtained principally from the oxidised zone.

Great Victoria G.M.—A sampling option has been taken on the Great Victoria by a company, and there appears to be a reasonable prospect of its being purchased.

Generally speaking the outlook of mining in this field is very good.

ACCIDENTS.

All the accidents that have occurred have been reported to your office.

While some of these accidents from the nature of things were unforeseen and unavoidable, it is to be regretted that a certain percentage was due to either oversight or disregard to the provisions established for the protection of all. It seems almost incredible that men should persist in dangerous and forbidden practices, which sometime imperil the lives of others as well as their own. This indifference to danger by both management and workmen is, perhaps, not intentional. Constant exposure without injury seems to beget a disposition to underrate the liability to accidents, and the necessity of guarding against them.

After 14 years' experience of Government inspection I have become thoroughly convinced that it is this kind of indifference that causes most of our accidents, and I have for many years realised that, in order to reduce the number of accidents, something more than Government inspection is required.

Inspection of mines by Government officials of course is of some value, but I feel sure that no system of Government inspection can be thoroughly efficient without the accompaniment of trained mine officials who are impelled by self-interest not to allow the slightest unreasonable risk of danger to workmen being taken.

To bring about such a condition of affairs it is only necessary to make it compulsory for mine officials who are in immediate charge of the underground workings to have certificates to show that they are qualified to protect the lives entrusted to their care.

The question of the advisability of having certificated officials has been settled affirmatively in many other countries, and I feel sure it is the only remedy to be adopted in this State.

A good deal has been said regarding the inspection of mines which, no doubt, has been brought about through the high percentage of accidents compared with other countries. That something is wanting there can be no doubt, and it has been thought by some that the number of accidents could be reduced by the appointment of additional inspectors.

In my opinion there can be nothing more pernicious than the substituting of any Government inspection for the daily and hourly inspection of mine officials, as it simply means removing to a very great extent the responsibility from those who are constantly in a position to see that the workings are safe, and placing it on the Government. Such a course, in my opinion, is likely to produce the opposite effect to that most desired.

I feel convinced that the only effective measure in reducing the number of accidents is the compulsory certificating of mine officials.

It seems to me somewhat out of date to call attention to the advantages of having certificated officials, as statistics abroad have proved time and again the great gain in safety to miners due to such provision, but for reasons given above I cannot refrain from again strongly recommending to the favourable consideration of the Government the advisability of enacting laws providing for such a measure.

VENTILATION.

The ventilation of the mines has been good.

In places where much dust is caused I find it is a difficult matter to get men to protect themselves by wearing or using appliances for this particular purpose. I therefore think it would be advisable to have a regulation making it compulsory for men to use such appliances when provided.

SIGNALLING.

I beg to recommend the adoption of alterations and additions to the present code of signals, on the lines set out in my previous reports dealing with this matter.

Seeing that there has been a considerable amount of discussion regarding signalling from moving cages at different points of a shaft, I would refer you to particulars of a system in use described in "The Journal of the Transvaal Institute of Mechanical Engin-

eers," page 42, which, I think, will be of benefit to all concerned.

UNDERGROUND EXCAVATIONS.

The only mine that has given occasion for much anxiety is the Burbanks Main Lode, where outbursts of rock due to ground pressure are apt to take place. Although a few outbursts did occur at different points none were attended with injury to any person.

The precaution taken of placing substantial timbers between foot and hanging walls at regular intervals in the stopes for the purpose of resisting the pressure of the walls, and thus relieving the lode material of pressure which causes it to disintegrate violently, has been found to give excellent results. Had it not been for the care taken in this way I do not think it would have been possible to extract the ore from such places with any reasonable degree of safety.

The pressure on the timbers becomes very marked shortly after they are placed in position, and increases as the lode material is taken out. After careful inspections it seems very evident that the pressure is not due to the weight of any rock which may be in a semi-detached condition, but to pressure that has been brought about by earth movement in some remote period.

Attention has centred very much recently on the need of having the height of all stopes limited by law. As I have on previous occasions expressed the opinion that I do not think it would be advisable to adopt such a course, I do not think it necessary for me to again go into the matter, beyond saying that I feel quite sure the question of height of stopes, and other matters relating to the safety of workmen, would be regulated to the advantage of all concerned if mine officials in immediate charge of the workings were compelled to hold certificates.

I am absolutely convinced that the certificating of mine officials is the only reasonable means of reaching a high standard of security and reducing the number of accidents.

SUNDAY LABOUR.

Permits were granted to the Edna May, Viking No. 1, and Burbanks Main Lode Gold Mines.

PROSECUTIONS.

It was not found necessary to take any proceedings.

COLLIE COALFIELD.

Mr. R. McVee, Inspector of Mines: Report dated 12th January, 1914:—

The total output of coal from the Collie field for the year amounted to 314,090 tons, being an increase of 19,013 tons over the output for 1912.

The following in their relative order are the number of tons produced by each of the collieries on the field:—

	Tons.
Co-operative Colliery ..	75,817.9
Cardiff (Collie Coal Co.) Colliery	75,659.8
Scottish Colliery	48,961.5
Proprietary Colliery	41,191.0
Westralian Colliery	39,270.4
Premier Colliery	33,189.4

The whole of the output from the Co-operative, Cardiff, and Proprietary Collieries is produced by means of electric coal cutting machines, and up to

November 22nd, 95 per cent. of the output of the Scottish Colliery was produced by electric coal cutting machines. At this colliery the coal is now being won by hand mining, owing to insufficiency of power, but the change is only of a temporary nature, as further electric plant is being installed at the Colliery. The amount of coal produced by means of coal cutting machines during the year was 235,400 tons, representing 74.94 per cent. of the total output.

The whole of the underground plant at the four mines referred to is driven by means of electricity, as are also ventilating appliances at the surface of each colliery. During the coming year it is anticipated that the Westralian Colliery will also be electrically equipped.

Unfortunately no regulations governing the use of electricity exist in the Coal Mines Regulation Act, 1902, consequently there is no uniformity in the class of cables, etc., installed. In some of the collieries proper mining cables are in use, whilst in others aerial cables are installed. These leave much to be desired in the way of insulation for mining purposes. Fortunately, so far, no accidents due to electric shocks have been reported, although I have no doubt many of the workmen received shocks more or less severe during the year. I think a much higher efficiency would be obtained from some of the plants, together with a larger margin of safety, if the regulations governing the use of electricity as set out in the Mines Regulation Act, 1906 were made to apply also to the mines of the Collie district.

The output for the year, viz., 314,090 tons, by no means represents the producing capacity of the mines on the field, as during the year the work at the majority of the mines has been of an intermittent nature owing to the insufficiency of trade.

The average number of men employed during the year was 560, as against 545 for the previous year; an increase of 15 men. The average number of men employed on the surface was 139, and underground 421 men.

The amount of coal per annum produced by each man employed in the industry was 561 tons, as against 541 tons for the previous year, an increase of 20 tons per man, and the quantity of coal produced by those employed underground alone amounted to 746 tons.

Accidents.

I have pleasure in again being able to report that no fatal accidents have occurred in the field during the year.

The serious accidents totalled 84 and the minor 23, making a total of 107 for the year.

Accidents at the surface accounted for 16 serious and one minor. Miscellaneous undergrounds—50 serious and 19 minor. Falls of ground, 12 serious and minor *nil*. Explosives—6 serious, minor *nil*. Shafts—*nil*.

Injuries to back represented 26.17 per cent. of the total accidents, hands 26.17 per cent., legs 19.62 per cent., arms 11.21 per cent., feet 11.21 per cent., eyes 3.75, face 1.87 per cent.

Nineteen per cent. of the miscellaneous accidents were due to wounds becoming poisoned. There were no fractured limbs during the year. There were two cases of broken fingers, and one case of broken collar-bone.

Three rather serious accidents occurred during the year due to explosives. In one case, two brothers—David and Evan Whitteaker—were injured by a premature explosion. They were engaged in lighting two shots; the first shot exploded before they had retired to a place of safety. Both men received the full explosion in chest, body, and face. The elder brother's eye was so badly injured that he had to have it taken out, whilst the other brother is still suffering from the effects of the injury to one of his eyes. The other case was that of a man, named David Little, employed as a miner, who was working alone at the time of the accident, and engaged lifting bottom coal averaging from 4 to 8 inches, which had been left on the floor by the coal-cutting machines. It is the practice of the men, in order to facilitate the lifting of these bottoms, to place very light charges consisting usually of a half plug of monobel and a detonator in a vertical hole in the bottom. This, they maintain, shatters the bottoms and makes them easier to lift. Little had four shots ready to fire at the same time, he managed to ignite three of the fuses and endeavoured to ignite the fourth. He did not succeed as he thought, and thinking the others would explode he retired to a place of safety. When the three charges had exploded he returned to ignite the fourth. Whilst searching for the fuse the charge exploded in his face, causing injuries to the face and eyes. The accident occurred on the 30th of May last, and Little is still under medical treatment for his eyes. Fortunately the doctor hopes to be able to save the sight of both eyes. The length of the fuses used ranged from 7 to 13 inches, yet the man, when questioned in regard to the accident, did not seem to realise he was taking any unnecessary risk in lighting the four shots himself. A regulation governing the number of shots to be fired by one person when working alone has since been added to General Rule 12, Section 50, of the Coal Mines Regulation Act, 1902.

Sunday Labour Permits.

Eight permits were granted during the year under Section 46 of the Mines Regulation Act, 1906, and the number of men employed under the permits was 44.

Prosecutions.

There were two prosecutions during the year, one against a miner for a breach of the Special Rules. Fine imposed with costs.

Second, case was against one of the companies for breach of Section 72 of the Coal Mines Regulation Act, 1902, for failure to pay moneys due to Accident Relief Fund within the specified period. Case withdrawn on the company paying the money due, together with all the costs incurred in the case.

Progress during the Year.

Cardiff Colliery.—During the year this Company has added to the electric equipment by the installation of a Belliss Morcom compound high speed, self-lubricating engine of 290 B.H.P.; working steam pressure 120lbs. Direct coupled to this is a British Westinghouse generator of 200 K.W., compound wound, 550 volts, 363 amps., running at 415 revs. per minute.

Co-operative Colliery.—During the year this company have added to their mechanical equipment as follows:—One "Browlett Lindly" high pressure double cylinder engine of 290 B.H.P. Direct coupled to this is a Crompton and Co. direct current generator of 200 K.W., 550 volts. 365 amps., running at 425 revolutions per minute. One Thompson dish end Lancashire boiler 30ft. x 8ft. 6in., with a working pressure of 130lbs. to square inch. One winding engine, pair of 16in. dia. cylinders. With the addition of this engine the company should be able to materially increase their output.

Proprietary Colliery.—During the year a new gantry, screening appliances, railway sidings, etc., have been completed at this colliery; the whole of the plant has also been removed from the old Wallsend Colliery and concentrated in close proximity to the mouth of No. 3 Proprietary tunnel. The coal from the mine will now land direct on to the new gantry, which should materially assist in the increase of output from this mine; the old gantry is some 300 yards from the tunnel mouth, necessitating the coal being handled by horses after being brought to the surface.

Premier Colliery.—During October a creep of a somewhat serious nature took place over portion of this colliery, necessitating a temporary stoppage of work at the face of the workings.

The difficulty has now been overcome, and the mine is again at work producing coal.

During the year consistent development has been carried on in some of the collieries.

In two of the collieries the system of running the boards and headings on definite lines is strictly carried out. There are eight lines on the whole of the places and uniformity of the pillars is ensured as well as position of the whole of the workings at all times being known.

A modification of the "panel" system of working is also carried out on one side of each of these two collieries, viz.:—Proprietary and Westralian, and it would therefore be possible to seal off a fire (should one occur) in these districts by the closing of two openings, a most important point and one to be recommended to other mines in the district. During the year, mining for clay has been commenced by the Stoneware Pipe and Pottery Co. of East Perth at Muja, on the Collie-Narrogin railway. Seven men are now employed, and the output of clay is about 50 tons weekly.

During the year I have been supplied by the Department with "hydrogen-safety lamp" for the detection of fire damp. I have made careful tests at each of the collieries for the presence of fire damp, but none has been found present in any of them.

PHILLIPS RIVER GOLDFIELD, GREENBUSHES AND NORTHAMPTON MINERAL FIELDS.

Mr. S. Cullingworth, Relieving Inspector of Mines: Report dated 30th January, 1914:—

At the beginning of this year I was transferred to Perth as Relieving Inspector, and the districts of Northampton, Greenbushes, and Phillips River were included in the Perth Inspector's district. During the year the relieving work has comprised: relieving the Inspector of the Murchison District three months, relieving at Mt. Margaret one month, and relieving the Coolgardie Inspector one and a-half months.

The mines in the districts under my control have also been visited as opportunity allowed, and a special

trip to Balla Balla undertaken to inspect the Whim Well Copper Mine. The Phillips River Mineral Field has only been visited once. This district is somewhat isolated, and most of the mines are being worked upon a comparatively small scale, so it was not considered advisable to revisit the locality during the period. The progress of the various districts has been fully reported on from time to time, so it will only be necessary to refer briefly to them.

NORTHAMPTON.

As the high price of lead has been well maintained during the year, it was hoped that more development of the field would have taken place. Some extra development work has been undertaken, certainly, but generally speaking investors have been chary about putting capital into the district. Doubtless the chief reasons for this are:—

The lead ores, although containing a high percentage of this metal, do not contain any appreciable amount of either silver or gold, and any considerable fall in the price of lead would make them unprofitable. Many of the mines known have been previously worked and abandoned many years ago, and there is a great element of uncertainty in opening up an old mine about which very little information can be obtained. Wherever any payable ore has been showing on the surface it has long ago been worked out, the open-cuts have fallen in, and, as has been often mentioned previously in official reports, much of the mineral-bearing country is in private hands, the owners of which are apparently not anxious to have their properties worked. This is not always the case, as will be seen later on.

However, some of the old mines have been re-taken up and work is in progress upon them, viz., Kirtons, the Nooka, and the Uga. The Sunny Corner was also taken up by a small syndicate, but some legal difficulty has arisen and practically no work has been done. The Mary Springs Mine was also re-taken up, and a small quantity of good ore sent away, but although there seems every probability of this mine opening up well, dissensions have taken place between the members of the party and little development work has been done. The principal producer has been the Baddera Mine.

Baddera Mine.—During the year the main shaft has been sunk to 347ft. and the No. 3 level commenced on the lode, and the Nos. 1 and 2 levels considerably extended. No. 2 level is over 800ft. in length. Additions and alterations have been made to the plant, and an average monthly output of about 2,200 tons of ore has been treated. The production for the eleven months available is 24,693.30 tons, yielding 2,293.91 tons of lead, realising £42,157, in addition to which the ore contained small quantities of gold and silver, for which some £6,000 was realised.

The *Narra Tarra Mine* is being developed. The main shaft has been sunk to 260ft. and a level at 250 ft. is being driven, exposing a good body of ore. This mine is now being equipped with a reducing and concentrating plant, and a new winding engine has been erected. 332.20 tons of ore, yielding 237.27 tons of lead, have been obtained.

Kirtons.—The party owning this old property has been successful in locating a lode which may ultimately be found to be a separate body from that previously worked. The present workings are almost in the centre of the property. A shaft 80ft. in depth was sunk, and a level has been driven for about

140ft. exposing a lode from five to eight feet wide containing a high percentage of ore.

To the south of Kirtons a small local syndicate made an arrangement with the owner of the ground, which is private property, to mine. A shallow shaft was put down on the course of Kirton's lode, and at about 20ft. good lead ore (galena) was struck. Development is now proceeding.

It is therefore evident that some of the local owners are willing to come to an arrangement for mining on their ground. It would appear to be the absentee owner who is difficult to approach.

At the Uga a local syndicate has erected a very complete dressing plant, driven by an oil engine, for treating the accumulated tailings on this mine. The same syndicate has taken up the old Fortune Mine, and proposes also to treat the tailing dumps here. Doubtless if these operations are successful they will lead to the unwatering and working of one or both of these mines.

On the Nooka a main shaft has been started and a petrol engine and small hoist erected.

PHILLIPS RIVER DISTRICT.

The progress of the Phillips River district was reported on, after my visit in July last. Since then an important discovery has taken place on the Harbour View Mine at Kundip of gold in material hitherto looked upon as worthless.

The lode material (an earthy ironstone) does not, I understand, yield any gold by panning, and this method of ascertaining values has been relied upon, but on being assayed, high gold values were obtained. This is one more instance of the fallacy of relying entirely upon panning in earthy or clayey ores, where the gold is in a very fine state of division.

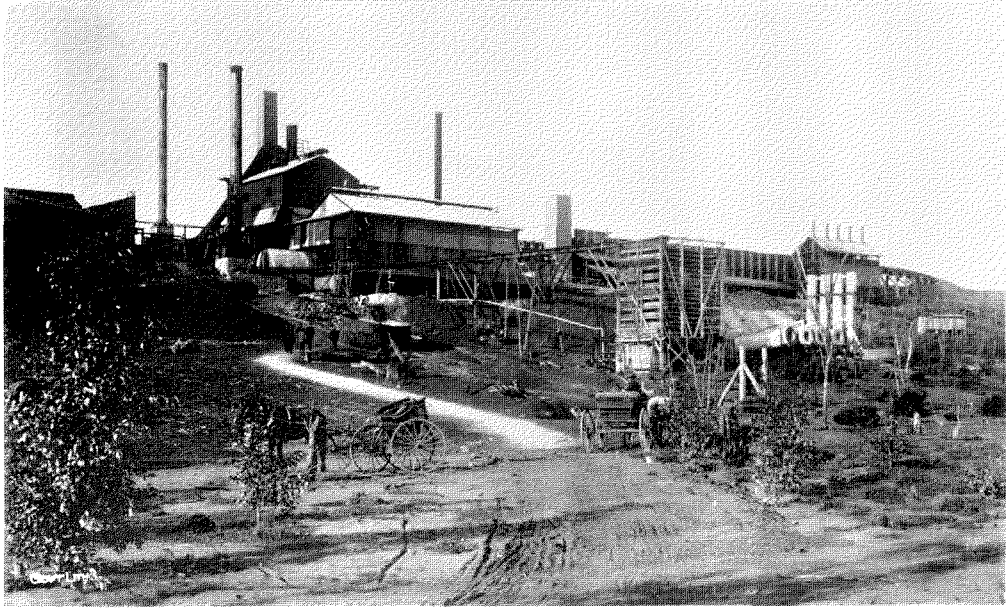
The following returns of ore have been sent in by mine owners from the district:—

	Tons.	Fine ozs., Gold.	Copper.		
			Tons.	Metal.	Value
Surprise..	..	4.83	54.5	14.96	£ 1,050
Marion Martin	..	12.41	115.14	17.25	1,128
Hillsborough ..	158	389.18	25.	2.52	190
Fairplay ..	462	376.12	38.8	2.86	195
Two Boys ..	1,675	722.12	..	..	..
Harbour View..	283	120.38	..	..	..

Other parcels of copper ore have been sent away, but the returns are not available.

GREENBUSHES DISTRICT.

At Greenbushes most of the dredges have been working as usual during the year. Some of the plants, I understand, suffered from want of water towards the end of last summer. To obviate the possibility of this for the future, the Greenbushes Development Company has constructed a new dam, which the winter rains have filled. Some years ago this company installed a pumping plant on the Blackwood River, some seven miles away from their operations, and connected with a pipe line, but the working and upkeep of this must have been a heavy expense, which it is expected the new dam will do away with.



Phillips River Smelter at Ravensthorpe, under Government control.



Phillips River Concentrating Plant.

The following are the returns of black tin given by the owners of the larger sluicing properties during ten months of the year:—

	Stream Tin.	Value.
	tons.	£
Greenbushes Development Company..	63·10	6,726
F. A. Moss, Spring Gully	67·50	8,470
F. A. Moss, Mt. Jones.	19·6	2,430

The reported output for the field for 10 months was:—Lode tin 23.07 tons, stream tin 357.05 tons; value £43,150.

One or two new alluvial finds have been made towards the southern end of the field. The discoveries have only lately been made, and it is yet too early to comment much upon them.

In the vicinity of these finds other parties are working at from 20ft. to 40ft. in depth on alluvial wash. Messrs. Spittal and party have a considerable width of wash exposed in their workings. On a hill above these workings Thorley and Cox are developing a lode in a systematic manner. Their hauling shaft, just over 100ft. in depth, is equipped with a small petrol engine and hoist, which is, I understand, very economical and satisfactory. Their workings extend for some 250 or 300ft. along the line of lode, which is apparently from 8 to 14ft. in width.

On the Cornwall the owners are developing one of the lodes upon their property. A hauling shaft, 100ft. in depth, is equipped with a small steam winder. The bottom level has been driven about 140ft. The lode is from 6 to 8ft. wide, or more in places. The ore is low grade, but should yield a profit, more especially if treated on the ground. Between the Cornwall and the town boundary, and just north of the South Cornwall, another lode is being opened up. At the time of my visit the shaft was about 18 or 20ft. in depth, and what prospecting work had been done revealed a large lode formation, which, I am informed, carries payable values. All the lodes are low grade, and require to be crushed with as little expense in the cost of crushing and carting as possible.

A quantity of black tin goes away yearly from this field of which no records are obtained. This is from a number of registered claims, the owners of which sell their tin to local buyers and do not supply the Department with any returns, nor do the buyers send in any returns of the quantity bought.

WEST PILBARA DISTRICT.

At the Whim Well Copper Mine, West Pilbara, a Murex concentrating plant has been erected. I understand the initial difficulties have been overcome, and the plant is treating the low-grade oxidised copper ores successfully.

ACCIDENTS.

Northampton.—One fatal accident occurred through a man falling off a staging whilst attending to a

pump in a shaft; he fell into the well and was drowned.

Four serious accidents were reported: one from a fall of rock; one caused by a truck of ore falling down the shaft, a stone striking a man on the bottom plat; one explosive accident through boring into an old butt; one, through hand being caught in crushing rolls.

Greenbushes.—One fatal accident took place through the collapse of a sluice-box structure.

West Pilbara.—One serious accident; caught in belting.

PROSECUTION.

One man was prosecuted for negligence under Section 57, and as a warning was fined £1 and costs.

SUNDAY LABOUR PERMIT.

A Sunday labour permit was issued for 18 men for two weeks on the Baddera Lead Mine.

PILBARA AND WEST PILBARA GOLDFIELDS.

Mr. P. C. Riches, Inspector of Mines and Warden. Report, dated 9th February, 1914:—

Herewith I beg to hand you my Annual Report for the year ended 31st December, 1913.

During the year under review mining has been, generally, in a quiescent state. Nothing of a startling nature has occurred and no sensational finds have been made. On the other hand, steady work has been carried out, and at the end of the year I think I can say that mining matters are decidedly brighter than they were on the 31st December, 1912.

The amount of stone crushed at the State Battery, Marble Bar, was 1,947 tons for a yield of 2,263.78 fine ounces. This shows that the leases around Marble Bar are maintaining their output, both as regards tonnage and gold contents.

The State Battery at Marble Bar has been a great boon to the miners; without it mining would have been dead on the Marble Bar portion of the field.

At Bamboo Creek the State Battery commenced crushing in July, but was continually hung up for water. This difficulty is on the eve of being overcome, and as soon as crushing operations are resumed this centre should become an active milling centre. So far, to the end of the year, 729 tons have been crushed for 949.24 fine ounces.

At Warrawoona the Klondyke Boulder Goldmining Coy. have had an unfortunate year; mishap after mishap occurred which stopped work, but at the time of writing all difficulties have been overcome and crushing has been resumed. I feel confident that the coming year will be a prosperous one for this company, and that their dogged determination to overcome difficulties will be rewarded. The Co.'s crushings for the year amounted to 406 tons for 467 fine ounces. A fine block of stone is now being stoped and the gold contents appear to be very promising.

At the State battery at 20-Mile Sandy, 761 tons were crushed for a yield of 1,083 fine ounces. This shows a slight decrease on last year's returns. At Eastern Creek dry weather has retarded mining operations, but good rains fell during the last few days of the year, and crushing should be resumed almost at once.

The yield of tin for the year was 139.10 tons, of an estimated value of £16,507. This shows an increase over the output of 1912 of 15.63 tons. Generally, mining is in the same position as at the end of last year.

During the year one ton of gadolinite was disposed of to American buyers for £112.

At the beginning of the year a number of mineral leases were applied for at the Gregory Ranges, the mineral comprised within the leases being silver lead. Nothing has been done with these propositions, but at the time of writing I understand that English capitalists are interesting themselves in the venture, and a mining engineer is on his way from England to report on them. If a moiety of what has been said of this find turns out to be true, then a large and wealthy field will be added to the mining fields of Western Australia.

I am pleased to be able to report that there were no mining accidents of any sort notified.

The number of leases in force in the Marble Bar District at the end of the year are as follows:—

For Goldmining 32, area 325.
For Mineral 22, area 771.
Prospecting areas for Gold number 9, area 94.
Prospecting areas for Mineral number 2, area 36.
Lode and Alluvial Claims number only 3 for 1 acre.

In the Nullagine District there are 12 Goldmining leases of 112 total acreage and 15 Prospecting Areas totalling 88 acres.

The yield of gold from the Marble Bar District was 3,864.76 fine ounces, and from Nullagine District 1,883.76 fine ounces, making a total for the whole field of 5,748.52 ounces. This is a somewhat smaller yield than for the year 1912, but if the batteries at Bamboo Creek and Warrawoona had not been unavoidably hung up the output of gold for 1913 would easily have beaten that for 1912.

The year under review was a very dry one, no rain falling between March and the last week of December. Since then, however, good rains have fallen, and the outlook for 1914 is, so far, a very good one.

I feel that, taking into consideration the development of the Marble Bar, Bamboo Creek, Warrawoona, Nullagine, and Eastern Creek centres, together with the great possibilities there may be in the silver lead leases at the Gregory Ranges, the coming year bids fair to be a much brighter one than for some time past.

MINING ACCIDENTS.

Tabulated statements of the mining accidents for the year 1913 are forwarded herewith for the customary tables Nos. 26, 27, and 28 of your Annual Report, with the previous year's totals for comparison, also a diagram of the fatal accidents year by year, and their causes. As in the last three years' reports, the accidents tabulated in these returns are now 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 statement hereunder, 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 1913, as it happens, all the fatal accidents recorded were to men directly engaged in mining work.

	1909.	1910.	1911.	1912.	1913
Total fatal accidents on mines reported	37	34	44	38	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	3	5	7	3	..
Fatal accidents to men engaged in mining	34	29	37	35	26
Total men engaged in mining (average)	18,336	17,711	16,596	14,961	14,780
Accident death rate, per 1,000 men engaged in mining	1.85	1.64	2.23	2.34	1.76

Table 26 shows the number of accidents in the different gold and mineral fields classified according to causes, and it will be seen from it that during 1913 26 persons were killed and 741 seriously injured as compared with 35 killed and 491 seriously injured in 1911. The diagram shows graphically the totals of fatal accidents year by year since 1891, the year 1913 showing the lowest total since 1896.

Table 27 shows the death rate per 1,000 persons employed on surface and underground in mines classified as gold, coal, and other mines according to the mineral produced, the general average rate

for 1913 being 1.76 as against 2.34 for 1912. The rates per 1,000 are based upon the figures in your table No. 21, which gives a grand total for 1913 of 14,780 men employed at mines above and underground, inclusive of alluvial workers.

Table 28 deals with gold mines, and gives a summary for 1913 of all fatal accidents above and below ground, with rates per 1,000 men employed, and per 1,000 tons of ore raised, similar figures for 1912 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,

A general table is attached hereunder classifying the fatal and serious accidents during 1913, according to the gold or mineral field in which they happened, and also according to causes, the totals from each cause for 1912 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. East Coolgardie	7	3	46	2	19	4	275	..	77	2	39	11	463
2. Mt. Margaret	2	..	5	..	4	..	45	1	20	..	1	1	77
3. Murchison	1	..	4	..	2	..	22	..	11	..	7	..	47
4. East Murchison	1	1	1	3	1	1	..	..	1	6	..	2	4	13
5. Coolgardie	2	1	..	..	..	14	..	3	..	..	2	18
6. Yilgarn	1	..	1	2	..	..	4	..	2	..	4	2	12
7. North Coolgardie	1	..	..	..	..	1	..	..	..	2	1	3
8. North-East Coolgardie	1	..	1	1	..	..	2	..	1	..	..	1	5
9. Broad Arrow	2	1	1	..	1	..	..	..	..	..	..	1	4
10. Dundas	2	..	1	..	..	..	3
11. Pilbara
12. Peak Hill
13. Yalgoo	1	..	1	1	1	..	3	1	6
14. Phillips River
15. Collie	6	..	12	..	..	..	50	..	15	..	1	..	84
16. Greenbushes	1	..	..	..	1	..
17. Northampton	1	..	1	1	1	..	..	..	..	..	2	1	5
18. West Pilbara	1	..	1
Total for 1913	1	22	8	75	7	29	4	416	4	137	2	62	26	741
Total for 1912	3	11	14	62	8	20	7	284	2	87	1	27	35	491

FATAL ACCIDENTS.

Hereunder are brief particulars of each of the fatal accidents reported during the year 1913.

Explosions.

While engaged sinking a winze in the Youanmi Gold Mine a man met a terrible death and another received slight injuries through an explosion. Before firing the fuses of a round of shots in the bottom of the winze, the two men removed the bottom length of the skids, which served them as a ladder, and tied a chain to the bottom of the next length as an aid to climbing up to it. After lighting the fuses one man scrambled up the chain and skids to the top of the winze, but the other was unable to do so owing to his hands being greasy from greasing the primers. The first man says he himself then slid back to the bottom of the winze and attempted to cut the fuses, but finding it impossible to do so, again climbed up and was close to the top when the first shot exploded, inflicting slight injuries on him. The man left at the bottom was killed, being subjected to all the shots as they exploded successively. Much want of good judgment was shown in removing the bottom length of skids, and in both men remaining in the winze to fire the shots, as one of them might quite well have stood by the Holman hoist at the top and wound up his mate by it without any necessity for climbing by a chain. The Coroner's jury returned a verdict of accidental death through failure to retreat from an explosion of dynamite, no blame attachable to anyone, and added a rider that they considered a better travelling way from the winze should have been provided. Seeing that the men themselves removed the skids which served them as a ladder, in order to save these from injury from the shots, it seems reasonable to suppose that they would have done the same with a ladder if they had had one. (2382/13.)

In Shafts.

A deplorable accident occurred at the Golden Horseshoe G.M. when two cages, one containing two and the other eight men, fell down the No. 2 shaft, causing the death of one man and more or less seriously injuring eight others. At the time of the accident the south cage was being lifted from the 1,200 feet level with eight men on it and the north cage simultaneously lowered from surface with two men, the drums being geared together to work in balance. When the cages had moved between 200 and 300 feet up and down respectively the jaw clutch holding the north winding drum of the engine to the driving shaft or spindle came out of gear with a loud noise and immediately the north cage, being now loose on the shaft, began to run away; the faces of the clutch kept jarring against one another, making much noise and emitting sparks and smoke. The engine-driver shut off steam at once and applied both brakes and then tried to screw in the clutch again, but the brakes failed to stop the drum and the north cage continued to fall a total distance of about 1,000 feet until between the 1,200 and 1,300 feet levels the safety grippers began to act, and after tearing into the skids for about 14 feet brought that cage to rest. The two men in it escaped with their lives but were considerably injured by the shock. Meanwhile the south cage being unsupported by steam also started to run back, and gathering speed as it went dropped upon the penthouse at the 150 feet level, a total fall of over 500 feet, with the result that one man was fatally injured and six hurt more or less seriously. The engine driver tried to put steam against the falling cage, and probably succeeded to some small extent before the cage struck the penthouse, otherwise the impact must have been very much greater, and all the men probably killed. The accident was caused through the jaw clutch

coming out of gear, but how this came about is unknown. Most probably it had not been screwed home properly. The Coroner's jury found that there was no direct evidence to show the cause of the accident. (192/13.)

Two men had removed the ladders from a small mine at Pingin, and the man below was being lifted to surface by the windlass when the rope broke, and he fell to the bottom, a distance of about 76 feet, and was killed. He was one of the owners of the mine, and the wire rope was his own property. It was a steel wire rope, 5/16 inch diameter, and on examination it appeared good externally, but the hemp core was quite perished, and many of the wires were rusty and brittle. Notwithstanding its having broken it was turned end for end immediately after the accident and used to lower men to recover the body of the man killed. The Coroner's jury found that death was due to an accident for which no blame attached to anyone. According to the information obtained by the Inspector of Mines little or no care appeared to have been taken to examine the rope periodically, or to grease it from time to time, but for this neglect the sufferer was himself to blame more than any other person. (255/13.)

While engaged in repacking the pumps at the main shaft of the Baddera Lead mine a man fell into the water at the bottom of the shaft and was drowned. There is no evidence as to the cause of the accident, but as a spanner was found at the bottom of the shaft, it can only be surmised that he slipped or overbalanced and fell down the shaft. Most probably in falling he struck his head against some projection, and so lost consciousness, as there were only about five feet of water in the shaft, and he need not have been drowned if he had retained consciousness. The Coroner's jury returned a verdict of death due to drowning, but that the evidence was insufficient to show what caused him to fall into the water: no blame attachable to anyone. (553/13.)

At the Edna May mine a man was killed through being struck by a plank which fell down the shaft. He was working at the bottom of the shaft at a depth of about 60 feet below the surface, sending up dirt by means of a bucket and windlass operated by a man at surface. The top of the shaft was partly covered with planks, some nailed down, but others left loose in order to facilitate men getting to the ladder-way. The braceman appears to have put his foot against the end of one of the loose planks while struggling to land a heavy bucket of dirt, and in doing so he drove it into the shaft, causing it to fall on the man beneath, with fatal consequences. The Coroner's jury found that deceased "came to his death from acute meningitis, the result of an accident on the Edna May mine, such accident being caused by the decking on the top of brace not being properly secured," and "that the manager of the mine being responsible was guilty of an act of omission in not seeing to the proper security of the decking." After full consideration of the case, however, the Crown Law Department concluded that it was not advisable to take action against any person on the charge of manslaughter, which would follow from concurrence with the verdict of the Coroner's jury, and that as this was the case it would not be proper to prosecute on a minor charge of breach of the Mines Regulation Act. (2029/13.)

At the Youanmi G.M. a fatal accident occurred through a man falling down the shaft from No. 3

plat into the water in the sump below No. 4 level, and being drowned. There was no night shift in the mine, and consequently the lights on the plats had to be lighted afresh each morning by the first persons who might go to each. The deceased went down before the shift to attend to changing the sanitary pans, and had a candle with him, and it appears certain that while working at No. 3 plat he did not light the plat lights, and by some mistake went into the empty compartment of the shaft instead of into the cage on which he had gone down, and fell to the bottom, sustaining very severe injuries from the fall which prevented him from rising out of the water in the sump—so caused him to be drowned. The Coroner's jury found that he came to his death accidentally by drowning, but added that in their opinion a better system of lighting should be supplied in all plats, and that a rail three feet high from the plat is not sufficient protection for a plat. The rail in question was the bar ordinarily employed across shafts when the gates are not in use. The sufficiency or otherwise of this as a fence or gate is dealt with later on in this report in the notes on matters relating to the regulation of mines. (2431/13.)

A fatal accident at the Bullfinch Proprietary mine was due to some misunderstanding of signals between the engine-driver and a platman, undue haste in winding on the part of the driver, or undue slowness in signalling on the part of the platman. The platman at No. 2 level—a man who had just been appointed to this work—having been instructed to take the cage to No. 1 level took out an empty truck at No. 2, and proceeded to give the required signal rings, viz.:—"one" (pause) "one." As he gave the second ring he tried to step into the cage, but the engine-driver had already started to raise it, and the platman fell on his back on to the floor of the cage with his head projecting which was then at once caught between the cage and the shaft timber, causing fracture of the spine and death. The driver stated that the signal received by him appeared to him to be only "one" (= heave up) and he had started to raise the cage before he heard a second "one" after much more than the usual interval. He stopped as quickly as he could, but too late to prevent the accident. There was no return signal given, but as the engine-driver was under the belief that he had been signalled only "one," to hoist dirt to surface, he naturally thought that a return of the signal was not required, as no return signal is used when hoisting rock only. According to the prescribed signal code, however, it was the duty of the engine-driver to allow at least two pauses, i.e., the space of time ordinarily allowed for ringing *four* rings before moving the cage, which is twice as long as the proper interval between the rings in the signal "one (pause) one," and it seems extraordinary if the interval allowed by the deceased between his rings was so great as to justify the driver in thinking that "one" was the complete signal. Possibly the platman was a little slow in ringing his second "one," and the driver a little fast in moving the cage, and no proof was obtainable which was most to blame.

This accident is the only one in this State recorded during seven years during which the prescribed code has been in operation, which might be claimed to be due to a defect in the code, and it seems more likely that the men were to blame than that the code

was the cause of the misunderstanding. The Coroner's jury found that death was accidental, without remark on the question of the signals. (2950/13.)

A miner was working at the bottom of the shaft on the Corn Cob G.M. sending up dirt in a hide bucket, when a piece of stone fell and struck him on the head, fracturing his skull and causing death shortly afterwards. The shaft was 100 feet deep, and the winding done by hand with a windlass. The stone which fell most probably dropped from the ascending bucket, when it was at or close to the surface. The Coroner's jury returned a verdict of accidental death, no blame being attachable to anyone. (3525/13.)

Falls of Ground.

A heavy fall of ground at the Mountain Queen G.M. caused the death of a miner who was working in the stopes over No. 2 level helping to fill it with mullock. The fall of ground appears to have been due to a flat "head" in the ground about 10 feet above the back of the stope, and not detectable by the men therein until after the fall had taken place. The stope appears to have been worked in what was considered quite a safe manner, and the back was supported by several stacks of timber. The Coroner's jury found no blame attachable to any person for the accident. (530/13.)

At the Ivanhoe Gold Corporation mine a man was killed at the ore pass in the stopes over the 865 feet level while in the act of relighting the candle placed there, which had gone out. While so engaged a rock fell upon him from the back of the stope. The evidence at the Coroner's inquest was that the back had been well examined, but the Inspector of Mines was not at all satisfied that this had been done properly. The jury, however, found a verdict of accidental death, and in consequence the Inspector did not think it advisable to take any legal proceedings for breach of the General Rules. (946/13.)

A man lost his life at the Sydney Mint G.M. through a fall of ground. He had returned to his stope after firing four shots without waiting for the smoke to clear away thoroughly, and so probably could not have examined the back closely. The ground was oxidised and somewhat balked, and risks should not have been taken with it. The Coroner's jury found that the man met his death by accident, no blame being attachable to anyone. (1171/13.)

One man was killed and one seriously injured through a fall of ground occurring in the Great Boulder Perseverance stopes over 900 feet level, while the men were working down loose ground after firing. The piece that fell was one which they had been trying to bring down, and which in the end came away unexpectedly. A verdict of accidental death without blame to any person was given by the Coroner's jury. The accident appears to have been one of the mishaps unavoidable in such work. (1401/13.)

A miner sustained fatal injuries at the Youanmi G.M. from a fall of rock while he was working in the stopes over No. 2 level. He was told by his shift boss to work down some ground which appeared somewhat shaken after firing, but appears to have neglected to do so, or done it insufficiently, as a heavy piece of it came down upon them shortly afterwards as he was shovelling ore into a pass. The Coroner's jury inspected the place, and after full inquiry found that death was accidental, and that no blame was attachable to anyone. The Inspector of

Mines came to the conclusion that the deceased had elected to throw the ore into the pass before pulling down the balked ground contrary to the expressed orders of the shift boss. (2440/13.)

At the Victorious G.M. a fatal accident occurred to a man through a fall of ground which occurred just as he was leaving the place to procure a prop and head board with which to make the ground safer. He was an experienced man, and was on the point of taking steps to support the ground, but had unfortunately waited a little too long before doing so. A verdict of accidental death, no blame to anyone, was given by the Coroner's jury. The accident was one of a sort incidental to underground excavation work, and not preventible by ordinary reasonable skill and foresight. (2535/13.)

Two men prospecting at the 150 feet level of the Euroa Lease were examining the west face of the level when a fall of ground occurred which killed one of them. The ground came away without warning from a "soapy head." The Coroner's jury returned a verdict of accidental death, no blame being attachable to anyone. (2543/13.)

A fall of rock in the stopes of the Ivanhoe G.M. above the 2,120 feet level caused the death of a miner who was working there. He and others had been barring down loose rock after firing, but the place where the fall occurred was not thought to be shaken and was believed to be safe. The back was well supported by numerous timber stacks. The Coroner's jury found that death was due to an accident. The Inspector of Mines was of opinion that the men had not been so careful as they ought to have been. (3178/13.)

Miscellaneous Underground.

At the Ivanhoe Gold Mine a fatal accident occurred to a man who was passing through a stope to get a shovel, through his falling down the main ore pass, which was uncovered at the time. The Coroner's jury found that the deceased came to his death through falling down the main ore pass, and that no blame was attachable to anybody, but added that in their opinion there should be a barricade across the stope about 30 feet from the open pass as a warning of danger ahead. The Inspector of Mines has reported that the management did not anticipate that anyone would have occasion to go by the opening from the stope into the pass, and that any covering over the pass would have been destroyed by the stones falling down from higher levels. The deceased had been working in the mine for over a year, and must have known of the position and open condition of the main ore pass. (1022/13.)

While employed shovelling sand in a rill stope above the 2,200 feet level of the Great Boulder Proprietary G.M. a man was killed owing to being buried by a sudden rush of sand from the mullock-filling pass. The sand appears to have hung up for a time, and then come away so suddenly as to choke the part of the pass below the stope and cause a heavy overflow down the rill. The Coroner's jury's verdict was deceased came to his death through falling down a rill, and that no blame attached to anyone. No one appears to have considered the place unsafe previously to the accident. (1105/13.)

A miner was engaged at the Great Boulder Proprietary mine in barring down dangerous ground, when a falling rock struck the bar he was using with such force as to drive it into his abdomen. He succumbed to his injuries two days later. The Cor-

oner's jury returned a verdict of accidental death, no blame being attributable to any person. (2344/13.)

While assisting to rig a drill in the stopes of the Golden Horseshoe G.M. two men were injured, one fatally, the other seriously, through the stage on which they were working collapsing and precipitating them down an ore pass which had been left open underneath the stage. Two other men on the stage fell clear of the pass and escaped uninjured. The failure of the stage was due to the breakage of a pole used as a bearer, and which proved to be so hollow as to be a mere shell at the point of fracture. The Coroner's jury brought in a verdict of accidental death, but added that they considered the pass should have been made safe before rigging up the stage. The machine men in charge of the drill should have covered the pass, and proceedings have been instituted against them in consequence of their neglect to do so. (3565/13.)

Surface.

At the Mt. Jones tin-sluicing plant a man met his death through the collapse of a high flume used to carry tailing from the dredge. The accident was inquired into by the Coroner, and the jury returned the following verdict: "Death by accident by the collapsing of the sluice boxes at the Mt. Jones Sluicing Plant. We find also that insufficient care was taken in the construction of the boxes inasmuch as they were not sufficiently stayed and that some of the timbers used were not fit for the purpose." The structure appears to have been somewhat flimsily erected, and the immediate cause of its collapse most probably was the breaking of a defective piece of timber. Prior to the accident, however, no one appears to have taken any objection to the construction of the flume, and its collapse appears to have been entirely unexpected. The structure was one of a kind which necessarily has to be put up in a more or less temporary manner, as the flumes have to be removed from place to place a good deal, and it would not be reasonable to expect them to be built like permanent structures. Like flumes have been used quite successfully in the district for years, and if carefully constructed are quite strong and safe. The failure in the case in question seems to have been due to defective material. After full consideration the Crown Law Officers advised against prosecuting any person in connection with this accident. (315/13.)

An employee in the Ivanhoe Gold Corporation's battery, who was in a bad state of health, and about to leave Kalgoorlie in consequence, lost his life through falling a distance of about 9 feet from the counter shaft platform. He is supposed to have become giddy and lost his balance, but no one saw the accident happen. The platform was securely erected and guarded for all ordinary working conditions. The Coroner's jury returned a verdict of accidental death; no blame attributable to anyone. (897/13.)

A fatal accident happened to a man while carting boxes from the Royal Standard G.M. to the old mill, through the horse attached to the cart becoming frightened at the noise made by the boxes and causing the driver to fall under the wheel. As this accident happened on a mine and in consequence of the work of the mine, it has to be classed as a "mining" accident, though obviously one of a sort which might occur anywhere to a man engaged in carting with horses. (2920/13.)

A contractor died from pneumonia supervening on an injury to his lungs through being struck by a truck while removing residues from the Sons of Gwalia mill. There was no evidence of any negligence on the part of anyone or of defect in the appliances which might have led to the accident. The injury did not appear serious at first. (3039/13.)

An engine-driver at the Great Boulder Perseverance mine met with his death through an overwind, the cause of which has not been proved conclusively. There appears to be some reason to think that the driver may have fainted at his post or become temporarily incapable of acting, as he had done so on a former occasion. Through overwinding, the rope became detached from the skip and flew into the engine-house, where the heavy shackle appears to have struck the engine-driver as he stood at his levers and killed him. The engine appears to have been in good order, and in no way responsible for the accident. (3668/13.)

A man while trucking residues from under the cyanide vats at the Oroya Black Range G.M. stepped to one side to allow the truck to pass, but was caught and crushed between it and a post supporting a vat. The Coroner's jury brought in a verdict of accidental death, without blame to anyone. (35/14.)

Serious Accidents.

Should a person be debarred for a period of 14 days or more from returning to his work at a mine through injuries received in the performance of his duties, the accident is termed "Serious" (see Sec. 26, M. R. Act, 1906), although in the ordinary acceptance of the term the word "serious" would often be a misnomer.

Of the 741 serious accidents during 1913 the East Coolgardie Goldfield was responsible for 463, only 20 cases, however, being 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, toes, and noses; scalds, burns, poisoned cuts, shocks, smaller dislocations, strains, etc., but sufficiently serious to cause the sufferer to be absent from work for 14 days or more. Unfortunately there is some reason to think that many men whose injuries are very slight are beginning to make a practice of staying off longer than need be, in order to take advantage of the compensation payable under the Workers' Compensation Act, thus unduly swelling the record of accidents attended with "serious" injury.

Explosions and Explosives.

During the year 1913 twenty-two persons were seriously injured through explosions. In 10 cases the explosions occurred more or less prematurely, or before the men reached a safe place; in three, men walked up to or returned to shots just as they were about to explode; in two others explosions occurred while "bulling" holes; in four, men were hurt by detonators exploding; in one instance a plug of gelignite became jammed and partly smeared on the sides of the hole, and was exploded while being tamped; in another a man's pick struck some gelignite in a butt; in yet another, dust from a slight explosion caused injuries to a man's eyes.

Falls of Ground.

Seventy-five serious accidents occurred during 1913 through "falls of ground." In nine instances 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, unpreventable by exercise of ordinary skill and care, and of a sort inseparable from mining, but there were also several instances in which the Inspectors of Mines were of opinion that the men concerned might have been much more careful. In accidents of this sort, the care exercised by the men themselves who are actually engaged at the place is the principal safeguard, their safety lying mainly in their own hands.

In Shafts.

Twenty-nine accidents of a serious nature occurred in shafts from the following causes: 10 from objects falling down the shafts, such as a truck of stone, buckets, and stones; one from winding-rope becoming entangled with an old rope and dragging it across a man's body; one from a skip becoming derailed; two from men falling down shafts; three from cages being lowered on to men working in shafts; one from a man stepping from the cage before it was flush with the plat; one from a cage being hung up through striking a loose skid; eight from a winding engine running out of control of the engine-driver; two from cages being bumped on the chairs or bearers.

Miscellaneous Underground.

416 persons were more or less seriously injured by miscellaneous accidents underground. In 122 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, large stones moving in trucks and injuring hands, and so on, the injuries being mostly wrenches, sprains, bruises, jars, fractures of fingers and toes, and cuts. In 83 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 12 men received severe cuts while handling sharp stones. Forty-four were injured handling rock drills and coal-cutting machines and parts of same, and five by the stages on which machines were erected collapsing. Other falls in the workings from stages or ladders in rills and passes and so on caused injury to 10 persons, and 37 were hurt by falling tools and pieces of machinery. Flying splinters of stone and steel were responsible for 19 men being injured, while 15 were hurt while handling timber. The remaining 69 cases were due to various accidental causes—jarring of hands, blows from tools, strains, and so on. Many of these accidents no doubt could have been avoided by the exercise of a little care on the part of the injured party, but the majority must be regarded as purely accidental mishaps.

Surface (including machinery).

199 surface accidents were recorded during 1913. Five men were scalded by hot water, and eleven burnt in various ways. Twenty-one persons sustained injuries from falls caused by missing their footing, slipping and overbalancing; 20 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 four men, and two got their hands jarred. Falls of timber

and pieces of machinery while being handled accounted for 13 cases of injury. Fifty were caused by machinery in motion, 12 of these being caused by handling belts in motion. Twenty-eight men were hurt while handling timber. Other causes of 34 accidents were strains from lifting heavy weights, tools slipping and inflicting cuts and bruises, and so on. The majority of the foregoing accidents were mishaps of an accidental character, 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 Injury to Persons).

Regulation 11 of "The Mines Regulation Act, 1906," requires that all accidents to winding machinery be reported to the Mines Department whether resulting in injury to persons or not, and the following cases were reported during 1913 in which no person was hurt.

Overwinding.

An engine-driver at the Golden Horseshoe G.M. had just tipped a skip of ore when his attention was diverted to reply to a question from the Chief Engineer, and on receiving a signal from below to hoist, he turned on steam without noticing that he had not reversed the engine. On noticing his omission he applied both brakes, but too late to prevent an accident. The skip struck the safety thimble and hung up on the safety hooks and side grippers, releasing the rope. The Whitmore overwinding device was out of action at the time. No damage was done. (32/13.)

At the Eclipse G.M., Kalgoorlie, the engine-driver fainted while lowering two men to the No. 5 level, and allowed the cage to run down to the shaft bottom, causing slight injuries to one of the men. On coming to his senses the driver found one cage hung up in the safety hook and the other at the bottom of the shaft with nearly all the spare rope off the drum. Later on in the year the same driver was killed by his engine running out of control (*see fatal accident above, 3668/13*) under circumstances which point to his having again fainted most probably. (1069/13.)

A case of overwinding occurred at the Golden Horseshoe G.M. through the engine-driver while in the act of applying the foot-brake missing the step and lurching forward, with the result that his left hand carried the steam handle forward and applied more steam. This gave the engine an impetus which carried the cage into the safety thimble before it could be stopped. No damage was done to the cage or shaft. (1070/13.)

An overwind at the Gt. Boulder Proprietary G.M. was caused by the engine-driver allowing his attention to wander while hauling up an empty cage. The copper safety pin in the safety hook was sheared and the cage hung up in the thimble. An inquiry was held by the Board of Examiners, resulting in the driver being restricted for twelve months from driving first motion winding engines. (2001/13.)

While hauling water at the Great Fingall G.M. the engine-driver states that the tank hung a little when near the kickup while being raised, and on his applying a little more steam suddenly went up to the wheel. He immediately shut off steam and applied the brake, but not in time to prevent the overwind. (2208/13.)

At the Great Boulder Proprietary an overwind occurred through the engine-driver losing control of his engine, through the starting valve opening more easily than he expected. He was new to this work and had no right to drive the engine, as his certificate was restricted to geared engines and locomotives. No damage was done. (1163/14.)

A case of overwinding occurred at the Golden Horseshoe G.M. The engine-driver, who was pulling ore at the time of the overwind, had the cage at the top brace, and on putting on steam to lift the cage off the chairs the reversing lever became stuck, and before he could pull it back the cage was at the ring, which sheared the copper rivet in the safety hook and released the rope. No damage was done to the cage or rope. (1165/14.)

Breakage of Rope.

At the Great Fingall G.M., while water was being hauled from the shaft the winding rope broke, owing to internal corrosion, and the engine raced. The driver was putting the brake down when the indicator gear broke and part of it struck him on the knee and knocked him down. The indicator of the north drum was smashed to pieces, the eccentric rod slightly bent, and 40 feet of skids had to be replaced. Both tanks went to the bottom, but were undamaged. (1343/13.)

While bailing water at the Royal Oak G.M. the winding rope broke, the breakage being caused through faulty shoeing. No damage was done. (3601/13.)

A winding rope at the Princess Royal G.M. broke about 19 feet from the skip owing to about 10 feet of it being corroded. The rope was inspected (externally) a few weeks before, when it appeared to be in fair order, with no signs of broken wires. (1391/14.)

Loose Drums running out of Control.

An accident occurred at the Fenian G.M. through the brake failing to hold an empty cage at surface when the drum was thrown out of gear, this allowing the empty cage to run from the surface to the bottom level, taking the rope down with it also. Very little damage was done to the cage, and none to the shaft. The brake appears to have been ineffective at the time of the accident. (1850/13.)

The dynamo at the Golden Ridge G.M. was undergoing repairs, and on account of the bad light the engine-driver passed the kickup with a full tank of water. He then put the loose drum carrying it out of gear in order to lengthen the other rope, but the brake did not hold the loose drum and it gradually crept away and got out of control, and on descending to the well at shaft bottom the concussion bent up both cages. The shaft was undamaged. The accident was due to the brake being in somewhat slack adjustment. (608/14.)

Accidents to Shafts.

An empty skip while ascending the main shaft of the Great Boulder Perseverance G.M. became caught, and from some unknown cause the shoes left the guides, and the skip tipped across the north compartment of the shaft. One end cut through the wall plates on the western side and landed on the timbers above the plat, while the bottom end projected eastward over the cap piece of the plat on that side. The safety hook was broken, the rope kinked, and the skip slightly bent. Before refastening the rope to

the thimble 59 feet were cut off the skip end of the rope. No cause could be found for the accident. (2202/13)

At the South Kalgurli G.M. while hauling ore from the No. 12 level the full skip became jammed in the shaft. About 150 feet of runners were pulled out, and the rope cut through the pit head sheave and was severed on the axle of the pithead pulley. The Inspector of Mines reported that the engine-driver was not to blame for the mishap, which he considers was due to hauling a heavy load at a high speed, the speed of winding being often 3,000 to 4,000 feet a minute while winding ore. (3735/13.)

At the Hainault G.M. while hauling ore the south skip hung up near the 400 feet level from some cause unknown, and about 8 feet of skids had to be renewed. The accident was most probably due to a bolt coming out and allowing a runner to spring out. (1159/14.)

Mishaps to Winding Engines.

At the Kalgurli G.M. the band of the friction clutch on the main winding engine broke on three separate occasions without other damage resulting. The second and third breakages were at the weld made to repair the first break, and after its failing a second time a new band altogether was put in. (257/13.)

At the Eclipse G.M. the drum shaft on the winding engine broke while hauling ore was in progress. No damage resulted. (1068/13.)

The flange on the south drum of the winding engine at the Patterson's shaft of the Ivanhoe G.M. cracked owing to side-wedging action of the ropes. No other damage resulted. (2897/13.)

At the Ivanhoe G.M. one of the adjusting bolts broke of the friction clutch of the north drum of the Patterson's shaft double winding engine. No other damage resulted, and a stronger bolt has been fitted. (3459/13.)

At the Oroya Links G.M. the slide valve spindle on the winding engine broke. It was replaced by a new steel spindle. (1160/14.)

While pulling dirt from the No. 2 level of the Oroya Links the drum shaft on the winding engine broke, but no other damage resulted. The Inspector of Machinery thought it somewhat light for its work. (1161/14.)

Derailment of Skip.

A newly overhauled skip was placed on the rails in the inclined shaft of the Sons of Gwalia mine with three men in it, and when about 70 feet from the surface the skip, from some unknown cause, suddenly left the rails and stopped about 10 or 12 feet farther on. The skip was strained somewhat, but the men were uninjured, and no damage was done to the shaft. No explanation could be found of the cause of the derailment. The men concerned strenuously denied that it was possible for the skip not to have been properly placed on the rails. (3177/13.)

Chairs left in Shaft.

A platman omitting to remove the chairs in the shaft at the 700 feet level of the Great Boulder Perseverance after signalling to gear to the 1,300 feet level, the descending cage struck the chairs and rebounded, when the safety catches acted. About 500 or 600 feet of rope was run out, but was not injured. (3179/13.)

Winding in wrong direction.

At the Great Fingall G.M. No. 4 winze an engine-driver, while under the influence of intoxicating liquor, started by revolving the engine the wrong way, and as the bucket was on the bearers at top of the winze, a number of coils of rope were caused to come off the drum and fall about the engine. The engine-driver was prosecuted and fined. (1713/13.)

Cage lowered into Water.

While lowering three men to the No. 2 level of the Havilah G.A., the engine-driver missed the mark and lowered them into about 10 feet of water. The men scrambled through the bonnet and up the rope, and the driver finding he had passed his mark then raised the cage to the level, where the men rang to be raised to the surface. The driver was prosecuted for negligence and fined. (2509/13.)

Notes on Mine Regulation matters.

The reports of the Inspectors of Mines on mining accidents to persons and various other mishaps liable to cause injury to persons have drawn attention during the past year to the need for improvement in mining methods and practices in several respects, some of which are worth instancing.

Overwinding.—The cases of overwinding above reported show that the control of winding engines is still far from perfect, and that the possibility of failure of the human element in the problem has to be considered seriously as well as the merely mechanical side of it.

In two cases the engine-drivers were incompetent through drunkenness to attend properly to the engines in their charge, and in two other instances the engine-driver appears to have lost control of his engine through fainting. Fortunately there were no very serious accidents to men due to these failures of the drivers, but this must be regarded as more due to good luck than otherwise, as the same causes would probably have brought about serious disaster if men had happened to be travelling in the cages or skips when the mishaps occurred. The more general adoption of safety appliances which automatically will prevent overwinding is therefore indicated as advisable, and invention should be stimulated to obtain these of a sort that will not be too expensive for use on the smaller winding plants, as well as of more elaborate sorts for the larger ones.

The cases of overwinding usually resulted in the cages or skips being hung up by the safety detaching hooks and safety catches, while the winding ropes were released, and the action of these appliances when called upon by actual emergencies is strong testimony to their usefulness, which has often been questioned. The list of fatal accidents previously given, however, contains a case in which the engine-driver was killed at his post by the released end of the winding rope being flung violently into the engine-room, which shows that the release of the rope by the safety detaching hooks may itself become a source of danger. The choice in such a case is of two evils, as we have to balance the probability of the released rope doing damage in the engine-room against that of the results of pulling the skip or cage into and perhaps over the poppet-heads. The aim of invention should be, therefore, to devise means to make overwinding impossible, rather than to make appliances to minimise its dangerous results.

Missing Plats.—A man was hurt through unexpectedly having to step down 18 inches from the cage on to a plat, when he thought that the floor of the cage would be level with the plat. The failure to bring the cage level with the plat showed want of proper care on someone's part in not having the marks on the indicator properly adjusted to the depth. No other remedy for such accidents seems available than constant care and attention on the part of engine-drivers and platmen.

Stones falling from Skips in Shafts.—Wherever skips are automatically loaded in shafts, especially in vertical shafts, from bin-shoots, there is some danger of occasional escapes of stone over the edges of the skips. Two accidents were reported in 1913 from the falling of such stones, and the falls are so frequent in such work that it is somewhat surprising that there were not more men injured. In the Mt. Lyell mine in Tasmania the writer last year noticed the use of hinged inclined doors placed across the shaft below the skip-loading stations, by which any falling stones were caught in a receptacle at the next lower level, and which were pulled out of the way after loading at each station was finished. This method shares the disadvantage which attaches to all sorts of stationary "keeps" or hinged "catches" at stations, that the removal of the obstruction from the shaft may be incomplete or overlooked, when an accident is sure to occur to the next cage or skip which is lowered inadvertently upon it.

Protection of Passes in Stopes.—A fatal accident through a man falling down a pass in a stope while passing through this to obtain something led to a Coroner's jury recommending that a protecting barricade should be erected in all such cases. The intention of the recommendation is excellent, but there are many cases in which it would be difficult if not impracticable to carry it out without undue obstruction of the work of the mine. This seems to be one of the cases where it would not be advisable to require a specific regulation to be made, but better to rely on the general directions already included in the general rules, which require all working places to be made and kept in the safest possible condition. Where greater safety could be secured by erecting barricades, without interference with the work in the stopes, they ought to be made use of so far as practicable.

Working under Stages.—Several accidents during last year through collapse of rock-drilling stages and falls of material from such stages have emphasised the objection raised in the last two annual reports to allowing men to work under such stages. The practice is obviously one attended with considerable risk to the men underneath, and should not be resorted to without strong necessity and without great care being taken to make sure that the stages can be relied upon not to give way and fall, and that nothing heavy can fall from them on men below.

Throwing Tools into Shoots.—The rather common practice of throwing drill steel down a pass to send it to a level below led to an accident through a drill getting jammed across a pass. The tool-carrier got into the shoot to get the drill and was hurt by a falling stone. This class of accident could be prevented by lowering tools down passes by means of a rope instead of flinging them down.

Use of Crossbar as a Fence to Shaft Openings.—A fatal accident above mentioned in the Youanmi mine has directed attention to a very common misunderstanding of General Rules (7) and (36) of

Section 32 of "The Mines Regulation Act, 1906," which refer to the provision of fences across the openings into shafts. In many mines the only fences across the openings into the shafts at plats underground are the bars prescribed in Rule (36), but on reading the two rules together it is clear that the intention of the Act is that the horizontal bar should be used only temporarily, while the more permanent gate has been removed or swung open out of the way of loading or unloading operations. All such openings should have properly hinged gates, and the bar is an additional protection for use when the gate must be kept open in furtherance of work.

Prescribed Signal System.—The system of signaling prescribed in the regulations under the Mines Regulation Act has been in operation now for several years with very general satisfaction, but a fatal accident in the Bullfinch mine has led to some doubt as to its being as effective as it should be, and it has been blamed by Inspector Crabb as the cause of the accident. The system was the result of much anxious consideration by all parties concerned, and was adopted only after long examination and much discussion by the departmental officers, and it seems doubtful if any amendment yet suggested is not more likely to do harm than good. The question is one which should continue to be carefully attended to by all concerned, with the object of detecting and eliminating sources of weakness and making improvements which will render it as nearly perfect as may be attainable.

Use of Explosives.—The year 1913 was no exception to the usual experience that someone is injured every year through the practice of "bulling" holes which have "fitchered" in order to make it possible to continue boring in them. This is a very common practice, and is carried out without accident in the majority of instances, but from some unexplained cause a percentage of the holes in which charges have been fired appear to retain enough unexploded nitroglycerine or other like compound to cause an explosion when boring is resumed. So many such explosions have occurred that the practice must be regarded as highly dangerous, and therefore has been forbidden by the general rules. It seems possible that the firing of a detonator in the holes before resuming boring would succeed in destroying any explosive driven into the walls of the hole, and experiments to find if this is so are highly advisable.

Use of Gelnite Chips in lighting Fuse.—In last year's report it was suggested that the dropping out of the chip of gelnite often used in lighting fuses might be a cause of some of the premature explosions which are so often inexplicable, and during 1913 there was a case reported in which the lighted chip was actually seen to fall into the hole, but did not burn through the fuse until the firer had time to get out of the way. Very great care should be taken that the burning chips cannot fall into the hole or on to another fuse.

Plans of Mines.—The systematic keeping of proper plans and sections of their workings is not by any means so well attended to on many mines as it ought to be, and much objection is often made by owners of the smaller concerns and of such as are in financial difficulties to the requirements of the Department, that plans shall be regularly kept, and that copies of them shall be sent in yearly to the Mines office. As a matter of fact the practice in this State is much less onerous than in most of the other States of Australasia, as plans by licensed surveyors are not

insisted upon except in cases where a high degree of accuracy is necessary, which is not usually the case with the smaller mines, and very rough plans are accepted in instances where such seem to the inspecting officer to be sufficient to meet the needs of the case as a matter of record for future safety. There is so much advantage to the proper working of any mine in having good plans and sections of the workings that even the smallest should make a point of keeping them. Even if the draughtsmanship is of the crudest they are of much value so long as the measurements and bearings are fairly correct, and it has been the aim of the Inspection Department during the past year to have more attention paid to this very useful adjunct to mining operations. The copies sent to the Mines office allow proper records to be kept, and are a guarantee that the plans are duly kept at the mines. It has been decided that in future plans will be required under the Act from all mines whose operations are at all considerable.

Mines Regulation Board.

"The Mines Regulation Bill, 1913," which was rejected by the Legislative Council, contained provision for the constitution of a technical Board to deal with a great many matters of mines regulation practice which require consideration by some such authority, if improvement is to be brought about. It was proposed to be composed of the heads of the official sub-departments immediately concerned, representatives of the owners of mines, and representatives of the workmen in and about mines, and that it should have fairly wide powers of investigation, and authority to conduct experiments. The aim was to secure co-operation of all the interests concerned in investigating sources of accidents in mining practice and devising means of improving methods so as to minimise the heavy loss inflicted on the mining industry and the community in general by mining casualties. The foregoing notes indicate a few of the directions in which such a body could do very useful and necessary work, and there are numerous other questions continually arising on which investigation and experiment are necessary in order to find ways of overcoming faults in existing practice which reveal themselves by the accidents resulting from them. Much more is required than merely departmental investigations, as there is need for many innovations in existing practice which would require to be tested experimentally before being introduced by means of regulations, and to try which satisfactorily requires the use of mines in operation and the cordial assistance of both mine owners and mine employees.

Prosecutions for breaches of the Mines Regulation Acts and Regulations.

During 1913 informations were laid against various persons in 102 cases, of which 101 came into Court, and one was withdrawn without doing so, the offender having in the meantime remedied his default, which consisted of failure to pay moneys into the Coal Mines Accident Relief Fund as required by the Coal Mines Regulation Fund. Of the 101 cases which went into Court one was withdrawn in the Court and three were dismissed; in the remaining 97 instances fines were inflicted of varying amounts together with Court costs. An appeal affecting 11 of these cases went to the Supreme Court, and was upheld, with costs against the Department.

Mines Regulation Act, Section 42.—Forty-four informations were laid against managers of mines for employing persons unable to speak the English

language readily and intelligibly. One was withdrawn in Court, two dismissed, and fines were inflicted in 41 cases, of which, as above mentioned, 11 were lost on appeal to the Supreme Court.

Mines Regulation Act, Section 40.—Thirty-eight charges were laid, 19 against the manager of a mine for employing the same number of men, and 19 against these men for accepting employment, for more than thirteen consecutive days in a fortnight. Fines were inflicted in all cases.

Mines Regulation Act, Section 57.—Ten persons were charged with negligence causing injury to persons or endangering their safety, and fines were inflicted in all cases. Three cases involved engine-drivers, four miners (for careless use of explosives), two platmen, and one shift boss.

Mines Regulation Act, Section 32.—Four miners were prosecuted and fined for breaches of the general rules relating to firing and use of explosives, and one manager for putting up a rise in contravention of Rule 49, which requires use of the box system of rising. The other prosecution under this section, under Rule 9, was of the owners of a large mine for failure to keep a working place in safe condition, and was dismissed by the Court without costs against the Department.

Mines Regulation Act, Section 51.—One owner of a prospecting mine was prosecuted and fined for illegally removing ladders from a shaft which he had abandoned.

Mines Regulation Act, Section 26.—One mining manager was prosecuted and fined for failure to report a serious accident.

Coal Mines Regulation Act, Section 52.—A coal miner was fined for failure to observe special Rule 17 of the colliery in which he was employed by neglecting to set timber to keep his working place in safe condition, although he had been instructed to do so by the overman.

Exemptions from Section 31, Subsection 4, of "The Mines Regulation Act, 1906."

During the year under review twenty exemption certificates were issued to allow men to take charge of machinery where it was impracticable for various reasons to employ a duly qualified engine-driver. Before issuing the exemptions the Inspectors of Mines examined the applicants on the machinery for which the exemption was required, to determine whether they were capable of handling and taking charge of it. These exemptions do not permit of men being lowered or raised, but are only to be used when hauling ore or materials.

Sunday Labour.

The number of cases during 1913 in which permission was given for labour to be employed underground on Sundays was only 26, as against 50 in 1912. It was given to 14 mines, including six collieries, and in every case was on account of urgent work which could not be done at other times in the week without stopping the work of a large number of other men. The legislation on this matter has been fairly successful in attaining the desired result of causing owners of mines to make their arrangements underground such that they are able to get enough ore during the week days to allow them to run their mills continuously without requiring employment of men getting ore underground on Sundays.

Sampling Mines before granting Loans under the Mining Development Act.

During 1913 it was found advisable in several instances to have mines regularly sampled before granting advances under the Mining Development Act, and it has been very strongly impressed upon the writer that this practice is one which should be continued and extended. There are many applications for assistance under the Act in which judgment of the prospects of success has to rest on other factors besides ore in sight, and where sampling is of little consequence in comparison with the history of the mine and the mode of occurrence of the ore; but in the majority of cases the success of the loan depends so entirely on the prospects of the ore in sight being payable that no proper judgment of the probability of the loans being repaid can be made without ascertaining values by systematic sampling. In one case met with during the past year the mine returns of assay values obtained while driving through an ore body proved to be entirely incorrect when they were checked by an independent sampling, and what has been reported to be a large body of workable ore proved to be quite valueless "country." Had the mine assays been accepted without question, the case for a loan under the Mining Development Act would have been a very good one, and a loan of £1,000 would have been granted, most probably. The expense of sampling should be looked upon, therefore, as an insurance necessary to guard against making loans on unsound grounds. In the case in question it is only fair to say that the responsibility for the incorrect assays appears to have rested with an assayer who did the work, but who was not on the mine staff, and not with the latter, who accepted the results in good faith.

Sampling of Copper and making Advances on them.

In September, 1912, representations were made to the Minister that there was a great demand in the Roebourne district for some means whereby persons raising auriferous copper ores might obtain cash advances upon them to enable them to continue working their mines until the proceeds of sale of the ore were available. It is usually five to six months after the ore is raised before the money obtained by sale of it in Europe can be returned to the producers. Strong assurances were sent by the local people that there were as many as seventy men anxious to work, and that 80 tons of ore per month could be guaranteed. The Minister then approved sending an experienced sampler to Roebourne, and laying down a sampling floor, so that parcels of ore might be assayed properly, and advances made in accordance with the assays. The sampling floor was completed in November, 1912, but the supplies of ore were very far from the quantity promised, and up to the first week in March, 1913, only three parcels had been received and sampled aggregating 22 tons. The floor was then taken up and removed to Fremantle, where it has been laid down in the J. shed on the North Wharf for convenience in sampling ores for export. The net cost of laying down the floor at Roebourne and removing it was £43 18s., and of sending the sampler there for five months of the experiment, £149 17s. 8d. The parcels of ore were shipped to Liverpool, and sold there for a total net return to the owners of £172 1s. 10d.

Since the sampling floor has been laid down at Fremantle several parcels of ore from various parts

of the State have been sampled upon it, and as its usefulness is becoming better known there seems much likelihood of its becoming of much service to owners of small mines raising copper or lead ores who have parcels of ore to be sent out of the State for treatment.

Field Work.

Owing to great press of office work during the year, the writer was not able to do much personal examination of the various mining districts. An examination was made of the Gimlet and Victorious mines at Ora Banda in January, the reports on which were published in last year's annual report of the department, and in August and September a visit was made to the Phillips River Field, a report on which, in Bulletin form, is now in the printer's hands. Two visits were made to Southern Cross to fix sites for diamond drill boring on Fraser's leases, and four to Kalgoorlie in connection with departmental mat-

ters of various sorts. In April and May the Government of Tasmania requested my services in connection with an inquiry into the methods of working the Mt. Lyell mine, for which leave was granted by the Government of this State. Altogether 72 days were spent in the above work.

Assistance to Mining Development.

Appendix I to this report contains particulars of all the operations carried on during 1913, with aid of financial assistance from the Government, under the provisions of "The Mining Development Act, 1902," and with moneys from the vote for the development of mining, with tables showing the expenditure and returns in each case.

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... Appendix I to this report contains particulars of all the operations carried on during 1913, with aid of financial assistance from the Government, under the provisions of "The Mining Development Act, 1902," and with moneys from the vote for the development of mining, with tables showing the expenditure and returns in each case.

APPENDIX 1.

LOANS AND SUBSIDIES UNDER "THE MINING DEVELOPMENT ACT, 1902," AND THE
MINING DEVELOPMENT VOTE: ACTION DURING 1912.

(Nos. in italics represent Nos. in last year's report.)

(a.) ADVANCES FOR PIONEER MINING AND PROSPECTING.

1. *Sunbeam G.M.L. 1121X, Kanowna (1).*—There were no transactions during 1913. (4748/11.)
2. *Eclipse G.M.L. 1047X, Gindalbie (2).*—With the exception of the vertical boiler and rock drills all the plant on this mine has now been disposed of, and the proceeds credited to repayment of the loan. (1144/12.)
3. *Westralia Tasmania G.M.L. 1665T and Mt. Noungel G.M.L. 1745T, Erlistoun (3).*—Beyond payment of interest on loan to the end of December, 1912, there were no transactions on this account during 1913. (2427/11.)
4. *Greenbushes Prospecting and Mining Co., Ltd.; Greenbushes South Cornwall M.L. 300 (6).*—During the year little work was done in the mine, and the tribute agreement was terminated. Messrs. Barrymore and Phillips then applied for a lease of the ground, offering a rental of £1 per week for the plant. This offer was still under consideration at the end of the year. (977/12.)
5. *North End Mines, Ltd., Kalgoorlie, G.M.L. 4037E, Devon Consols South Extended (8).*—The owners of this mine believing they had discovered a large body of workable ore in the 4th level, requested an examination by the State Mining Engineer, who visited the mine, and had the supposed ore occurrence carefully sampled. The results showed that there was no large ore-body as supposed, but only small values in occasional veins in the ground traversed. At the end of the year the mine was under exemption. (3461/08.)
6. *Jupiter G.M.L. 771M, Mt. Magnet (9).*—During the year the loan was further reduced by proceeds of the sale of engine, winch and kibble. (319/12.)
7. *Wheal May Lead Mine, Northampton (11).*—During the year the boiler was disposed of for £40, and the rest of the machinery sent into the Public Works Department's yard at Geraldton for storage. (1807/09.)
8. *Jourdie Enterprise G.M. Syndicate G.M.Ls. 786S and 773S, Jourdie Hills (12).*—Towards the end of the year the above syndicate refunded to the Government the total balance of the amount of the loan and interest thereon. (2150/11.)
9. *W.E.G. G.M.L. 505G, Niagara (13).*—No transactions took place in connection with the loan on this mine during 1913. (4286/10.)
10. *Lady Florence G.M.L. 1265, Cue (15).*—No work has been done on this mine during 1913, and the lease was forfeited for nonpayment of rent. (363/10.)
11. *Kalgoorlie North End Development Co., N.L. G.M.L. 3880E, Devon Consols, Kalgoorlie (17).*—During the year the whole of the plant was disposed of to the Westralian Machinery Corporation, Ltd. (2744/12.)
12. *Klondyke Boulder G.M.L. 604, Warrarwoona (18).*—During the year the shaft was sunk 80 feet, making the total depth 239ft. 6in., where crosscuts were put in East and West for a distance of 152 and 112 feet respectively. The west reef was found to be 2ft. wide, and estimated to return 2ozs. of gold per ton. A large reef was struck in the east crosscut. A parcel of 20 tons—15 tons being from the west reef—of stone gave a return of 47ozs. 9dwts.; another parcel of 30 tons from the east reef returned 58ozs. 10dwts. The amount of gold won during the year was 830ozs. 11dwts. 12 grs. from the west reef, No. 2 level, and 103ozs. 19dwts. from the east reef from crushings of 816 and 57 tons respectively, giving values of £13 14s. 2d. and £6 14s. 9d. per ton. (4548/11 and 360/14.)
13. *Britannia G.M.L. 953M (19).*—This mine was being worked by a party of tributers at the end of 1912, who took out a few crushings in 1913, but found the proposition too low grade to proceed with it, and therefore surrendered it in January, 1914. (909/12.)
14. *Water Supply to Hannans Reward Tributers, Kalgoorlie (20).*—No reduction of the loan was made during 1913. (2527/12 and 1051/13.)
15. *V's United G.M.L. 271F, Mt. Morgans (21).*—The Crossley engine was sold during 1913, but there were no further transactions on account of the loan in this case. (2426/11.)
16. *Balkis G.M.L. 5354Z, Menzies (22).*—During the year a crosscut was driven west 39 feet at the 400ft. level, when the displaced lode was located; a drive was then put in north and south for a distance of 28 feet, and a 10ft. winze sunk. The lode was 2 to 3 feet wide. Work was still proceeding at the end of the year. (3016/11.)
17. *Lady Seddon G.M.L. 633B, Black Range (23).*—This mine has been worked during the past year by a tribute party, the owner being a member of the party. A fair amount of development has been done in the shallow ground. A crushing put

through gave poor results. At the close of the year the party were still struggling to carry on the mine. (4556/11.)

18. *Princess Royal Syndicate G.M.Ls.* 222, 653, 784, 1016, 1048, and 1114, *Cue* (24).—The leases have been surrendered and taken over by a tribute party. An old cage, trucks, and rails were sold for £5. (2898/11 and 3118/13.)

19. *Riverina G.M.L.* 123U, *Mulwarrie* (25).—During the year a level was driven 36 feet at 236ft., making the level 112 feet long from face to face. Work in the mine has been carried on continuously, and at the end of the year there were about 4,000 tons of 4dwt. sands ready for treatment by the cyanide plant. (1373/12.)

20. *Champion South G.M.L.* 817N, *Nannine* (26).—During the year, as the party were unable to carry on, the Department foreclosed its mortgage, and the plant was sold to Mr. Crockford for £350 on hire purchase terms, he being given at the same time a subsidy of 1s. per ton on all ore crushed in his battery for the public at Meekatharra State Battery rates. By the end of the year the plant was removed and erected at Meekatharra. (2257/12.)

21. *Great Carbine G.M.L.* 928R, *Linden* (27).—Work in this mine during the year 1913 resulted in 282.03ozs. of fine gold being obtained, worth £1,198 0s. 10d., and rent and royalties have been duly paid. (1197/09.)

22. *Stanley G.M.L.* 1271X, *Kanowna, J. Rollo and M. Gregor* (28).—During the year the shaft was sunk to 97 feet, where a thin layer of "wash" was encountered carrying good values in gold in parts, but on the whole rather poor. An option was then taken over the mine on account of one of the large Kalgoorlie mines, which did a considerable amount of driving without locating a body of payable ore although several small rich pockets were met with. There is said to be about 3 feet of gold-bearing material described by Mr. Rollo as "decomposed felsite" at 8 feet below the "wash" which gave more consistent values than the latter. The ground in this mine proved very heavy, and required close timbering, and the shaft became unsafe and had to be abandoned. Fifty tons of "wash" crushed returned under 3dwt. of gold per ton. The owners then turned their attention to reopening the "Rollo's Reward" mine, and left this one. (2376/10.)

23. *Havilah Development G.M.L.* 345B, *Black Range* (29).—In April, 1913, the Hon. the Minister approved of £100 of the loan being expended in the purchase of a boiler and tools. A fair amount of development work has been done during the year, the shaft having reached a depth of 250 feet. Interest has been met to 31st December, 1913. (2981/12.)

24. *The Globe G.M. Syndicate G.M.L.* 912N, *Meekatharra* (30).—During the year the shaft was sunk 90 feet, making it a total depth of 220 feet. Owing to the hardness of the rock the party, instead of completing the 100 feet of sinking specified in the agreement, opened out at 204 feet, where a plat was cut on the south side, and a drive put in west 3 feet from the edge of the plat. At the 220 feet a cross-cut was put in 34 feet, but no gold was struck. Interest to 30th June, 1913, was met. In October the party was granted four months exemption to raise further capital to develop the mine. (3594/09 and 830/13.)

25. *The Bullrush Gold Estates, N.L., Yuin—Erection of a Telephone Line, Yalgoo to Yuin* (31).—The sum of £175 10s. was expended by the Department during 1913 on the above line, which was duly completed and put into use. An instalment towards repayment of the money advanced has since been received. (3715/12.)

26. *P.A.* 485Y, *Jenkins, Brown and party, Bulong* (32).—This party worked throughout the year and did a large amount of good prospecting work at the 110 ft. level, getting some good prospects but only a little payable ore. Further advances up to £150 were approved in July, for driving at the 200 ft. level, but this work was not successful either in finding ore worth working out. A good deal of stoping was done as well as driving and crosscutting. Operations were discontinued definitely in January, 1914. (1435/12 and 1803/13.)

27. *Morning Star G.M.L.* 4484E, *Boulder* (33).—The balance of the plant, with the exception of an electric motor, has been disposed of during the year. (3786/12.)

28. *Lake View G.M.L.* 606, *Payne's Find, Yalgoo Goldfield* (34).—This mine continued working during the year with some success, though badly hampered by want of water, and the question of utilisation of the pipes supplied appears to have been in abeyance. (2372/11.)

29. *Comstock W.A. G.M.L.* 1079Y, *Randalls* (35).—During the year the shaft was sunk to 159 ft. 6in., the country passed through being very hard. As there appeared to be no possibility of obtaining a water supply by sinking the applicants were allowed to vary the agreement by putting in a crosscut west at a depth of 150 feet, and at the end of the year there were indications of a lode being in close proximity. Interest was paid to 30th June, 1913. (1104/13.)

30. *Lubra Queen G.M.L.* 734G, *Kookynie* (36).—The owners of this mine have had a hard struggle throughout the year, the gold won just paying the wages, but towards the end of the year the prospects of the mine looked somewhat brighter. (3751/10 and 2297/13.)

31. *Princess Royal G.M. Co., N.L., Princess Royal G.M.L.* 106, *Dundas* (37).—During the year sinking of the winze was continued to a total depth of 360 feet below the 950 feet level, and a chamber was cut above, to the west of the drive. Down to 321 feet the lode channel was 6 to 7 feet wide, but in the last 39 feet it contracted in width and showed an average of about 6 inches of quartz on the footwall. No payable ore was obtained, assays ranging from traces of gold up to 15s. per ton. A new head gear and bin for self-tipping skips and hauling winch were erected on the winze. An application for a further loan of £2,000 was refused, and in May the funds being exhausted the mine was closed down under exemption. (3573/12.)

32. *Dostmund G.M.L.* 738R, *Yarri* (38).—Progress on this mine during the past year has been rather unsatisfactory, but there is still some prospect of better results. (29/05 and 3541/13.)

33. *Sunset G.M.L.* 2240, *Golden Valley* (39).—In June, 1913, the owners of above mine applied for further assistance by way of a pumping plant as the development of the mine was being retarded by an inflow of water. The winch and rope belonging to the Eclipse mine at Gindalbie were sold to them on hire purchase terms. (2239/12.)

34. *Specimen Hill G.M.L. 1644T, Mt. Weld (40)*.—During the year several crushings were put through, giving good values. In October the balance outstanding of the loan and interest thereon, were repaid, and the transaction satisfactorily concluded (2060/05 and 709/13.)

35. *Hawk G.M.L. 725G, Niagara (41)*.—A fair amount of development work has been done on this lease during the year, but no gold was won, and the party were therefore unable to make any repayments. (3703/12.)

36. *Creme d'Or G.M.Ls. 389D, 421D, and 422D, Day Dawn (42)*.—During the past year a complete producer gas plant has been erected and a fair amount of development work done. Several crushings have been put through with fair results, but up to the end of the year the party found themselves unable to meet the interest due, or to repay any portion of the loan, owing to the heavy expenditure in erection of the machinery. (2334/12 and 3373/13.)

37. *Metzke and party, P.A. 647*.—A loan of £100 was granted to Metzke and party on a £ for £ basis to assist them in sinking a shaft on their P.A. and crosscutting and driving therefrom. Loan to bear interest at 5 per cent. per annum, and to be secured by a first mortgage and bill of sale over the P.A., and to be repayable by 15 per cent. of all gold won. A shaft was sunk 72 feet, and several drives put in on a layer of "wash" carrying some gold, but not enough to pay for working. The amount of the loan was later on increased by £100, and a second shaft was sunk 76 feet, and driving and crosscutting started therefrom. At the end of the year the party were driving west to connect with a crosscut in the workings from the first shaft. The "wash" contained gold, and some of it was worth raising for treatment. (4164/12.)

38. *Maori Lass G.M.L. 2416, Yilgarn*.—In August the Hon. the Minister approved of a loan of £600 at the rate of £ for £ expended by the syndicate for the purpose of purchasing and erecting machinery on the mine, sinking the shaft (which had already been sunk to water level) to 100 feet, and driving and crosscutting 200 feet therefrom. The loan to carry 5 per cent. interest per annum, payable half-yearly, and to be repaid by monthly instalments of £50 each, the total amount of the loan to be repaid within 18 months of the date of the agreement; 20 per cent. of all gold won from the mine to be paid after each crushing, and to go towards payment of the interest and instalments. At the end of the year the erection of the plant was nearing completion, the shaft timbered to water level, and the pump being installed. (2126/11.)

39. *Nungarra Junction G.M.L. 619B, Black Range*.—In January the Hon. the Minister approved of a loan of £150 to Mr. Werner, the owner of the above mine, to assist him in purchasing and erecting an oil engine and pump on his mine; the loan to be secured by a bill of sale and first mortgage over the mine and plant; repayments to begin three months after payment of the last instalment by 10 per cent. of the value of all gold won until the loan is repaid with interest at 5 per cent.; the whole to be repaid within two years. Four hundred tons of ore were crushed from the mine, and at the end of the year an instalment had been paid in reduction of the loan. (4645/09.)

40. *H. A. Ryan, Mt. Ryan Reward M.L. 45, Poonak. Mining for Emeralds*.—During 1913 a loan

of £100 was granted to Mr. Ryan on a £ for £ basis for sinking and timbering his shaft. The shaft was sunk a distance of 62 feet, and a drive put in 16 feet on the east load without meeting with any emeralds below 10 feet in the shaft. The shaft was therefore abandoned, and at the end of the year a new one was being sunk about 100 yards north-east of the old one. (3946/12.)

(b) *Assistance in erecting Batteries and Treatment Plants to be used for Ore Treatment for the Public.*

41. *Spring Hill G.M.L. 724, Parker's Range (43)*.—This mine and the battery thereon continued working all through 1913 under great difficulties on account of shortage of water. In September it was agreed that a further loan of £200 be made available to the owner of the mine to assist him in sinking his north shaft 50 feet deeper, from 110 feet to 160 feet, and crosscutting at the latter depth. At the end of the year, however, Mr. Patterson notified that he could not take the loan. (499/14.)

42. *Never Never G.M.L. 665, Yilgarn (44)*.—This mine during the past year was in the hands of the Yilgarn Gold Mining Co., Ltd., who let the slimes to Messrs. Allsop & Don of Kalgoorlie for cyanide treatment. No work was done in the mine itself. Payments of £203 4s. 9d. for interest and £551 9s. 11d. on principal reduced the outstanding debt to £527 17s. 5d. at the end of the year, the moneys being derived from gold won from the slimes treatment. (4224/11 and 3438/13.)

43. *Hidden Secret North G.M.L. 4253, Eundynie (45)*.—This transaction was concluded successfully during the year by the owners of the mine paying off the balance of the loan and interest. (3245/11.)

44. *Lady Pratt G.M.L. 1228X, Mulgarrie (47)*.—Several crushings were put through this battery during 1913, and the loan was reduced by £26 6s. No gold was returned as won from the mine during the year. (4475/11.)

45. *Royal Mint G.M.L. 549, Yalgoo (48)*.—Early in the year the agreement for lease of the plant was terminated, and fresh tenders were invited for it. No offers being received, all movable articles were stored at the Court House, Yalgoo. The plant was again offered for sale later on, and several tenders were received, but no finality had been reached at the close of the year. (1518/12.)

46. *Malcolm Prospecting Co., N.L., Mt. Malcolm (50)*.—Work on this mine has continued steadily during the year, and part of the interest on the loan has been met, but it has not been possible to obtain any reduction of the principal advanced. (4416/11.)

47. *Randwick G.M.L. 978C, Mt. Malcolm (51)*.—No transactions occurred on this account during 1913. (1575/14.)

48. *Hornsby G.M.L. 937N, Nannine (formerly North Pole and Gibraltar) (52)*.—Mr. Fenwick's interest in this mine and machinery were transferred to Messrs. Rupe and Young, of the Romsey mine, who were granted a loan of £150 for repairs to the battery. The new owners took over the liability in regard to the existing Government loan, and gave a mortgage over both the Romsey and Hornsby mines and mill. The repairs were effected, and the mill running satisfactorily early in the year. The Hornsby mine was forfeited for non-payment of rent, and in September Messrs. Rupe and Young took up M.A. 12N in lieu of it, being portion of the Hornsby mine on which the mill stands. 3409/12.)

49. *Red Hill Westralia G.M. Co., Ltd., Sons of Erin Battery, Higginsville (54)*.—No transactions during 1913. 1866/07.)
50. *Phoenix G.M.L. 622N, Quinns (55)*.—During the year the Department foreclosed on its security, as the owners of the mine were unable to carry on. The mine was advertised for sale without result, and the tools and movable parts of the plant stored at the State Battery, Quinns. (3911/10.)
51. *Southern Cross G.M.Ls. 1076 and 1067, Bulong (57)*.—Development work was carried out on these leases with but little success during 1913, and in September operations were suspended owing to the party being unable to carry on. At the close of the year endeavours were being made to form a syndicate to test the old Oversight G.M. (4726/11.)
52. *Ravensthorpe Battery Co. (58)*.—Crushing operations were continued during the year at intervals, and the Minister approved of the subsidy of 1s. per ton on stone crushed for the public being continued. (3683/12.)
53. *Great Victoria G.M.L. 719, Yilgarn (59)*.—During 1913 this mine was examined by prospective buyers on options of purchase, but at the end of the year it had not changed hands. Very little fresh progress was made in developing the mine during these negotiations, and the running of the mill was greatly limited by shortage of water. (2675/12.)
54. *Battaglia and Party, Battlesville G.M.L. 931R, Yundamindera (60)*.—Several crushings were put through the battery during the year, and a cyanide plant was erected, but the party had a very hard struggle to carry on, the ore being of low grade. (2071/12 & 371/13.)
55. *Red White and Blue G.M.L. 641B, Curran's Find, Youanmi (61)*.—During the year the owners of this mine were supplied with a 5-head battery complete, erected on their mine on hire purchase terms, on condition of their undertaking crushing for the public. At the end of the year the plant was erected, and ready to hand over. (1353/10.)
56. *McCahon and Party, Cyanide Plant at Mt. Ida Battery (62)*.—The above party having discontinued working the cyanide plant with no prospect of resumption of it at an early date, the Department foreclosed its mortgage. Tenders were called for the plant, but no offers were received. (363/12.)
57. *Donovan's Find G.M.L. 768, Yilgarn (63)*.—The battery continued running during the year, but was hung up in October owing to scarcity of stone for crushing. Owing to the battery not getting the amount of public crushing work which had been expected, the owner has been unable to reduce his liability on his loan. (3145/12.)
58. *King's Sound Mining Company, Limited, Taylor's Wolfram Reward M.L. 146H, Derby (64)*.—This mine was under exemption for the first three months of the year owing to shortage of funds. The company then went into liquidation, and a new company was formed called "The Charago Tin Mining Company, Limited," who applied for a loan of £500 to develop the property. The mine was examined by Mr. Blatchford, Assistant Government Geologist, but as his report was unfavourable, further assistance was refused. Three months more exemption was granted in June. At the end of the year the company were endeavouring to sell the mine. (2322/11 and 1064/13.)
59. *Chunderloo G.M.L. 1084N, Yaloginda, The Lane Mill Syndicate (65)*.—During the year the milling and winding plant was erected, and considerable development work done. The shaft was sunk 108 feet and opened out at 100 feet; a crosscut was driven 112 feet and connected with the old workings. An additional loan of £250 was granted for further sinking, driving, and crosscutting. (5947/10 and 1337/13.)
60. *Star of Fremantle G.M.L. 654S, Kunanalling (66)*.—Development work was carried on during the year, and several crushings were taken out, which gave fairly good values when put through the battery. (3912/12.)
61. *S. Graham, M.A. 14, Hope's Hill*.—In January, 1913, Mr. Graham was granted a loan of £150 to assist him in purchasing a boiler. The loan to be secured by a bill of sale and mortgage over the M.A. and plant thereon, with interest at 5 per cent. per annum, and to be repayable by four equal quarterly payments, beginning three months after the loan is paid: all payments of subsidy for public crushing to be applied on reduction of the loan. (94/13.)
62. *Erection of Public Battery on Harder to Find G.M.L. 364P, Ruby Well*.—During the year the Hon. the Minister approved of a loan to F. B. Trude of £500 for the purpose of erecting a 5-head battery for public crushing. The loan to bear interest at five per cent. per annum, crushing rates not to exceed 20 per cent. over those prevailing at the nearest State battery; tailings to be purchased or allowed to be removed by owner; and all stone crushed for the public to be subsidised at 3s. a ton. The plant was erected, and started crushing on 15th August, and has been working throughout the rest of the year. (2815/12.)
63. *Transcontinental G.M.L. 805Y, Randalls*.—Messrs. Friedman, Johnson and Truman applied in September for a loan in aid of their erection of a battery of 10 stamps on the "Santa Claus" mine, which should be open for public crushing, and a loan of £1,500 was accordingly authorised under Part IV. of the Mining Development Act, secured by first mortgage and bill of sale over the whole mine and plant, charges for public crushing not to exceed 11s. 6d. per ton. A subsidy of 1s. 6d. per ton was also granted on all ore crushed for the public. The total cost of the plant to be erected was estimated at £4,020. Good progress was made with the erection of the plant, but it was not quite completed by the end of the year. (2106/12.)
- (c)—Boring.
64. During the year 1913 no transactions have taken place in connection with the following loans, previous dealings with which were given in last year's report.—Boring for coal at Eradu (72); J. Rollo, boring on North Lead, Kanowna (68); Diamond drilling at Cue (71); Mt. Morgans Drilling and Exploration Syndicate Limited, Mt. Morgans, (67); Lord Cardigan G.M.L. 1042, Southern Cross, (74); and Violet Golden Valley (69).
65. *The King's Cairn Mining Company, Limited, Parker's Range (73)*.—The property owned by this company was under exemption the whole of 1913 to allow of the company obtaining further capital. (1054/11 and 1583/13.)

66. *Allerton G.M.L. 2529, Southern Cross (75).* The cores from the second bore on being assayed gave 17grs. of gold per ton from 310ft. 6in. to 320ft. 10in., and a trace of gold at 320ft. 10in. to 335ft. 9in. (134/12.)

67. *Boring at Fraser's Mine, Southern Cross.*—Towards the end of 1912 arrangements were entered upon between the owners of the late Fraser's G.M. Syndicate's leases, a local company known as the Yilgarn Diamond Drilling Company, No-Liability, and the Hon. the Minister for Mines, whereby an extensive series of bores should be made to test Fraser's line of reef at depths well below the present workings, the Hon. the Minister agreeing to pay two-thirds of the expense up to a total not exceeding £10,000 worth of boring. There was much delay in finally fixing all details of the legal arrangements, which were not completed till September, 1913, but boring was started in advance of them in January, 1913, with the Government Diamond Drill.

No 1 bore was nearly opposite No. 2 shaft and was carried down vertically to a depth of 1,160 feet, intersecting the whole of the Fraser's series of reefs between 700 and 1,000 feet. A lode previously unknown was cut at 538½ to 542½ feet, the core from which gave an assay result of 19dwt. 21grs. of gold per ton. The rest of the cores gave very low assay results.

No. 2 bore was then commenced and carried down to 701 feet with the Government drill, after which, in September, the work was given on contract to the Goldfields Diamond Drilling Company, who provided

their own plant. This bore was at an angle of 80deg. from the horizontal, and was terminated at 825ft., after again passing through the whole series of reefs known as Fraser's Mine, in positions closely corresponding with those in No. 1 bore, between 440 ft. and 758ft., but also with very poor assay values.

No. 3 bore was then put down opposite Fraser's South Extended shaft, at an angle of 80deg. from the horizontal, and carried down to a total depth of 549ft., passing through the Fraser's Extended series of lodes between 330ft. to 478ft., with small values (2dwt. 13grs. per ton) at 447 to 452ft.

No. 4 bore was 150ft. S.E. of No. 3, also to cut Fraser's South Extended lode, and was at 80deg. from the horizontal. It was carried down to 550ft., cutting the Fraser's South Extended lode series from 328 to 447 feet, but with poor results, the highest assay return being 3dwt. 6grs. per ton from 336 to 339 feet. There were smaller values from 328ft. to 339ft. 391ft. to 401ft., 431ft. to 436ft., and 443 to 447ft., from 17grs. per ton up to 2½dwts. per ton.

No. 5 bore at 60deg. from the horizontal, was put down 100ft. S.E. of No. 4, the flatter angle being employed for the purpose of boring into the footwall of Fraser's South Extended reef far enough to see if Fraser's series of lodes still existed to the N.E. of them. This bore was still in progress at the end of 1913, having then reached a depth of 596 feet.

68. *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 THE MINING DEVELOPMENT VOTE
FROM 1ST JANUARY TO 31ST DECEMBER, 1913.

Mine or Owner.	Mining Centre.	Amount.	Total.
		£ s d.	£ s d.
<i>A.—Advances in Aid of Mining Work and Equipment.</i>			
E. J. Evans	Riverina	90 0 0	
"Creme d'Or"	Day Dawn	250 0 0	
Davidson, G. W.	Randalls	60 17 6	
"Lubra Queen"	Kookynie	500 0 0	
"Princess Royal"	Norseman	1,375 14 2	
"Havilah Development"	Black Range	261 9 7	
Bryce Bunny	Laverton	40 14 7	
Hill, W. S.	Linden	161 0 0	
"Dostmund"	Yerilla	65 16 5	
Brown, Cramp and others	Bulong	353 13 4	
John Rollo and Mark Gregor	do.	112 0 0	
Globe G.M. Co.	Meekatharra	444 2 9	
Klondyke Boulder	Warrawoona	500 0 7	
McDermott & Soanes	Meekatharra	800 0 0	
Werner, F.	Black Range	143 17 3	
"Balkis"	Menzies	115 10 0	
Metzke, Svendsen & Watson	Darlot	103 6 3	
Callion	Callion	87 0 0	
Ryan, Alex.	Cue	30 10 0	
Rupe & Young	Nannine	150 0 0	
Maori Lass	Southern Cross	600 0 0	
			6,245 12 5
<i>B.—Advances in Aid of and Equipment of Batteries for Public Crushing.</i>			
Graham, S.	Southern Cross	127 5 0	
Johnson & Friedman	Ora Banda	924 10 11	
King's Sound Mining Co.	Derby	250 0 0	
Red, White and Blue, "Curran's Find"	Curran's Find	2,450 4 5	
Ruby Well	Peak Hill	359 19 1	
			4,111 19 5
<i>C.—Boring Advances.</i>			
Lord Cardigan	Southern Cross	36 9 6	
Allerton Leases	do.	169 17 11	
Fraser's	do.	2,671 12 6	
Coal Kockatea, No. 2		415 5 2	
			3,293 5 1
<i>D.—Miscellaneous Expenditure.</i>			
Boring Plant Parts		3 9 6	
Renewals and Repairs to Diamond Drills		18 0 0	
Purchase of Carbons		534 0 0	
Rebate re Water Supply		600 6 6	
Preliminary investigations—Sampling Mines		364 11 2	
Clearing Road, Edna May Mine		19 10 3	
Assistance Telephone Line, Yalgoo to Yuin		175 10 0	
			1,715 7 5
<i>Subsidies on Carting long distances to Batteries.</i>			
Southey & Party	Leonora	3 9 0	
Superintendent, State Batteries	Perth	9 15 0	
Metzke	Darlot	29 12 4	
<i>State Batteries.</i>			
Recoups of Crushing charges deducted in lieu of cartage subsidies		0 19 0	
			43 15 4
<i>Subsidies to Batteries crushing for the Public.</i>			
Edjudina G. F., Ltd., 366½ tons	Edjudina	27 9 6	
Mandlestam, 723½ tons	do.	54 5 3	
Buhlman, F. T., 526 tons	Mulgarrrie	26 6 0	
Patterson, W. A., 704½ tons	Parker's Range	35 4 6	
Trude, F. B., 935 tons	Peak Hill	233 15 0	
Langford & Smith, 694½ tons	Lawlers	69 9 0	
Poole, H., 2,701½ tons	do.	270 3 0	
Gem Consolidated, 1,206 tons	Kundip	120 12 0	
Spencer & Thompson, 85 tons	Berrigrin	8 10 0	
Stuckey, N. S., 2,351½ tons	Carrabin	235 3 0	
Gem. G.M. Co., 543 tons	Kundip	59 16 0	
Ravensthorpe Battery Co. 375 tons	Ravensthorpe	18 15 0	
Spicer, J., 190 tons	Tampa	6 15 0	
Ware, C. H., 1,606 tons	Kundip	80 6 0	
Phippard Bros., 40 tons	Pilbara	75 0 0	
Graham, S., 1,713 tons	Southern Cross	128 9 11	
			1,440 19 2
<i>Subsidies on Development Work.</i>			
Rufin, P.	Linden	3 11 0	
Dawkins, H.	Black Range	22 6 3	
			25 17 3
<i>Providing Transport for Prospectors.</i>			
Purchase of Horses, Camels, etc.			215 10 7
Purchase of Tailings	Various		10,430 19 2
			£27,532 5 10

The amount, £10,430 19s. 2d., 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.

SUMMARY OF EXPENDITURE ON MINING DEVELOPMENT, ETC.—continued.

ADVANCES REFUNDED.

1st January, 1913, to 31st December, 1913.

Mine or Owner.	Mining Centre.	Amount.	Total
		£ s. d.	£ s. d.
Callion G.M.		300 0 0	
Jupiter Lease		0 14 4	
Britannia Lease		8 0 0	
Bryce Bunny		190 12 3	
Jourdie Enterprise		402 15 9	
Jenkins, Brown, and party		6 1 9	
Phillips and party		71 7 1	
Never Never Lease		359 13 7	
Hidden Secret North		96 0 0	
Graham, S. . .		100 4 3	
Buhlman, F. T. . .		19 12 2	
Homeward G.M. Co.		401 10 0	
Spring Hill . .		3 10 2	
Trude, F. B. . .		140 0 11	
Red, White, and Blue Leases		2 9 10	
			2 102 12 1
<i>Recovered from sale of Securities.</i>			
Coolgardie Redemption		6 8 0	
Eclipse Mine		10 0 0	
Jupiter Lease		36 0 0	
Morning Star		65 0 0	
V's United . .		30 0 0	
Wheal May Mine		40 0 0	
Devon Consols Mine		25 0 0	
			212 8 0
<i>Miscellaneous Refunds.</i>			
Sale of Timber, etc., A. Allom . .		7 10 0	
Cost of Diamonds, Fraser's G.M.		944 17 0	
Cost of Diamonds, Lord Cardigan		170 3 4	
Cost of Diamonds, Allerton Leases		90 4 8	
Means of Transport for Prospectors		36 11 6	
Carting Ore, Metzke's		300 0 0	
Callion, Caretaker's pay . .		89 2 10	
Sale of Camel, Agricultural Department		5 11 0	
Cost Boring, Fraser's G.M.		588 2 11	
Sale of Nugget . .		788 18 8	
Refund of half Steamer Fare . .		9 0 0	
			3,030 1 11
Amounts received account purchase of Tailings			8,848 2 3
			£14,193 4 3

"THE MINING DEVELOPMENT ACT, 1902."

Advances Written off to 31st December, 1913.

Year Authorised.	Name of Mine or Borrower.	Nature of Work.	Locality.	Amount of Loan and Interest written off.	Date written off.
				£ s. d.	
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 Loubert	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
	Gt. 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
	Trenton G.M. Co., N.L.	Crosscutting main shaft	Day Dawn	621 4 6	4/5/10
1906	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	50 0 0	19/7/11
	McLellan & Smith	P.A. 221 N.B.	Broad Arrow	307 6 2	20/3/11
1910	Manton & Newson	Alathea	Menzies	195 19 11	22/8/11
				£15,128 10 0	

MINING DEVELOPMENT EXPENDITURE.

Advances outstanding at 31st December, 1913.

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., 1913.
					Previous to 1913.	During 1913.	Repaid.	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	Brittania	953M	Mt. Magnet .. .	150 0 0	114 12 6	.. .. .	78 12 6	9 4 6	87 17 0	87 17 0	
3016/11	Balkis	5354Z	Menzies	300 0 0	150 0 0	115 10 0	.. .. .	265 10 0	19 3 3	6 14 4	272 4 4
3715/12	Bullrush Gold Estates ..	.. .. .	Yalgoo	200 0 0	.. .. .	175 10 0	.. .. .	175 10 0	4 5 3	179 15 3	
2257/12	Champion South * .. .	817N, 1039N ..	Nannine	400 0 0	400 0 0	.. .. .	50 0 0	29 11 8	19 19 8	69 19 8	
3323/08	Coolgardie P.D. and Mining Syndicate	4093, 4117 ..	Coolgardie .. .	1,500 0 0	904 10 5	.. .. .	904 10 5	19 19 10	67 16 9	972 7 2	
1986/10	Coolgardie Redemption ..	3918, 4052 ..	do.	1,000 0 0	1,020 16 9	.. .. .	987 18 9	.. .. .	73 2 8	1,061 1 5	
2334/12	Creme D'Or	389, 421, 422D	Day Dawn	1,000 0 0	1,000 0 0	.. .. .	1,000 0 0	.. .. .	75 15 6	1,075 15 6	
427/11	Comstock	1079Y	Randalls	200 0 0	48 15 0	60 17 6	.. .. .	109 12 6	1 17 8	112 1 7	
29/05	Dostmond	788R	Yerilla	350 0 0	271 15 3	65 16 5	.. .. .	337 11 8	10 8 4	346 3 9	
1144/12	Eclipse †	1047X	Gindalbie	450 0 0	498 19 1	.. .. .	286 14 1	62 8 11	8 12 1	286 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	444 2 9	4 11 4	10 17 8	455 0 5	
1197/09	Great Carbine	928R	Linden	225 0 0	.. .. .	161 0 0	161 0 0	.. .. .	8 2 7	169 2 7	
4689/06	Havilah Development .. .	345B	Black Range ..	600 0 0	180 15 8	311 0 2	.. .. .	491 15 10	8 0 9	9 13 5	501 9 3
4738/09	Hawk	725G	Desdemona .. .	107 0 0	107 0 0	.. .. .	107 0 0	.. .. .	6 19 8	113 19 8	
319/12	Jupiter	771M	Mt. Magnet .. .	400 0 0	401 0 0	.. .. .	293 15 11	5 0 0	45 11 3	339 7 2	
1803/13	Jenkins and Party .. .	P.A. 485Y .. .	Bulong	450 0 0	88 18 5	340 16 7	6 1 9	423 13 3	0 5 3	13 1 10	436 15 1
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	41 11 7	1,516 11 7
1101/09	Kanowna Prospecting Syndicate ..	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	499 10 0	500 0 7	88 5 6	911 5 1	34 5 4	50 15 3	962 0 4
735/10	Lady Seddon	633B	Sandstone	200 0 0	136 0 0	.. .. .	.. .. .	136 0 0	.. .. .	19 4 1	155 4 1
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	1,000 0 0	500 0 0	500 0 0	.. .. .	1,000 0 0	.. .. .	57 17 4	1,057 17 4
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	.. .. .	75 0 0	209 19 4	6 8 9	216 8 1	
2126/11	Maori Lass	2416	Yilgarn	600 0 0	.. .. .	600 0 0	.. .. .	600 0 0	3 5 8	603 5 8	
4164/12	Metzke and others .. .	P.A. 647 .. .	Lake Darlot .. .	200 0 0	.. .. .	119 8 9	.. .. .	119 8 9	1 19 7	121 8 4	
3461/08	North End Mines	4054, 4037, 4039, 4231	Kalgoorlie .. .	1,000 0 0	436 10 0	.. .. .	.. .. .	436 10 0	.. .. .	436 10 0	
2898/11	Princess Royal	222, 653, 1016, 1048, 1114	Cue	1,000 0 0	1,000 0 0	.. .. .	.. .. .	1,000 0 0	.. .. .	94 16 8	1,094 16 8
3573/12	Princess Royal	106, 187, 587, 840, 972	Norseman	2,000 0 0	847 12 10	1,152 7 2	.. .. .	2,000 0 0	.. .. .	92 10 11	2,092 10 11
3409/12	Rupe & Young	Mach. Area ..	Nannine	848 17 5	698 17 5	150 0 0	.. .. .	848 17 5	.. .. .	10 10 0	859 7 5
1373/12	Riverina	123N	Mulwarrie	500 0 0	378 19 10	90 0 0	.. .. .	468 19 10	23 6 6	11 7 3	480 7 1
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	Late 300	Greenbushes .. .	1,200 0 0	1,068 6 10	.. .. .	7 15 9	1,060 11 1	6 0 0	109 10 11	1,170 2 0
278/12	South Kalgoorlie Kurnalpi Syndicate	.. .. .	Kalgoorlie	75 0 0	75 0 0	.. .. .	65 0 0	10 0 0	.. .. .	.. .. .	10 0 0
2376/10	Stanley G.M.	Late 1271X ..	Kanowna	150 0 0	.. .. .	112 0 0	.. .. .	112 0 0	.. .. .	4 16 11	116 16 11
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
645/09	Werner, F.	619B	Nungarra	150 0 0	.. .. .	143 17 3	.. .. .	143 17 3	1 18 0	3 12 9	147 10 9
2239/12	Williamson & Pender ¶	.. .. .	Kanowna	180 0 0	180 0 0	.. .. .	.. .. .	180 0 0	.. .. .	1 6 8	181 6 8
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 Tasmania .. .	1665, 1745T ..	Erlistoun	300 0 0	300 4 9	.. .. .	51 0 0	249 4 9	77 1 11	13 0 9	262 5 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	4 9 0	114 13 5	1,178 9 7
5884/10	Callion	860	Callion	1,000 0 0	1,000 0 0	..	309 2 2	690 17 10	40 0 4	110 1 2	800 19 0
3145/12	Donovan's Find	768	Jacoletti	1,000 0 0	100 0 0	..	..	1,000 0 0	..	70 19 9	1,070 19 9
3155/11	Great Victoria Leases	719, 944/5,	Southern Cross	2,000 0 0	1,641 15 0	..	..	1,641 15 0	106 10 4	42 13 3	1,684 8 3
94/13	Graham & O'Brien	1229 Mach. Area No. 14	Southern Cross	150 0 0	..	150 0 0	100 4 3	49 15 9	1 9 9	2 8 2	52 3 11
1343/07	Hodder, E.	Mach. Area 64	Randalls	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	..	924 10 11	..	2 15 9	927 6 8
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	Mulgarrrie	250 0 0	205 4 10	..	106 17 2	98 7 8	28 16 3	2 13 8	101 1 4
3785/08	Lady Agnes	910Y	Bulong	480 0 0	486 12 3	..	93 4 9	393 7 6	..	27 7 5	420 14 11
4416/11	Malcolm Prospecting Co.	1175C	Malcolm	1,550 0 0	1,550 0 0	..	..	1,550 0 0	334 8 9	248 1 4	1,798 1 4
363/12	McCahon and party	..	Mt. Ida	400 0 0	400 0 0	..	..	400 0 0	..	27 14 5	427 14 5
1518/12	Mystery	P.A. 157	Yalgoo	350 0 0	367 5 2	..	313 10 0	53 15 2	..	5 11 0	59 6 2
5947/10	McDermott & Soanes "Chunderloo"	..	Nannin	1,532 12 8	732 12 8	800 0 0	..	1,532 12 8	..	40 16 6	1,573 9 2
4224/11	Never Never	665	Yilgarn	1,000 0 0	1,073 15 9	..	551 9 11	22 5 10	203 4 9	5 11 7	527 17 5
3911/10	Phoenix	622N	Quinns	250 0 0	250 0 0	..	..	250 0 0	17 12 1	17 5 11	267 5 11
2325/11	Ravensthorpe Battery Co.	..	Ravensthorpe	1,300 0 0	1,038 8 2	..	..	1,038 8 2	..	167 13 3	1,206 1 5
1353/10	Red White and Blue	641B	Currans' Find	2,137 0 0	..	2,524 7 0	..	2,524 7 0	..	53 17 3	2,578 4 3
919/14	Rocklee G.M. §	..	Yaloginda	350 0 0	350 0 0	..	..	350 0 0	..	6 17 1	356 17 1
3551/10	Randwick	978C	Malcolm	560 0 0	577 3 5	..	43 4 6	533 18 11	..	45 3 5	579 2 4
2815/12	Ruby Well Battery	364P	Ruby Well	500 0 0	..	500 0 0	140 0 11	359 19 1	0 4 1	10 7 5	370 6 6
4726/11	Southern Cross and Southern Cross S.	1067, 1076, W.R. 27	Bulong	1,000 0 0	1,000 0 0	..	95 15 3	904 4 9	31 12 6	120 15 9	1,025 0 6
3362/11	Spring Hill	721	Parker's Range	855 0 0	855 16 5	..	219 2 0	636 14 5	196 0 5	60 2 7	696 17 0
4422/07	Star of Fremantle	645S	Kunanalling	325 0 0	320 0 0	..	..	320 0 0	15 19 4	8 3 6	328 3 6
C.—BORING ADVANCES FOR 1913.											
Lord Cardigan	..	..	Southern Cross	..	..	36 9 6	..	..	..	..	36 9 6
Allerton Leases	..	..	Southern Cross	..	..	169 17 11	..	..	..	..	169 17 11
Fraser's	..	..	Southern Cross	..	..	2,671 12 6	..	..	..	..	2,671 12 6
Coal Kockatea No. 2	..	..	Murchison	..	..	415 5 2	..	..	..	..	415 5 2
D.—MISCELLANEOUS ADVANCES.											
Ryan, H. A.	..	Reward 45 M.L.	Murchison	..	..	76 2 6	..	..	..	..	76 2 6
				45,877 11 5	32,702 17 1	13,310 12 8	3,780 5 0	38,863 17 2	1,447 8 9	2,707 19 3	44,941 4 0
A.—Pioneer Mining and Prospecting				25,570 19 5	18,037 4 1	5,042 7 2	1,659 1 1	21,420 10 2	460 12 10	1,452 3 6	22,872 13 8
B.—Assistance in Erecting Batteries, etc.				20,306 12 0	14,665 13 0	4,898 17 11	2,121 3 11	17,443 7 0	986 15 11	1,255 15 9	18,699 2 9
C.—Boring Advances for (1913)				..	..	3,293 5 1	..	..	..	..	3,293 5 1
D.—Miscellaneous Advances				..	..	76 2 6	..	..	..	..	76 2 6
				45,877 11 5	32,702 17 1	13,310 12 8	3,780 5 0	38,863 17 2	1,447 8 9	2,707 19 3	44,941 4 0

* Machinery sold to A. Crockford, £350.

† Part machinery sold to Williamson and Pender, £72.

‡ Part machinery sold to South Kalgurlu Kurnalpi Syndicate, £75.

§ Boiler sold Williamson & Pender, £108.

|| Machinery taken over from Morning Star.

¶ Machinery from Eclipse and Sunbeam Leases.

§ Plant and Machinery etc., from Champion South Mine.

DIVISION II.

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, 1914.

Sir,

We have the honour to forward, for the information of the Hon. the Minister for Mines, the Annual Report of the Board of Examiners for Colliery Managers, etc., for the year 1913.

Two meetings, as required by the regulations, were held during the year, the first on 11th April and the other on 23rd October.

The vacancy on the Board caused by the resignation of Mr. T. D. Briggs has been filled by the appointment of his successor in the office of Inspector of Mines, Mr. Robert McVee.

Examination for Certificates.

An examination of one candidate, who presented himself for examination for Second Class Certificate, was held on the 7th and 8th October, at which the candidate gained a pass, and the Board issued him a Second Class Certificate of Competency.

A copy of the papers set for the written part of the examination is appended to this report. There was also an oral examination.

We have, etc.,

A. MONTGOMERY,
State Mining Engineer, Chairman.

A. GIBB MAITLAND,
Government Geologist, Member.

ROBT. McVEE,
Inspector of Mines, Colliery, Member.

F. A. LANE,
Acting Secretary.

The Coal Mines Regulation Act, 1902.

EXAMINATION FOR SECOND CLASS CERTIFICATE OF COMPETENCY AS UNDER MANAGER OR OVERMAN.

SUBJECT: VENTILATION.

Tuesday, 7th October, 1913, 10 a.m. to 11.30 a.m.

Possible
Marks.

- | | |
|----|--|
| 50 | (1.) Why and how would you erect a pair of doors between a main intake and a return airway? |
| 50 | (2.) In the event of the W.G. at the fan registering a pressure much greater or less than usual, what conclusion would you draw as to the cause? |

Possible
Marks.

- | | |
|----|---|
| 50 | (3.) Explain the principle of the safety lamp, and state the conditions under which its use is necessary. What is a "fiery" mine? |
| 50 | (4.) Name the principal noxious and inflammable gases found in mines, and explain how each occurs, and how each may be detected. |
| 50 | (5.) What is an air-crossing, and how would you construct one of brickwork? |
| 60 | (6.) Two districts in a mine are to be ventilated by a total quantity of 25,000 cubic feet of air per minute, one requiring 15,000 cubic feet and the other 10,000 feet. Supposing the resistance of the two were equal, how would you ensure the relative quantities going into each district? |

300

The Coal Mines Regulation Act, 1902.

EXAMINATION FOR SECOND CLASS CERTIFICATE OF COMPETENCY AS UNDER MANAGER OR OVERMAN.

SUBJECT: MINING OF COAL.

Tuesday, 7th October, 1913, 11.30 a.m. to 1 pm.

Possible
Marks.

- | | |
|----|--|
| 50 | (1.) In a mine liable to spontaneous combustion state what precautions you would think necessary to provide for the early detection and location of heating, and what measures you would take for dealing with it quickly and effectively, (a.) in its initial stage, (b.) when active combustion has begun. |
| 50 | (2.) Explain how you would construct a dam in a rise heading to keep back a heavy feeder of water, the roof and coal being hard and the floor soft for a depth of two feet. |
| 50 | (3.) What precautions would you take to guard against sudden outbursts of gas when driving stone drifts to reach coal dislocated by faulting? |
| 50 | (4.) Explain the use of siphons for removing water from mine workings, stating the conditions under which they are applicable. |
| 50 | (5.) What are the factors governing the size of pillars when working coal on the bord and pillar system? |
| 50 | (6.) In the Colliery Coalfield what precautions should be taken when mining (a.) under the Colliery River, (b.) under the Government railways? |

300

The Coal Mines Regulation Act, 1902.

EXAMINATION FOR SECOND CLASS CERTIFICATE OF COMPETENCY AS UNDER MANAGER OR OVERMAN.

SUBJECT: ARITHMETIC.

Tuesday, 7th October, 1913, 2 p.m. to 3 p.m.

Possible
Marks.

- 20 (1.) Two machinemen cut 64 sq. yards of coal in a 5ft. seam per shift, the rate being $4\frac{5}{8}$ d. per ton: How much do they earn per shift? If the rate for shooting and filling is 1s. $4\frac{1}{2}$ d. per ton, how much is paid for this on the above shift's work? (Take a cubic foot of coal at 80lbs. weight.)
- 20 (2.) A seam of coal, 5ft. wide, is worked longwall, with gateway, 12 feet wide and 30 yards apart, centre to centre. The gateway packs are each 18 feet wide and cost 2s. 6d. per cubic yard. How much do the packs cost per ton of coal got? (Cubic foot of coal = 80lbs.)
- 20 (3.) Wagons of 10 tons capacity, costing £86 each, are hired out at 4d. per ton of coal carried, and each wagon averages 3 trips per week: What does each wagon earn per annum, and what percentage are the earnings on the capital cost?
- 20 (4.) A man works six days, and earns the following daily amounts, viz., 7s. 9d., 8s. 9d., 6s. 4d., 9s. 2d., 10s. 3d., 7s.: What is his average daily earning? If he gets a rise of 10 per cent., what would be his new daily average earning?
- 20 (5.) What is the cost of 12 tons 6cwt. 30lbs., at £10 12s. per ton? If the price goes up 4 per cent., what would the cost be?

100

The Coal Mines Regulation Act, 1902.

EXAMINATION FOR SECOND CLASS CERTIFICATE OF COMPETENCY AS UNDER MANAGER OR OVERMAN.

SUBJECT: ROADWAYS.

Tuesday, 7th October, 1913, 3 p.m. to 4 p.m.

Possible
Marks.

- 20 (1.) Describe the method you would adopt of constructing a main rope-haulage road in a 7ft. seam of hard coal, the roof of which is bad and the floor soft.

Possible
Marks.

- 15 (2.) What precautions would you take in a main heading, dipping 1 in 3, to ensure safety of the men against danger of run-away skips?
- 25 (3.) Portion of a main haulage road 12ft. wide is to be graded for a total distance of 50 yards by taking up portion of the floor to depths not exceeding 2 feet: How would you proceed with the work so as not to stop haulage from the mine?
- 20 (4.) Explain by sketches and description how you would arrange the work of a coal-cutting machine in bord and pillar workings so as to obtain the greatest economy and safety.
- 20 (5.) In the case of the road described in question (1), describe and specify the quantities of material required for construction of 1,000 yards of roadway, not including the rope.

100

The Coal Mines Regulation Act, 1902.

EXAMINATION FOR SECOND CLASS CERTIFICATE OF COMPETENCY AS UNDER MANAGER OR OVERMAN.

SUBJECT: THE COAL MINES REGULATION ACT, 1902.

Tuesday, 7th October, 1913, 4 p.m. to 5 p.m.

Possible
Marks.

- 20 (1.) How do the General Rules provide for safety of persons travelling on haulage roads?
- 20 (2.) What are the requirements of the General Rules regarding use of explosives by workmen underground?
- 20 (3.) What precautions are prescribed by the Rules when approaching a place likely to contain a dangerous accumulation of water?
- 20 (4.) What are the requirements of the Rules when the timbering of the workings is done by the workmen employed therein?
- 20 (5.) What is the substance of the General Rule relating to withdrawal of workmen in case of danger?

100

DIVISION III.

REPORT OF THE SUPERINTENDENT OF STATE BATTERIES FOR THE YEAR 1913.

The Under Secretary for Mines.

Department of Mines,
State Batteries Branch,
Perth, 15th April, 1914.

Sir,—

I have the honour to submit my Annual Report for the year 1913, for the information of the Hon. the Minister for Mines:—

Inspector's Report.

Mr. Desmond F. Browne reports as follows under date of April 3rd:—

I have the honour to present my report for the work done by State Batteries for the twelve months ending 31st December, 1913.

The tonnage handled in the different operations totalled 106,035 $\frac{3}{4}$ tons as against 88,651 in 1912, the increase being chiefly due to 13,078 tons of tailings having been treated.

Milling.

60,572 $\frac{3}{4}$ tons were crushed for the year, an increase of 3,936 $\frac{1}{4}$ tons over 1912.

This increase is rather a pleasing feature, as the tonnage has been steadily on the decrease for some time, but it is somewhat discounted by the fact that there were two more mills in operation.

The cost was 12s. 5.66d. as against 12s. 9.26d. in 1912, a decrease of 3.60d. per ton, and when the fact is taken into consideration that there were 16 5-heads running as against 11 in 1912, and 2 less 10-heads the cost is satisfactory.

The revenue shows a falling off of 3.36d., being 9s. 5.40d. as against 9s. 8.76d. in the previous year. This can be traced to the large tonnage milled by time at Coolgardie, Youanmi and Wiluna.

Repairs and Renewals under the head of "Milling," exclusive of tin operations, cost £3,339 5s. 1d. or 1s. 1.2d. per ton. A loss of £9,155 12s. 5d. was incurred.

Sand Treatment.

In view of the fact of the new policy of tailings treatment being instituted, the tonnage of sand treated by direct leaching was only 18,300 tons as against 18,599 $\frac{1}{2}$ tons in 1912, notwithstanding an increase in tonnage milled of nearly 4,000 tons. The cost of the upkeep of so many idle plants while tailings were being accumulated, with its attendant extra cost of water for settling which could not be charged to tailings treatment, necessarily inflated our costs both in milling and cyaniding. Even with these drawbacks costs fell from 8s. 3.52d. to 7s. 11.67d., which I consider satisfactory. The profit resulting from this treatment was £1,261 14s.

Tailings Treatment.

13,078 tons of tailings were treated during the period under review at a cost of 6s. 7.88d. per ton, receipts being 9s. 6.72d. per ton.

The cost, 6s. 7.88d., is slightly in excess of the maximum cost which I anticipated in my first report dealing with the subject in connection with the plant erected at Linden. The maximum cost I estimated to be 6s. 6d., and considering the year's figures, represent the brunt attendant on the installation of the system and also the fact that in the treatment of the Mt. Sir Samuel tailings, considered so long as untreatable, a cost of 13s. 1.65d. was incurred. I consider the above figures as highly satisfactory, and when this system is adopted throughout our batteries, the working costs should show a big reduction and the Tailings Suspense Account should be practically liquidated.

In support of my contention I might mention that 2,966 tons of tailings were treated at Sir Samuel at a cost of 13s. 1.65d. Should these tailings have been amenable to ordinary cyanide treatment and have cost 6s. 6d. a ton, the cost of the whole of the tonnage treated at our mills would have been reduced by 1s. 6.07d. a ton, resulting in a cost of just over 5s. a ton.

The fact that at some mills, namely, Yerilla, Linden and Leonora, we have had the advantage of large tonnages consequent to lengthy accumulations which has assisted towards the low cost, will be compensated for fully when the system is universally in vogue. The following figures bear this out:—

Tailings treated Jan. 1-Dec. 31—13,078 tons at a cost of 6s. 7.88d. per ton.

Tailings treated Sept. 30-Dec. 31—8,363 tons at a cost of 6s. 5.25 per ton.

Total Profit—£1,898 2s. 4d. Repairs and Renewals—£671 9s. 10d.

Slime Treatment.

This treatment has been practically discontinued. The Mulline plant treated 5,329 tons out of the total of 6,089 tons for all plants.

The cost per ton was 12s. 4.08d. and revenue 9s. 6.10d. per ton as compared with 11s. 8.68d. and 10s. 5.25d. for 8,085 tons treated in 1912.

The total loss was £861 19s. 7d.
Repairs and Renewals amounted to £385 7s. 9d.

Tim Treatment.

During the year the Wodgina plant was leased and put into operation.

8,032 yards were crushed at all plants for a cost of 5s. 5.12d., and a revenue of 4s. 1.78d. as against 5,330 tons for a revenue of 3s. 7.69d. and an expenditure of 4s. 5.14d.

The total loss was £513 8s. 5d.

New Plants.

New 5-head plants equipped with down-draught producers and acetylene gas plants have been erected at Bamboo Creek, Mt. Keith, Norseman, Ravelstone and Ora Banda.

A new Cornish boiler was put in place of the old tubular one at Yerilla.

Tailings plants were erected at Linden, Payne's Find, and a cyanide plant purchased for tailings treatment at Coolgardie.

Producer Plants.

The five new plants erected were equipped with down-draught generators.

Practically no trouble has occurred with them, and the fuel consumption per hour run is very satisfactory.

Mt. Keith and Norseman show costs of 5.16d. and 5.43d. per hour run, as against 8.2d. and 9.9d., the two cheapest charcoal producers at Quinns and Mt. Ida. Since the cost of the whole of the fuel burnt, including that required to keep the generator alight during stoppages, is taken in estimating the above figures, the installation has been a success.

The following table shows the consumption of fuel and cost at the various batteries where producer plants have been installed:—

Battery.	Lbs. of Charcoal.	Lbs. of Charcoal per hour run.	Lbs. of Charcoal per B.H.P. hour.	Cost per hour run.	
				s.	d.
10 -Heads—					
Linden	77,711	41.03	1.05	1	4.4
Wiluna	343,910	50.9	1.45	1	10.6
5-Heads—					
Quinns	32,256	18	0.90	0	8.20
Egerton	39,872	21.9	1.10	1	0.7
Marble Bar	55,664	23.5	1.18	1	6.3
Mt. Ida	44,016	28.6	1.43	0	9.9
Payne's Find	115,600	29.4	1.47	1	1.3
Meekatharra	62,496	35	1.75	1	0.6
Sir Samuel	44,688	57.6	2.88	2	8.3
Wood Producers.	Lbs. of Wood.	Lbs. of Wood.	Lbs. of Wood.	s.	d.
Mt. Keith	177,184	70.2	3.56	0	5.16, 28 cwt. cord
Bamboo Creek	78,400	76.6	3.83	1	2.05 " "
Ravelstone	100,352	95.2	4.76	0	11.6 " "
Norseman	78,624	67.5	3.37	0	5.43 26 cwt. " "
Ora Banda	388,640	145.6	7.28	0	7.07 30 cwt. " "

Summary.

During my visits to the different batteries I have taken pains to see that the plants are kept in good repair. This gets more difficult each year as the plants become older; nevertheless, I consider the standard has been fully kept up, and at places like Niagara, Yerilla, Black Range, and Burtville a decided improvement has taken place.

The installation of down draught producers, the inauguration of the present tailings treatment, and the improved work of some of your Managers have gone far to enable us to finish the year in a very much better position than in the preceding year, notwithstanding the higher cost of stores, fuel, transport, and labour.

Milling.

During the year 37 plants (285 head of stamps) were available for milling operations, three 10-stamp mills being leased (Boogardie, Lennonville, and Tuckanarra).

Schedule 5 sets forth details for each plant of the number of parcels treated, recovery by amalgamation, gross contents of tailings, and the value of the ore.

1,060 parcels of ore were treated, the average size of each parcel being 57.1 tons, the total tonnage being 60,572.75 tons. This result shows an increase of 3,936.25 tons in comparison with the figures for 1912.

During the year there were 313 working days, which for the 285 stamps provided 89,205 stamp days. As only sufficient ore to keep the mills running 15,148 stamp days was supplied for treatment, it will be seen that the batteries were only kept running 17 per cent. of the time, little more than one-sixth, time, or, including the time occupied in cleaning up, less than one-fifth time.

The average duty per stamp was 4 tons per 24 hours, the screens used averaging 850 holes per square inch, whilst the stamp speed varied between 95 to 110 drops per minute.

The average percentage recovery from amalgamation was 76.0 per cent., a decrease of 1.1 per cent. on the result for 1912. At Wiluna, where a large tonnage of ore unsuitable to the amalgamation process was treated, the recovery only amounted to 19.2 per cent., which affected the total result.

The expenditure was £37,776 18s. 1d., equal to 12s. 5.66d. per ton, a decrease of 3.60 pence per ton on last year's expenditure.

The revenue amounted to £28,621 5s. 8d., or 9s. 5.4d. per ton, a decrease of 3.36 pence per ton on last year's revenue.

A loss of £9,155 12s. 5d. was recorded on milling operations. Although working costs were reduced 3.6 pence per ton, which showed a saving of £908 on the tonnage milled, the revenue showed a falling-off of 3.36 pence per ton. The reduction in revenue was due principally to reductions and concessions in the scale of charges. (Schedules 1 and 8.)

Tin Treatment.

Three tin-dressing plants were operative during the year, two at Greenbushes and one at Wodgina.

180 parcels of tin ore were treated, representing 8,032 yards, the average size of each parcel being 44.6 yards. The tonnage treated showed an increase of 2,697 yards on last year's return, whilst the weight of black tin recovered was 79.13 tons.

The expenditure amounted to £2179 15s., and the revenue totalled £1,666 6s. 7d., the loss on operations being £513 8s. 5d.

The expenditure in connection with the renovation of the Bunbury End plant, Greenbushes, was paid from revenue, which, in addition to the much more expensive plant to work at Wodgina, had the effect of increasing the working costs a good deal. The Wodgina plant is a really good one, but it is situated so remotely that the cost of working it for the small tonnage obtainable is very high. (Schedules 1 and 8.)

Sand Treatment.

18,300 tons of sand were treated, being 299.5 tons less than the tonnage treated during 1912.

The expenditure was £7,294 19s. 8d., or 7s. 11.67d. per ton, a decrease of 3.85 pence per ton on last year's costs, whilst the revenue amounted to £8,556 13s. 8d., or 9s. 4.21d. per ton, the profit being £1,261 14s. (Schedules 3 and 9.)

Slime Treatment.

6,089 tons of slime were treated for an expenditure of 3,757 0s. 6d., or 12s. 4.08d. per ton, the revenue being £2,895 0s. 11d., or 9s. 6.10d. per ton, the operations showing a loss of £861 19s. 7d. As pointed out in my report last year, direct slime treatment is being curtailed as much as possible, and it is expected that no further operations will be undertaken after the treatment of a few thousand tons at Norseman during the first few months of 1914. (Schedules 3 and 9.)

Tailings Treatment.

For the more economical treatment of sand and slime, and with the object of overcoming the system of accumulating slime for long periods, it was decided to stop direct sand and slime treatment at the various batteries as soon as possible. Leaching plants capable of treating the tailings (sand and slime) have been erected at several batteries in order that the new system of tailings treatment could be inaugurated. The tailings are first accumulated in suitable-sized dams and allowed to dry. They are then delivered into vats, the slime being mixed with the sand and leached. The extra cost of handling in comparison with direct sand treatment is much more than recouped by the extra extraction obtained through the

benefits derived from oxidation and drying, which latter operation only takes a few weeks or months at most.

An idea of the success of the process can be gathered from the results obtained from the treatment of 13,078 tons of tailings (sand and slime) during the year. The expenditure was £4,353 3s. 4d., or 6s. 7.88d. per ton, whilst the revenue was £6,251 5s. 8d., or 9s. 6.72d. per ton, the profit on the operations being £1,898 2s. 4d.

The lowest direct sand treatment cost recorded for a year's operations was 6s. 3d. per ton in 1910, when 43,391 tons were treated, and the lowest direct slime treatment cost was 8s. 9.1d. per ton during the same year on 28,599½ tons treated.

The ore crushed at all plants produced tailings containing about 75 per cent. sand and 25 per cent. slime. In order to make a comparison of the work done this year and the direct treatment processes during 1910, when the lowest costs on record were established, the following figures are quoted:—

	Tons.	Cost per ton.	
		s.	d.
1910	39,693	6	10.50
1913	13,078	6	7.88
Saving in cost		0	2.62

which allow for 3 of sand treated to 1 of slime treated at the actual cost of each treatment during 1910. It should be remembered that during 1910 we had new slimes plants, upon which no money from revenue had to be expended on repairs, which is always a costly item.

It will be seen, therefore, that the tailings treatments costs during the year were slightly better than the previous best records, when large tonnages were being handled under favourable conditions. (Schedules 3 and 9.)

Additions and Equipment.

Under this heading £340 7s. 9d. was expended on the various batteries, the amount being paid from revenue and included in the working costs.

Repairs and Renewals.

£3,680 16s. 4d. was spent in repairs and renewals to the mills, and £1,056 17s. 7d. was spent on sand and slime treatment plants, a total of £4,737 13s. 11d. This expenditure was paid from revenue, and is included in the working cost.

New Plants.

New 5-stamp batteries, complete with all accessories, were erected and commenced operations during the year at Bamboo Creek, Mt. Keith, Norseman, and Ora Banda. The results sent in during the year provide ample proof of the efficiency of these plants.

The Mt. Cassiterite tin-dressing plant at Wodgina was leased for a period of two years in order that reduction facilities should be provided for the prospectors and mine owners working in the district.

New water supplies were provided at Burtville and Greenbushes (Salt Water Gully), and improvements made to the supply at Payne's Find.

The renovation of the Ravelstone plant was completed early in the year.

The total amount spent from the Loan Expenditure Fund on new work was £22,537 9s. 1d. (Schedule 6.)

Tailings Purchase.

During the year 22,204¼ tons of tailings were purchased by the Department for the sum of £18,675 16s. 8d. (Treasury Returns) nett to customers. These figures represent the actual purchases effected within the year. 1,411¼ tons of tailings were purchased from customers by contractors for the sum of £668 2s. 10d. nett to customers.

24,266 tons of tailings, having an assay value of over 3 dwts. per ton and containing 10.138 fine ozs., were produced during the year, the nett price payable to owners for their purchase being £19,507 16s.

6,410 tons of tailings, having an assay value of over 3 dwts. per ton and containing 2,055.74 ozs. fine, were accumulated, but not purchased, at centres where treatment plants had not been erected. During next year tailings treatment will be completed and payments made at Bamboo Creek, Mt. Keith, Mt. Sir Samuel, and Quinns, the tonnage at these centres representing 2,593 tons of the 6,410 tons mentioned above. At Mt. Sir Samuel and Quinns payments will be made for tailings accumulated from inception.

18,617 tons of tailings, worth under 3dwts. per ton and containing 1,663.95 ozs. fine, became the property of the Department, but the bulk of them were too low grade to return a profit from treatment.

The percentage of tailings recovered from the ore milled on which payments were based was 82.4 per cent.

Recovery obtained from the Ore supplied for Treatment.

59,816¾ tons of ore were handled at the batteries operated under Departmental control. 43,717.16 fine

ounces were recovered by amalgamation, having a value of £185,699.

The gross value of the tailings was £58,864, the gross value of the ore being £244,563. Battery charges amounted to £28,541. The total amount paid to owners for tailings was £19,343.

The nett return received by customers from their ore was 72.1 per cent., as follows (Treasury Returns) :—

	£	£
Gross Value of Ore, £244,563		
Gross recovery by amalgamation	185,699	
Less Milling Charges	28,541	
	—————	157,158
Amount paid for tailings (nett to customers)		19,343
		—————
Nett to customers		£176,501

The actual return was as follows :—

Gross Value of Ore, £244,563			
Nett Return to Customers—			
By Amalgamation (64.2%)	157,158		
„ Tailings (8.0%)	19,508		
	—————	176,666	= 72.2%
Received by Department—			
Milling Charges (11.7%)	28,541		
Tailings Charges (5.2%)	12,788		
	—————	41,329	= 16.9%
Loss in Residues (4.4%)	10,768		
Value of unpayable tailings (2.9%)	7,068		
Value of unpurchased tailings (3.6%)	8,732		
	—————	26,568	= 10.9%
		—————	
		£244,563	

COMPARATIVE SYNOPSIS OF RESULTS AT STATE BATTERIES FOR TWELVE MONTHS ENDING
31st DECEMBER, 1912 AND 1913.

Operations.	1913.			1912.		
	Tonnage.	Expenditure per ton.	Revenue per ton.	Tonnage.	Expenditure per ton.	Revenue per ton.
Milling	60,572½	s. d. 12 5-66	s. d. 9 5-40	56,636½	s. d. 12 9-26	s. d. 9 8-76
Sand Treatment	18,300	7 11-67	9 4-21	18,599½	8 3-52	8 8-65
Tailings Treatment	13,078	6 7-88	9 6-72	..	..	..
Slime Treatment	6,089	12 4-08	9 6-10	8,085	11 8-68	10 5-25
Tin Treatment	8,032	5 5-12	4 1-78	5,330	4 5-14	3 7-69

REVENUE AND EXPENDITURE, 1913.

Operations.	Tonnage.	Revenue.	Expenditure.	Profit.	Loss.
Milling	60,572½	£ 28,621 5 8	£ 37,776 18 1	£ ..	£ 9,155 12 5
Sand Treatment	18,300	8,556 13 8	7,294 19 8	1,261 14 0	..
Tailings Treatment	13,078	6,251 5 8	4,353 3 4	1,898 2 4	..
Slime Treatment	6,089	2,895 0 11	3,757 0 6	..	861 19 7
Tin Treatment	8,032	1,666 6 7	2,179 15 0	..	513 8 5
	106,071½	£47,990 12 6	£55,361 16 7	£3,159 16 4	£10,531 0 5
				Less Profit	3,159 16 4
				Loss	7,371 4 1
				Additions and Equipment	340 7 9
				Gross Loss	£7,711 11 10

The Staff.

The 37 plants under departmental control were managed by 17 Managers and two Acting Managers, and supervised by the Inspector.

During the first half of the year two engineers were in charge of construction work, but one engineer was able to complete the work during the second half of the year.

The Head Office staff remained unchanged, and consisted of the Engineer and Draftsman, Assayer, Clerk-in-Charge, and seven Clerks.

The staff was kept very busy during the year, and the improvement in the result of the year's operations was due to its individual and united efforts, which were of a highly efficient order.

Output since Inception.

From inception to the end of 1913 Gold and Tin to the value of £4,189,955.12 has been recovered at the State plants.

960,989.44 tons of Gold ore were treated, and produced £3,528,996.24 worth of gold by amalgamation, £478,383.17 worth by cyanidation, £101,942.5 from slime treatment, and 64,919.75 tons of Tin ore produced tin to the value of £80,835.31.

I have, etc.,

A. M. HOWE,
Superintendent of State Batteries.

SCHEDULE 1.

Return showing the number of Tons crushed, Gold Yield, Average per ton in shillings, and Total Value for year ending 31st December, 1913.

Battery.	Tons crushed.	Gold Yield, Bullion.	Average per ton in shillings.	Total Value.
		ozs.		£
Bamboo Creek	729·00	1,058·50	104·54	3,810·60
Black Range	2,778·50	2,953·83	76·40	10,633·55
Boogardie	495·50	642·55	93·40	2,313·18
Burtville	1,067·50	1,978·15	133·40	7,121·34
Coolgardie	6,350·75	4,597·55	52·00	16,551·18
Darlot	1,381·00	868·00	45·20	3,124·80
Laverton	598·25	979·10	117·8	3,524·76
Leonora	2,112·25	3,937·80	13·32	14,076·08
Linden	2,715·50	2,376·05	63·00	8,553·78
Meekatharra	1,867·25	1,930·12	74·40	6,948·43
Menzies	886·75	499·95	40·40	1,799·82
Marble Bar	1,922·50	2,524·80	93·36	9,089·28
Mt. Egerton	1,543·50	1,032·35	36·40	2,983·29
Mt. Ida	1,252·00	1,515·55	87·00	5,455·98
Mt. Jackson	1,768·25	2,971·14	120·98	10,696·10
Mt. Keith	2,058·25	1,790·60	62·60	6,446·16
Mt. Sir Samuel	632·00	641·15	73·00	2,308·13
Mulline	1,349·00	2,173·90	127·80	7,826·04
Mulwarrie	1,163·50	1,493·35	92·40	5,376·06
Nannine				
Niagara	2,030·00	1,890·35	67·00	6,805·26
Norseman	1,739·50	1,956·65	80·98	7,043·94
Ora Banda	2,841·00	1,126·72	28·45	4,056·17
Payne's Find	3,203·50	3,825·45	85·80	13,771·62
Pigwell				
Pinjin	798·50	389·57	35·12	1,402·45
Quinn's	1,410·50	646·75	33·00	2,328·30
20-Mile Sandy	572·25	389·40	48·98	1,401·84
Siberia	209·00	353·20	121·60	1,271·52
Wiluna	5,425·00	795·35	105·54	2,863·26
Yarri	2,579·50	91·77	26·00	3,354·37
Yerilla	1,776·00	1,685·30	68·32	6,067·08
Youanmi	4,010·50	1,067·40	19·16	3,842·64
Lennonville	255·00	247·45	69·80	890·82
Tuckanarra				
Widgiemooltha				
Ravelstone	1,051·25	1,245·75	85·20	4,484·70
	60,572·75	52,515·55	62·41	188,222·23

TIN PLANTS.

	Tons.	Yield Tons, Black Tin.
Greenbushes—B. End	6,059·00	52·57
Do. S. W. Gully	1,523·00	12·76
Wodgina	450·00	13·80

SCHEDULE 2.

Return showing the number of Tons crushed, Gold Yield, Average per ton, and Value since inception to 31st December, 1913.

Battery.	Tons treated.	Gold Yield, Bullion.	Average Gold, per ton.	Value.
		ozs.	ozs.	£
Bamboo Creek	729·00	1,058·50	1·45	3,810·60
Black Range	54,110·65	58,356·38	1·07	210,278·31
Boogardie	45,114·65	24,623·82	·54	90,039·94
Burtville	28,399·00	61,874·26	2·17	224,053·15
Coolgardie	55,896·75	47,670·47	·85	171,670·77
Darlot	32,955·25	37,446·99	1·00	138,237·95
Laverton	12,278·50	13,453·96	1·09	49,605·98
Leonora	50,219·45	52,607·89	1·04	192,868·73
Linden	12,644·25	13,237·29	1·04	47,654·23
Meekatharra	57,769·75	71,954·12	1·24	261,714·22
Menzies	54,574·25	44,199·67	·81	158,966·21
Marble Bar	6,076·00	7,284·15	1·19	26,222·89
Mt. Egerton	2,616·00	1,718·20	·66	5,452·35
Mt. Ida	35,674·90	49,896·16	1·40	182,928·37
Mt. Jackson	3,376·75	6,062·49	1·79	21,824·96
Mt. Keith	2,058·25	1,790·60	·87	6,446·16
Mt. Sir Samuel	6,839·25	5,298·40	·77	19,074·23
Mulline	72,424·70	94,240·85	1·26	338,447·20
Mulwarrie	29,116·40	33,842·36	1·16	125,089·19
Nannine	10,116·35	5,971·84	·59	21,498·59
Niagara	57,278·00	50,077·37	·87	182,466·73
Norseman	52,089·20	54,817·92	1·05	200,526·98
Ora Banda	2,841·00	1,126·72	·39	4,056·17
Payne's Find	5,252·50	6,199·55	1·18	22,318·38
Pig Well	16,666·50	16,712·73	1·00	60,165·81
Pinjin	16,820·15	12,743·68	·75	45,876·82
Quinn's	6,713·00	3,736·15	·55	13,450·14
20-Mile Sandy	9,187·90	16,310·02	1·77	58,816·04
Siberia	12,664·00	13,885·69	1·09	49,913·81
Wiluna	43,739·25	26,722·65	·61	96,346·72
Yarri	39,133·00	26,066·11	·66	93,837·82
Yerilla	11,318·50	10,882·40	·96	36,374·56
Youanme	18,897·00	7,464·69	·39	26,872·88
Lennonville	30,496·39	34,578·09	1·13	129,537·86
Tuckanarra	15,456·85	20,897·56	1·35	76,854·93
Widgiemooltha	5,711·00	2,413·43	·42	8,949·40
Ravelstone	11,993·80	11,482·32	·95	42,507·59
Batteries closed	31,740·80	22,859·76	·72	84,239·57
	960,989·44	971,565·24	1·01	3,528,996·24

	Tons.	Yield Tons, Black Tin.
Greenbushes—B. End	46,431·50	648·776
Do. S. W. Gully	2,998·00	24·260
Do. North End	15,026·00	163·827
Wodgina	450·00	13·760
Marble Bar	14·25	·275
	64,919·75	850·898

MILLING.				CYANIDING SANDS—continued.			
Up to	Tons	ozs.	Up to	Tons.			
1901 (3 years)	68,791	75,533	1907	63,778			
1902	39,517	57,255	1908	62,081			
1903	49,233	58,305	1909	61,265			
1904	71,616	78,309	1910	43,915			
1905	85,018	92,327	1911	27,444			
1906	95,831	94,187	1912	18,599			
1907	95,280	97,962	1913	18,300			
1908	95,624	89,875					
1909	94,218	83,127					
1910	89,278	80,074					
1911	59,373	56,265					
1912	56,636	53,868					
1913	60,573	52,515					
				TAILINGS.			
				1913			13,078
				SLIMES TREATMENT.			
				Up to 1904			691
				1905			7,028
				1906			
				1907			8,220
				1908			5,818
				1909			16,848
				1910			28,819
				1911			20,821
				1912			8,085
				1913			6,089
				CYANIDING SANDS.			
Up to 1902		Tons.					
1903		29,255					
1904		32,369					
1905		42,559					
1906		54,420					
		60,422					

SCHEDULE 3.

Add Tonnages not cleaned up, 31st December, 1913:—

Sands and Tailings Treatment for 1913.

Battery.	Tons.	Yield. Fine ozs.	Value—£.
Black Range	929	211·00	896·36
Coolgardie	2,074	358·83	1,524·33
Leonora	4,303	904·27	3,841·34
Linden	5,809	1,709·69	7,262·74
Meekatharra	915	159·18	676·25
Menzies	560	92·53	393·07
Mt. Sir Samuel	2,966	625·24	2,656·06
Mulline	689	136·93	581·73
Mulwarrie	635	137·18	582·75
Niagara	2,131	264·22	1,122·43
Payne's Find	2,805	350·92	1,490·73
Pinjin	36	·92	3·93
Sandy Creek	486	139·07	590·75
Wiluna	2,216	1,279·38	5,434·83
Yarri	582	74·55	316·65
Yerilla	2,259	336·97	1,431·43
Youanmi.. ..	1,619	287·60	1,221·75
	31,014	7,068·48	3,027·13

Tons.	
Black Range	280
Wiluna	84
	364

Tonnage brought down .. 31,014
31,378

Totals omitted from Annual Report for 1912:—

Leonora	302	123·38	524·10
Sandy Creek	199	47·72	202·92
Yarri	660	102·48	435·33
Youanmi.. ..	111	28·51	121·13
	1,272	302·09	1,283·48

Slimes Treatment, 1913.

Battery.	Tons.	Yield. Fine ozs.	Value—£.
Mulline	5,329	1,378·42	5,855·63
Niagara	496	40·52	172·14
Yarri	264	31·71	134·73
	6,089	1,450·65	6,162·50

SCHEDULE 4.

Sands Treatment since inception to 31st December, 1913.

Battery.	Tons.	Yield. Fine ozs.	Value—£.
Black Range	31,102	8,528·89	35,943·44
Burtville	15,568½	5,142·94	21,429·25
Coolgardie	27,144	4,647·69	19,456·74
Laverton.. ..	9,350	1,091·14	4,439·24
Leonora	32,368½	7,993·12	33,181·80
Linden	10,057	3,055·42	12,979·81
Meekatharra	34,190	7,019·82	29,200·64
Menzies	30,587½	7,891·04	33,074·71
Mulline	41,456	11,560·61	46,886·94
Mulwarrie	22,871½	4,391·24	18,013·45
Niagara	36,917	5,940·96	24,656·66
Norseman	36,206½	7,419·67	30,759·63
Pinjin	11,718	1,243·07	5,256·01
Sandy Creek	8,141¼	2,584·61	10,846·34
Siberia	5,550	1,201·56	5,105·20
Wiluna	14,349	6,156·62	26,054·13
Yarri	30,880	2,801·09	11,635·18
Yerilla	8,800	1,106·56	4,700·52
Youanmi.. ..	7,799	2,332·25	10,119·65
Mount Sir Samuel	2,966	625·24	2,656·06
Payne's Find	2,805	350·92	1,490·73
Darlot	23,654	2,699·17	11,042·16
Lennonville	24,309	6,592·43	26,653·23
Mount Ida	3,570	357·97	1,423·64
Nannine	3,650	410·12	1,742·50
Boogardie	29,432	7,702·28	32,186·47
Duketon	2,083½	250·51	1,025·77
Devon	261½	120·44	511·64
Southern Cross	3,471	452·75	1,815·18
Yundamindera	4,977	920·33	3,909·25
Randalls	791	56·05	224·80
Pig Well	11,379	2,373·25	9,962·50
	528,395	115,069·76	478,383·17

Slimes Treatment since inception to 31st December, 1913.

Battery.	Tons.	Yield. Fine ozs.	Value—£.
Mulline	21,348½	6,833·05	24,557·11
Black Range	13,040	2,604·59	11,064·71
Burtville	1,643	519·00	2,204·71
Menzies	21,905½	5,454·53	23,171·45
Meekatharra	1,980	462·78	1,966·08
Niagara	13,875	2,175·45	9,242·12
Sandy Creek	293½	75·00	318·68
Darlot	570	82·61	223·55
Linden	419	87·30	370·90
Leonora	12,440	2,198·09	9,338·73
Norseman	11,671	2,843·10	12,076·78
Laverton.. ..	273	45·24	192·19
Pig Well	340	64·65	274·57
Boogardie	1,218	284·63	1,209·07
Yerilla	424	44·55	189·33
Yarri	3,162	287·02	1,219·36
Wiluna	2,597	913·21	3,879·43
Siberia	347	104·47	443·73
	107,546½	25,049·27	101,942·50

SCHEDULE 5.

Return showing Number of Parcels treated and Tons crushed at State Batteries for Year 1913.

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.	dwt.	ozs.	dwt.	ozs.	dwt.	ozs.	dwt.		dwt.	grs.	£	s.	d.
13	Bamboo Creek	729.00	1,058	.50	897	.03	239	.21	1,136	.24	31	4	6	12	4
37	Black Range	2,778.50	2,953	.83	2,503	.24	711	.66	3,214	.90	23	3	4	18	2
22	Burtville	1,067.50	1,978	.15	1,676	.40	214	.81	1,891	.21	35	10	7	10	5
174	Coolgardie	6,350.75	4,597	.55	3,896	.23	1,108	.00	5,004	.23	15	18	3	6	9
14	Darlot	1,381.00	868	.00	735	.59	92	.86	828	.45	12	0	2	11	0
21	Laverton	598.25	979	.10	829	.74	257	.44	1,087	.18	36	8	7	14	3
73	Leonora	2,112.25	3,937	.80	3,337	.12	524	.07	3,861	.19	36	13	7	15	0
53	Linden	2,715.50	2,376	.05	2,013	.60	1,239	.86	3,253	.46	23	23	5	1	6
20	Marble Bar	1,947.00	2,524	.80	2,139	.66	271	.95	2,411	.61	24	18	5	4	10
43	Meekatharra	1,867.25	1,930	.12	1,635	.69	304	.14	1,939	.83	20	18	4	7	11
15	Menzies	886.75	499	.95	390	.42	192	.47	582	.89	13	3	2	15	7
35	Mt. Egerton	1,638.50	1,032	.35	874	.87	312	.07	1,186	.94	14	12	3	1	4
14	Mount Ida	1,252.00	1,515	.55	1,284	.36	464	.38	1,748	.74	27	22	5	18	4
36	Mt. Jackson	1,768.25	2,971	.14	2,517	.91	360	.65	2,878	.56	32	13	6	17	11
25	Mt. Keith	2,058.25	1,790	.60	1,517	.45	296	.42	1,813	.87	17	15	3	14	9
16	Mt. Sir Samuel	632.00	641	.15	543	.39	164	.41	707	.75	22	9	4	14	9
33	Mulline	1,224.00	2,173	.90	1,842	.29	310	.82	2,153	.11	35	4	7	9	4
29	Mulwarrie	1,163.50	1,493	.35	1,265	.55	276	.78	1,542	.33	26	12	5	12	8
50	Niagara	2,030.00	1,890	.35	1,601	.99	355	.09	1,957	.08	19	6	4	1	7
42	Norseman	1,739.50	1,956	.65	1,658	.16	458	.86	2,117	.02	24	5	5	2	7
44	Ora Banda	2,841.00	1,126	.72	954	.84	403	.09	1,357	.93	9	13	2	0	5
50	Payne's Find	3,203.50	3,825	.45	3,241	.90	511	.84	3,753	.74	23	10	4	19	4
10	Pinjin	798.50	389	.57	330	.14	121	.30	451	.44	11	7	2	7	10
30	Quinn's	1,410.50	646	.75	548	.09	197	.84	745	.93	10	13	2	4	8
25	Ravelstone	1,051.25	1,245	.75	1,055	.72	224	.50	1,280	.22	24	8	5	3	1
8	Sandy Creek	572.25	389	.40	330	.00	119	.35	449	.35	15	17	3	6	7
11	Siberia	209.00	353	.20	299	.32	104	.76	404	.08	38	16	8	3	11
35	Wiluna	5,425.00	795	.35	674	.03	2,813	.70	3,487	.73	12	21	2	14	6
23	Yarri	2,579.50	931	.77	789	.64	240	.93	1,030	.57	7	23	1	13	7
13	Yerilla	1,776.00	1,685	.30	1,428	.22	376	.35	1,804	.57	21	7	4	10	4
21	Youanme	4,010.00	1,067	.40	904	.57	588	.08	1,492	.65	7	10	1	11	4
1,035		59,816.75	51,625	.55	43,717	.16	13,857	.69	57,574	.80	19	6	4	1	6
22	Boogardie	495.50	642	.55	544	.53	..	..	544	.53	21	23	4	13	3
3	Lennonville	255.00	247	.45	209	.70	..	..	209	.70	16	11	3	9	8
25		750.50	890	.00	754	.23	..	..	754	.23	20	2	4	5	3
1,060	Total tonnage treated ..	60,567.25													
	Less Estimated tonnage under treatment, 31st December, 1912 ..	1,915.50													
	Estimated	60,375.75	52,515	.55											
	Add tonnage under treatment, 31st December, 1913	197.00													
		60,572.75													

TIN PLANTS.

No. of Parcels.	Battery.	Yards of Tin ground treated.	Yield.	Average per yard.
124	Greenbushes, Bunbury end ..	6,059	tons. 52.57	qrs. lbs. 0 19.26
35	Greenbushes, S.W. Gully	1,523	12.76	0 18.59
21	Wodgina	450	13.80	2 12.54
		8,032	79.13	0 22

SCHEDULE 6.

Expenditure from Consolidated Revenue Vote and Loan Expenditure Funds on Erection of State Batteries for year ending 31st December, 1913, and Totals since Inception.

Battery.	From Revenue.		From Loan.		Total.	
	£	s. d.	£	s. d.	£	s. d.
Mount Egerton, Battery Erection			183	14 7		
Payne's Find, Battery Erection			1,194	15 3		
Meekatharra, Battery Erection (5-head)			246	15 4		
Mount Jackson, Battery Lease			300	0 0		
Mount Ida, Battery Erection			0	2 6		
Mount Keith, Battery Erection			2,999	17 1		
Bamboo Creek, Battery Erection			3,430	2 7		
Marble Bar, Installing Wilfley Table			94	1 2		
Yerilla Battery, General Overhaul			454	2 0		
Ora Banda, Battery Erection			3,196	19 0		
Mount Sir Samuel, Cyanide Erection			117	4 11		
Linden, Cyanide Erection			801	14 0		
Ravelstone Battery, Gas Producer			816	19 1		
Norseman, Erection of 5-head Battery			2,394	13 11		
Paynes' Find, Leaching Plant			1,002	6 5		
Wodgina State Battery, Tin Lease			592	12 5		
Quinn's, Installing Tailings Pump			115	4 2		
Suspense Account			38	3 0		
Greenbushes, S. W. Gully, Installing Pump			102	2 9		
Greenbushes, S. W. Gully, Boring Operations			378	6 3		
Ora Banda Battery, Water Supply			475	16 5		
Mount Keith Battery, Water Supply			2,221	15 7		
Burtville Battery, Water Supply			224	17 7		
Mulline, Filter Press Frames			234	7 10		
Norseman, Cyanide Plant Erection			681	7 7		
Coolgardie, Purchase and Renovation of Cyanide Plant			200	19 11		
Quinn's, Erection of Cyanide Plant			38	7 9		
Erection of State Batteries—						
Expenditure to 31st December, 1907	91,981	1 8				
Loan Expenditure to 31st December, 1912			217,859	6 0		
Grand Total	91,981	1 8	240,396	15 1	332,377	16 9

SCHEDULE 7.

Direct Purchases, 1913.

Battery.	TAILINGS.		SLIMES.	
	Tons.	Amount paid.	Tons.	Amount paid.
		£ s. d.		£ s. d.
Black Range	1,239	865 2 4	101	74 13 1
Boogardie			48½	14 11 0
Burtville	527½	140 7 6	300½	307 3 10
Coolgardie	2,051½	1,774 3 5		
Laverton	583½	716 10 8		
Leonora	1,458½	761 17 1		
Meekatharra	994	682 14 6	222½	185 9 6
Menzies	367½	310 9 1	6½	2 1 2
Mulline	748½	402 5 8		
Mulwarrie	735½	388 1 5		
Nannine	39	18 2 4	213½	18 7 4
Niagara	869½	327 7 9	2½	0 18 10
Norseman	1,022	579 17 8		
Payne's Find	636	323 15 11		
Sandy Creek	403½	165 3 9		
Siberia	225	150 15 1		
Yarri	257	112 10 2		
Yerilla	1,723	637 10 8		
Wiluna	4,409½	6,986 13 7		
Linden	1,702	2,582 12 6		
Youanmi	1,822½	447 1 7		
Quinn's	217½	227 8 0		
Mount Sir Samuel	173	75 6 0		
	22,204·25	18,675 16 8	895·08	603 4 9

SCHEDULE 8.
ANNUAL REPORT, 1913.

Statement of Receipts and Expenditure for Year ending 31st December, 1913 (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.
Bamboo Creek	729	£ s. d. 125 1 4	£ s. d. 228 16 1	£ s. d. 192 12 1	£ s. d. 546 9 6	s. d. 14 11.90	£ s. d. 17 15 0	£ s. d. 57 19 2	£ s. d. 622 3 8	s. d. 17 0.83	£ s. d. 446 10 6	s. d. 12 3.00	£ s. d. ..	£ s. d. 137 13 2
Black Range	2,778½	125 10 0	609 9 10	343 18 0	1,078 17 10	7 9.15	150 1 6	183 19 0	1,412 18 4	10 2.04	1,355 13 5	9 9.09	..	57 4 11
Boogardie	495½	..	..	62 16 5	62 16 5	..	..	..	62 16 5	..	62 16 5	..	..	..
Burtville	1,067½	91 0 0	234 0 11	181 13 1	506 14 0	9 5.90	82 19 8	95 5 1	684 18 9	12 9.98	646 2 9	12 1.24	..	38 16 0
Coolgardie	6,350½	238 0 0	681 17 11	1,032 15 7	1,952 13 6	6 1.79	346 16 0	282 13 6	2,582 3 0	8 1.58	2,261 4 11	7 1.45	..	320 18 1
Darlot	1,381	102 0 0	288 7 6	196 15 1	587 2 7	8 6.03	32 15 5	84 14 4	704 12 4	10 2.44	722 15 11	10 5.61	18 3 7	..
Laverton	598½	83 10 0	270 13 5	156 16 6	510 19 11	17 0.96	50 4 3	60 5 2	621 9 4	20 9.15	338 1 2	11 3.61	..	283 8 2
Lennonville	255	..	..	..	..	..	..	..	..	..	17 4 2	..	17 4 2	..
Leonora	2,112½	97 4 5	392 16 7	394 13 6	884 14 6	8 4.51	205 10 3	145 19 7	1,236 4 4	11 8.40	1,095 4 2	10 4.44	..	141 0 2
Linden	2,715½	86 10 0	373 12 3	354 8 6	814 10 9	5 11.96	207 8 8	144 10 11	1,166 10 4	8 7.08	1,451 5 2	10 8.28	284 14 10	..
Marble Bar	1,922½	192 4 4	506 18 6	292 5 7	991 8 5	10 3.76	32 10 8	99 7 8	1,123 6 9	11 8.23	1,171 7 6	12 2.21	48 0 9	..
Meekatharra	1,867½	259 10 0	502 12 8	314 14 11	1,076 17 7	11 6.40	64 4 0	137 9 5	1,278 11 0	13 8.32	783 5 9	8 4.65	..	495 5 3
Menzies	886½	93 3 0	231 8 11	163 4 6	487 16 5	11 0.24	29 14 0	121 12 3	639 2 8	14 4.96	382 15 4	8 7.58	..	256 7 4
Mt. Egerton	1,543½	250 0 0	402 9 0	271 18 6	924 7 6	11 11.71	44 3 3	142 4 8	1,110 15 5	14 4.70	1,037 11 0	13 5.32	..	73 4 5
Mt. Ida	1,252	260 0 0	368 4 9	184 1 10	812 6 7	12 11.71	52 16 7	100 4 10	965 8 0	15 5.04	639 13 0	10 2.61	..	325 15 0
Mt. Jackson	1,768½	308 0 0	325 12 11	498 14 1	1,132 7 0	12 9.67	100 0 8	129 8 2	1,361 15 10	15 4.83	974 1 0	11 0.19	..	387 14 10
Mt. Keith	2,058½	170 14 0	716 11 0	413 12 9	1,300 17 9	12 7.68	143 2 2	117 12 10	1,561 12 9	15 2.08	1,072 1 7	10 4.99	..	489 11 2
Mt. Sir Samuel	632	80 0 0	1.3 15 5	247 7 0	521 2 5	16 5.88	85 0 2	86 3 7	692 6 2	21 10.89	312 10 6	9 10.68	..	379 15 8
Mulline	1,349	94 10 6	339 5 6	286 18 8	720 14 8	10 8.21	127 2 5	81 4 4	929 1 5	13 9.12	727 18 8	10 9.50	..	201 2 9
Mulwarrie	1,163½	55 2 11	377 17 6	212 0 5	645 0 10	11 1.03	45 3 3	91 7 6	781 11 7	13 5.20	622 14 9	10 8.44	..	158 16 10
Nannine .. .. .	..	..	110 18 2	12 7 0	123 5 2	..	..	9 12 4	132 17 6	..	..	..	..	132 17 6
Niagara	2,030	91 5 6	481 2 5	409 15 6	982 3 5	9 8.11	299 6 0	145 1 5	1,426 10 10	14 0.64	1,025 18 11	10 1.17	..	400 11 11
Norseman	1,739½	144 0 0	560 9 7	434 16 0	1,139 5 7	13 1.17	25 10 10	172 6 9	1,337 3 2	15 4.48	988 16 6	11 4.41	..	348 6 8
Ora Banda	2,841	176 0 0	801 9 10	572 12 3	1,550 2 1	10 10.94	88 10 4	136 11 2	1,775 3 7	12 5.95	1,172 19 0	8 3.07	..	640 4 7
Payne's Find	3,203½	247 0 0	1,222 13 1	614 6 6	2,083 19 7	13 0.12	245 0 5	252 4 8	2,581 4 8	16 1.38	1,751 14 6	10 11.23	..	829 10 2
Pig Well .. .. .	..	..	86 17 0	62 0 11	148 17 11	..	5 8 2	21 8 9	175 14 10	..	..	..	..	175 14 10
Pinjin	798½	83 16 10	293 2 6	177 0 1	553 19 5	13 10.48	96 13 7	78 7 6	729 0 6	18 3.10	347 0 7	8 8.30	..	381 19 11
Quinn's	1,410½	100 10 0	531 8 6	178 9 6	810 8 0	11 5.89	55 1 4	147 8 6	1,012 17 10	14 4.32	733 17 8	10 4.86	..	279 0 2
Ravelstone	1,051½	145 6 8	389 13 5	180 14 7	715 14 8	13 7.39	35 4 6	366 8 4	1,117 7 6	21 3.00	544 16 4	10 4.36	..	572 11 2
20-Mile Sandy	572½	60 4 8	206 18 10	178 16 5	445 19 11	15 6.96	13 14 9	49 5 3	508 19 11	17 9.55	344 2 1	12 0.31	..	164 17 10
Siberia	209	30 0 0	202 11 5	68 6 10	300 18 3	28 9.52	55 7 3	38 13 7	394 19 1	37 9.60	99 15 8	9 6.57	..	295 3 5
Wiluna	5,425	244 5 3	1,092 19 7	637 11 0	1,974 15 10	7 3.36	99 4 2	231 6 0	2,305 6 0	8 5.97	2,135 12 8	7 10.46	..	169 13 4
Yarri	2,579½	325 17 4	511 7 0	432 17 11	1,270 2 3	9 10.12	201 1 0	287 1 1	1,758 4 4	13 7.58	1,215 19 4	9 5.13	..	542 5 0
Yerilla	1,776	82 19 8	597 3 2	330 6 0	1,010 8 10	11 4.53	188 6 5	154 10 5	1,353 5 8	15 2.85	926 9 5	10 5.18	..	426 16 3
Youanmi	4,010½	102 10 0	731 3 8	412 10 11	1,246 4 7	6 2.57	113 8 5	223 14 5	1,583 7 5	7 10.75	1,213 5 4	6 0.60	..	370 2 1
Widgiemooltha .. .. .	..	..	39 9 2	..	39 9 2	..	..	7 18 0	47 7 2	..	..	..	..	47 7 2
	60,572½	4,545 16 5	14,903 18 0	10,503 18 5	29,953 12 10	9 10.68	3,339 5 1	4,484 0 2	37,776 18 1	12 5.66	28,621 5 8	9 5.40	368 3 4	9,523 15 9
TIN PLANTS.														
Greenbushes, Bunbury End	6,059	180 0 0	424 15 3	295 8 8	900 3 11	2 11.65	202 17 2	129 13 2	1,232 14 3	4 0.81	1,050 0 10	3 5.59	..	182 13 5
Greenbushes, S.W. Gully	1,523	180 0 0	184 8 0	79 14 5	444 2 5	5 9.98	137 1 5	28 15 10	609 19 8	8 0.12	373 7 9	4 10.82	..	236 11 11
Wodgina	450	208 0 0	47 12 1	50 15 2	306 7 3	13 7.20	1 12 8	29 1 2	337 1 1	14 11.76	242 18 0	10 9.36	..	94 3 1
	68,604½	5,113 16 5	15,560 13 4	10,929 16 8	31,604 6 5	..	3,680 16 4	4,671 10 4	39,956 13 1	..	30,287 12 3	..	368 3 4	10,037 4 2

SCHEDULE 9.

ANNUAL REPORT, 1913.

Statement of Receipts and Expenditure for Year ending 31st December, 1913 (excluding Additions and Equipment).

Plant.	CYANIDE AND SLIMES.														
	Tonnage.	Management.	Wages.	Assays.	Stores.	Total Working Expenditure.	Cost per ton.	Repairs.	Sundries.	Gross Expenditure.	Cost per ton.	Receipts.	Per ton.	Profit.	Loss.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	s. d.	£ s. d.	£ s. d.	£ s. d.	s. d.	£ s. d.	s. d.	£ s. d.	£ s. d.
Black Range	1,209	65 10 0	83 11 3	22 0 7	90 15 8	261 17 6	4 3-98	26 17 0	53 15 2	342 9 8	5 7-96	503 16 3	8 4-00	161 6 7	
Burtville				2 18 0		2 18 0				2 18 0					2 18 0
Coolgardie	2,074	59 0 0	213 12 2	55 14 6	147 0 9	475 7 5	4 7-00	47 5 9	90 0 4	612 13 6	5 10-89	859 19 4	8 3-50	247 5 10	
Leonora	4,303	134 12 3	483 15 5	38 11 0	246 3 0	903 1 8	4 2-35	190 16 2	205 16 10	1,299 14 8	6 0-49	2,070 7 8	9 7-46	770 13 0	
Linden	5,809	131 10 0	832 10 1	154 18 1	730 18 6	1,849 16 8	6 4-41	29 16 3	289 12 5	2,169 5 4	7 5-62	2,701 16 1	9 3-62	532 10 9	
Meekatharra	915		61 13 7	26 7 6	92 4 1	180 5 2	3 11-28	15 16 5	36 7 1	232 8 8	5 0-96	401 9 7	8 9-38	169 0 11	
Menzies	560	21 17 0	40 0 0	21 0 6	50 2 0	132 19 6	4 8-97	0 13 1	36 12 5	170 5 0	6 0-96	252 10 3	9 0-21	82 5 3	
Mt. Sir Samuel	2,966	332 5 0	418 0 10	256 2 8	730 13 2	1,737 1 8	11 8-56	54 15 4	156 15 8	1,948 12 8	13 1-65	1,951 10 7	13 1-89	2 17 11	
Mulline	689	31 6 1	145 5 4	38 12 5	76 16 5	292 0 3	8 5-71	18 2 10	41 0 10	351 3 11	10 2-32	333 9 10	9 8-16		17 14 1
Mulwarrie	635	32 6 1	113 18 5	20 5 0	90 10 10	257 0 4	8 1-14	67 9 6	25 13 5	350 3 3	11 0-33	304 7 3	9 7-03		45 16 0
Niagara	2,131	52 0 8	313 15 4	21 13 7	148 7 5	535 17 0	5 0-33	29 3 7	85 13 5	650 14 0	6 1-27	927 19 1	8 8-49	277 5 1	
Norseman									1 2 6	1 2 6					1 2 6
Payne's Find	2,805	120 0 0	417 9 6	52 18 10	202 17 5	793 5 9	5 7-87	2 18 9	118 9 8	914 14 2	6 6-24	1,140 12 2	8 1-58	225 18 0	
Pig Well					77 14 11	77 14 11				77 14 11		111 18 2		34 3 3	
Pinjin	36		3 12 0	1 2 7	1 0 0	5 14 7	3 2-16		0 10 9	6 5 4	3 5-76	3 12 8	2 0-24		2 12 8
20-Mile Sandy	486	54 0 0	53 18 9	9 13 1	30 7 1	147 18 11	6 1-05	87 11 8	39 9 11	275 0 6	11 3-81	233 0 10	9 7-08		41 19 8
Siberia		6 6 0	6 12 3			12 18 3				12 18 3					12 18 3
Wiluna	2,300	77 14 9	355 19 9	88 1 1	259 0 0	780 15 7	6 9-45	20 4 7	182 3 9	983 3 11	8 6-57	1,138 14 7	9 10-82	155 10 8	
Yarri	582	13 0 0	54 15 6	12 8 9	23 6 6	103 10 9	3 6-69	28 17 6	56 1 7	188 9 10	6 5-71	176 5 1	6 0-67		12 4 9
Yarilla	2,259	84 13 6	262 4 1	19 19 5	108 3 2	475 0 2	4 2-44	25 15 5	93 13 4	594 8 11	5 3-14	943 7 11	8 4-22	348 19 0	
Youanme	1,619	57 10 0	179 16 8	32 19 5	83 4 9	353 10 10	4 4-39	25 6 0	84 19 2	463 16 0	5 8-73	753 2 0	9 3-62	289 6 0	
	31,378	1,273 11 4	4,040 10 11	875 7 0	3,189 5 8	9,378 14 11	5 11-80	671 9 10	1,597 18 3	11,648 3 0	7 5-18	14,807 19 4	9 5-37	3,297 2 3	137 5 11
SLIMES.															
Black Range			0 15 0			0 15 0			1 8 6	1 8 6					1 8 6
Linden								0 15 0		1 10 0					1 10 0
Mulline	5,329	195 7 9	1,585 3 11	132 11 5	1,003 14 3	2,916 17 4	10 11-35	381 12 9	173 19 4	3,472 9 5	13 0-38	2,664 10 0	10 0-		807 19 5
Niagara	496	21 0 8	122 8 4	14 11 9	47 18 11	205 19 8	8 3-64		22 13 7	228 13 3	9 2-64	165 2 9	6 7-89		63 10 6
Yarri	264	9 5 10	22 19 7	1 15 2	11 14 7	45 15 2	3 5-59	3 0 0	4 4 2	52 19 4	4 0-14	65 8 2	4 11-44	12 8 10	
	37,467	1,499 5 7	5,771 17 9	1,024 5 4	4,252 13 5	12,548 2 1	..	1,056 17 7	1,800 3 10	15,405 3 6	..	17,703 0 3	..	3,309 11 1	1,011 14 4

DIVISION IV.

ANNUAL PROGRESS REPORT

OF THE

GEOLOGICAL SURVEY

For the Year 1913,

WITH TWO MAPS.

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MAPS.

Map of Western Australia, showing four miles to one inch series of Geological Sketch Maps and other Geological Maps issued since 1896.

Map of Western Australia, showing Goldfields and other districts; also distribution of useful minerals.

Annual Progress Report of the Geological Survey for the Year 1913.

The work of the Geological Survey Staff has, during the year 1913, in general followed the lines along which its activities have been directed in the past, and to which full reference has been made in the preceding eighteen annual reports.

THE STAFF.

The work of the Department has been carried out during the period under review by eighteen classified officers.

The senior field geologist, Mr. E. C. Saint-Smith, who had accepted an appointment on the Geological Survey of Queensland, relinquished his duties on the 6th of January.

In the month of March, the vacancy thus created in the ranks of the Senior Field Geologists was after due consideration filled by the appointment of Mr. E. de C. Clarke, M.A., formerly of the staff of the Geological Survey of New Zealand. The experience which he thus brings to the Department, coupled with his ability as an instructor, combine to give him a knowledge that should prove of inestimable value to Western Australia.

Mr. L. T. C. Jackson, General Assistant, resigned the position he held for over five years, on the 30th April, and his place was filled by Mr. B. S. Welsh, who was appointed on probation on the 26th of May.

FIELD WORK.

During the year the work of the Survey consisted of:—

- (a.) Reconnaissance surveys and explorations, covering in a general way large tracts of country, and
- (b.) Systematic mapping and description in detail of less extensive mining areas.

The former should, as has been pointed out in previous reports, theoretically precede the occupation of the country for mining or other purposes, and for a good many years to come it must in the nature of things remain the only method possible of dealing with those large areas of Western Australia, which lie beyond the boundaries of connected settlement.

Several requests have been made by private persons for the services of the staff for reports upon individual mining properties, but they have almost invariably been refused, as such work falls properly within the province of those engaged in the private practice of their profession.

The policy of the Survey has never been to devote any portion of the time of its scientific staff to examinations of, and the preparation of reports upon, individual mining properties, unless such form part of the regular and systematically planned operations of the Department, embracing a particular mining district as a whole.

If the work of the staff is to fulfil its highest functions and to be of real and permanent value to the State, such must be carried out, so far as is compatible with the resources available, and ever changing conditions, in accordance with definite plans, by which its mineral and allied resources are investigated on the well thought out lines of a more less settled and defined policy.

While this is undoubtedly the best and most effective course to pursue it is not possible to carry on the work as systematically as purely theoretical considerations would indicate as being the best suited to the investigation of particular scientific problems, no matter how important the solution of such may at first sight appear. This arises from the fact that it is, in the public interest, necessary for the work of the Survey to be more or less concentrated in mining districts, or others the potentialities of which indicate a likelihood of their developing into industrial centres of greater or less importance.

In a report dealing with Geological Survey Work one of the most eminent geologists of America stated:—

“A national Geological Survey is, of course, merely supported as a commercial investment

“A nation is, therefore, justified in asking, not how far questions of abstract speculation have been advanced, but as to what progress has been made in the preparation of the maps, for upon these so largely depends the economical working of mines, the development of mineral wealth of newly settled districts, the determination of the most profitable routes for roads and railways, and the establishment of the best water supply.

“It is generally recognised, that the fundamental duty of a Survey is to survey, and that the progress in mapping is the best guide by which those responsible for the expenditure of the public funds can determine whether the nation is getting the best return for its money.”

The *locale* of the field parties is fully set out in the attached table showing the distribution of field work during the year 1913.

Table showing the Distribution of Field Work for the year 1913.

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.
Kimberley Division	41	11.2	..	..	..	..	..	..	..	..	..	..
Peak Hill	125	34.3	13	4.4	..	..	..	..
East Murchison	24	6.6	47	16.0	..	..	..	..
Murchison	13	3.5	..	..	24	6.6	21	5.8	173	58.8	..	..	..	..
Yalgoo	7	1.9	..	..	..	..	..	..	..	..
Mt. Margaret	7	1.9	..	..	..	..	..	..	..	..
North Coolgardie	70	19.2	..	..	..	..	..	..	..	..
Broad Arrow	3	.8	..	..	..	..	..	..	..	..
North-East Coolgardie	12	4.1	27	7.4	..	..
East Coolgardie	1	.3	..	..	4	1.4	239	65.5	230	63.0
Yilgarn	232	63.6	..	..	..	..	..	..	..	..	..	..
Dundas	35	9.6
Phillips River	7	1.9	..	..	..	..	3	.8
North-West Division	6	1.6	..	..	..	..	..	..
Eastern Division	88	24.1	..	..	..	..	..	..
South-Western Division	112	30.7	..	..	..	..	6	1.6	5	1.7	..	..	..	..
Totals	125	34.2	273	74.8	112	30.7	277	75.9	254	86.4	266	72.9	268	73.4

* Appointed 13th March, 1913.

As has been the case in the past, there have been made, in addition to the more or less systematic work of the Survey, 27 reports in connection with the alienation of mineral-bearing lands, and 30 dealing with matters arising out of applications for direct State aid, under the provisions of the Mining Development Act.

A. Gibb Maitland.—Administrative duties, consequent upon the increased staff, are of such a nature as to prevent me carrying out systematic field work in person; hence the planning of future examinations, conferences in the field with the field geologists, and some short reconnaissances have taken up the chief share of my time outside the office.

As has been the case in the past, a considerable portion of my time in the office has been occupied with the very necessary duty of reading and revision of manuscripts, maps, proof reading and other editorial duties. These latter labours have, however, been very much reduced owing to the assistance which Mr. Atkins, the Clerk-in-Charge, has been able to render through the appointment of a Clerk and Typist.

The attached tabulated return shows the volume of editorial work carried out during the period covered by this report:—

Table showing Editorial Work, 1913.

Report.	Pages.		Figs.	Maps.
	M.S.	Type.		
Bulletin LI. ..	127	85	43	13
Do. LII. ..	236	157	40	10
Do. LIII. ..	118	79	15	6
Do. LIV. ..	231	134	31	5
Do. LV. ..	51	34	9	..
Do. LX. ..	1,059	296	..	..
Do. LXI. ..	311	205	119	2
Annual Report, 1912	73	18	..	1
Total ..	2,206	1,008	257	37

In addition to the above a considerable portion of my time has been devoted to imparting information to the public, personally and by correspondence, in regard to all those multifarious matters which come within the province of the Department. Valuable assistance has also been rendered by Messrs. Simpson and Farquharson in the examination and determination of specimens brought or sent to the office by the public.

Despite these duties opportunity was found for a few short trips into the field in different portions of the State, as the exigencies of the situation required.

Between the 13th and the 28th of February I was absent from duty on recreation leave.

On the 31st March, I left Perth with Mr. E. de C. Clarke for Kojonup, returning on the 4th of April; between the 12th and 28th of April a brief reconnaissance was made of a portion of the East and North-East Coolgardie Goldfields with Mr. Clarke. The period between the 19th of June and the 9th of July was devoted, in company with Messrs. Feldtmann and Honman, to an examination of the country between Feysville and Yindi Rock in the North-East Coolgardie Goldfield. From the 17th of August to

the 22nd of September found me examining the country between Feysville and Mt. Holland, and inspecting the work carried out by my colleague, Mr. Blatchford, in the southern portion of the Yilgarn Goldfield. The country between Leonora and Meekatharra was traversed by myself between the 3rd of November and the 16th of December. During the year I thus spent 124 days in the field.

H. P. Woodward.—After taking his annual leave in January Mr. Woodward, in company with Mr. Farquharson, proceeded to Cue for the purpose of consulting with the petrologist in the field upon certain questions which had arisen in the course of the field work on the Murchison. The two officers visited the mining centres of Coodardy, Poona, and the Weld Range. This work occupied the time between the 23rd of January and the 4th of February.

On returning to headquarters Mr. Woodward commenced a survey of the limestone deposits of the Metropolitan Area, designed to form part of that larger investigation of the lime and phosphate deposits of the South-West Division.

Having completed the work in the Metropolitan Area, Mr. Woodward continued the survey of the Coastal Plain, which had been left unfinished by Mr. Saint-Smith and whose work had not been carried further north than the Collie River. During the year this work was completed and connected with that in the Metropolitan Area.

The work was subject to interruption owing to the necessity for special reports being required by the Department of Agriculture, on the Lime Lake at Wagin; the limestones of Yonga near Denmark; and the shell deposits of Oyster Harbour, near Albany. The balance of the time has been occupied in the preparation of a Bulletin on part of the Murchison Goldfield, with the necessary geological maps and plans, and on other reports dealing with matters arising out of the requirements of the Department of Agriculture. Owing to my frequent absences from headquarters, Mr. Woodward's time was largely encroached upon in attending to the multifarious work involved in administering the ordinary official business of the Department.

Mr. Woodward was engaged in the field for 125 days.

T. Blatchford.—During the first two months of the year Mr. Blatchford was absent on accumulated annual leave.

On March the 3rd Mr. Blatchford left headquarters for the Yilgarn Goldfields and commenced detailed field work in the vicinity of Parker's Range, near the southern end of the field. Work in this portion of the State was continued until the 11th of May, when the camp was broken up, owing to Mr. Blatchford's presence being required in the Kimberley Division. This officer left for Derby on the 15th of May to report upon an application for State aid made by the owners of the King Sound Tin Mine, and it was not until the 29th of June that Mr. Blatchford returned to Perth. Field work was resumed at Parker's Range, and continued without interruption to the 21st of December.

The total number of days devoted to work in the field was 273.

J. T. Jutson.—Up to the 29th January Mr. Jutson was on leave. On resuming duty on the 30th, Mr. Jutson's time was devoted to the preparation of the maps and sections and a detailed report on Ora Banda and in preparing for publication reports on Kurnalpi and Kanowna. This occupied his time until the 19th of May, when a second visit was paid to Ora Banda, to bring the mining and other plans up to date, to make a further inspection of the Victorious mine, and to obtain other information necessary to finally complete the maps and report. Returning to head-quarters on the 24th of May after revisiting Kanowna, Mr. Jutson was engaged in work at the office until the 11th of June. Between the 12th of June and the 10th of July, he was engaged at Mount Magnet in connection with requests for State-aided boring, and in making observations on the present condition of mining at that centre. The interval between the 11th and the 16th of July was devoted to an investigation into the general geology of the Yuin district and on the structural geology of the Royal Standard mine. Up to the 23rd of September, Mr. Jutson was engaged at head-quarters writing reports on Yuin and Mount Magnet, and in making the necessary preparations for the detailed survey of Kookynie and Niagara. Leaving Perth on the 24th of September a brief visit was paid to Darlot for the purpose of examining some deep lead workings, while operations were proceeding.

Field work at Kookynie occupied Mr. Jutson's time until the 22nd of December, when he returned to Perth on leave.

At intervals during the year as opportunity offered, during the scanty leisure of a field geologist, Mr. Jutson was engaged in the preparation of a Bulletin on the Physiographical Geology of Western Australia. By far the greater part of the literary research preliminary to such a report was carried out in non-official hours.

During the year Mr. Jutson was engaged in work in the field for 112 working days.

H. W. B. Talbot.—From the beginning of the year to March 8th Mr. Talbot was generally engaged at headquarters, preparing maps from notes made during the field work of the previous season. A few days were devoted to the mapping of the laterites in the Darling Range near Smith's Mill; and from the 18th to the 24th of February, the Phillips River Field was visited in connection with the alienation of lands within the Mining Area. On the 8th of March Mr. Talbot left Perth for Lawlers, and from the time of his arrival at that place on the 12th idem he was engaged on a flying survey of the country extending northwards as far as the Ophthalmia Range. During the course of this work special investigations were made and reports prepared on the gold mining centre of Ruby Well, and the new copper discoveries to the northwards of Peak Hill. From the 8th of December to the close of the year, Mr. Talbot was absent on leave.

During the year Mr. Talbot was engaged for 277 working days in the field.

E. de C. Clarke.—Mr. Clarke, formerly of the Geological Survey of New Zealand, assumed his duties on the staff on the 13th of March. Between

the 31st of March and the 4th of April, a brief visit was paid to Kojonup for the purpose of examining into the occurrence of some fossil plants which had been reported to the Department; whilst the period between the 12th and 28th of April was devoted to a brief visit, in company with myself, to portions of the East and North-East Coolgardie Goldfields. Portions of May, June, and October were spent at Sandstone investigating the Mining Geology of that centre. The last week in October and the early part of November were spent on the Peak Hill Goldfield examining and reporting on the newly discovered gold mining centre of Mikhaburra (Holden's Find).

The greater part of the year, however, was taken up with the detailed geological survey of Meekatharra.

The total number of days spent in field work amounted to 254.

F. R. Feldtmann.—From the beginning of the year up to the 26th of February, with a slight interruption, Mr. Feldtmann continued the detailed work connected with the underground Geological Survey of Kalgoorlie; his operations being confined to the North End of the field. The period between the 1st of March and the 3rd of April was spent on annual leave for 1912, and that also, from the 11th of December to the close of the year, for 1913.

The bulk of the available time of the year was spent in underground work at Kalgoorlie, with the exception of the latter portion of June, and the first week in July, which was devoted to a general reconnaissance of the country between Feysville and Yindi in the North-East Coolgardie Goldfield.

The total number of days spent in field work amounted to 266.

C. S. Honman.—This officer was employed at headquarters until the 7th of April, in working up the maps and preparing a report on the field work of 1912. Mr. Honman's field work for 1913 was commenced on the 8th of April in the Kalgoorlie district and continued uninterruptedly until the end of August. During that period the country in the vicinity of Feysville, south-westwards as far as the granite contact and thence southwards to within ten miles of Widgiemootha, was mapped on broad lines. The whole of September and a portion of October were spent on a reconnaissance survey of the country in the vicinity of the Bremer Range, and in the preparation of a report thereon.

The mapping of the Kalgoorlie district was resumed towards the end of October and continued eastwards of Feysville, including the Boorara Mining Centre; during the course of this work special attention was paid to the geology of the Golden Ridge Mine at Waterfall, and the results of these investigations were embodied in a special report.

Mr. Honman devoted 268 days to work in the field during 1913.

LABORATORY WORK.

As has been the case in the past the various Chemical and Physical Examinations required for the De-

partment and the general public have been carried out by Mr. Simpson and the officers working under his direction. The attached table shows the routine work performed during the year 1913:—

Table showing the Routine Work of the Geological Survey Laboratory during 1913.

	Pay.	Free.	G.S.W.A.	Other Depart- ments.	Total.
Samples	73	251	138	1,158	1,620
Gold	62	158	38	1,125	1,383
Silver	11	51	18	104	184
Copper	18	37	4	32	91
Tin .. .. .	..	18	4	17	39
Lead	2	23	..	23	48
Zinc .. .. .	..	..	..	16	16
Sulphur .. .. .	..	5	..	..	5
Bismuth	2	6	1	..	9
Nickel .. .. .	..	1	..	1	2
Cobalt .. .. .	..	1	..	1	2
Antimony .. .. .	..	1	1	..	2
Phosphoric Oxide .. .. .	..	5	1	..	6
Tungsten .. .. .	..	4	4	..	8
Manganese .. .. .	..	2	..	..	2
Iron	1	1	..	..	2
Lime .. .. .	..	..	3	..	3
Complete Analyses	1	3	29	11	44
Partial Analyses	1	5	52	9	67
Proximate Analyses	1	4	6	..	11
Clay Tests .. .. .	..	4	..	2	6
Metallurgical Tests .. .. .	..	..	..	6	6
Calorific Value	2	..	..	..	2
Mineral determinations	2	52	20	67	141
Miscellaneous .. .. .	..	5	5	3	13
Totals	103	386	186	1,413	2,092

Mr. Simpson, reporting on the year's operations, remarks:—

"The routine work was continued on the same lines as that of previous years. In all 1,620 samples were received for investigation and report, being a decrease of 291 on the number for the year 1912. Details of these samples are given in the accompanying table.

"One of the most important functions of the laboratory is the correlation of the various isolated results obtained and the preparation on this basis of reports for publication which are calculated to supply to the public general or particular information of interest and importance regarding the mineral resources of the State. During the year under review I prepared *inter alia*:—

A Revision of Bulletin 19, Minerals of Economic Value; first published in 1905.

The Deposition of Gold in the Gimlet Ore-vein and the accompanying Chemical Changes in the Adjacent Rock (in press in Bulletin 54.)

"A commencement was made with general reports upon:—

The Clays of South-Western Australia.

The Oehres of Western Australia.

"The following, previously written, were published during the year:—

Bulletin 42.—Contributions to the Study of the Geology and Ore Deposits of Kalgoorlie, Part I., by E. S. Simpson and C. G. Gibson. (Third) Census of Minerals of Western Australia. (Included in Guide to the W.A. Museum, Part VI.)

Radium-Uranium Ores from Wodgina; Occurrences of Monazite at Cooglegong and Moolyella; Investigation into the Composi-

tion and Properties of Coals from the Collie Field, with an Appendix on the Spontaneous Combustion of Coal; Two New Meteorites from Western Australia; A peculiar Biotite (Anomite) from Ubini; Miscellaneous Mineral Notes. (Included in Bulletin 48.)

"Further, the Assistant Chemist and Assayer, Mr. A. J. Robertson, M.Sc., wrote for publication a Description of two Felspars from Kalgoorlie.

"Amongst the material passing through my hands during the year several new mineral occurrences of interest were noted, viz.:—

Calaverite (telluride of gold), Victorious G.M., Ora Banda, Central Division.

Vanadinite (chlorovanadate of lead), in large masses associated with pyromorphite (chlorophosphate of lead), Gregory Ranges, North-East Division.

Rutile (oxide of titanium), Karridale, South-West Division.

Ilmenorutile (oxide of titanium with niobate of iron), Yalgoo Goldfield, Murchison Division.

Chrysocolla (hydrated silicate of copper), magnificent specimens of this mineral were obtained at Ilgarere and Wonyulganna, North-West Division.

Bismutite (hydrated carbonate of bismuth) and *Bismuthinite* (sulphide of bismuth) in commercially important quantities at Melville, Murchison Division.

Bismutosphaerite (carbonate of bismuth), North Pole, North-West Division.

Magnesite (carbonate of magnesium), very pure in quality, said to be representative of a large deposit at Bulong, Central Division.

Fergusonite (niobate and tantalate of yttrium and erbium), known previously only in alluvium at Cooglegong (North-West Division) has been found in its original matrix, an albite pegmatite.

"In conclusion I desire to draw attention to the accommodation provided for the Laboratory Staff. The building now occupied was built 13 years ago to provide *temporary accommodation* and has since outgrown its utility. The building is badly situated as regard both dust and vibrations, and both building and fittings are unsuitable for the present volume and standard of work required to be done, being greatly inferior in each respect to those provided for junior students at the Technical School and School of Mines."

PETROLOGICAL WORK.

The work performed by Mr. Farquharson, the Petrologist, during the past year has been both large in amount and varied in character. Reporting upon this work, the Petrologist intimates that, broadly speaking, it may be considered under four main heads:—

- (a.) The determination of mineral and other specimens and the preparation of notes on some of these that are of economic value for prospectors and others.
- (b.) The examination of various suites of rocks for officers of the Survey and the Mines Department and the preparation of the results of these examinations for publication.
- (c.) The preparation of various small articles for the field geologists and Mines Department, microphotography, etc., etc., and
- (d.) The determination and sampling of the bore cores from Fraser's mine, Southern Cross, and the preparation of reports and sections in this connection.

(a.) Altogether 239 mineral specimens have been determined by me during the course of the year, most of which have been sent in by prospectors and settlers. While the majority call for no individual mention, the following occurrences of the material which has passed through my hands are especially worth recording:—

Black Tourmaline, from Twin Peaks, Yalgoo Goldfield.

Fluorite from Poona.

A new Meteorite from the neighbourhood of Onslow.

Cyanite from the Donnelly River.

Bismuth carbonate and *Molybdenite* from Yalgoo.

Pyromorphite and *Wulfenite* from Whim Well.

Erythrite from Hamersley River.

Brown Tourmaline (Dravite) in exceptionally large six-sided prisms from West Kimberley.

In addition, various notes have been issued to inquirers on the occurrence, mineralogical characters and economic value of molybdenite, mica, scheelite, graphite, etc., and reports have been made on the suitability of various rocks for ornamental and general building purposes.

During the latter part of the year, a paper on the Petrology of Portion of the North End, Kalgoorlie, was sent for publication to the London Geological Magazine.

(b.) The suites of rocks examined include those from:—

1. *South Yilgarn and Parker's Range*.—Most of the rocks sent in from these localities are so decomposed that little trace is discoverable in them of any original structure, and it has been a matter of great difficulty to form an opinion as to their origin. Especially noteworthy, however, amongst the rocks are some probable metamorphosed sediments, viz.:—Sheared carbonaceous phyllites, garnetiferous mica rock with pyrrhotite and carbon, andalusite mica schists.

Other rocks worthy of mention are: a basaltic dolerite, a foliated quartz porphyry, a quartz dolerite, epidiorites, hornblende schists, hornblendites, and amphibolites and a graphic granite. The petrography of the area will be dealt with in a forthcoming Bulletin.

2. *Phillips River District*.—Rocks sent for examination by the State Mining Engineer. Several of the specimens were very much weathered, so much so, in fact, that most if not all original characters have been obliterated. Further, in examining the rocks, I have been comparatively in the dark with regard to their field occurrence and relationships, a circumstance which should in future cases be remedied if the most is to be got out of the petrological examination. In the present case, as some of the rocks are fairly certainly intermediate or transition facies, some indefiniteness in their nomenclature is consequently quite unavoidable. Since the results of the examination will doubtless appear in the State Mining Engineer's report on the district, a detailed account of the rocks will not be given here, but mention must be made of a peculiar black porphyrite that has not hitherto been described from the locality. Further, the so-called "camptonites" of early Bulletins of the Survey prove not to be such, but to be rather granulitised quartz diorites or amphibolites.

3. *North End, Kalgoorlie*.—These specimens are in general very similar to those previously examined from this area, of which an account will be found in Bulletin 51. The green rocks are divisible into two groups:—

(a.) Coarse-grained.

(b.) Fine-grained.

The former are almost all derived from coarse dolerites or gabbros, as their internal structure generally shows. The latter are usually more or less carbonated, containing a considerable amount of quartz and chlorite, and only rarely show traces of original structure. Though their origin is not yet very clear, they appear to be derived from fine-grained amphibolites. The yellowish-white rocks are either kaolinic clays or masses of sericitic scales in forms which suggest an origin from felspar crystals, and hence may indicate that the rocks were formerly the albitic porphyrite. The specimens will be dealt with fully in the forthcoming Bulletin, Part II. of the Kalgoorlie series.

4. *Ora Banda*.—The rocks collected by Mr. Jutson from Ora Banda fall ultimately into the following divisions:—

(1) Granite.

(2) Acid intrusives.

(3) Gabbroid and Doleritic rocks—

(a.) Hypersthene gabbro.

(b.) Epidiorites.

(c.) Epidotised and saussuritised gabbros and dolerites.

(4) Serpentes.

(5) Secondary products.

Full accounts of the specimens are given in the Bulletin—No. 54—already in the press, together with accounts of the alterations that have taken place in the rocks contiguous to the ore channels. These alterations observed in four of the specimens are briefly: micacisation of the larger felspars, chloritisation of the ferro-magnesian constituents with the production of calcite in grains, the development of pyrites and pyrrhotite in the rock-mass doubtless from the action of sulphide solutions; epidotisation and especially zoisitisation of the larger felspars; epidotisation and chloritisation of the original ferro-magnesian with the production of calcite and some quartz; a general breaking down of all the rock constituents with the production in the acid rock of sericitic fibres, some quartz and a clear felspar; the development of a considerable amount of granular calcite, due in part to decomposition of a pre-existing ferro-magnesian, but mostly to the presence of CO₂ in the solutions producing the rock alteration; finally, a development of tourmaline and arsenical pyrites. Metasomatic replacement of the rock on either side of the ore channel is pronounced.

5. *Coolgardie, Mount Monger and Gibraltar.*—A preliminary account of the petrography of this area was given in the Annual Report for 1912. The subject has since been fully investigated and the results are given in Bulletin 53, which is already in the press. It will suffice to give here merely the classification of rocks that has been drawn up:—

- (1) Granite; (a) Pegmatite and aplite.
- (2) Quartz-porphyrines.
- (3) Porphyrites.
- (4) Gabbros and Dolerites.
- (5) Amphibolites and allied rocks, such as Epidiorites, hornblende schist, chlorite schist, etc.
- (6) Foliated rocks other than hornblende schist—
 - (a) Gneissoid rocks.
 - (b) Ferruginous banded tourmaline quartz schist.
 - (c) Graphitic schist.
- (7) Rocks probably of sedimentary origin.

6. *Sandstone.*—The greater part of the area is made up of green metamorphosed rocks of which some are sheared and others massive. It would seem that originally these green rocks were quartz-dolerites of varying grain and various facies, but, owing to dynamic, metamorphic, and chemical agencies the dolerites have become altered in places to amphibolised dolerite, in others to fine-grained carbonate-chlorite rocks, and in others to chlorite schists. Besides the green rocks, there is a fine development of a fine-grained fresh black basaltic dolerite which occurs as a thin dyke cutting across the country and across even the quartz reefs. Jasper bars also form a prominent feature of the topography and geology of the area. In appearance and mode of occurrence these rocks are similar to those occurring in other parts of the Murchison and other goldfields, but are rather less ferruginous and consist principally of laminated quartz and iron-stained quartz. According to Mr. Clarke, below water level in some of the mines, the jaspers are found to be represented by graphite schists. These are much sheared, are in places re-

placed by chlorite schists, and from the examination of them so far made they certainly appear to be but sheared chlorite rocks impregnated by carbon. A full account of the various rocks is given in the Bulletin on the Sandstone Area, now ready for press.

7. *Binduli, etc.*—A careful examination of the specimens collected by Mr. Honman allows of the following grouping:—

- (1) Acid porphyries—
 - (a) The felsitic facies.
 - (b) The medium to coarse-grained facies including both pink and dark green varieties.
 - (c) The sheared pink variety.
 - (d) Varieties with tremolite.
- (2) Porphyrites—
 - (a) Albite or soda-porphyrines.
 - (b) Hornblende porphyrite.
- (3) Gabbroid and Doleritic rocks—
 - (a) Gabbro.
 - (b) Quartz dolerite.
- (4) Epidioritic rocks.
- (5) Tourmaline rocks.
- (6) Rocks probably of sedimentary origin.
- (7) Rocks of somewhat doubtful origin.

Each specimen has necessarily been regarded as a separate study, and no general review of the petrology of the area has been possible. Full details of the various rocks will be found in the Bulletin on the district. Some stress also has been laid in the section dealing with the general characteristics of the porphyries on the possible importance of the sheared sericitised variety, which may indicate an extension of the Golden Mile porphyry into the Binduli area.

(c.) Of smaller articles, mention will be made here only of the following:—

(1) The origin of the gold and of some of the quartz in the rich Boogardie haematite jaspers, of which details will be found in Mr. Jutson's report on the Mt. Magnet, Lennonville, and Boogardie Districts.

(2) The mode of origin of the gold and the minerals in association with the gold in the quartz from Sandstone.

(3) Report on the oxidised lead and copper minerals from Whim Well.

(d.) *Rock from Fraser's Mine Boring Operations.*—Particularly during the latter half of the year, a considerable amount of time has been taken up in determining and sampling the cores from the various bores put down under Government subsidy on Fraser's mine at Southern Cross on the Yilgarn Goldfield. As, up to the present, little information regarding the results of this undertaking has been made available to the public, a critical analysis of the different cores will here be given. This will, however, be brief, since it is intended to publish later on a full account of the cores on a petrological basis from the surface to the lowest depth attained.

In all, five bores have so far been sunk, and 3,885 feet of core have been examined. The depths reached in the individual bores were as follows:—

No. 1 Bore	..	..	..	..	1,160 feet
No. 2	..	..	..	..	825 "
No. 3	..	..	..	..	549 "
No. 4	..	..	..	..	551 "
No. 5	..	..	..	..	800 "
Total	..	..	..	..	3,885 "

Determinations have been made of all the distinct rock varieties passed through. Owing, however, to the amount of work involved, and to the fact that expeditious sampling of the cores was the prime consideration, these determinations are mostly the result of examination of hand specimens only, but though greater accuracy would have been arrived at by microscopic investigation, the names are sufficiently near to the truth for the main purpose in hand. The aim in sampling has been to select every portion of the core that held out any possibility of containing values. In consequence, even though in my opinion there was little hope of any appreciable values being obtained, assay samples have been taken of hard country rock that showed even a little pyrites in grains, of rock more closely approaching lode material such as quartz-chlorite facies, pyrrhotitic quartz-chlorite rock, white quartz, and of chloritic schist both brown and green, whether showing pyrites or not. In some cases, moreover, test or trial or "check" assays have been made of obviously solid hard country without even a trace of mineral matter.

Altogether 164 assays have been made from the five bores. The character of the results will be seen from the following analysis of the various cores:—

No. 1 BORE Total depth .. 1,160 feet.

Forty-eight assays were made from this core, inclusive of 18 made at the suggestion of the State Mining Engineer, between the depths 805ft.-918ft.

From 409ft.-417ft. .. the assay was 1dwt. per ton.
 " 484ft. .. " " 1dwt. 2grs. per ton.
 " 538ft.-542ft. .. " " 19dwts. 21grs. per ton

All the other assays, including the above-mentioned 18, gave the result "nil" or "trace" only.

At 538-542 feet, the material was pyrrhotite-quartz-chlorite rock.

No. 2 BORE Total Depth 825 feet.

26 assays were made.

From 262ft.-265ft. .. Result was .. 9grs. per ton.
 " 268ft.-269ft. .. " " 1dwt. 15grs. per ton.
 " 374ft.-376ft. .. " " 2dwts. 4grs. "
 " 436ft.-443ft. .. " " 1dwt. 7grs. "
 " 590ft.-591ft. 6in. .. " " 1dwt. 11grs. "

All other assays gave "nil" or "trace" only.

No. 3 BORE Total Depth .. 549 feet.

11 assays were made.

From 344ft.-345ft. .. Result was .. 22grs. per ton.
 " 447ft. 6in.-452ft. .. " " 2dwts. 13grs. per ton.

All other assays gave "nil" or "trace" only.

No. 4 BORE Total depth .. 551 feet.

29 assays were made.

From 329ft.-329ft. 6in. Result was .. 1dwt. 6grs. per ton.
 " 333ft.-334ft. .. " " 2 dwts. 11grs. "
 " 336ft.-339ft. .. " " 3dwts. 6grs. "
 " 391ft.-395ft. 6in. .. " " 2dwts. 2grs. "
 " 397ft.-6in.-401ft. .. " " 17grs. "
 " 431ft.-436ft. .. " " 2dwts. 13grs. "
 " 443ft. 6in.-447ft. .. " " 2dwts. 0grs. "

All other assays gave "nil" or "trace" only.

No. 5 BORE Total depth .. 800 feet.

50 assays were made.

From 317ft.-322ft. .. Result was .. 2dwts. 11grs. per ton.

From all the other assays the result was "nil"

The rock facies in relation to values:—

The white and water-clear quartz and quartz-chlorite rock are almost invariably barren. In the No. 1 Bore, about 30 feet of quartz with chlorite in places was passed through, and, though the whole of it was assayed in convenient lengths, no trace of gold was observable. The so-called free gold in it proved to be finely divided pyrites.

The brown and green chloritic schist in no case carried any but the poorest values—3dwts. being the maximum—and in most instances, even when carrying a little pyrites or quartz, it was barren.

Chlorite schist with white quartz and pyrites also generally proved valueless, as did chloritic amphibolite and chlorite schist with pyrites. The best values—though these were quite inconsiderable—were obtained from chloritic pyrrhotitic rock with quartz, the sample from the No. 1 Bore at 538 feet carrying 20dwts. per ton; in no other cases, however, in which this facies occurred, did values rise above 3½dwts.

The No. 5 bore has proved rather extraordinary in that, though brown and green chlorite rock with quartz and pyrites as well as chlorite schist with the same minerals occurred at various depths, in no case except one—at 317 feet—was a trace of gold discovered in the assays, and values then reached only 2dwts. 11grs. per ton.

From the sections of the bores that have been prepared, based on the known dip of the auriferous formations in Fraser's mine, it would seem that usually indications, at least, of the reefs or lodes expected to be found have been passed through at approximately the calculated depths, but so far as boring has up to the present thrown light on the nature of the country and the reefs or lodes at depth, there seems little prospect of proving any ore-bearing material likely to justify exploitation.

PALAEONTOLOGICAL WORK.

Gingin Beds.—An extensive collection of fossils from the Gingin chalk, amounting to considerably over 200 specimens, has been submitted to and examined by our Hon. Consulting Palaeontologist, Mr. Etheridge, of the Australian Museum. The results indicate that there is much that is important and new.

The full details are now in the Press as Bulletin No. 55, which constitutes Part IV. of the series of Palaeontological Contributions to the Geology of Western Australia, issued by the Geological Survey. Some of the fossils were collected by Mr. W. Philbey and the majority by the officers of the Geological Survey in the ordinary course of their official duties.

The Gingin "Chalk," which serves as a most important stratigraphical datum plane, consists of a white chalky limestone, passing downwards into a greenish glauconitic marl, and appears from recent field researches to have a very wide extension to the northward.

At present the number of species which can be identified from the Gingin "Chalk" is comparatively small, but the collection is sufficient to show that a large and important fauna could probably be obtained. Amongst the fossils described by Mr. Etheridge are:—

- (1.) A new species of *Peronella*, *P* (?) *globosa*, sp. nov., which is only the second sponge yet found in the Cretaceous Rocks of Australia.

- (2.) A new species of *Coelosmilium*, *C. ginginensis*, sp. nov. This coral is only the third representative of the Actinozoa found in the Australian Cretaceous Beds.
- (3.) Spines of several varieties of Echinoids, whose general characters are in accord with those of the Genus *Cidaris*.
- (4.) Three Annelids, *i.e.*, *Serpula fluctuata*, an undeterminable species of *Spirorbis*, *Spirulula gregaria*.
- (5.) A new species of *Pollicipes*, *P. ginginensis*, sp. nov. This is believed to be the first definite determination of a Cirripede in the Cretaceous Rocks of Australia.
- (6.) A badly preserved Coleopterous *Elytron*. Only one other insect is known from the Australian Cretaceous, *viz.*, a butterfly *Aeschna flindersensis*.
- (7.) Seven new species of Brachiopods, *viz.*:—
Terebratulina ovata, sp. nov., hitherto only found in the Australian Tertiaries.
Magas mesembrinus, sp. nov.
Magasella cretacea, sp. nov.
Trigonosemus acanthodes, sp. nov.
Pycnodonta ginginensis, sp. nov.
Pecten (Camptonectes) ellipticus, sp. nov.
Mytilus piriformis, sp. nov.
In addition to these there are also an unnamed species of *Ostrea* and varieties of *Inoceramus* allied to *I. maximus v. etheridgei*.
- (8.) A new Gasteropod *Tubulostium pyramidale*, sp. nov.
- (9.) Six Ammonites, having affinities with *Haploceras daintreei*, Eth., *H. mitchella* and *H. flindersi*, and *Ammonites peramplus*.
- (10.) Fish are represented by two imperfect teeth of *Lamna* and
- (11.) The reptiles by a bone which Mr. Etheridge has been unable to determine. Until the fauna of the Cretaceous Rocks of Western Australia is more completely known, its exact relationship to the faunas of other areas cannot very well be definitely made out.

The chief point of interest in connection with the Gingin Fossils is the appearance of types new to the Australian Cretaceous Rocks, but familiar in the Old World, *e.g.*, the sponge (*Peronella*), the coral (*Coelosmilium*), and the brachiopods (*Trigonosemus*, *Magas* and *Magasella*).

At the same time the Australian facies is maintained by the presence of *Inoceramus* and *Ammonites*. A purely homotaxial and not synchronal relation of the Australian Cretaceous Deposits with those of Europe and elsewhere has already been advocated, and there now seems to be reason for believing a much nearer connection to exist with some portions of the Indian system.

There are in Australia at least five developments of the Cretaceous strata, *viz.*:—

- (a.) Those of Queensland, Western New South Wales, and the Lake Eyre Basin of South Australia forming one;
- (b.) A second in the limonitic deposit of Point Charles and Shoal Bay, Darwin, Northern Territory;
- (c.) A third in the Eucla District, Great Australian Bight;

(d.) A fourth in the Perth Metropolitan area; and

(e.) The Eucla beds, proved by boring for artesian water, may be an extension of the Lake Eyre series, but the relations of the others to the general series yet remains to be solved.

Much light will, it is hoped, be thrown upon this problem during the progress of the survey which is at present being made of the lime deposits of the Coastal Plain, to the north and south of the Metropolitan area.

Dongara Beds.—Towards the latter end of 1912, Mr. W. D. Campbell, a former member of the geological survey staff, discovered about 15 miles south of Dongara, a suite of fossils. According to this gentleman's description the exact locality is on C.P. 6117, between the main road and the sand-dunes. The fossils occur in the Coastal Limestone Series, which has been shown on the Geological Map (Bull. 38) as of Tertiary Age. Mr. Campbell's fossils, which have been presented to the Survey Collection, were examined by Mr. Etheridge, and determined by him to be as follows:—

Cardium organum, Deshayes.

Tapes turgida, Lamarck.

Cardita (eff. *C. Amabilis*, Deshayes, an Eastern Australian species.)

Marcia peronii, Lamarck.

Dosinia, sp.

Ostrea sp.

From what is known as the 20-Mile Gully, Dongarra, Mr. Campbell also obtained—

Cardita (eff. *C. Amabilis*, Deshayes).

Mr. Etheridge reports:—"The whole collection can only be regarded as Post-Tertiary to Semi-recent."

Kojonup.—Thirty-two specimens of plant remains from Kojonup were collected by Mr. Clarke and myself in the early part of the year, and on being submitted to Mr. Etheridge, he reported—

"Quite impossible to name these fragments These leaf impressions very closely resemble those from Dalton, near Gunning in New South Wales, referred by Baron Von Ettinghausen to the Oak (*Quercus*), but as I have only a limited knowledge of the flora of Western Australia, the opinion is expressed with all reservation."

LIBRARY.

The Survey Library received during 1913, 842 publications from the Geological Surveys and cognate departments throughout the world. In addition 144 volumes were added by purchase and 72 volumes bound. The distribution of the official publications of the Geological Survey issued during the year amounted to 5,219, over 3,000 more than the previous year.

GEOLOGICAL MUSEUM.

The additions to the Survey Collection during 1913 amounted to 608, bringing the total registered up to 13,475. The accessions comprised 532 rocks, 42 mineral, and 33 fossils.

The number of microsections cut during the year amounted to 394, bringing the total number of slides in possession of the Survey up to 2,215.

Owing to want of space and other causes, the arrangement of the Survey Collection housed in the National Museum remains practically in the same condition as when reported on in the Annual Progress Report for the year 1912.

One of the educational functions of the Survey is the collection and distribution of specimens illustrating the geology and mineral resources of the State; and during the year, so far as the limited stock of duplicates now available will admit, several small collections have been made up and despatched.

PUBLICATIONS.

The publications of the year, which clearly indicate the character and scope of the work of the Survey, and were issued to the public, were as follows:—

Annual Progress Report for the year 1912.

Bulletin 42.—Contributions to the Study of the Geology and Ore Deposits of Kalgoorlie; Part I.: by E. S. Simpson and C. G. Gibson.

Bulletin 44.—A Geological Reconnaissance of a portion of the South-West Division of Western Australia: by E. C. Saint-Smith.

Bulletin 48.—Miscellaneous Reports, Nos. 9-32.

Bulletin 49.—The Geology and Mineral Resources of the Yilgarn Goldfield, Part I., Southern Cross: by E. C. Saint-Smith and R. A. Farquharson.

Bulletin 51.—Contributions to the Study of the Geology and Ore Deposits of Kalgoorlie, Part II.: by F. R. Feldtmann and R. A. Farquharson.

Bulletin 55.—Palaeontological Contributions to the Geology of Western Australia, IV.: by R. Etheridge, junr.

In addition to the above there are now in the hands of the Government Printer:—

Bulletin 52.—The Mineral Resources of the North-West: by T. Blatchford.

Bulletin 53.—Geological Investigations in the Area embracing the Burbanks and Londonderry Centres, Coolgardie Goldfields: by T. Blatchford.

Bulletin 54.—The Mining Geology of Ora Banda, Broad Arrow Goldfield: by J. T. Jutson.

Bulletin 57.—A Geological Reconnaissance of a portion of the Murchison Goldfield: by H. P. Woodward.

Bulletin 60.—General Index to Reports 1870-1910.

Bulletin 61.—An Outline of the Physiographical Geology (Physiography) of Western Australia: by J. T. Jutson.

The following will, it is hoped, be shortly in the hands of the printer:—

Bulletin 56.—The Geology of the Country between Kalgoorlie and Coolgardie: by C. S. Honman.

Bulletin 58.—The Artesian Water Resources of Western Australia: by A. Gibb Maitland.

Bulletin 59.—Miscellaneous Reports, III.

Bulletin 62.—Notes on the Geology and Mining at Sandstone and Hancock: by E. de C. Clarke.

The Western Australian Mining Handbook.

General.—Attached to this report, Plate I., is a general map of Western Australia, showing the districts which have been examined, reported on, and geological maps issued, since the department was organised on its present basis in 1896. The new series of geological sketch maps are issued on the scale of 4 miles to the inch, numbered in accordance with the 300 chain series issued by the Department of Lands and Surveys.

The 4-mile series of geological sketch maps have been designed for the special purpose of outlining the general features of the geology of the districts they embrace, and of affording information of a nature which will materially assist in legitimately

opening up the undeveloped mineral and allied resources of the State. To fulfil their highest scientific functions, however, far more minute surveys are essential before the minor details of structure and stratigraphy can be arrived at; this must, however, be left to the future.

PRINCIPAL RESULTS OF THE YEAR'S OPERATIONS.

A précis of the principal results of the work of the year is given below, as far as possible in the officer's own words, though in one or two instances some slight condensation and alteration has been made.

DOMINIONS ROYAL COMMISSION.

In the month of May last I was summoned to attend and give evidence before the Dominions Royal Commission on the subject of the Mineral Resources and Artesian Water possibilities of the State.

I attended at Parliament House on the 28th of May and gave evidence before the Royal Commissioners.

In the course of my evidence it was pointed out that:—

The Geological Survey is at present engaged upon the delimitation of the actual and potential mineral and artesian water-bearing areas of the State, or, in other words, "taking stock" of its mineral and allied resources, and has been *inter alia* directing its efforts towards the investigation of the raw materials for iron and the other metal trades. Surveys, etc., have been made of the tin, copper, lead, coal, iron, and goldfields, as well as surveys of the phosphates, etc., in the interests of the agricultural industry, and of artesian water areas in the interests of the pastoral industry.

Mineral Resources.—The principal mineral products of greatest importance in Western Australia, arranged in order of value at the end of 1912, are gold, copper, coal, tin, lead, and phosphates. The total value of the mineral products of Western Australia up to the end of 1912 amounts to £113,660,065; of this 54.5 per cent. has been obtained from the East Coolgardie Goldfield, which contains the important mining centre of Kalgoorlie.

The metals and metalliferous minerals make up by far the greater proportion of the value of the output, being over 98 per cent. of the total.

General Return showing the value of the Mineral Products of Western Australia up to the end of 1912:—

Mineral.	Value.	Percentage of total Value.
	£	
Gold	*109,298,872	96.1629
Copper	*1,113,062	.9793
Coal	1,069,435	.9409
Tin	*1,051,155	.9248
Lead	*† 425,133	.3740
Phosphates	†335,592	.2953
Silver	283,848	.2497
Iron Ore	36,695	.0323
Limestone	18,290	.0161
Tantalite	13,486	.0120
Pyritic Ore	6,072	.0053
Zinc	4,285	.0038
Asbestos	1,754	.0015
Tungsten Ore	1,222	.0010
Antimony	860	.0008
Mica	304	.0003
Total	£113,660,065	100.0000

* The export figures, being the greater, have been taken in this table. † Includes pig lead, £13,306, and silver-lead ore, £8,071. ‡ Export figures only, phosphates used in the State not included.

Fuels are limited to coal, the total production of which amounts in value to £1,069,435.

Structural materials, such as building stone, clays, etc., have, unfortunately, not so far been included in the statistical tables of production. No statistics are obtainable to show the extent of the undoubtedly great industrial value of the clays of the State.

Abrasive materials are not altogether without place in the mineral resources of the State, and considerable deposits of infusorial earth known to occur are as yet unexploited.

Chemical materials are limited, so far as production is concerned, to salt, but workable deposits of gypsum are known.

Miscellaneous mineral products comprise asbestos, mica, limestone, etc., as well as guano and artesian water; these, excepting the latter, amounted in total value of production, at the end of 1912, to £335,592. The contribution from phosphates is by far the largest, while, of the others, except for limestone for fluxing purposes, amounting to £18,290, the value has been very insignificant.

Western Australia possesses a possible asset of very great value in the deposits of laterite which occupy such extensive areas in the State. The laterites have in places been utilised, by the ease with which they could be smelted rather than by their richness or purity, as a source of iron ore for fluxing purposes. Some of the deposits contain considerable quantities of alumina, and are in every respect identical with bauxite, a mineral which is now the chief source of aluminium. It is difficult, of course, to estimate the value of these bauxite deposits. They might, of course, be developed by:—

- (a.) Exporting the raw material for use in the alumina factories.
- (b.) Manufacturing pure alumina locally for export to aluminium works; or
- (c.) Manufacturing the metal in the State.

The local manufacture of pure alumina would seem, on the whole, to be the one most practicable, and need not involve any heavy capital expenditure.

The mineral deposits may be grouped into two broad classes, viz.:—(a.) those which are available under present conditions, and (b.) those which will become available eventually.

The future of gold mining in Western Australia must, in a great measure, depend upon the exploitation of its low-grade deposits, and given a proper discrimination in the selection of properties and the exercise of judgment in the expenditure of capital, the country must continue to be a gold producer.

The coal workings on the only field opened up are still very shallow. The freedom of the field from tectonic disturbances does not present difficulties, which would otherwise be involved in working seams.

With the information at our disposal it is impossible to venture to give figures which could convey even an approximate idea of what might be called our mineral reserves.

In other countries in which the study of the mineral resources has been carried on for very long periods it is justifiable, I think, to present figures which may be claimed to represent close approximations.

Consideration must also be given to the fact that the total area of Western Australia is nearly 1,000,000 square miles, and a great part of this is more or less of a *terra incognita* as regards systematic knowledge concerning its mineral resources.

Artesian Water.—So far as available official data show there are 109 artesian wells in the State reaching an aggregate depth of 92,645 feet (or over 17 miles)

yielding a total flow of 29,324,828 gallons of water per diem, which is equivalent to 10,703,562,220 gallons per annum.

In addition to these, there are 12 sub-artesian (or non-flowing) wells of an aggregate depth of 8,897 feet, from which 2,576,900 gallons of water can be pumped daily, or at the rate of 940,568,500 gallons per annum.

The system of boring for artesian water, however, is capable of great expansion in the State; such success as has already attended its operations has been reflected in the increased stock carrying capacity of certain districts and an enhanced wool clip. The first step in connection with the utilisation and conservation of the artesian water resources of the State is the determination of the areas in which the supplies occur and their extent.

The North-West Basin has been defined more or less tentatively; the Coastal Plain Basin has been also delimited more or less accurately in certain portions of its area, and tentatively in others. The Desert and the Gulf Basins in the Kimberley Division have not as yet been more than very cursorily examined, and have not yet been defined. The Eucla Basin, which is destined to rise to importance in consequence of the construction of the Transcontinental Railway Line, has not yet been examined.

The Artesian Water supplies of the State are limited, and such must be carefully safeguarded if this most valuable asset of the community is to be available for all time.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

In the month of September I was commissioned to write, in collaboration with Mr. E. F. Pittman, the Government Geologist and Under Secretary for Mines of New South Wales, an article on the Mineral Fields of Australia, for the Handbook to be issued by the Commonwealth Government on the occasion of the visit of the British Association to Australia.

After consultation, the portion of Australia allotted to me embraced the Western States, whilst the Eastern States and Tasmania fell to the lot of my collaborator. My contribution to this article, entitled "The Mineral Fields of Western Australia, Northern Territory, and South Australia," was forwarded in November to the Commonwealth Statistician, who acts as editor.

The necessary limitations of space precluded that justice being done to the Western Australian portion which its importance demanded, whilst in that dealing with the Northern Territory and South Australia, the want of sufficient official and other literature tended to the same end.

The article pointed out, *inter alia*, that the State of Western Australia occupied the Western third of the Commonwealth, and embraced an area of 975,920 square miles. The mineral fields are numerous, and scattered over a very wide extent of country. The total area of the proclaimed mineral fields amounts to 329,828 square miles; the position of the fields, as legally defined by the authorities, is shown on the map of Western Australia included in the Report of the Department of Mines for the year 1912. The legal boundaries of the mineral fields, however, bear no relation whatever to the geological boundaries.

The inception of active mining operations in Australia dates from the year 1842, when lead and copper lodes were first discovered and worked at Waneranaooka, in the Northampton District of Western Australia. Since then the State has produced mineral products, the total value of which, up to the end of

1912, amounts to £113,660,065; of this 54.5 per cent. has been obtained from the East Coolgardie Goldfield, which contains the important gold mining centre of Kalgoorlie. The real mining history, however, dates from the year 1893.

The principal mineral products of greatest importance in Western Australia, arranged in order of value, at the end of 1912, are gold, copper, coal, tin, lead and phosphates. The metals and metalliferous minerals make up by far the greater proportion of the value of the output, being over 98 per cent. of the total. The South-Western corner of the State, from Israelite Bay to Cape Leeuwin, and as far north as latitude 25° South, is a more or less broken tableland, from which rise isolated hills and ridges of metamorphic and crystalline rocks, to which a pre-Cambrian Age has been assigned. This plateau forms the chief mineral region of the State.

Isolated patches of variable extent of these older pre-Cambrian rocks rise from beneath the newer strata, in the North-West and Kimberley Divisions, and are as important from the mineral standpoint as in the South-Western plateau. The pre-Cambrian rocks are remarkable for the variety of useful and valuable minerals they contain, numbering up to date no less than 196. There are sound reasons for knowing that the major portion of this pre-Cambrian plateau has been a land surface since early Palæozoic times, and having had such a peaceful geological history, there has not been very much opportunity for mineralisation, hence the valuable ores have a very wide distribution instead of, with certain notable exceptions, being concentrated into very rich deposits. Whilst this is so, the results obtained by geological exploration, prospecting, and mining operations indicate quite clearly that the mineral industry of the State will not only be progressive but great. The future of gold mining in Western Australia, however, must in a great measure depend upon the exploitation of its low-grade deposits, of which there are very many. The mineral deposits of Western Australia occur in areas generally as more or less parallel belts of relatively narrow lateral dimensions, though in certain localities they appear as small isolated areas or patches. These narrow, well-defined belts have a general north-west and south-east direction, with occasional divergencies of several degrees on either side. The ore deposits in these belts or zones, owing to dynamo-metamorphic processes, do not crop out in long lines, but are cut up into relatively short lenticles, arranged *en echelon*. There are in all 24 proclaimed mineral fields in the State, though there are, in addition, other areas which have been proved to be mineral-bearing, but which have not as yet been brought within the limits of any legally-defined mineral field. Most of the mineral fields of Western Australia produce other metals besides gold, though in nearly all cases this is by far the most important product.

THE REPUTED OCCURRENCE OF OIL IN WESTERN AUSTRALIA.

In October a memorandum on the reputed occurrence of oil in Western Australia was prepared and submitted to the Government. This memorandum dealt solely with the facts as ascertained by personal investigation and boring in the State, and did not in any way touch upon the fascinating and much de-

bated scientific question as to the origin of petroleum and cognate points. The memorandum, which was printed *in extenso* in the Western Australian press for public information, and became the subject of questions in Parliament, reads as follows:—

In a pamphlet by Mr. Geo. D. Meudell, in September, 1913, entitled "Petroleum Exists in Australia," and issued by the Australian Oil Wells Company, there appear statements regarding oil in Western Australia about which it is desirable that the investing section of the public should receive timely warning:—

I.

On page 4 of the pamphlet it is set out:—

"The floor of Albany Harbour, West Australia, is of bituminous formation, and to the south is covered by impervious strata of limestone. Where the limestone capping was broken when dredging the harbour, traces of oil were discovered and in several instances the flow of oil lasted several days. Six bores were put down in the harbour, the deepest being only 105 feet, but oil was found in two of the bores. To the west of the harbour are large beds of limestone and sandstone, and oil and bitumen have been frequently found for many years past. Petroleum will most assuredly be found by boring to a depth of, say, 2,000 feet."

The belief in the occurrence of oil-bearing rocks at Albany led, in 1906, to the formation of the Princess Royal Harbour Mineral and Oil Company, and to an application to the Government for State aid in the prosecution of boring operations "to ascertain the strata, to locate the anticlinal axis."

A personal inspection of the harbour and its surroundings was made by myself and a report, accompanied by a geological map, prepared and submitted to the Government; this document and map were published early in 1907 in Geological Survey Bulletin No. 26, under the title of "The Geology of Princess Royal Harbour with reference to the occurrence of Oil."

This report showed the harbour to be very shallow and to be everywhere underlaid by granite and allied rocks, which were met with in two of the bores put down by the Mineral and Oil Company at 46 and 48 feet respectively. The low ground round the harbour had been also pierced by bore holes and in every case was the floor of crystalline rocks met with, the greatest depth being 234 feet. After dealing exhaustively with the geology of the harbour the report further set out that there is nothing in the geological constitution and structure to in any way indicate that the occurrence of mineral oil is probable, whilst the wrong hypothesis as to the source of the bitumen dredged up, and the oil floating about on the surface of the water, appears to have led to money being needlessly spent in boring, etc.

In November, 1912, Mr. Geo. D. Meudell, the author of the pamphlet, wrote asking to be supplied with any reports, plans, etc., bearing on the subject of petroleum in Western Australia, and a copy of the Bulletin in which the official report and map on the Geology of Princess Royal Harbour, was duly supplied to him.

II.

On page 5 of Mr. Meudell's pamphlet it is stated:—

"The Warren-Blackwood oilfield, east of Cape Leeuwin, has been favourably reported on by Mr. S. Göczel, a famous Hungarian geologist, who claims that oil will be struck by boring to a sufficient depth.

In 1901 application was made by the Westralian Mining and Oil Corporation for State aid to bore for oil in the Warren and Donnelly Rivers, and after a personal inspection of the district in question by myself, a report, "The Reputed Petroliferous Deposits of the Warren and the Donnelly Rivers," was prepared and submitted to the Government.

In this report it was set out that—

"In the light of our knowledge of the Geological structure of the valleys of the Warren and the Donnelly it may be reasonably doubted whether the district can in any sense be regarded as petroliferous."

No petroleum has been discovered in the district, nor does its geological structure appear to conform to that which regulates the occurrence of oil elsewhere. In consequence the application for State aid was refused.

At a later date the Oil Company again approached the Government for assistance to continue the boring operations which had been started. The State Mining Engineer, after visiting the district, reported to the Government:—

"On the prospects of discovering petroleum by boring in the Warren River District, in which it was set out that the formation is not unfavourable for oil, though not specially promising either, and that there is the positive fact that bitumen, a product of oil, has been repeatedly and continually found in the district for many years past."

Boring was carried down to a depth of 1,719 feet. No oil was found, and the last 1,000 feet penetrated angular sand, of quartz felspar and pale garnets, such as owes its origin to the disintegration of the crystalline rocks upon which the strata of the Warren and the Donnelly Rivers rest, and which outcrop to the north.

The various reports were published in the Annual Reports of the Mines Department for the years 1902, 1903, and 1904.

III.

Mr. Meudell's pamphlet, part 5, states:—

"The geological map of West Australia shows the correct oil bearing tertiary rocks fringe the coast from Cape Leeuwin to Derby on King's Sound."

Over 110 bores have been put down in the sedimentary rocks (Tertiary to Devonian) which form a relatively narrow fringe in the maritime districts from Eucla to Wyndham.

In the Kimberley Division there are 9 bores, in the North-West 24, in the South-West 67, and in the Eucla Division 9, without any trace whatever of oil being found.

These are the only districts of the State in which petroleum can occur, if such exists, of which at the present time there is no evidence.

METEORITES.

On the 20th April, 1913, a meteorite weighing 355lbs. was found by Mr. Jas Bourke, of Boolaloo Station, on the Ashburton River. The meteorite, of which about 5 inches of the thinnest part was showing above the surface, measures about 2 feet 4 inches long by 1 foot 8 inches broad.

The nickel contents amount to 9.45 per cent.

The meteorite has been acquired by the Foote Mineral Company of Philadelphia, U.S.A., but a cast [13323] has been secured by the Department.

It is very much to be regretted that the meteorite was not retained in the State for the Survey Collection.

There have been in all eight meteorites recorded from the State and, with the exception of those found at Nuleri, Premier Downs, and Mount Dooling, all of them have been secured by outsiders and find a place in the museums, etc., of other countries to the detriment of the scientific institutions of Western Australia.

It is essential that this should be prevented in the future by making all meteorites State property. This can be accomplished by legislation, on similar lines to that recently brought under the notice of the South African Legislature at the instance of its scientific advisers.

In the event of legislation tending towards this end being drafted, the Act should stipulate that all meteorites found must be reported to the office of the nearest magistrate and warden, or the Government Geologist, to enable the necessary official steps to secure the specimen being taken.

It would also be necessary to arrange with the Customs authorities of the Commonwealth to prevent any meteorite leaving the State, unless with the sanction of the Western Australian Government.

THE ORE DEPOSITS OF P.As. 815c AND 818c, LEONORA.

Passing through Leonora opportunity was taken to examine the workings on P.A. 815c, which it had been proposed to test with a diamond drill by a locally formed syndicate.

A full account, illustrated with maps and sections, of the geology of this locality has already been given in Bulletin 13 and the Annual Progress Report of the Geological Survey for 1909, hence little reference need be made thereto, as the work done since that time has added little, if anything, new to the facts already accumulated.

The belt of country in which P.As. 815c and 818c are situated has been tested by means of the diamond drill, with the results fully set out in my report of the 7th of September, 1909.

In 1910 the managing director of the Gold Industry of W.A., Ltd., approached the Government for a subsidy (and other concessions) for putting down a series of bore-holes (amounting in the aggregate to 6,000 feet) in at least 10 different localities comprised within an area of 9 miles long by 600 feet wide, embracing the westernmost schist belt at Leonora, but for the reasons set out at length in my memo of the 27th January, 1910, this proposal was not entertained by the Government.

Some desultory prospecting operations have been carried out on P.A. 818c (Bowden), P.A. 815c (Perkins), and the Casimir G.M.L. 1436c.

On P.A. 815c (Perkins) a prospecting shaft (No. 2) had been put down to a depth of about 15 feet, in which was exposed decomposed schist dipping at an angle of about 50 degrees to the east and trending generally north and south. The schist is traversed by several "ribs" of quartz of varying dimensions, and which lies parallel to the strike and dip of the enclosing rock. Some of these quartz ribs are intersected by veinlets of white quartz, which lie at right angles to the strike of the schist but which in no case intersect them.

Some of these were seen to contain small quantities of coarse gold. One of these lenses from Bowden's P.A. 818c, collected by myself, assayed 6 ozs. 1 dwt. 9 grs. per ton. Another shaft, No. 1, had been

carried down to a depth of 92 feet from the surface, from which a drive had been carried north 114 feet along the strike of the schist. From the northern end of the drive a crosscut had been carried west about 50 feet and intersected about three feet of schist carrying "ribs of quartz"; these dipped east at about 65 degrees. Another parallel crosscut had been driven westward from the foot of the shaft for a distance of about 60 feet with the object of intersecting the country opened out by the northern crosscut, but with somewhat indifferent success.

In any of the workings from this shaft no very defined ore body had been opened up at the time of my visit, though it is by no means improbable that other parallel quartz lentils would be met with by crosscutting across the comb of the country, as there are several evidences of such on the surface.

The type of ore deposit to be met with in this class of country is likely to be more or less irregular, but whether or not the quartz "ribs" and lenses (some of which have proved to be very rich) are likely to prove sufficiently numerous to make even a modest mine, can only be satisfactorily demonstrated by judicious prospecting operations.

While in my judgment the prospects of such do not appear to be too hopeful, the chances are not entirely destitute of success, hence I would recommend that, if the local owners of the Prospecting Areas 815c and 818c and the Casimir 1436c find themselves willing and able to raise a fair and reasonable proportion of the cost necessary to put down three bore-holes to a depth of 300 feet below the surface at sites to be afterwards selected, a subsidy be granted towards that end.

LIMESTONE DEPOSITS OF THE SOUTH-WEST DIVISION.

(H. P. WOODWARD.)

The work carried out during the year under review in connection with the lime deposits of the State by Mr. H. P. Woodward embraces that area of the Coastal Plain which is bounded by the Jandakot Railway line on the north, the Murray River on the south, on the east by the steep face of the Darling Range, and on the west by the sea.

In this section there is one continuous unbroken line of coastal hills, between which and the range is a tract of undulating sandy country, the general fall of which is to the southward to the Murray River, but this is so slight that defined watercourses are uncommon, while the main streams which come from the range are either completely lost in the sand or their course is indicated by a chain of swamps.

In this section of the coast the sand dunes have assumed much more considerable proportions than either further south or north, while they extend in one almost continuous line between Mandurah and Rockingham. It is quite apparent that these sand dunes overlie the limestone series, since this latter is met with as reefs on the sea side, while the main formation lies upon their eastern side. It is quite clear that these dunes are of greater antiquity than those to the southward of Mandurah, since they are now covered with coarse vegetation, while the whole belt from Mandurah to a point a few miles north of Rockingham is absolutely destitute of timber, which latter was evidently destroyed by the sand drift in a similar manner to that which is now taking place near Lake Clifton.

To the northward of Point James, where the coast-line is protected from the south-westerly weather by Garden Island, the sand dunes are quite insignificant, while the limestone hills impinge upon the shore line.

In the Mandurah-Rockingham section the limestone at the rear of the sand hills does not usually form such bold hills as both further north and south, while in some places there are no hills, the presence of the limestone being indicated by boulder-like outcrops upon a low sandy flat.

These outcrops, when seen from a distance, present the appearance of a grazing flock of sheep. This peculiar form appears to indicate a very extensive period of meteoric weathering, but this question will be more fully discussed when the whole of the limestone deposits are dealt with together.

Limestone in this form is usually of considerable purity, but since it does not lend itself to quarrying it is not so economical to work as lower grade stone that does. There are numerous quarries of this latter kind of stone between Mt. Brown and Fremantle, and it is from this area that the main supply of lime consumed in this State is obtained.

In portions of this limestone belt lakes are met with, in the beds of which there are deposits of calcareous marl, due to the disintegration of shelly matter. This deposit, although similar to those of Lakes Clifton and Preston, belong evidently to an older series, since every vestige of shells or other organisms has entirely disappeared, while over portion of these lake beds, which are now dry for the greater portion of the year, the marl is gradually changing into a chalky limestone.

These lakes only contain water for a portion of the year, consequently the aquatic fauna which formed these deposits are now unable to exist.

A sample of this clean marl gave a return of 85 per cent. of carbonate of lime and contained only 2 per cent. of insoluble matter, the balance being made up of 10 per cent. organic matter and 3 per cent. moisture.

A series of samples taken from over a considerable area of the reverted limestone averaged 78 per cent. of carbonate of lime, while the balance in this case also consisted largely of organic matter.

Between White and Salt Lakes there is a large bank of loose material which has been swept by the wind off the lake surface and piled up, a sample of which gave 76½ per cent. of carbonate of lime. There are many thousand tons of material in this bank in a fit state for agricultural purposes.

It is apparent that this group of lakes at one time formed one large lake with a connecting channel to Mangles Bay, while the water brought down by the Serpentine River entered the northern lake at its north-eastern corner.

Since it is probable that the calcareous deposit covers an area of 12 square miles, there should be sufficient to last for a long period, while the fact that the old Rockingham-Jarrahdale railway crosses the north end of the White Lake will enable it to be conveyed quickly and cheaply to the market.

On the eastern side of the calcareous belt is a wide stretch of undulating sandy country; the sand being of the dune character indicates that it was left behind as the sea gradually receded from this area. In the course of this upheaval salt lakes and marshes were detached from the sea, and in these the marine fauna continued to exist in forms which became gradually modified by the changing conditions until

fair-sized marine types were, after a time, represented by miniature shells living in absolutely fresh water.

Many of these old lakes, with the alteration of the land surface level, became dry, when the marl from the comminuted shell fragments was gradually converted into a chalky limestone, many small deposits of which are met with near the base of the range between Pinjarra and Gingin.

These deposits now usually consist of small knoll cappings which vary from a few inches to four feet in thickness, while beneath the intervening flats no limestone is met with. As in the case of the other limestone deposits, the "cap" or surface crust is of much better quality than the underlying beds, this being due to the action of rain water containing carbonic acid gas, which first dissolved the carbonate by converting it into the bi-carbonate, from which the carbonate is subsequently re-deposited in an almost pure form.

A sample of this "cap-stone" obtained from one of these lake remains near North Dandalup contained 89 per cent. of carbonate of lime, while the underlying stone only yielded 83½ per cent., while the average of a number of samples, including both cap and under-bed, showed an increase of 1 per cent. of carbonate of lime by the inclusion of the "cap-stone."

These deposits are of considerable value as a local source of supply of agricultural lime, but are of far too limited an extent to warrant the erection of a costly plant.

Along the eastern fringe of the area under review mineral discoveries have been reported from time to time, but up to the present only the phyllites, which are used in the manufacture of dry pressed bricks, have proved to be of any economic value.

The earliest of these discoveries consisted of two small galena lodes situated near Mundijong, the most southerly of which is situated close to the Jarrahdale Railway line and has been re-opened from time to time.

In this the galena was associated with a considerable quantity of blend, but both minerals were in too limited quantities to be profitable.

These mines are mentioned by Mr. H. Y. L. Brown in a report written, as Government Geologist, in the years 1870 and 1871, but there is no record of the output, which was probably small. In 1888 a mild excitement was caused in Fremantle by the reported discovery of a silver lode near Pinjarra, and a company called the Federal Silver Mining Co. was formed; unfortunately, however, when a sample was submitted to the writer it proved to be only marcasite (white iron pyrites, FeS_2).

In 1895 a considerable sensation was caused by the reported discovery of gold at North Dandalup, and so favourably was this reported on by Capt. Fowler, the senior mining inspector, that a goldfield was proclaimed and Mr. H. C. Prinsep, Secretary for Mines, appointed Warden.

It was unfortunate that at this juncture the position of Government Geologist was vacant, since the writer had relinquished that position some months previously and Mr. Maitland had not then been appointed, therefore we have no report which explains in any way the terrible fiasco of the North Dandalup Goldfield, but it is quite clear that the bulk samples taken by Capt. Fowler contained some gold that was foreign to the locality from which it was supposed to have come.

This is the only instance which has come to the writer's knowledge (and he has had as wide an experience of sampling prospectors' shows as anyone in Western Australia) of successful manipulation, and it is only right here to pay a tribute to the honesty and integrity of the prospectors met with in Western Australia.

In 1907 it was reported that gold had been discovered upon some private property near Mundijong, but upon investigation by the writer it soon became apparent that this was a false alarm.

From an agricultural point of view this tract of country does not compare favourably with that to the southward of the Murray River, since in the latter a large area consists of clay, silt, and loam, whilst in that under review by far the largest portion is sand. This fact militates considerably against successful irrigation since, owing to the very permeable character of the soil a much larger volume of water would be needed, which would cause a very large loss of plant food by its leaching action.

The swampy lands which, as a rule, contain a large proportion of humus after draining, are very suitable for intense cultivation such as market gardening, but in the cultivation of such land it is wise to avoid as far as possible the use of acid fertilisers, substituting bone-dust for superphosphates, nitrate of soda by preference over all chemicals, while the potash in which all this class of soil is very deficient would best be added as sulphate, while a heavy dressing of ground limestone every three or four years should put such land in a condition to grow a fine crop.

The use of caustic or hydrated lime is not recommended unless as a first application after draining the swamp when it is desired to rapidly destroy the organic acids, the reason being that caustic lime destroys all nitrate-bearing matter, driving off nitrogen, which it costs more to replace than the initial price paid for the lime.

A full and detailed report upon the Lime, Phosphate, and Clay Deposits of the State is in course of preparation.

THE GOLD BELT OF THE YILGARN GOLD-FIELD.

(T. BLATCHFORD.)

The country under consideration embraces that portion of the Yilgarn Goldfield bounded on the north by a line six miles south of and parallel to the Great Eastern railway line, on the south by a line running east and west five miles south of Cheriton's Reward gold mine, and on the east and west by the boundaries of the Yilgarn Goldfield: giving roughly a total area of some 2,400 square miles.

During the year 1913 the work of Mr. Blatchford has extended from the southern boundary to a line running east and west through a point some four miles north of the Victoria Gold Mine, within the areas embraced on lithos L53A, L55A, L53B; the work has been depicted on 10 chains to the inch plans, outside these boundaries on a 300 chain to the inch plan.

When completed, the work in hand will join that of Bulletin No. 17.

Topography.—The topographical features are similar to those of most of the Eastern Goldfields, viz.:—Low ridges in the greenstone areas, "breakaway" country with occasional ridges in the sedimentary series, and undulating sand-plains with large isolated bare granite outcrops in the granitic areas.

On the eastern side of the greenstone belt is an almost continuous chain of dry lakes which, extending from a point to the east of Yelladine southward past Cheriton's Reward, mark the junction of the granite and sediments or granite and greenstones.

Geological Description.—By far the greater portion of the area above referred to consists of massive granite, represented at the surface by extensive undulating, scrub-covered sand-plains, from which rise isolated granite knobs, forming the only break in the monotonous landscape. Extending in an unbroken line through this granite in a north-westerly south-easterly direction is a comparatively narrow belt of greenstones and highly altered sedimentary rocks.

Of these three the sediments are undoubtedly the oldest and are intruded by the greenstones, both being in turn intruded and crushed by the later enclosing granites. The interior belt of greenstones and sediments is by far the more important from an economic point of view, as it is only in them that gold has been found in payable quantities.

Ore Deposits.—Owing mainly to the covered nature of most of the surface, exposures are comparatively rare, hence great difficulty is met with in collecting data to form definite conclusions as to the occurrence of the underlying lodes and rocks.

The following remarks might therefore very easily require modification, when mining operations are advanced beyond the oxidised zone.

The ore deposits of the southern portion of the Yilgarn Goldfield may be classed under three main heads:—

I.—Fissure lodes—

- (a) in greenstones.
- (b) in sediments.

II.—Contact lodes.

III.—Quartz reefs—

- (a) in sediments.
- (b) in greenstones.

IV.—Alluvial deposits.

I.—*Fissure Lodes.*

(a) In Greenstones.—There are several good examples of this class of lode, the most important being a more or less continuous line extending in a general north and south direction from half a mile north of McKenna's battery southward to Cheriton's Reward, and running parallel with the granite on the east.

Owing to the influence of the granite, strains were induced in the greenstones which eventually caused fissuring, and along this fissure lenses of ironstone have formed, which contain gold values sufficiently high to be in some instances payable. As a rule these lenses are not of any great width but at times have a very considerable length, with a pronounced underlie to the west.

Comparatively little mining has been carried on along this series of lodes, the only localities where any serious attempt has been made to treat the ore in bulk being at the Spring Hill Gold Mine (Patterson's) and McKenna's Gold Mine. A new development on a lode of this class is being opened up at the Dulcie group in the south end of the field.

This lode is a parallel one to the main series and has only been opened out at present to a shallow depth of 50 feet. Developments, however, so far have given encouraging results.

Associated with the main ironstone series are numerous quartz veins running either parallel to or at a high angle with the former.

These quartz veins, though small and erratic in occurrence, have and are still producing considerable amounts of payable stone and have been the means of maintaining mining activity in the southern portion of the field.

(b) In Sediments.—Being the oldest of the series, the sedimentary rocks have necessarily undergone more dynamic changes than either the greenstones or granites, evidence of which may be seen in the intense folding and faulting in many of the outcrops. Chemical changes have also played an important part in the sediments, and amongst other secondary minerals, chiastolite, and alusite, and garnets are of common occurrence, and numerous ironstone lodes have formed along the planes of cleavage or faults where circulating mineral solutions had easy access.

At times these lodes occur as massive ironstone deposits, but usually only as lenses or layers alternating with the country rock.

Up to the present, gold has not been found in payable quantities in any of the lodes of this class.

II.—*Contact Lodes.*

Genetically the only difference between this class and the foregoing is that the latter occur at or very near the contact of the sediments and greenstones, whilst the former are found occurring actually in either of these rocks and away from the junction lines.

The lodes in both cases have undoubtedly been formed chiefly by metasomatic replacement.

Of the contact lodes the most important examples are the Victoria lode, the Broncho lode, and the Caudan lode.

From the mapping so far completed it would seem that the sediments in the vicinity of the Victoria group have been subjected to intense pressure from the north-east with a corresponding buckling. In consequence, though the general strike in the southern portion is practically north and south when the Victoria is reached, this buckling causes an alteration in strike to one of north 40°-50° west.

The Caudan line (really a north and south line) follows this alteration in strike, as the mapping shows, and after passing into the Victoria group turns practically due west for a short distance and then unfortunately disappears under an extensive layer of laterite. On the footwall or south side of this bend, in really a much crushed zone, the Victoria lode has been formed by an almost complete replacement of the crushed material with silica and iron oxides, extending in an oxidised state to a vertical depth of 285 feet. Probably the formation of this lode was largely due to the presence of a rather extensive greenstone intrusion, which forms the footwall of the Victoria lode, and would undoubtedly help to concentrate the circulating mineral-bearing solutions.

The formation from an economic point is important as being one of the largest opened out in the State and having gold values which render the mine a payable proposition. Both the Broncho and Caudan lodes are similarly situated on the contact of the sediments and the same greenstone rock as on the footwall of the Victoria lode, but so far they are in the prospecting stage. It is gratifying to learn, however, that sufficient capital has been raised to test both the latter down to the sulphide zone: for they are, if anything, larger deposits than even the Victoria lode, which has an average width of from 100

to 150 feet. Further reference to these three lodes will be found appended to these notes.

III.—*Quartz Reefs.*

(a) In Sediments.—As far as ascertainable there is no payable gold-bearing quartz reef in the sedimentary series, and the quartz veins, though abundant, are such as would give little encouragement to prospectors, so it is unlikely, in the writer's opinion, that this class of reefs will be of any great economic importance.

(b) In Greenstones.—A considerable amount of prospecting has been carried on in this class of ore body.

As a general rule the quartz veins are small lenticular, and erratic in their occurrence, but on the other hand often contain high gold values: up to the present they have been the mainstay of mining in the district. An important feature in their development is the repeated occurrence of intrusive acid (pegmatite) dykes. These dykes have been the source of much trouble to the prospector, inasmuch as they not only frequently pass through the reefs and cut them off, but faulting often takes place along their course.

Noted examples of this occurrence are to be found in the Comet, Bohemia, and McIntosh G.Ms.; as a general rule the faulting is to the west when driving south and to the east driving north, though there are exceptions to the rule.

It is worthy of note that these dykes, except in as far as they cause mining difficulties, do not influence the gold contents of the quartz veins, and they would appear to be of distinctly later origin than the occurrence of the gold and to have no genetic connection with the latter. It is highly probable, too, that they are of later origin than the main granite mass and have come into their present position in a very fluid state along the newer faults and fissures, due to the contraction following on intense compression. As a general rule they are very seldom found in the sedimentary series, but are extremely abundant in the greenstones, especially along the eastern margin.

IV.—*Alluvial Deposits.*

The alluvial deposits of the field are scarcely worthy of notice from an economic point of view. There is evidence of a very limited amount of "dry blowing" in the vicinity of the old Parker's Range townsite and elsewhere, the returns from which are not obtainable.

In two isolated spots, one at the Parker's Range Dam, there is definite evidence of a sedimentary deposit similar in many characteristics to the North Lead in Kanowna, but the gutter is very narrow and shallow, and gold values are too low to be profitably worked. On G.M.L. 2528, immediately south of McKenna's battery, a similar deposit has been opened out, but this also has proved unpayable, and is of very limited dimensions.

The future mining prosperity of the district will undoubtedly mainly depend on the development of the large low-grade lodes, and to a minor extent on the quartz reefs in the greenstone areas.

THE VICTORIA, BRONCHO, AND GRAND NATIONAL LODES.

The geological features of the area in which these three lodes occur are masked for the most part by a heavy overburden of laterite on the extreme north-

ern end, and by a large alluvial flat extending through the centre for a distance of several miles. There is sufficient surface data, however, to show that the boundary of the granite on the west and the general trend of the sedimentary rocks on the contact of which with the greenstones the main lodes occur.

The general strike of the sediments as far north as G.M.L. 719 is practically north and south, but beyond this point a sudden bending to the west occurs, and the strike eventually generalises into one of about N. 40° W. The reason of this alteration in strike would appear to be due to a general pressure coming from the south-east which has caused the sediments to buckle and be thrown out to the east, evidence of which can be clearly seen in the lake country south of Hatt's water reserve, and immediately to the east of mile post 16 on Yelladine road.

Simultaneously with, or possibly at a later date than, this earth movement an intrusion of greenstone of considerable magnitude has forced its way up through the sediments and will be found in the writer's opinion to occupy the alluvial covered flats lying to the south of the Victoria Gold Mine and west of the Grand National Gold Mine (G.M.L. 2601). Unfortunately exposures of this greenstone can only be seen where coloured green on the accompanying map, though identically similar rock in hand specimens is to be found in the bore cores extracted at a depth of some 500 feet by boring operations at Mt. Caudan some five miles South of the Victoria Gold Mine. The greenstone rock specimens, collected from exposures at the Victoria and Broncho mines, have been classified by the Petrologist as "amphibolite." Microscopic determinations of the cores from the Caudan bores are unfortunately not at present available.

Referring to the sedimentary series, they consist of various fine-grained varieties of sedimentary rocks such as quartz mica schists, carbonaceous mica schists, phyllites in some cases with numerous inclusions of the secondary minerals, and alusite and chialtolite (a variety of andalusite), garnet schists and sericite schists, and in two cases, coarse quartz conglomerates. It is along the contact lines of the greenstones and these sediments that the lodes under review have formed.

The Victoria Lode, G.M.L. 719.—This lode has been opened out to a vertical depth of 285 feet, with intermediate levels at 150, and 50 feet from the main shaft.

The thickness of the lode has not been accurately determined, but can be estimated as averaging at least from 100 to 150 feet.

On the surface the outcrop is about 15 chains in length. Owing to the covered nature of the ground, neither the eastern nor western extension is discernible, and it is very doubtful whether the Victoria lode passes through the Caudan line in G.M.L. 944 and junctions with the lode lying to the east, or whether this second lode is disconnected or a faulted portion of the Victoria lode. Mining operations will probably enable light to be thrown on this subject in the near future.

A second shaft, sunk in the north-east corner of G.M.L. 719 to a vertical depth of 80 feet, shows plainly the existence of both the Victoria and Caudan lodes, but cross-cutting from the bottom of shaft has not definitely decided the thickness of either. The Victoria lode is an oxidised highly silicified ore body

to the 285 feet level, below this the lode rapidly turns into dense sulphides of iron. Descending from the surface, the iron percentage becomes less, while that of the silica increases till at the bottom level some of the ore is literally a highly coloured jasper.

The footwall of the lode is greenstone, and well defined, with a decided underlie to the north, whilst the hanging wall is a quartzite, much brecciated in places and very indefinite. Throughout the mine to the 285 feet level the ore is free milling, and is at present being mined in bulk from an open-cut from the 50 feet level to the surface and treated in a Fraser and Chalmers type 10-head stamp mill.

Up to the present a cyanide plant has not been installed, so the following returns have been from gold won only from the battery:—

Tons crushed.	Gold therefrom.	Value in shillings per ton.
18,550	2,492·11	11·41

The Broncho and Caudan lodes are similar in occurrence to the Victoria lode, but have not been developed to the same extent.

As a matter of fact, practically no mining except a little surface costeaning has been done on the Caudan lode in this locality. One costean, however, on G.M.L. 2601/1490 shows the existence of an almost solid ironstone lode for a width of 250 feet at the surface.

It is to be hoped that capital will be expended to prove whether this large deposit does carry payable values at depth, as there is no geological reason why it should not.

On the eastern leg of the Broncho lode (*vide* plan), nothing has been done in the way of development, the only prospecting along the line being a limited amount of costeaning for sampling purposes, and a few bore holes for the same object.

The boundaries of the lode on the surface are indefinite, but are probably approximately as depicted on the accompanying plan.

In the western leg a fair number of shafts have been sunk and the lode cross-cut in several places. I have not examined all these workings in detail.

On the most southern lease, G.M.L. 1689, two shafts are at present being sunk to water level, a vertical depth of 200 feet.

Cross-cutting at the 50-foot level in the most southern of the shafts shown on the accompanying plan on G.M.L. 1689, shows the lode to have a width here of approximately 200 feet. The lode at this level consists of the ordinary oxidised lode material with bunches and stringers of ironstone irregularly distributed throughout. Owing to the leaching out of the oxides of iron some of the faces are almost white. So far at this level there are no defined walls visible.

It is early days, in the writer's opinion, to form any definite ideas about this mine, and for this reason inspection has been postponed until the present work has been extended, *viz.*, cross-cutting east and west at the bottom levels. This work will undoubtedly throw considerable light on both the geological and mining aspects and amply warrants the incurred expenditure.

ORA BANDA.

(J. T. JUTSON.)

The detailed geological survey carried out by Mr. Jutson embraced the two chief mining areas of the Ora Banda field, *viz.*, Ora Banda proper and the belt known as "Cashman's," situated about two miles to the east of the township of Ora Banda.

The rocks of the district are igneous and metamorphic, all the latter being regarded as of igneous origin. Sediments were not observed in the area. The solid rocks are largely obscured by laterite and other superficial formations.

The igneous rocks consist of coarse-grained greenstones (amphibolites, etc., derived from gabbros, dolerites, or pyroxenites), fine-grained greenstones (epidiorites, etc., derived from gabbros or dolerites), porphyrite, granite, and quartz porphyries. The metamorphic rocks comprise schists and serpentines, as well as some "quartzites" which have been derived from basic rocks.

The western portion (Ora Banda proper) of the field is occupied by the porphyrite (the "native cat rock" of the miners). To the east are the schists, the coarse-grained greenstones, the granite and the fine-grained greenstones, in narrow belts. On the west the porphyrite abuts against a narrow strip of serpentine, which in turn is flanked on the west by some coarse-grained greenstones, which, at least in part, consist of hypersthene-gabbro. The rocks are in bands running, roughly, north-west and south-east.

The eastern and western masses of coarse-grained greenstone appear to trend towards one another in their northern outcrops, which suggests that the porphyrite may be cut off in this direction. Its western boundary has been determined, but not its eastern, and its extent to the south is also quite obscure. A comparatively small area of this rock is therefore actually known.

The results of chemical analyses and microscopical examinations show that there is much affinity between the basic rocks, but nothing definite as to their age and relations to one another can be stated. The coarse-grained greenstones may, however, be intrusive into the fine-grained series, but this is not certain.

The "schists" represent a body of rocks which are in part true schists, and in part more massive decomposed rocks. The main group, on the eastern side of the field, is regarded as the altered coarse-grained and fine-grained greenstones (particularly the former) along the junction of the two series, and therefore in their present characters of later origin than the greenstones.

The granite is considered as intrusive into the schists and the fine-grained greenstones.

The quartz porphyry dykes are only found on the eastern side, and the principal group runs parallel to the planes of schistosity of the schists. They are intrusive into the latter, and they may be related to the granite.

Lode-formations occur almost solely in the porphyrite, and as these are the richest lodes, this rock is, therefore, the most important on the field. The auriferous quartz reefs are chiefly restricted to the schists, and are generally associated with the main group of porphyry dykes. The schists are second to the porphyrite from an economic standpoint.

The lode-formations so far as observed, possess no general uniform direction, but run at various angles, although the most important lines yet discovered, the Gimlet lode and the Gimlet South lode, are parallel

to one another, their direction being about west-south-west and east-north-east. The irregularity of the lodes may be due to pressure from the east and the west. The dip of the lodes is generally close to the vertical, but it often oscillates from one side of this plane to the other. The lodè-formations vary much in thickness, both in different lodes, in different portions of the same lode, and both horizontally and vertically. The variations extend from a few inches to, perhaps, 70 feet. As a rule the lodes are not much sheared.

The lode-formations are chiefly bands of porphyrite, which have been largely metasomatically replaced by the gold-bearing solutions. The latter have also filled the cracks and fissures of the rocks in the auriferous zones. Oxidation of the lodes, and to a less extent, of the country, has taken place to a considerable, but varying depth, and this has enabled the mines to be rapidly and cheaply worked. Little work has been done in the sulphide zone.

In the oxidised zone free gold is found disseminated through the lode, and in the quartz and ironstone veins traversing the main body. Telluride ore has been discovered in the chief mine of the district, the Victorious mine.

The auriferous quartz reefs are, as already stated, chiefly confined to the eastern belt of schists. They have a generally uniform direction of north-west to west-north-west, usually running parallel to and between the planes of schistosity of the schists, and dipping to the south-west at a moderate angle. The chief gold-bearing belt in this area is almost always associated with the porphyry dykes. Where these do not occur, little gold has usually been found. An important apparent exception to this point is at the southern end of the belt, where the Lady Evelyn mine is situated, and where no porphyry dykes have been located. At the western boundary of the granite, numerous quartz reefs occur, but they are apparently barren of gold.

With regard to the future possibilities of the field, the quartz reefs chiefly occur as lenses, and tend frequently to pinch out at no great depth from the surface. The probability is that they will "make" again at depth, but in view of the low values near the surface, the outlook for deep quartz mining is not too bright.

The known area carrying the lode formation is limited, but there is still abundant space for the occurrence of numerous lodes. From the probable mode of formation of the ore-channels, they and the resulting ore-bodies may be expected to be irregular and sometimes faulted. If such be correct, the mining of the porphyrite lodes will meet with difficulties, owing to their possible dying out (both vertically and horizontally), and their faulting, splitting, and branching. As against these disadvantages, the ore-bodies appear to be of deep-seated origin, and there is no reason to think that collectively they will not live to great depths. Moreover, the lodes are likely to be numerous, so that in endeavouring to pick up a lost lode, or in cross-cutting for a known one, others may be discovered. Their payable or non-payable character, however, can only be ascertained by actual developmental work.

To the end of 1912 the official returns (excluding Christmas and "Sundry Claims," comprising others than at Ora Banda) show that 24,336.24 fine ounces of gold were obtained from 76,253 tons, giving an average per ton of 0.32 fine ounces. The yield has, of course, been considerably increased in 1913, mainly by the Victorious mine.

MOUNT MAGNET, LENNONVILLE, AND BOOGARDIE.

(J. T. JUTSON.)

The rocks of these districts consist largely of greenstones (frequently foliated), with which are associated iron-bearing quartzites, these latter apparently being highly altered products of the greenstones. On the east and west of the main belt of greenstones are extensive areas of granite, which is apparently intrusive into the greenstone. Some quartz porphyry dykes have also been discovered and possibly a basic dyke.

The lodes comprise three series:—quartz reefs, quartzite lodes and fault-lodes. The quartz reefs are numerous, and of varying length and thickness. They have been proved to be auriferous to 500ft. in depth. These reefs are most extensively developed between Lennonville and Mt. Magnet. The quartzite lodes are thick masses of altered country of a low-grade character. They are frequently intersected by thin quartz veins, and are then stated to be most auriferous. They have not been worked to a greater depth than 300 feet.

The fault lodes are the famous Boogardie "breaks." The latter consist of narrow bands of lodestuff between the fault-planes, which generally cut across the iron-bearing quartzites of Boogardie. The latter apart from the Sirdar mine, have not so far been found to be auriferous to any extent. These "breaks" are sometimes extremely rich in free gold. Below water level, however, they, where worked, have seemingly yielded poor results. It is probable that some of the "breaks" have been intruded by quartz-porphry dykes, and that these dykes have had some influence in the deposition of the gold.

Most of the workings in the lodes generally are very shallow, and the deepest are not below 500 feet.

No definite conclusion as to the origin of the gold generally can be arrived at. It is very probable, however, that secondary deposition and concentration in certain areas within the zone of the oxidation have taken place.

Regarding the possibilities of the field the reefs appear to have every chance of living to greater depths than at present worked, although some, from their apparent character of short lenses, will give out. New payable reefs probably remain to be discovered. The quartzite lodes at the time of examination were yet to be proved at depth, but some being opened up were promising, and their mode of occurrence suggests that other undiscovered similar lodes exist. They are essentially for companies to work.

The fault-lodes are chiefly for prospectors, and the late rich finds of the "Boogardie View" and "Polar Star" emphasise the point that further auriferous "breaks" may yet be found.

Certain areas outside the known belts appear to warrant further prospecting.

YUIN AND THE ROYAL STANDARD MINE.

(J. T. JUTSON.)

The country at Yuin consists of a belt of greenstone, intersected by thin pegmatite dykes, and with intrusions of granite more or less surrounding the basic rocks in a broken ring. The greenstones are frequently foliated in an approximately east and west direction, but the granite is only affected at its margin, the main portions being quite massive. The evidence indicates that the foliation of the greenstones took place prior to the granitic intrusions. There are various quartz reefs in the greenstones parallel to the foliation planes of the latter, but the only one so far

proved payably auriferous, is that of the Royal Standard mine. This reef is of great length and of considerable thickness. It strikes approximately east and west, and dips to the south at a high angle. At a depth of about 300 feet, the reef abruptly ends against a mass of underlying granite. The junction between the granite and the reef is probably a fault plane, and the reef has, doubtless, been displaced by this fault, but no criteria were available to determine the direction or amount of such displacement.

DARLOT DEEP LEAD.

(J. T. JUTSON.)

Some years ago, several shafts were sunk with the object of locating the "gutter" of a supposed deep lead, but the work was apparently not successful. Recently a syndicate sank some more shafts, and did some driving therefrom with the same object. A visit to the ground whilst the work was in progress, showed that the principal new shaft had been sunk to a depth of 72 feet, at which depth some iron-bearing deposits ("wash") occurred. These carried some traces of gold, but were not regarded as payable. By driving south from the shaft and making various cross-cuts, a deposit consisting mainly of white clay with angular, subangular, and rounded pebbles of quartz was discovered. Some coarse and fine gold occurred in the "wash." This deposit is undoubtedly a true detrital one, although most of the component pebbles have travelled but a short distance. The extremely rounded pebbles suggest that they may have been derived from a pre-existing gravel deposit, and if so, it is possible that some of the gold may also have come from such a formation.

Insufficient work had been done to prove whether the "gutter" had been located or not.

PHYSIOGRAPHICAL GEOLOGY OF WESTERN AUSTRALIA.

(J. T. JUTSON.)

This report is based upon a study of the available general topographical and geological maps of the State and of all accessible literature pertaining to the surface features and their origin; as well as upon personal observations over various portions of southern Western Australia. The objects of writing have been to bring together in a compact form what is already known concerning the physiography of this State; to endeavour to formulate some broad comprehensive generalisations as to the origin and history of its chief physical features; and so to furnish a starting point and a stimulus for further detailed research. Physiography is often of much value in some questions of economic geology, such, for instance, as the nature and extent of the auriferous and stanniferous deep leads, artesian water supply and structural geology. Its educational value is now also well recognised.

The principal results may be stated as follows:— After an introduction indicating the nature and scope of the work and brief accounts of the general physical features, rainfall, vegetation, and general geology, the State is divided into six physiographic divisions, named respectively the Kimberley or Northern, the North-West, the South-West, the Central or Salt Lake, the Eucla or South-East and the Eastern. In each of these six divisions, the rainfall, vegetation, geology, and the physical characteristics generally, are briefly described, together with the nature of the human occupation, and to some extent, the relation

of the latter to the physical environment. The river systems are described in physiographic terms and their possible histories outlined. The remarkable series of salt lakes which receive the interior drainage are discussed, and the conclusion is drawn that the wind is the predominating agent in their formation, although some may occupy deformation basins. The vast elevated plateau forming the major portion of Western Australia is treated of, and it is shown that over the interior (which comprises the Eastern and Northern goldfields), on account of the scanty rainfall, there are no defined streams, and consequently little normal valley erosion. Wind is the great denuding agent and it tends to keep the country level. Great quantities of detritus are formed, and if it were not that the wind "exports" an enormous amount in the form of fine dust, the lodes would be buried many feet in depth. Such "exportation" tends to keep the bed rocks and their contained lodes, in very many places, quite close to the surface, although almost everywhere there are thin superficial deposits, and these cause much trouble. Still they are small difficulties compared with great thicknesses of wind-blown detritus. In treating of the origin and history of the great plateau, the auriferous deep leads are mentioned, and the various possible theories as to their origin receive consideration. Whilst detailed observations are required to adequately discuss the question, it is concluded with some degree of probability that there are basins into which the old deep leads drain, which may yet be found to be gold-bearing. A suggestion is almost made which may to some extent throw some light on the difficulty of accounting for rich patches of alluvial gold where few or no valuable lodes have been discovered. The idea is that some of this gold may have been derived from old deep leads, the remains of which have been removed by denudation.

Some of the harbours of the State are shown to be comparatively recently drowned river valleys, and the weathering of rocks is described, together with the general process of arid erosion.

THE COUNTRY BETWEEN LAT. 23° AND 26° S., AND LONG. 119° AND 121° EAST.

(H. W. B. TALBOT.)

The following is a brief account of the country examined by Mr. Talbot during the past field season.

A much more general interest is being awakened throughout this portion of the State. Between Wiluna and Ruby Well most of the outcrops consist of sedimentary rocks of the same type as those seen in the Finlayson Range,* which was described in the notes attached to last year's Annual Report. In some places, however, these sedimentary beds have been removed by denudation, and the underlying rocks are exposed, and along the Wiluna-Peak Hill Stock Route between the former place and No. 22 Well †; these belong to the greenstone series. They are everywhere much weathered, and the outcrops usually consist of decomposed, earthy schists and haematite quartz schists. A few small quartz veins were seen occasionally, but in some localities there was a considerable amount of detrital quartz, which must have been shed from fairly large reefs. The quartz, however, was, in most places, of a particularly uninviting type, and did not appear likely to yield payable gold. The greenstones were seen at intervals as far north as Jeminya Pool, ‡ on the Middle Branch of the Gas-

* Lands Department Litho. 60/300. † Not shown on any map. ‡ Lands Department Litho. 71/300.

coyne River, where they were cut off by a large granite area. On the western side the greenstone belt is bounded by granite, and in several places along the contact, basic schists enclosing quartz veins were seen; and, although it is unlikely that any large ore bodies will be found, I am of opinion that the strip of country along the junction of the two formations southwards from Jeminya Pool for about 30 miles is well worth attention from prospectors.

At Ruby Well some auriferous reefs have been recently discovered, and at the time of my visit several leases and prospecting areas were being worked, and dryblowers were apparently obtaining satisfactory results from their labour. The Ruby Well workings are situated at the eastern end of a greenstone belt, which at this point came just within the limits of the area being mapped. It, however, extends for a considerable distance to the westward, and the new discovery at Holden's Find is probably on the same belt. To the eastward of the Ruby Well workings the greenstone belt abuts against the same granite mass referred to previously as occurring along the western side of the greenstone series extending from No. 22 Well to Jeminya Pool.

To the north of the Ruby Well belt there is a fairly high range (the Robinson Range*) running easterly and westerly, consisting of highly inclined metamorphosed sedimentary rocks:—slates, quartzites, and jasperoid rocks associated with which there are numerous quartz reefs, which coincide with the strike of the country, i.e., easterly and westerly.

On the divide between the Ashburton and Fortescue Rivers there is another narrow greenstone belt trending easterly and westerly. It extends easterly for about 30 miles, but the western extension of the belt has not yet been mapped. The rocks in this greenstone area consist of basic schists, with numerous short quartz lenses, and nearly everywhere there is a large amount of detrital quartz.

A considerable amount of work has been done a few miles to the N.E. of Deadman's Hill,† but at the time of my visit the locality was abandoned, and I am unable to state whether any payable gold was obtained or not.

Along the south side of the Ophthalmia Range‡ there is another greenstone belt about ten miles in width running parallel with the range. This belt was crossed only in one place, so that much has not yet been learned regarding it. The few outcrops which were examined consisted of hornblende and ferruginous quartz schists.

It will be noticed that the last three greenstone areas mentioned have an easterly and westerly strike. This is at right angles to the usual strike of similar formations in the southern goldfields of this State. A general east and west strike is also characteristic of the sedimentary series with their associated quartz dolerite sills and laccoliths, of which mention will be made further on.

Granite.—A narrow belt of granite runs along the western side of the greenstone area referred to at the beginning of these notes, but a little to the north of Jeminya Pool the granite swings round to the eastward and, cutting off the greenstone, joins the large granite area that extends easterly beyond the Rabbit-proof Fence, and northwards to within a few miles of Wonyulgurna.‡

The only other granite area seen during the season's work lies between Deadman's Hill† and the greenstone belt south of the Ophthalmia Range.‡

The granite, which is about 30 miles in width, runs easterly nearly as far as Jiggalong§ on the Rabbit-proof Fence, where it is overlaid by the sedimentary series. I was informed, however, that the granite is again visible along the fence to the northward of Jiggalong, and it may be that it connects with the granite seen by me on the Rudall River, some years ago. The western extension of this granite area has not yet been defined.

The greater portion of the area mapped during the past season was occupied by a series of sedimentary rocks, which to the south of a curved line drawn from near the 15-mile post on the Peak Hill-Nullagine telegraph line* through Wonyulgurna† to Mt. Essendon* consist of large detached masses of small outliers, but to the north of that line practically the whole of the country to the north boundary of Lands Dept. Litho. 80/300 is occupied by the sedimentary series. These sedimentary beds consist of grits, sandstones, shales, limestones, and, occasionally, conglomerates, and with these, over the western portion of the area are associated numerous laccoliths and sills of quartz dolerite varying in thickness from a few inches up to over 200 feet. Speaking broadly the strike of the sedimentary and the igneous intrusions is to the east and west, but the angle and direction at which the beds are inclined varies considerably. In portions of the area there is no appreciable dip, while in other places the beds are tilted into steep anticlinal and synclinal folds.

Copper has been found in five different localities in this area, all of which were visited and examined.

In every case except Humphry's Reward the copper was found filling a fissure traversing shales or fine-grained sandstones. At Humphry's Reward the copper is found in bunches in a quartzose lode traversing a quartz dolerite sill. While a few of the leases which have been taken up may yield payable returns to small syndicates, who are in a position to have their ore carted away, the geographical position of the deposits and the small size of the lodges, in my opinion, preclude their attracting serious attention from com-

MEEKATHARRA.

(E. DE C. CLARKE.)

Meekatharra is situated in the Murchison Goldfield, about 400 miles N.N.E. of Perth. Field work has only been completed over about 24 square miles in the northern (Garden Gully) portion of the area. More than 100 square miles, therefore, remain to be examined. The greater part of the time spent in actual geological work at Meekatharra has been taken up with the examination of the more important mines.

In the present incomplete state of the work the statements to be advanced will probably seem premature, and will, no doubt, require great alteration when the results of the petrological examinations are available, and when further field work has been done.

The most striking structural feature of the area is a belt of granite which separates the auriferous country at Meekatharra from the less important centre of Garden Gully. The character of the country rocks and the mode of occurrence of the gold appear to be different in these two areas. As yet I am ignorant as to the conditions at Yaloginda, which forms a third gold-mining centre in the district to be reported on.

(a.) *Garden Gully and Neighbourhood.*—A considerable portion of this area is a plain covered with alluvium, and regarding this portion no geological data are available.

* Lands Department Litho. 71/300. † Lands Department Litho. 80/300. ‡ Lands Department Litho. 91/300. § Lands Department Litho. 90/300.

Where they are exposed the rocks prove to be soft schists, with occasional bars of a harder greenstone. These bars, though roughly parallel to the planes of schistosity, appear to be lenticular in outline. They may prove to be intrusives. Large masses of basic igneous rocks occur near the eastern and western boundaries of the Garden Gully area. Quartz reefs occur abundantly in the eastern portion of the Garden Gully area, and appear to be either parallel or approximately at right angles to the shearing planes.

The Kyarra—the only mine in active operation in the parts which I examined—appears to be at the junction of reefs belonging to both systems. No reefs show at the surface for any great distance, and but few of them are auriferous.

The most noticeable difference between the Garden Gully and Meekatharra areas is the absence from the former of the "Jasper Bars" which are so marked a feature of the country round Meekatharra.

(b.) *Meekatharra*.—Further examination will probably show that the geological features of the Pioneer and neighbouring leases, in all of which the auriferous bodies are quartz reefs, are distinct from those of the mines of the "Paddy's Flat" Belt—the chief mines of the district—which are characterised by the occurrence of "lode formations."

The following remarks apply solely to the Paddy's Flat Belt:—

The oldest rocks are possibly of sedimentary origin, and were once mainly argillites and conglomerates. These, while still comparatively unaltered, were intruded by basic or ultra-basic rocks. Then followed a period of great regional metamorphism. As a result, both igneous and sedimentary rocks were much sheared and underwent great chemical and mineralogical changes. It was during this period that the "Jasper Bars"—zones of the greatest shearing—were formed. Then—possibly coincident with the intrusion of the main granitic mass referred to above—a dyke of quartz porphyry, which runs, roughly, N.N.E. and S.S.W. through the Flat, was intruded. During the last phases of consolidation of this dyke, or more probably subsequent to its complete consolidation, fresh fissuring and shearing took place, the lines of the main fissuring and shearing were parallel to the porphyry dyke and dipped steeply to the east. In the openings so formed gold-bearing solutions circulated, and partly by deposition in the fissures and more largely by partial metasomatic replacement of the shattered country the existing auriferous quartz veins and lodes were formed.

After gold deposition had ceased a further faulting took place, accompanied by the intrusion of a large dolerite dyke on the east side of the belt. In places this dyke has cut through the auriferous bodies. Their continuity on the eastern side of the dyke has not yet been proved by mining.

The dolerite intrusion closes the series of geological events of importance in this area.

SANDSTONE.

(E. DE C. CLARKE.)

The country examined in detail covers an area of about six square miles at Sandstone. Sandstone is situated in the East Murchison Goldfield, about 340 miles north-east of Perth. The geology shows little variety. The country rock is a mass of quartz dolerite which has been greatly altered—the principal processes being the production of schistosity and mineralogical changes resulting in carbonation,

chloritisation, etc.* After these changes had in great measure taken place the quartz dolerite was intruded by granite, of which two small areas are known to exist. These areas are completely masked by rock waste and have only been disclosed in mine workings. At a later date the main gold-bearing reefs were formed in fissures running generally north and south.

As at Meekatharra, the last geological event of importance was the intrusion of dolerite dykes. At Sandstone one of these dykes is found to be very closely associated with an important reef, but has probably not had any influence on values.

Recent deposits in the form of laterites and unconsolidated debris are of course abundantly represented.

The abundant jasper bars form the most interesting feature of the area. These bars have an east and west strike and often stand up above the ordinary level as long, fairly steep-sided ridges. At the surface the rock is the usual "banded jasper" which has often been described. Below the zone of oxidation this "jasper" is found to pass into graphite schists, showing under the microscope signs of intense shearing. The jasper bars appear to mark the zones along which the most pronounced shearing of the quartz-dolerites was effected. It is not certain whether they were entirely formed before the intrusion of the granites, as the foregoing summary of the geological history would imply. They are contemporaneous with, not later than, the fissures in which the auriferous quartz was deposited. It is not clear that they have had any definite enriching or impoverishing effect on the reefs, but in some cases of minor importance marked enrichment does take place where the reef enters a jasper bar.

The auriferous bodies at present being worked round Sandstone are quartz reefs which generally strike more or less north and south and dip to the west at about 45 degrees. The Wanderie reef, striking east and west and practically vertical, is an exception. The frequent close relationship between the reefs, the later dolerite and the jasper bar has been noted. There is evidence for at least two periods of filling in the majority of the reefs.

It seems unlikely that the auriferous reefs owe their formation to the intrusion of the granite.

MIKHABURRA (HOLDEN'S FIND).

(E. DE C. CLARKE.)

This find is situated near the south boundary of the Peak Hill Goldfield about 50 miles north of Meekatharra. It lies on the higher ground bounding the Murchison Valley to the south.

Gold was discovered there in September, 1913, and, owing to the rich specimens obtained from floaters, there was a small "rush" which resulted in the pegging of claims over a considerable area. Prospecting work of any consequence had at the time of my visit (October, 1913) been carried out only on two groups of leases, held respectively by the Ruby Well Development and Ruby Well Option Syndicates.

The country rock appears† to be a rather fine-grained greenstone, in places strongly sheared. The shearing planes run in a general north and south direction. A band of very compact rock, which offers a strong contrast to the country rock through appearing macroscopically but little altered right to the surface, is assumed to be an intrusive of later date than the general country rock.

* My remarks on Sandstone owe any value they may have to the large number of microscopic determinations by the Petrologist, Mr. R. A. Farquharson. † These notes are from observations made in October, 1913, and may now be inaccurate. They are not supported by any microscopic petrology.

Gold is found in quartz reefs or rather in the majority of cases in "floaters" which are supposed to have come from reefs. Judging by the orientation of the lines of "floaters," most of the parent reefs run east and west. A few, including that (Whittaker's) on which most of the work has been done, run north-west and south-east. The dip appears to be generally to the south or south-west. Opinions differ as to whether Whittaker's reef is one body of stone faulted or two distinct reefs. Taking the former view, the reef must have a length of at least 2,500 feet, and the middle 1,200 feet of this will be found to average at least six feet in width. While rich "floaters" are of frequent occurrence at Holden's Find the quartz from Whittaker's reef (the only proved reef at the Find) is rarely rich, though it is said to be consistently auriferous. It is generally considered that Whittaker's reef will yield satisfactory results if the ore can be treated on the spot.

THE NORTH END (KALGOORLIE).

(F. R. FELDTMANN.)

The results of the first section of the work completed during 1912 were embodied in Bulletin 51, and the area examined during the past year lies to the south of and adjoining that described in that bulletin.

General Geology.—The rocks of the present section in the main resemble those described in Bulletin 51, but in addition to them, the rocks described by Mr. Gibson in Bulletin 42 under the title of "Calcschists" occur along the eastern boundary of the area mapped.

The following is a rough classification of the rocks of the present section:—

Older Greenstones	..	Calcschists (chlorite-carbonate rocks of peculiar type).
Later or Intrusive Greenstones	..	Now represented by—
Including	{ original Quartz Dolerite or Gabbro and { original Pyroxenite	{ Amphibolised Quartz Dolerite Amphibolite Chloritised Amphibolite Epidiorite Hornblendite Talc-Chlorite rock
		{ Amphibolised Quartz Dolerite Amphibolite Chloritised Amphibolite Epidiorite Hornblendite Talc-Chlorite rock
Newer Intrusives	..	Albite Porphyrite or Quartz Keratophyre

The Amphibolised Quartz Dolerite is found on the extreme west of the area and is of considerable width.

Typical specimens are found at the back of the Warden's residence where the rock is of coarse grain and pale in colour owing to the large proportion of felspar present. Very similar varieties of the rock are found on G.M.L. 4470e, Hannan's Find, towards the southern end of the area. It occurs also towards the eastern side of the intrusive greenstones, to the west of the North End Gold Mines main lode.

The Amphibolite and its chloritised variety adjoin the Amphibolised Quartz Dolerite on its eastern boundary and together form the most prominent hills of the locality, including Mt. Charlotte, Hannan's Hill, Cassidy Hill, and Mt. Gledden.

The Hornblendite and Talc-chlorite rock—the latter being often very highly carbonated—may repre-

sent a separate dyke more basic in character than the gabbro-dolerite rocks, or more probably they may represent a more pyroxenic facies of those rocks. Fairly fresh hornblendite occurs on the Bonnie Play lease. In addition to these rocks a highly carbonated chloritic rock of fairly fine grain occurs—outcropping on the Bonnie Play and Fair Play leases which may be a highly altered form either of the amphibolite or of the hornblendite.

The Albite Porphyrite is found in the area under review, but hardly to the same extent as in the first section. A small hill about 16 chains east of Mt. Gledden probably consists largely of this rock.

Lateritic deposits occur but not to the same extent as further north—the most prominent occurrence being on the A.W.A. United, G.M.L. 4051e.

Ore Deposits.—At the present stage a classification of the ore deposits of this area is inadvisable, but one important fact discovered is that several of the supposed lodes are apparently only barren shear zones of later origin than the true lodes which, as a rule, have a N.N.W.-S.S.E. strike—the later shear zone having a strike much more nearly north and south. The so-called lodes of the Mt. Charlotte Reward leases are of this type—the chief source of the gold found in these leases being the cross quartz veins of which there are two series, an older one striking approximately north-east and nearly vertical—and a younger series of which the strike is more erratic, but in general more nearly east-west and with a northerly dip of approximately 30 degrees. One important difference between the true lodes and the barren shear zones is that in the latter the metasomatic alteration that characterises the country in the vicinity of the former is practically absent in the sulphide zone—in the oxidised zone it is more difficult to distinguish between them, but the faulting of the cross quartz veins is a good guide.

Haematite-quartz rocks passing as a rule into graphitic schists at depth are of common occurrence within this area—one of the most important being that running through the Devon Consols and continuing to the south past the junction of the Bulong and Parkestown roads—it is identical with the one passing through the Union Club, Ivy, and Sir John leases further to the north.

The greater portion of the underground work in connection with the present section has been completed and it is anticipated that the remainder will be finished early in the present year.

THE COUNTRY BETWEEN KALGOORLIE AND COOLGARDIE.

(C. S. HONMAN.)

During the year roughly 600 square miles of country were mapped, connecting up with Mr. Gibson's map of Kalgoorlie to the north and continuous with the mapping done between Kalgoorlie and Coolgardie in 1912, also connecting up with the southern portion of Mr. Blatchford's map of the Coolgardie district. Owing to an interruption of about six weeks, necessitated by a trip to Bremer Range, the Red Hill centre and Block 48 of the Hampton Plains have not been included in the year's work. A special feature of the work is the detailed survey of the Golden Ridge Gold Mine at Waterfall. Some interesting bedded rocks have been mapped at Feysville where beds of

breccia which strongly resemble volcanic breccias can be seen interbedded with slates and associated with porphyritic rocks. These breccias can be traced from Feysville in a N.N.W. direction along the western shore of Hannan's Lake as far as the western slope of Mt. Hunt. Some interesting intrusive porphyries occur in Block 50 where the Speakman Syndicate has been working. A detailed sketch map of their workings has been prepared and will accompany the final report.

In the southern portion of the area mapped the contact of the main Coolgardie-Kalgoorlie greenstone belt with the large granite belt to the west has been traced and some interesting instances of contact metamorphism occur along the granite boundary, of which the occurrence of extensive garnetiferous schists is an example.

During the course of the work outcrops of conglomerates which appear to be the southern extension of the Kurrawang series were discovered. These outcrops occur at Mable's Old Homestead, between Red Hill and Yilmia Trig, outside the area under review. In the Golden Ridge country there occur some interesting carbonate rocks, some of which are similar to the altered Peridotites mapped by Mr. Gibson near Mt. Hunt. Sedimentary rocks are also prominently represented in the hills north-east of Golden Ridge. Some interesting breccias occur also to the east of Kalgoorlie, but are not as well represented as they are to the west. No attempt has yet been made to correlate the geology of this area in the office, and therefore no definite results are available.

THE BREMER RANGE COUNTRY.

(C. S. HONMAN.)

There being practically no knowledge extant as to the geology of the Bremer Range, in its relation to its

mineral possibilities, Mr. Honman was instructed to proceed to the locality and report thereon. Owing to the lateness of the season, and the consequent shortness of water and other causes, this officer's researches were of necessity somewhat circumscribed.

The country examined near the Bremer Range covered an area of about 1,500 square miles, chiefly in the vicinity of the Johnson Lakes. In its geological characters the country bears an intimate relationship to that which characterises the staple area of the Eastern Goldfields, and there are some sound scientific reasons for claiming a geological kinship with the Phillips River area in the south and Parker's Range on the north.

The country under examination proved to be composed of an isolated belt of greenstones, surrounded by large tracts of granite which separate it from direct connection with the greenstone belt of Southern Cross. The Bremer Range belt of country is on the same general strike as that of Mt. Jackson. The boundaries of the greenstone area have been mapped, also all the prominent geological and topographical features. In respect to the mineral resources of the area under review, it appears to be metalliferous, though up to the present no valuable finds have been made or reported. The hope, however, may be reasonably indulged in that, with better means of access and facilities for water supply to enable prospectors and others to remain in the district for somewhat longer periods than is at present possible, deposits of an exploitable character may ultimately be found.



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DIVISION V.

SCHOOL OF MINES OF WESTERN AUSTRALIA

The Under Secretary for Mines.

I beg to forward, for the information of the Hon. the Minister, my report for the year 1913.

Owing to the resignation of Mr. A. F. Heseltine, B.Sc., who, early in the year, received an appointment as Director of the Port Pirie School of Mines in South Australia, it became necessary to advertise for a Lecturer in Mathematics and Assistant in Engineering Subjects. Mr. A. Tomlinson, M.Sc., who was selected from a number of applicants, commenced duty in April, 1913, as Lecturer in the above subjects and conducted the classes for the remainder of the year in a very satisfactory manner, but, unfortunately for the School, he received an appointment at the local University as from the beginning of 1914, and we are now advertising for another Lecturer.

During the first term of 1913, the Lecturer in Electrical Engineering became incapacitated for duty and in June was granted leave of absence for the remainder of the year in order that he might visit the continent of Europe and undergo a course of treatment. This necessitated several alterations in the conduct of the classwork in this department of the School. Engine-driving and the second course in Electrical Engineering were postponed until 1914. Mr. McDougall, Lecturer in Physics, conducted the class in the first course of Electrical Engineering for the greater part of 1913, and Mr. T. H. Harse, an electrician in outside practice, was called in to supervise the practical instruction in the Electrical Laboratories. This arrangement has worked satisfactorily, and Mr. McDougall deserves praise for the manner in which he came forward and, by conducting the lecture work of his fellow lecturer, helped the School out of a difficult position.

Mr. B. H. Moore, B.Sc., has been appointed Acting Assistant Director for six months from December 1st, 1913, in place of Mr. Butement, who is absent on long service leave.

The gas producer plant and experimental engine recently erected have attracted to the School a considerable number of men engaged in working gas plants on the fields, and have been the means of imparting to them a large amount of useful information. The beneficial effects of this installation and the class instruction given in connection therewith will be felt far and wide during the next few years. There is no doubt that considerable benefits will result in the direction of reduced working costs and more efficient working of the gas plants generally. The Gas Engine instruction given during the first two terms was attended by 50 individual students, of whom over 30 proceeded with the Indicator class-

work arranged for the third term. The Co-Examiner in this subject, C. J. Mathews, Esq., Chief Inspector of Machinery, reporting upon the results obtained at the examination in Gas Engine work, expressed his satisfaction as follows:—

“Considering that this is the first year students have presented themselves for examination in this course, I regard the results obtained as most satisfactory. The information imparted will be of great value to gas engine-drivers, and I am pleased that the School of Mines has taken up this very important work with such zeal and thoroughness.”

A down-draught wood producer is required to enable the scope of the class-work to be enlarged to meet the requirements of men in charge of this type of plant. I have already brought this requirement under the notice of the Department, and special reference was again made to the matter in one of the speeches delivered at the School of Mines' dinner last December.

The attendance at classes during 1913 has been greater than that for the previous year by the number of new students brought in by the Gas Engine classes; otherwise the attendance for 1913 has been practically the same as that for 1912. The same high standard of class-work has been maintained, but the examination results show a greater proportion of lower-grade passes than for 1912.

During the year 351 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	288
Assays for Copper	12
Determinations of Rocks, Minerals, etc	51

Total	351
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Although the total is less than usual, a large amount of valuable information has been given to prospectors, and the assays and the determinations, which have all been performed in a careful manner, have entailed considerable labour on the members of the staff in the departments concerned.

During the year Cabinet decided that, in future, the tuition at the School of Mines should be free. Regulations defining the conditions upon which students may enter classes have been drawn up and gazetted to come into force on January 1, 1914. It remains to be seen whether the abolition of fees will make any material difference in the attendance at classes, but, in any case, genuine mining school students deserve first consideration, and every endeavour will be made to give them the preference.

Students of the School continue to secure responsible positions outside, and are able to give satisfaction to their employers. No student remains unplaced for any length of time, and the School is not always able to meet the demands made upon it to supply men to fill vacant positions.

The following are some of the positions held by past students:—

- Burrows, M. F., Metallurgist and Surveyor, Whim Well Copper Mine.
 Beech, S. J., Cyaniding on his own account at Mt. Morgans, W.A.
 Banks, R., Metallurgist and Surveyor, Westralia, Mt. Morgans.
 Harrison, P., Assistant Surveyor, Great Boulder Proprietary.
 Getty, A., Smelter Room, Golden Horseshoe G.M.
 Bradley, W. S., Assayer, Mountain Queen, Marvel Loch (lately Experimental Chemist, Lake View and Star).
 Gabel, J., Surveyor, Taquah Mines, W. Africa.
 Jaentsch, P., Draughtsman, Bewick, Moreing & Co., Kalgoorlie.
 Joll, E., Metallurgist, Queen of the Hills, Meekatharra.
 Leevers, J. C., Assistant Surveyor, Great Boulder Perseverance G.M.
 Mundle, E., Second Assistant Surveyor, Ivanhoe G.M.
 Osborne, G.W., Surveyor, Queen of the Hills, Meekatharra.
 Peart, T. S., Assayer and Surveyor, Kyarra G.M., Meekatharra.
 Pike, R. W., Assistant Engineer, Sons of Gwalia.
 Shaw, C. C., Assistant Surveyor, Lake View and Star G.M.
 Stuart, C., Electrical Department, Great Boulder Perseverance G.M.
 Rosenberg, J. M., Municipal Electric Light Station.
 Woolf, M., Assayer, Cam and Motor G.M., Rhodesia, South Africa.

The Annual Demonstration was held on February 25th. The Mayor (Mr. C. Cutbush) expressed his satisfaction at the large attendance of citizens, which was indicative of the continued interest taken in the welfare of the School. He remarked upon the opportunities afforded youths of gaining secondary education at the School, and hinted at the possibility of a substantial reduction being made in the scale of charges for tuition. He considered that the movement for compulsory military training was of assistance in secondary education because it taught discipline and cleanliness and made for smartness and energy, and he urged the youths of the district to take every opportunity of further improving themselves by attendance at classes in order that they might become citizens worthy of their country.

The Director then delivered an address dealing with the development of the various departments of the School of Mines, and Mr. Richard Hamilton, General Manager of the Great Boulder Proprietary, enlarged upon the value of the institution as a training ground, not only for those engaged in mining occupations, but for those who intended to follow agricultural and other pursuits.

On the conclusion of the speeches the visitors made a thorough inspection of the museum, laboratories, and classrooms, and appeared greatly interested in the students' work, the running machinery, and the School equipment generally.

The tenth Annual Dinner of the Students' Association was held on Saturday, December 6th, 1913. The President, Mr. Jos. Grigg, occupied the chair, and amongst those present were the Mayor of Kalgoorlie (Mr. C. Cutbush); the General Manager of the Golden Horseshoe (Mr. J. W. Sutherland); Messrs. E. H. Irving, Johnston (Ora Banda), Curle, Smith, and the Director and Staff of the School. Apologies were received from the Hon. P. Collier (Minister for Mines), Mr. A. E. Green, M.L.A., and others unable to be present, owing to parliamentary and other duties.

During the evening Mr. Sutherland spoke of the necessity of adding to the existing gas engine installation a gas producer for burning firewood. Mr. E. H. Irving enlarged upon the question of affiliation with the University. He considered that there should be full recognition of the work done at the School where courses well suited to the requirements of the district had been arranged. The Institution should preserve its individuality, but its teaching should be so fully recognised that students who desired to proceed to a University degree would not be handicapped to the extent of having to put in full attendance at the University. They should receive adequate recognition for the work already done at the School of Mines. In the eyes of the outside world a University degree counted for a great deal, and it should be the ambition of the School of Mines' students to crown a School of Mines Course with a University degree. He hoped that, in certain subjects, the teachers and the lecturers of the School would be accepted by the University, so that students might go up for University examinations without having to attend the University in Perth.

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 one 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 formulæ, 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.

Two 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 equipped 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 are conducted by Co-examiners appointed by the Minister for Mines. 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 ensure 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.

Kalgoorlie,
30th January, 1914.

DIVISION VI.

OPERATIONS OF THE "INSPECTION OF MACHINERY ACT, 1904."

*Office of the Chief Inspector of Machinery,
Treasury Buildings, Perth, W.A.,
30th April, 1914.*

**ANNUAL REPORT OF THE CHIEF INSPECTOR OF MACHINERY AND CHAIRMAN
OF BOARD OF EXAMINERS FOR ENGINE-DRIVERS FOR THE YEAR
ENDING 31st DECEMBER, 1913, 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, 1913.

For convenience of reference I have, as in previous years, divided the report 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.) Mishaps to Machinery.
- (7.) Engine-drivers' Examinations and kindred matters.
- (8.) General.
- (9.) Extracts from Inspectors' Reports.

DIVISION I.

Inspection of Boilers.

The number of boilers classed as useful for steam purposes on the registers at the end of the year was 2,980, as against 2,992 in 1912, thus showing a decrease of twelve (12). The total number of registrations since the commencement of the Act of course greatly exceeds 2,980, but, as explained in previous reports, all boilers permanently condemned have been written off the registers and are not considered. There were forty-six (46) new registrations during the year. Forty-five (45) were permanently condemned; two (2) were converted into tanks; five (5) were transferred to other States, and six (6)

were handed over to the jurisdiction of the Commissioner of Railways.

New Boilers Registered.

Forty-six (46) boilers were registered during the year, made up as follows:—Water tube, seven (7); Locomotive, eight (8); Locomotive portable, eight (8); Locomotive stationary, two (2); Cornish, one (1); Return multitubular stationary underfired, one (1); Return multitubular stationary internally fired, one (1); Gas-fired cylindrical dish-ended, one (1); Lancashire, one (1); Vertical stationary, twelve (12); Semi-Cornish, one (1); and digesters three (3).

Thirty-four of these new boilers were imported from the United Kingdom, three (3) from the United States, two (2) from Germany, three (3) from the Eastern States, and one (1) from New Zealand. Three (3) only were made in this State.

Boilers constructed in this State.

The number of boilers constructed in this State appears to be rapidly approaching vanishing point. There were only three this year, viz., one Cornish and two digesters, virtually only one "boiler."

The three represent only 6.5 per cent. of the total new registrations, and taking it as one, only 2.17 per cent. I can see no reason why a much larger percentage of the new boilers registered each year should not be manufactured locally, and it is disappointing to find that instead of increasing, the percentage of locally made boilers is rapidly decreasing. During 1907 to 1911 this percentage varied from 26 to 20 per cent., in 1912 it dropped to 8.3, and in

1913 to 6.5 (or 2.17 if the two digesters are not considered). The following return shows the classification of the various useful boilers on the registers at end of year:—

RETURN NO. 1.—Return showing Classification of various Types of useful Boilers in each District on 31st December, 1913.

Types of Boilers.	Districts.										Total.		
	South-Western.	Coolgardie and Yilgarn.	Dundas.	East Coolgardie.	North-East Coolgardie.	Broad Arrow.	North Coolgardie.	Mt. Margaret.	East Murchison.	Murchison, Peak Hill, and Yalgoo.	Pilbara and West Pilbara (not pro-claimed.)	1913.	1912.
	Lancashire	17	5	..	48	3	..	*9	9	3	19	..	113	113
Cornish	77	86	14	152	28	11	80	†86	69	112	..	715	729
Semi-Cornish	15	4	1	5	2	..	4	..	4	24	..	59	60
Vertical Stationary	246	79	13	82	14	14	60	65	45	76	..	694	700
" Portable	56	4	..	2	..	1	2	..	..	7	..	72	75
" Multi-Stationary	21	1	..	11	1	..	1	2	3	4	..	44	44
" Multi-Portable	11	..	..	..	..	..	1	2	..	..	..	14	13
" Patent Tubular	6	..	..	..	..	..	..	..	..	..	..	6	6
Loco. type, Rectangular Fire-box, Stationary	61	15	1	15	4	4	6	9	4	13	..	132	130
Loco. type, Rectangular Fire-box, Portable	255	16	6	15	4	..	5	7	4	13	..	325	326
Loco. type, Circular Firebox, Portable	128	1	..	2	..	..	1	..	..	..	..	132	131
Locomotive	62	10	..	17	3	..	..	7	6	3	..	108	103
Water Tube	101	22	3	105	..	..	3	18	10	..	..	262	260
Return Multitubular, under-fired, Stationary	70	16	2	44	3	4	4	5	7	9	..	164	166
Return Multitubular, under-fired, Portable	1	3	..	3	..	1	1	..	..	2	..	11	11
Return Multitubular, internally fired, Stationary	29	4	..	3	1	..	..	1	..	7	..	45	44
Return Multitubular, internally fired, Portable	1	..	..	..	..	..	..	..	..	1	..	2	2
Egg-ended and other types not elsewhere specified	16	9	..	4	1	..	..	..	..	1	29	60	60
Digesters	19	..	..	3	..	..	..	..	..	..	..	22	19
Total Registrations, Useful Boilers	1,192	275	40	511	64	35	177	211	155	291	29	2,980	2,992
Useful Boilers, out of use on 31st December, 1913	314	144	14	233	38	35	113	146	103	232	..	1,372	1,342

*Including four underfired Lancashires.

† Including two Hooker's Patent Cornish.

Taking the nine types that run into three figures, the following table shows the percentage that each type bears to the total number of registrations (useful boilers):—

	per cent.
Cornish	24
Vertical stationary	23
Loco. portable with rectangular firebox	10.9
Water tube	8.7
Return multitubular	5.4
Loco. stationary with rectangular fire-box	4.4
Loco. portable with circular firebox	4.4
Lancashire	3.8
Locomotives	3.6

The number of useful boilers out of use at the end of the year shows an increase of 30 over the previous year's figures. The considerable increase in the number of suction gas engine plants, recently installed, no doubt accounts for a good deal of this increase in the number of steam plants out of use.

Operations in the various Districts.

Return No. 2, showing the operations in the various districts, indicates an increase of 89 "thorough" in-

spectations made as against work done in 1912, and a decrease of 18 "working inspections."

In the South-Western District the year's increase in thorough inspections was 130. In the various Goldfields Districts there was a decrease of 41, the difference, 89, being the net increase in all districts. The total number of inspections, working and thorough, in all districts was 1,851, of which 1,133, or 61 per cent. of the whole number, were made in the South-Western District. Thirty-five out of the forty-six new registrations were also credited to this district.

The total number of certificates granted during 1913 shows a falling off of 16 as against those granted in 1912. In the South-Western District the increase was 50. Coolgardie and Yilgarn, East Coolgardie, Dundas, and North-East Coolgardie, grouped, show an increase of 17. The remaining districts show a decrease of 73. There is evidently a tendency to concentrate in the more developed centres, and not quite so much of the old pioneering prospecting spirit as there used to be. The revival of this spirit is to be greatly desired.

The revenue received from boiler inspection during the year was £3,399 13s., being £160 9s. 6d. less than the previous year.

RETURN NO. 2—Showing Operations in each of the Proclaimed Districts (Boilers only) during year ending 31st December, 1913.

	DISTRICTS.											TOTALS.	
	South-Western.	Coolgardie and Yilgarn.	Dundas.	East Coolgardie.	North-East Coolgardie.	Broad Arrow.	North Coolgardie.	Mount Margaret.	East Murchison.	Murchison Peak Hill, and Yalgoo.	Pilbara and West Pilbara (unproclaimed).	1913.	1912.
Total number of boilers registered and capable of being used as steam generators	1,192	275	40	511	64	35	177	211	155	291	29	2,980	2,992
New boilers registered during the year ..	35	4	..	7	..	..	..	..	..	..	..	46	48
Inspections for Year—													
Thorough	978	125	21	272	20	..	70	65	53	60	..	1,664	1,575
Working	155	..	4	..	..	..	11	7	5	5	..	187	205
Boilers condemned during year—													
Temporarily	35	2	..	2	3	..	3	2	2	..	..	49	70
Permanently	26	1	6	7	1	..	2	1	..	1	..	45	44
Boilers converted into tanks, air receivers, etc., during the year	1	..	..	..	..	..	..	1	..	..	..	2	6
Boilers sent to other States during the year	2 } *6)	2	..	1	..	..	..	..	..	..	..	11	6
No. of notices for repairs issued during the year	262	10	5	18	2	..	22	19	10	17	..	365	383
Number of certificates issued (including those issued under Sec. 30) during the year	877	129	26	274	21	..	70	65	60	67	..	1,589	1,595
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Total amount of fees for 1913	1,662 19 0	317 15 4	59 0 0	677 12 10	49 10 0	14 0 0	146 5 0	141 11 4	143 19 6	187 0 0	..	3,399 13 0	..
Total amount of fees for 1912	1,710 5 7	251 0 5	51 15 0	705 15 0	30 5 0	8 0 0	180 10 3	252 19 4	161 5 0	208 6 11	..	..	3,560 2 6
Number of Inspectors	3†			2			1		1‡			7	7

*Transferred to W.A. Government Railways. † Assisted by Inspector Lee in Northam and surrounding district and by Inspector Churchill in Northern part of South-Western District.
‡ The work in the East Murchison District has been divided between Inspectors at Geraldton and Leonora.

Boilers temporarily and permanently Condemned.

Forty-five boilers were written off the registers during the year as permanently condemned. The number is fairly high, but following the practice of the last three years, all old boilers which for one reason or another have been lying unrepaired, have been gone into more closely and it was found that quite a large number of these were not worth the cost of repairs. I anticipate that by this time most of these doubtful boilers have been dealt with. Since, and including the year 1899, four hundred and twenty-nine (429) boilers have been permanently condemned.

The number temporarily condemned is lower than it has been for some years, which shows that fewer repairs have had to be ordered, and that presumably the average of the boilers at work are in rather better condition than previously. With regard to repair work generally all inspectors are striving to show owners the futility of temporary patchwork repairs, their endeavour being, when it is necessary to order repairs, to bring the boilers up to their original strength as far as possible.

The following return shows the temporarily and permanently condemned boilers as a percentage of inspections made:—

RETURN NO. 3.—*Showing number of Temporarily and Permanently Condemned Boilers per 100 Inspections made during 1913,*

Year.	Temporarily.	Permanently.
	Per cent.	Per cent.
1899	2.64	1.42
1900	2.21	.498
1901	4.34	.511
1902	5.00	.958
1903	2.43	.697
1904	3.08	.389
1905	2.84	.388
1906	3.98	.960
1907	4.36	.802
1908	3.18	.599
1909	2.89	.797
1910	4.49	1.382
1911	3.54	8.070
1912	3.93	2.471
1913	2.64	2.431

Maintenance and Care of Boilers.

The tendency to take more interest in the upkeep of boilers, their efficient cleaning, and the provision of a good water supply is an increasing one. It is astonishing that more attention has not been bestowed on this matter long before this. Owners, who are now beginning to realise that it is bad economy to have even $\frac{1}{8}$ in. thick of scale in a boiler, would not have been in the least worried a few years ago had this thickness been $1\frac{1}{8}$ in. More attention than ever is being paid to the treatment of feed water before it enters the boiler, and to the entire elimination of grease. This is of course largely due to the general spread of knowledge, but this Department, and kindred institutions in other countries, have done much in the matter of calling pointed attention to what should now be known to everyone, by persistently bringing the matter before the notice of owners and those in charge of boilers. And yet even now cases are met with where oil is deliberately introduced into boilers, and where half an inch or so of hard sooty deposit on the outside of plates, and much thick scale in the interior is not looked on as any very serious detriment. I would like to once more call attention to the *great* economy that can be attained by proper and frequent cleaning of all surfaces, and by a scientific treatment of feed waters before entering the boiler. There is no known specific for all waters. Each has to be treated on its merits, and often a guinea or two paid for an analysis is money very well invested. I have referred

to this subject in connection with a special case in another part of this report.

DIVISION II.

Explosions and Interesting Defects.

It is satisfactory to be able to report once more that there has been no explosion of a boiler during the year. The extraordinary immunity in the matter of explosions enjoyed by this State must be a matter for congratulation to all concerned, and incidentally is a high testimony to the painstaking care bestowed on their work by the officers of this Department. It is a pleasure also to have to record the almost universal hearty co-operation of engineers, managers, and owners, which has no doubt largely contributed to this result. In September a serious explosion occurred in New South Wales, where there is no organised system of inspection. Portion of the boiler was blown 50 yards away, and bricks were hurled in all directions, some to a distance of 300 yards. Buildings and machinery were wrecked. The newspaper report (other than which no report is available) goes on to state: "D—'s body was found cut to pieces, and H— was found unconscious lying among the debris, fearfully scalded about the body." In all probability the latter also died.

Only five months previous to the above, another explosion occurred in the same mill, resulting in the death of another man. In all human probability these lives would have been saved by intelligent inspection of the boilers in question.

A large number of more or less serious defects have been discovered during the year in boilers in this State which, if neglected, would no doubt have led to disaster. A few interesting cases are referred to below:—

(1.) A small vertical boiler, about 15 years old, which was apparently in good condition, with the exception of the usual corrosion of the uptake so generally found in this class of boiler, was being inspected. The condition of shell was not suspected, as it was apparently in perfect order externally and internally. It was very difficult to see that part of the interior of the shell immediately behind the uptake. The Inspector, however, thought he detected a peculiar mark on the plate, and after some trouble managed to reach it and give it a blow with a hammer. The hammer penetrated the plate, which was no thicker than paper, for a strip four or five inches wide and three or four feet long. The explanation is simple and somewhat interesting. A small vertical engine was bolted to the outside of the boiler by six bolts. The hollow in the bed of the engine had been packed full of "rust jointing" by some criminally ignorant person. Probably one of the bolts leaked through into the cavity and caused fresh action in the rust jointing, and this caused severe external corrosion of the boiler plate where it was *completely hidden from view*. If it had not been detected the boiler must have exploded. The only mystery is why it did not do so before.

(2.) A small fracture (about one inch long), starting from the head of a stay in the wrapper plate of a locomotive was reported. On investigation the fracture, though not showing right through the plate, was found to extend for almost its whole length on the inside. An extensive patch was necessitated. The cause of the fracture is obscure. It was probably started by too severely stressing the plate in bending, and then gradually developed. The smoke box tube plate of this boiler was also found to be peculiarly affected, being grooved almost through the plate *above* the water level. A new plate was fitted.

(3.) An unusual accident occurred in connection with an underfired return tube boiler. The Perth City Water Supply had been in use constantly, but through an accident to the feed pump an old well supply was reverted to for a few weeks. This caused a large amount of deposit to accumulate at the lower part of back end of shell. A brick pier had been built under this part of boiler, and portion of this had fallen down at the spot where the deposit was heaviest (several inches thick). On examination, the plate was found bulged down close up to the back end plate, forming a pocket about 18 inches by 7½ inches by 4½ inches deep. The plate was a five-eighth inch one, and had become so hot at this spot that it was drawn out to a thickness of 1/32 inch at the bottom of the pocket, and had punctured. The size of the hole was very small, about ¾in. x ¼in., and the damage was so local that the caulking of the back end plate seam was not disturbed, though the pocket extended right up to this.

(4.) The owner of a Cornish boiler, which had a patch on the flue tube and had been out of use for some time, started to use salt water. The Inspector found plates encrusted to a thickness of four to five inches in places, and the patch in tube bulged

down nine inches. Boiler was temporarily condemned. Patch was renewed, and interior thoroughly cleaned out, after which a certificate was issued for a short period at a reduced pressure, so that an opportunity might be had for further inspection in a short time.

(5.) A somewhat unusual defect was discovered in two locomotives. The internal steam pipes conducting steam from regulator valves to smoke box tube plate were found collapsed almost flat for a considerable length. The boilers had been subjected to a hydraulic test of 200lbs. per square inch with hot water shortly before. The collapse took place under ordinary working conditions, at a pressure of 150lbs. and its cause is by no means clear. The pipes were ¾in. diameter and 9/64in. thick. The most probable explanation is loss of form through vibration weakening the structure of the tube. Wrought iron rings about 1½in. x ½in. thick, were shrunk on the pipes, and no further collapse has occurred.

(6.) An example of very bad workmanship in a comparatively new Cornish boiler, came to light during the year. The end plates of the boiler bulged, and on examination, this was found due to bad gusset staying. The plate for the stays was obviously old boiler plate flattened, and the rivetting was so very unsatisfactory that the Inspector had to order 5 new gusset stays. The holes in the plates were very much too large, and rivets a very bad fit.

(7.) A locomotive on construction work was very nearly seriously damaged through the carelessness of a cleaner. The man lighted the fire and proceeded to clean down the engine. He then opened the blow-off cock, and apparently forgot that he had done so and went on cleaning. The fusible plug melted and brought him to his senses, or rather, warned him that trouble might be expected. His next step was to unscrew one of the cleaning caps on top of firebox casing, and insert a hose, through which he turned on cold water. At this juncture the engine-driver came along, smothered the fire by shovelling sand on to it, and took charge.

Fortunately, the whole of the pressure, and there never was much, was relieved by the plugs and blow-off cock, so that, though the firebox plates were overheated and a little bulged, no great damage was done.

(8.) In October a serious accident occurred in connection with a Lancashire boiler in the Sandstone district. The boiler was one of a range of four, and it was actually due for inspection on the day the accident happened, so that it had been working for a year since seen by one of the Department's Inspectors. The accident occurred at 4 a.m., and the Inspector saw it at 9 a.m. He was informed that the pressure gauge was registering about 70lbs. (the authorised working pressure being 100) when there was suddenly a great rush of escaping steam in the flues. One of the attendants, with considerable presence of mind, isolated the boiler from the others by closing its stop valves. All the water and steam escaped through a rent in the bottom of the shell in the second belt of plates, and fortunately no damage was done, with the exception of the damaged plate, and some slight disturbance of the brickwork in the flues. The isolation of the boiler no doubt saved considerable damage, and possibly loss of life.

When the Inspector made his examination, he found the plate referred to badly bulged, and, consequently, much thinned over an area of about 6ft. x 4ft. with a considerable rent in it; the plate was bulged downwards 10in. to 12in.

The cause of the accident was overheating of the plate, due to heavy deposit in the boiler. The Inspector reports that this deposit was 6in. to 8in. thick in places on this plate. On inquiring when it was last cleaned, he was informed that it had been "rough cleaned only four or five weeks previously." There was an apparatus installed on the mine for treating the feed water, but it had never given any great satisfaction, and our Inspectors had more than once called the Manager's attention to this fact. If, however, the statement that boiler had been cleaned only four or five weeks before is correct, it is obvious that this apparatus had been completely neglected or was quite worthless. The management was most lucky in getting off so easily. In fact, it is difficult to say why a serious explosion did not occur.

The boiler has since been repaired, and instructions were issued that such alterations and arrangements as are necessary to ensure a continuous supply of suitable feed water be made before the end of the year. Steps were at once taken to overhaul the treatment plant, and extra filters and settling tanks were installed.

(9.) The boiler of a new locomotive, made by one of the leading American firms, and the largest locomotive used by a sawmilling company in the State, developed serious and unexpected trouble. At the preliminary hydraulic test before boiler was started (in July last), several leakages developed at seams and rivets, and one tube was found cracked and leaking. The tube was replaced and leakage caulked up. The Inspector remarks "The workmanship throughout is rough, especially in the firebox, the riveting of the firebox water space stays being the worst I ever saw." He further says, "the riveting on firebox side was evidently done with a heavy hammer, and the heads were flattened out to the thickness of a penny piece."

Under date September 27th, the Inspector reported, "This boiler, which has only been in use about six weeks, has given considerable trouble by leakage from stays and tubes." On inspection, it was found that many of the water space stays had fractured close to firebox casing plate. These were replaced by new copper stays, 1 $\frac{1}{8}$ inch diameter. In November further trouble was experienced, in the form of fractured stays and leaky tubes. The owners decided that the only satisfactory treatment was the entire renewal of the whole of the water space stays, and this was accordingly done. In addition the tubes were all drawn, annealed and re-ferruled.

The above, I think, constitutes a record in the matter of repairs to a boiler which has only done a few months' work. Omitting altogether the minor repairs to stays, tubes, riveting, etc., about 570 new copper stays were necessary.

(10.) A typical case of "water-hammer" in a steam pipe in the Collie district occurred in November. The steam pipe between boiler and en-

gines is, approximately, 60 feet long and is ordinary wrought iron pipe five inches diameter of good steam quality. The engine was stopped at about 5 p.m. by closing its throttle valve. The stop valve in the boiler was left open. The night was a frosty one, and considerable condensation probably took place in the pipe. At about 7.30 next morning the driver, having opened the engine drain cocks, eased the throttle valve slightly to warm the cylinders, and then gave engine a turn. Immediately there was a loud cracking noise, followed by the steam pipe in the engine-room splitting in two places for about 15 inches and 18 inches on each side of an ordinary pipe socket. No further damage was done. The case points to the importance of shutting off steam at the boilers, and providing ample drainage for condensed water.

(11.) An interesting case of rapid corrosion occurred in the Collie district. In May, 1912, at the usual annual inspection the Inspector reported the boiler in good condition and no appearance of corrosion. Knowing the very treacherous nature of the water in this district, he had advised the management to be particularly careful in the choice of a situation for their well. The well was sunk a considerable distance away from the mine (with the coal seam dipping away from it), in a sandy patch; the subsoil consisted of white quartz in small cubes mixed with sand, the whole making a good filter. The water was analysed and found excellent. A sample taken from the boiler after two months' work was analysed and again found good, and it was subsequently tested several times with the same results. The then management was fully seized with the importance of frequent testing, and frequent opening up of the boiler to make sure that the constant draw on the well was not changing the quality of the water. A letter was received from the manager, dated November, 1912, saying that boiler had just been opened up (6 months after inspection) and found in excellent condition. In May, 1913, only six months after date of letter referred to, the Inspector reports that plates are very seriously corroded throughout the boiler, rivet heads in places have almost disappeared, and great general deterioration has taken place. He was obliged to reduce the pressure from 130 to 100 lbs., and issued a short certificate to ensure an early opportunity of again inspecting it. He had the surface well cleaned and cement washed, and had the water treated with lime. This action had the desired effect, as at subsequent inspection in October he found no active corrosion in any part of the boiler. The Inspector was naturally curious to investigate the cause of the rapid corrosion, and found that subsequent to a change of management early in 1913, several hundred tons of "slack" had been dumped on the sand patch where the well was situated. This heap fired, and water from the mine was pumped on to it. This water, no doubt, percolated through into the well and was probably the whole cause of the trouble.

The case shows the absolute necessity of taking every possible precaution in the matter of boiler feed water. Pit water is almost always injurious, and surface contamination from slack heaps has more than once spoiled what has previously been a good supply.

DIVISION III.

Inspection of Machinery.

Return No. 4 is a classification of power-driving machinery in all districts. On analysing this, it will be seen in column headed "Total for 1913," that pride of place is no longer held by the steam engine. There are 1,333 registered groups now driven elec-

trically, as against 1,309 by steam direct. Oil engines (including petrol and benzine engines) come third, with 541, and Suction Gas engines fourth, with 163.

There has been an increase over the previous year's registrations of 186 groups driven by electric motors, 81 by steam engines, 87 by oil engines and 42 by suction gas engines.

RETURN NO. 4.—*Showing Classification of various sources of Power Driving Machinery in use or likely to be used again, in each District, for Year ending 31st December, 1913.*

	DISTRICTS.										TOTALS.	
	South-Western.	Coolgardie and Yil-garn.	Dundas.	East Coolgardie.	North-East Coolgardie.	Broad Arrow.	North Coolgardie.	Mt. Margaret.	East Murchison.	Murchison, Peak Hill, and Yalgoo.	1913.	1912.
Number of groups driven by Steam Engines	560	137	33	133	19	10	84	113	111	109	1,309	1,278
Number of groups driven by Oil Engines	433	10	1	3	2	..	23	9	23	37	541	454
Number of groups driven by ordinary Gas Engines	37	..	..	..	..	..	..	..	..	..	37	75
Number of groups driven by Suction Gas Engines	56	13	1	13	5	4	14	17	16	24	163	121
Number of groups driven by Compressed Air	1	3	..	20	..	..	..	..	..	3	27	26
Number of groups driven by Electric Motors	846	40	3	363	..	..	5	55	1	20	1,333	1,147
Number of groups driven by Hydraulic Pressure	12	..	..	..	..	..	..	..	..	..	12	12
Totals	1,945	203	38	532	26	14	126	194	151	193	3,422	3,113

The above figures do not, I regret, give an adequate idea of the actual progress in the matter of increasing use of machinery in the districts proclaimed under the Act. There are, I have no doubt, hundreds of small plants in outlying districts, and a large number in Perth itself, which are not registered. At the end of the year there were 265 registered groups of mach-

inery overdue for inspection in the metropolitan portion of the South-Western district alone. While this is the case it is obvious that it is impossible to take any steps to secure the registration of unregistered groups whose position even is often not accurately known.

RETURN No. 5.—Showing Operations in each of the Proclaimed Districts (Machinery only) during Year ending 31st December, 1913.

	DISTRICTS.										TOTALS.	
	South-Western.	Coolgardie and Yilgarn.	Dundas.	East Coolgardie.	North-East Coolgardie.	Broad Arrow.	North Coolgardie.	Mount Margaret.	East Murchison.	Peak Hill, Murchison, and Yalgoo.	1913.	1912.
Total registrations useful machinery	1,945	203	38	532	26	14	126	194	148	199	3,425	3,113
Total inspections made	1,241	93	21	487	8	..	65	61	72	89	2,137	1,725
Certificates (bearing fees)	883	40	7	392	4	..	26	36	32	50	1,470	1,112
Certificates, steam (without fees).. .. .	358	53	14	95	4	..	39	25	40	39	667	596
Notices issued "Machinery dangerous"	264	2	10	40	1	..	2	..	..	8	327	265
Total amount of fees for 1913	£308 8 0	22 0 0	5 15 0	228 0 0	3 10 0	1 10 0	19 15 0	14 0 0	16 0 0	27 5 0	646 3 0	..
" " " " 1912	£273 14 0	6 9 6	4 5 0	175 5 0	3 10 0	..	8 0 0	14 15 0	11 15 0	16 10 0	..	514 3 6
Number of Inspectors*	3			2			1		1		7	7

* See Notes on Return No. 2 re Inspectors.

From above return it will be seen that registrations of machinery have increased considerably during the year under review. There were 312 new registrations (of which 266 were in the South-Western District), and the number of inspections exceeded those made in 1912 by 412.

The revenue from machinery inspection fees was £646 3s., as against £514 3s. 6d. in 1912, thus showing a satisfactory increase.

Dangerous Machinery.

During the year it was found necessary to issue 327 notices calling attention to danger points in connection with various plants inspected. This number exceeded the previous year's figures by sixty-two (62). The increase has no particular significance, but may be partly accounted for by the large number of new registrations and partly by the fact that, as years go on, inspectors are finding it necessary to be more particular than ever in trying to guard machinery in such a way as to eliminate all accidents not directly due to absolute carelessness.

I am pleased to say that owners are gradually appreciating the benefits of effective safeguards, and in connection with this it is satisfactory to note that the majority of passenger lifts, and many goods lifts are now fitted with doors so electrically connected with the actuating mechanism that the cages cannot move away from floors unless the doors are shut and properly secured.

DIVISION IV.

Prosecutions under the Act.

1. On the 14th April, Messrs. J. and L. Baker, of Fremantle, were charged (a) with not preparing a boiler for inspection, and (b) working a boiler without a certificate. A fine of £2, and £1 5s. costs was imposed.

2. On the 15th April proceedings were taken against Hoskins & Co., Ltd., Perth, for not complying with certain instructions issued by the Department with regard to machinery considered dangerous to person. It was explained in Court that considerable alterations were being carried out, and that if inspector's instructions had been carried out they would have had to be taken down again. No such explanation was tendered to this Department, and the Magistrate fined the firm in question £5, including costs.

3. On the 15th July, Messrs. Learmonth, Duffy & Co., and Mr. A. E. Cockram were proceeded against for a breach of Section 45 of the Act, wherein it is

set forth that all sales of steam boilers shall be notified to this Department. The defendants pleaded ignorance, and consequently the Crown Prosecutor asked for a nominal penalty, pointing out, however, that there was considerable danger in selling boilers without notifying the Inspection of Machinery Department, as required by the Act. Old and untrustworthy boilers so sold might easily get into the hands of newcomers to the State, not aware of the law affecting the using of boilers, and disastrous explosions might result.

A fine of 1s. and 12s. 6d. costs was imposed in each case.

4. On the 12th August, the Perth Shop Fitting Company were fined 5s. and 2s. costs for not notifying an accident which occurred to one of their employees, as required by Section 50 of the Act.

5. On the 19th August, A. D. Jones & Co. were proceeded against for a similar breach of the Act, and were fined 10s. and 2s. costs.

6. On 31st October, Messrs. Detmold & Co. were also proceeded against on a like charge, and were fined £1, including costs.

During the year the Department had its attention drawn to the fact that many accidents were not being reported in accordance with Section 50 of the Inspection of Machinery Act. Several cases, about which information had been received, were inquired into, and the list of prosecutions under this Section would have been much larger than it is but for the fact that the majority of the accidents in question happened more than six months previously, and consequently no action could be taken.

This Department wishes it to be generally known that henceforward where breaches of the Act are committed prosecution will follow. The Act has now been in force nine years, and owners have had plenty of time to acquaint themselves of its contents. Ignorance of the requirements of the Act is almost always pleaded. It is, however, a very poor excuse, and owners of machinery should take the trouble to familiarise themselves with their responsibilities.

DIVISION V.

Accidents to persons caused by Machinery.

Return No. 6 is a list of all persons injured by accidents caused by machinery, and reported to this Department during the year, together with names of machinery owners, and short précis as to cause of accident.

RETURN No. 6—Return of Accidents for Year ending 31st December, 1913.

Name and Address of Owner.	Name of Injured Person.	Age.	Class of Machinery causing Accident.	Date.	Nature of Injuries.	Remarks.
1.—Strelitz Bros., Viking House, Perth	David Stewart Carlton	40	Passenger lift ..	January 10 ..	Fatal	Lift under construction. Deceased put his head through hole in lift shaft and got it caught by descending cage.
2.—A. Povey, Newcastle Street, Perth	J. Murray	?	Buzzer	January (early)	Loss of top joint, second finger, left hand	Due to carelessness on part of injured man.
3.—Kalgoorlie Foundry	Kenneth Dobson ..	18	Circular saw ..	January 16 ..	Cut lip	Mishap.
4.—Golden Horseshoe G.M. ..	John Harrington ..	62	Winding engine ..	January 20 ..	Fatal	Caused by engine-driver not putting clutch in gear.
5.—Do.	Edmund Ernest Goddard	48	do.	January 20 ..	Broken leg	do. do.
6.—Do.	W. G. B. Jones ..	26	do.	January 20 ..	Injury to ankle and knee ..	do. do.
7.—Do.	M. Mead	46	do.	January 20 ..	Bruised back	do. do.
8.—Do.	H. Paul	30	do.	January 20 ..	Cut elbow	do. do.
9.—Do.	C. Armstrong ..	26	do.	January 20 ..	Cut head	do. do.
10.—Do.	T. McDonald ..	26	do.	January 20 ..	Bruised shoulder	do. do.
11.—Do.	R. Tisi	31	do.	January 20 ..	Bruised ankle and shoulder ..	do. do.
12.—Do.	Con. O'Hea	43	do.	January 20 ..	Sprained ankle	do. do.
13.—Do.	Alex. McAlister ..	53	do.	January 20 ..	Injury to spine	do. do.
14.—Kalgurli G.M.	Thos. Conway ..	45	Filter press ..	January 21 ..	Bruised thumb	Mishap.
15.—Great Boulder Mine	Francis W. Doyle ..	30	Ridgeway filter ..	January 22 ..	Broken wrist	Carelessness, got hand jammed between frame and partition.
16.—W. A. Newspaper Co., Perth ..	Peter Addison ..	30	Printing Machine ..	January 23 ..	Bruised arm	Got arm caught in roller of "former."
17.—Perth Tannery Co.	W. Reilly	19	Leather Rolls ..	January 21 ..	Loss of fourth finger, right hand, and second and third fingers crushed	Got hand caught by a bag while wiping table, and bag and hand were drawn into rolls.
18.—W.A. Newspaper Co., Perth ..	Horace Faulk ..	19	Linotype machine ..	January 29 ..	Pinched finger	Carelessness, got finger caught between geared wheels whilst cleaning it in motion.
19.—Daily News Co., Perth	Albert Edward Game	18	Printing machine ..	February 2 ..	Crushed toe	Got toe caught by a cam close to floor, cam since guarded.
20.—Youanmi G.M.	Thomas Shaw ..	40	Belting	February 9 ..	Injured knee	Foot slipped and got caught in a belt which was going to be thrown off pulley.
21.—A. Douglas Jones, Guildford ..	Chas. Green	23	Wood shaper	February 13 ..	Cut finger	Hand slipped owing to losing control of plank, which was too long for this particular machine.
22.—Elder Shenton & Co., Elder Buildings, Perth	John Henry Noble ..	43	Passenger lift ..	February 15 ..	Broken wrist and sprained knee	Caused by lift door being left open while cage was at another floor, door now electrically connected.
23.—Associated G.M.	Chas. Newman ..	51	Ball mill	February 20 ..	Bruises and cuts	Caused by improperly tampering with belt by another man, while Newman was still working at the Ball Mill.
24.—Baddera Lead Mines	George Rowe ..	44	Crushing Rolls ..	February 22 ..	Loss of left hand	Hand got caught in rolls while removing a stone with a stick.
25.—Millar's Timber and Trading Co., Ltd., Perth	Jas. Alfred Higgins ..	abt. 30	Buzzer	February 26 ..	Loss of tip of second finger, left hand	Hand slipped and got caught by buzzer blades.
26.—Kyarra Gold Mines, Ltd., N.L., Meekatharra	Alexander Campbell	56	Steam engine ..	March 2 ..	First finger left hand broken ..	Was removing piston from engine when it slipped.
27.—Hoskins & Co., Ltd., Perth ..	Norman Brearley ..	22	Belting	March 3 ..	Right arm broken	Taking belt off of a pulley in an improper manner.
28.—South Kalgurli G.M.	Felix Stephens ..	35	Ore treating plant	March 8 ..	Bruised thumb.	

RETURN NO. 6.—Return of Accidents for Year ending 31st December, 1913—continued.

Name and Address of Owner.	Name of Injured Person.	Age.	Class of Machinery causing Accident.	Date.	Nature of Injuries.	Remarks.
29.—Lake View G.M.	Chas. Ed. Withnell	28	Belting	March 19	Lacerated knee cap	Knee struck by a Jackson fastener on a belt.
30.—Golden Horseshoe G.M.	Wm. Edgar Benda	?	Ore treating	March 25	Cut hand	Cut by bolt in a "finger-stick" while picking up a battery stamp.
31.—W. J. Filear	L. Wittman	40	Buzzer	March 29	Cut hand and thumb	Hand slipped while planing a wheel on buzzer.
32.—Great Fingall Consolidated G.M., Ltd.	J. Frankovitch	26	Conveyor belt	March 30	Cut and bruised knuckles	Got hand caught between belt and guide pulleys.
33.—South Kalgurli G.M.	John Curry Armstrong	27	Pulley	April 4	Broken ribs	Caught handle of a shovel in spokes of pulley.
34.—Perth Shop Fitting Co., Ltd.	Alex. Whitley	30	Buzzer	April 14	Cut finger	Hand slipped and caught buzzer blades.
35.—Corinthian North G.M.	John Leonard	..	Steam pipe	April 18	Burn on leg	Slipped, and got leg in contact with steam pipe.
36.—Associated G.M.	Frank Herbert	30	Ore treating	April 24	Crushed finger	Carelessly put his finger on rail of conveyor carriage.
37.—Great Fingall Consolidated G.M.	T. Paskov	31	Belting	May 5	Cut and bruised hand	Got hand caught between pulley and belt while putting on belt.
38.—Mountain Queen G.M.	J. W. Mason	34	Pulley	May 15	Broken arm	Spanner slipped and arm came in contact with rim of pulley.
39.—T. R. Hill, Perth	Frank Brigatti	27	Circular saw	May 27	Cut and bruised shoulder	Struck on shoulder by piece of wood thrown off by saw.
40.—Great Boulder Perseverance G.M.	Arthur Chas. Leever	15	Screwing machine	May 29	Poisoned finger	Finger got scratched by jagged nut on machine.
41.—Kalgurli G.M.	John Brown	35	Ore treating	May 30	Bruised foot	Dropped filter press plate on foot.
42.—Millars' Timber and Trading Co., Perth	Hy. Woodman	54	Band saw	June 4	Loss of top of third finger, right hand	Was picking a chip off table too close to saw.
43.—A. Povey, Perth	Albert Allen	24	Buzzer	June 7	Loss of first joint of finger, left hand	Working with improperly adjusted guard.
44.—Boulder Perseverance G.M.	Arthur Wm. Pringle	36	Elect. Loco.	June 9	Crushed finger	Dropped part of machinery on his finger.
45.—Kauri Timber Co., Barrabupp.	Robert McAlpine	30	Collision of locomotives	June 9	Broken leg	Got leg pinned between engine and tender.
46.—Do.	Harry Harbeck	23	do.	June 9	Sprained ankle	Slipped on foot plate.
47.—Albany Bell, Perth	Amy Evans	20	Cutting machine	June 11	Top of second and third fingers sheared off left hand	Unnecessarily placed fingers under a ledge in moving cutting table, and got them caught.
48.—Perth Shop Fitting Co., Perth.	Walter Young	37	Buzzer	June 13	Cut finger	Hand slipped, very slight cut.
49.—A. Povey, Perth	Ernest Schmidt	..	Buzzer	June 13	Loss of first joint, first finger left hand	Working with improperly adjusted guard.
50.—"Truth" Office, Perth	B. D. Bruning	abt. 40	Printing machine	June 13	Tendons on back of left hand severed	Placed hand in a dangerous position while adjusting machine in motion
51.—Wm. Detmold, Fremantle	Bevil Edwards	16	do.	June 13	Right hand severely crushed	Got hand caught in platen printing machine.
52.—State Battery, Yarri	J. Leipold	47	Friction winch	June 17	Ruptured hip	Brake on winch failed and allowed skip to run back on injured man.
53.—Bunning Bros., Perth	W. Brunen	28	Band saw	June 18	Lacerated thumb	Due to defective striking gear allowing belt to slip on to fast pulley.
54.—Golden Horseshoe G.M.	John Kerry Allen	50	Ore treating	June 23	Broken rib	Slipped while repairing rails of "tripper" and fell into ore bin.
55.—Great Boulder Perseverance Co.	Benjamin Fisher	22	Boiler	June 24	Bruised shin	Lifting heavy cast iron door which slipped.
56.—Golden Horseshoe G.M.	Matthew O'Keefe	33	Belting	June 26	Strained wrist and bruises	Hand get between belt and pulley while taking belt off pulley.
57.—Whittaker Bros., Subiaco	Hugh McGuinness	43	do.	July 3	Cut arm	Belt broke and fastener hit arm of injured man.
58.—Lake View and Oroya Exploration Ltd., Queen of Hills G.M., Meekatharra	Gordon Cassin	22	do.	July 5	Both legs broken	Got arm caught in loop of belt hanging from shaft, and was carried round shafting.

RETURN No. 6.—Return of Accidents for Year ending 31st December, 1913—continued.

Name and Address of Owner.	Name of Injured Person.	Age.	Class of Machinery causing Accident.	Date.	Nature of Injuries.	Remarks.
59.—Electric Power Station, Geraldton	J. B. Addenbrooke ..	33	Suction Gas Producer	July 6.. ..	Injuries to head and arms, and general, shock	Was testing gas at a cock <i>not</i> fitted with wire gauze. Gas fired back, causing severe explosion of the expansion box.
60.—Whittaker Bros., Subiaco ..	Geo. Wright	38	Buzzer	July 7.. ..	Cut finger	Hand slipped and caught blades.
61.—Westralia Iron Works, North Fremantle	Cecil Woods	18	Steam hammer ..	July 16	Jarred hand	Hand lever of hammer kicked and jarred hand.
62.—Bullfinch Proprietary G.M. ..	Albert Edward Cox	46	Ore treating ..	July 28	Bruised toes	Got foot caught between battery cam and tappet.
63.—Westralia Iron Works, North Fremantle	Arthur Gilpin	26	Steam hammer ..	July 29	Cut shin	While cutting bar iron under steam hammer the bottom cutter flew out and struck leg.
64.—Millars' Timber and Trading Co., Ltd., Jarrahdale	Henry Laustermann..	26	Docking saw ..	July 31	Loss of third finger, right hand	Counterweight too heavy and caused saw to project beyond guard (new machinery, not registered).
65.—A. Povey, Perth	Herbert Hewitt ..	35	Band saw	August 6	Cut thumb	Foot slipped on floor and hand came into contact with saw.
66.—Wm. Sandover & Co., Perth ..	Peter McInnes	14	Tinsmith's press ..	August 8	Loss of two fingers, left hand	Caused by operating a machine he had been forbidden to touch.
67.—Royal Standard G.M., Yuin ..	Joseph Reed	50	Air Compressor ..	August 13	Left shoulder dislocated ..	Was harring engine over centre when it kicked back causing injury which would not have occurred if safety pawl had been used.
68.—Marmont G.M., Meekatharra ..	Alexander Challenger	22	Ore treating ..	August 14	Loss of first joint of thumb ..	While picking up stamper got hand caught between cam and tappet.
69.—Bullfinch G.M.	Richard White	39	Circular saw	August 14	Lacerated thumb	Leg twisted and hand came in contact with saw.
70.—Wm. Sandover & Co., Perth ..	Oliver Davidson ..	15	Band saw	August 15	Cut finger	Due to carelessly working a machine he was not familiar with.
71.—Charles Atkins & Co., Perth ..	Frederick Roberts ..	21	Goods hoist	August 15	Fatal	Slipped when slinging a case, and fell through trap door to basement, sustaining fatal injuries.
72.—Empress G.M., Lennonville ..	Hugh Campbell	36	Belting	August 19	Strained arm	Got arm caught while putting belt on pulley.
73.—Associated Northern G.M. ..	Joseph Martin	35	Pulley	August 19	Bruised jaw	Throwing a belt off pulley with a stick. Stick caught in pulley and caused injury.
74.—W.A. Cabinet and Joinery Works, Maylands	Albert Lillingston ..	29	Wood shaper ..	August 28	End of thumb cut	Was cutting rebate in very hard wood. Knives pulled wood cut of his hand, and thumb got caught.
75.—Wright & Fendick, James St., Perth	S. C. Senior	34	Circular saw ..	August 29	End of thumb cut off	Was picking up a strip of wood from bench, saw caught it, and threw hand on to saw.
76.—Associated G.M.	George Hern	50	Glass water gauge	September 1 ..	Loss of eye	Caused by bursting of a glass water gauge and the protectors surrounding same.
77.—Ivanhoe Gold Corporation ..	Jas. Hoeking	39	Ore treating ..	September 1 ..	Broken toe and sprained thumb	Slipped while picking up battery stamper.
78.—Millars' Timber and Trading Co., Perth	Dillwyn Gronow ..	18	Docking saw ..	September 4 ..	End of one finger cut off ..	Hand accidentally touched saw while pulling timber past same.
79.—Brown Hill Mine	Fred. Daunt	27	Ore treating ..	September 5 ..	Crushed hand	Got hand caught while lifting battery stamper.
80.—Great Boulder Perseverance ..	Jas. Henderson ..	21	Condenser pipe ..	September 12..	Scalded face and neck ..	Was repairing a galvanised iron pipe and put his face too near end of pipe.
81.—Great Boulder Mine	John Charles Black ..	20	Conveyor belting	September 13..	Head and arm bruised ..	Got hand caught between belt and guide pulley.
82.—Younami G.M.	Wm. Kelly	51	Feed pump	September 14..	Cut and bruised finger ..	Got finger caught between cross-head and gland.
83.—William Sandover & Co., Perth	Stanley Caporn	15	Tinsmith's grooving machine	September 19..	Bruised finger	Got finger caught through holding tin improperly.
84.—Ingliston Extended G.M. ..	W. H. McLean	47	Suction Gas engine	September 22..	Bruised thumb	Mishap.
85.—Perth Jarrah Saw Mills, Lion Mill	L. F. McCarthy	21	Cross-cut saw ..	September 24..	Loss of two fingers left hand ..	Slipped on floor and caught hand on saw.

RETURN No. 6.—Return of Accidents for Year ending 31st December, 1913—continued.

Name and Address of Owner.	Name of Injured Person.	Age.	Class of Machinery causing Accident.	Date.	Nature of Injuries.	Remarks.
86.—Hugo Fisher, Perth	W. F. Thamm	38	Leather press	September 24..	Cut on right hand	Side of leather caught in fly-wheel and caused cutter to jump out of place and cause injury.
87.—Royal Standard G.M., Yuin ..	Hector Totolas	38	Air compressor	September 26..	Injured jaw and front teeth..	Engine kicked back when being barred round through not using safety pawl.
88.—A. H. Roase, Perth	J. Wilkinson	23	Buzzer	September 30..	Nail cut off third finger	Knot in the wood caused hand to slip on to blades.
89.—Ivanhoe Gold Corporation, Ltd.	Louis Rose	40	Ore treating	September 30..	Bruised finger	Got finger caught while hanging up a stamp.
90.—Great Boulder Perseverance	John Henry Harridge	50	do.	October 5	Crushed toe	Got foot caught in a wheel whilst greasing.
91.—Kalgoorlie Foundry	Kenneth Dobson	18	Circular saw	October 7	Four fingers lacerated	Inexperienced apprentice.
92.—Ironsides North G.M.	Matthew Smith	20	Belting	October 19	Cut head	Belt broke and end hit injured man on head.
93.—Great Boulder Perseverance ..	Alfred Louder	20	Steam engine	October 22	Crushed thumb	Got thumb caught by eccentrics while oiling.
94.—Baddera Lead Mine, Northamp- ton	Henry Jenkins	41	do.	October 22	Scalded arms and neck	Valve chest joint blew out and caused injuries.
95.—Dwyer, Carroll & Daniels, Perth	John George Graham	15	Printing	October 23	Three crushed fingers	Got hand caught in platen machine.
96.—Great Fingall G.M., Day Dawn	Robert Sloane	44	Steam pipes	October 29	Right hand badly burnt	Injured man got dizzy and put out hand to steady himself and caught a steam pipe.
97.—W. J. Buswell, Bunbury	Tom White	16	Clay rolls	November 3	Crushed foot and leg	Slipped on platform and got foot caught in rollers.
98.—Paragon Printing Works	A. F. Bignell.. ..	15	Printing machine	November 6	Broken arm	Got caught by moving carrier bar by improperly putting hand in its way.
99.—Great Boulder G.M.	John Henry Bennets	17	Belting	November 6	Blow on head	Belt was being drawn together by stretcher, when it broke, and clamp struck Bennets on head.
100.—Golden Horseshoe G.M.	Thos. Boulter	28	Ore treating	November 6	Crushed finger	Changing a stamp in battery, and got finger pinched.
101.—Oroya Links, Ltd.	Oskar Derschl	42	Belting	November 12..	Cut finger	While throwing belt off pulley finger struck belt fasteners.
102.—Great Boulder Perseverance, G.M.	Samuel Compton	23	Ore treating	November 14..	Bruised finger	Damper counterpoise fell on finger.
103.—Great Boulder G.M.	Wm. B. Rowe	54	Belt conveyer	November 16..	Bruised arm	Got arm caught between belt and pulley.
104.—Brown Hill G.M.	F. A. Daunt	27	Ore treating	November 17..	Bruised finger	Adjusting feed rod, hand slipped.
105.—Golden Horseshoe G.M.	Chas. Freiberg	24	do.	November 20..	Bruised finger	Putting on door of grit mill, and got finger caught.
106.—Do.	John J. Ree	?	Winding engine	November 24..	Sprained leg	Caused by cage being bumped on to chairs.
107.—Great Boulder Perseverance, Ltd.	Jas. Berry	53	Winding engine	November 26..	Fatal	Driver probably fainted and failed to stop engine, end of rope struck him with fatal results.
108.—Royal Standard G.M.	J. Devitt	22	Dynamo belt	November 29..	Rupture of lower bowel	Got struck by stick while putting belt on pulley.
109.—Millars' Timber and Trading Co., Perth	Gustav Wotzko	31	Belting	December 1	Broken finger and cut hand ..	Got hand struck by belt fastener while feeling a bearing.
110.—Do.	Oscar Johansen	49	Boiler	December 2	Scalded leg	End of blow-off pipe blew off owing to opening cock suddenly. Pipe should have been securely fastened.
111.—South Kalgurli G.M.	Robert Brown	24	Ore treating	December 2	Crushed finger	Got finger pinched while replacing door of ball mill.
112.—Sargood Bros., Perth	Reginald Harewood	14	Goods lift	December 4	Broken arm	Boy opened door of lift and let truck run against roll of linoleum, which fell over and threw him into basement.
113.—W.A. Rope and Binder Twine Co., Cottlesloe	Bert Nicholls	15	Rope making	December 8	Loss of thumb	Was balancing on a rail and got hand twisted up in a rope which was being spun.
114.—Premier Flour Mill, Katanning	Wm. Bruce Reid	31	Flour Milling	December 8	Three finger ends crushed ..	Tried to pick piece of galvanised iron out of rolls while moving, and got caught.
115.—Royal Standard G.M., Yuin ..	Albert Dawson	26	Belting	December 11..	Severe cut right hand.. ..	Got caught while picking up a stamper.
116.—G.P.O., Perth	Percy Marshall	18	Passenger lift	December 12..	Cut hand	Got hand caught by balance weight while cleaning. (Lift under repairs).

RETURN No. 6.—Return of Accidents for Year ending 31st December, 1913—continued.

Name and Address of Owner.	Name of Injured Person.	Age.	Class of Machinery causing Accident.	Date.	Nature of Injuries.	Remarks.
117.—Golden Horseshoe G.M. ..	H. E. Beer	24	Belt conveyer ..	December 13..	Lacerated thumb	Got hand caught between belt and idler.
118.—Westralia Ironworks, North Fremantle	John Perry	21	Emery wheel ..	December 16..	Lacerated thumb	Got finger caught between rest and wheel when grinding a chisel.
119.—Hoskins & Co., Perth	Wm. Ross	43	Bending machine ..	June 18 ..	Bruised ankle	Part of casting broke and fell on man's ankle.
120.—Bolton & Sons, Fremantle ..	Thomas Leece	44	Buzzer	June 18 ..	Cut three finger tips	Injured man used a machine he was not accustomed to and had no right to use.
121.—Gladstone G.M., Comet Vale ..	H. L. R. Bell	17	Ore treating ..	June 20 ..	Fracture of humerus, cuts and abrasions of arm and protruding muscle on right thigh	Struck by belt while wiping water off battery pulley.
122.—Great Boulder G.M.	S. A. Gully	27	Belting	June 21 ..	Dislocated ankle	Foot slipped while putting belt on pulley.
123.—Westralia Mt. Morgans Mines, N.L., Morgans	Peter Ball	?	Suction Gas engine	June 22 ..	Loss of third finger and nail of fourth finger, right hand	Got hand caught in gearing while cleaning engine.

On perusing the above list the following facts are the most noticeable, viz.:-

- (a.) Carelessness on the part of the injured person is almost invariable.
- (b.) The large percentage of the total accidents due to belting, and the fact that most of the accidents from this cause occur while trying to put on or take off belts while the pulleys are in motion.
- (c.) The usual large number of accidents caused by circular saws and buzzers.
- (d.) The abnormally large number (21) of accidents caused by ore-treating machinery, not one of which could have been prevented except by guarding the machinery in question in such a manner as to seriously interfere with its utility.

The accident roll this year is unusually high. Possibly more accidents have been reported than formerly on account of recent prosecutions for non-compliance with this requirement. Many of the accidents resulted in serious injury, but a large number were of a very trivial nature, and in some cases could scarcely be classified as accidents "caused by machinery."

I regret to report that there were four fatal accidents, viz.:-Nos. 1, 4, 71, and 107.

No. 1.—A lift at "Viking House," Perth, was the cause of this accident. The lift was under construction, and all the working parts were completed. The lift is surrounded by the staircase, and rough wooden guards had been erected along the stairways and at landings. Some of the doors and panels at landings were completed, but the one at the second floor was not, inasmuch as the openings at each side of door were not filled in with the wove wire. This work was in process of being done, and the rough wooden guards had in consequence to be removed. In order to avoid, as it was thought, any chance of an accident, the lift was temporarily fitted with a bell which rang continuously when lift was started up or down. On the morning of the accident the cage was at the third floor, and was just starting to go to basement when deceased, who had been standing on 2nd floor landing, walked across to the lift and put his head through one of the openings which were about to be fitted with wire. The cage struck the back of his head and death was instantaneous. Evidence showed that five persons heard the bell ringing in the descending lift. It could be heard all over the building, and it is difficult to find a rea-

son why any person should choose such a time to look down the shaft.

No. 4.—This accident occurred at the Golden Horseshoe Gold Mine. Eight men, of whom deceased was one, were being raised from the 1,200 feet level in the South cage. Two men were being lowered in the North cage. From evidence obtainable it appears that the clutch on North drum could not have been screwed home. It certainly was out of gear from some unexplained cause, and the North cage got away. This cage was eventually held by the grippers, and the two men's lives were probably saved by their action. Two of the men in the South cage gave evidence that they started up from the 1,200 feet level and got about 200 feet up, when cage stopped, and at once started down at a great rate, finally striking the bottom of the shaft. The deceased, who was in this cage, received such injuries as to cause his death. Exhaustive tests of the brakes and clutch gear were made, and they were found in perfect order. The verdict of the jury was that there was "no direct evidence to show the cause of the accident." The probable cause of this accident is fully dealt with in Division VII. under the heading of "Inquiries, etc."

No. 71.—Another fatality, which occurred in the warehouse of Messrs. Charles Atkins & Co., Perth, can scarcely be properly classed as having been caused by machinery. A new goods hoist had just been erected; this consisted simply of an electric winch and a rope with a hook on it for raising and lowering packing cases, etc., between the basement and first floor. The rope passes through double flap trap doors at each floor. At the ground floor half of one of these doors was open, and the deceased was slinging a case placed on the shut half. In some unexplained way he tripped, and fell about 15 feet on to the concrete floor of basement, receiving injuries which shortly caused his death.

No. 107.—Deceased person in this case was the driver of a winding engine on the Great Boulder Perseverance Gold Mine. The accident was the result of an overwind. The cage was suspended by the safety gear, and the end of the rope coming into the engine-house with great velocity, struck the driver and inflicted such severe injuries as to cause his death while being removed to the hospital. It appeared in evidence that deceased had fainted on one or two previous occasions, and it seems possible that he again fainted while in the act of hauling this cage, thus causing the overwind and his death.

RETURN No. 7.—Return showing number of Persons injured or killed by Machinery Accidents, and the Class of Machinery causing Accidents in each District during the Year ending 31st December, 1913.

Class of Machinery causing Accident.	DISTRICTS.										Totals.
	South-Western.	Coolgardie and Yilgarn.	Dundas.	East Coolgardie.	North-East Coolgardie.	Broad Arrow.	North Coolgardie.	Mt. Margaret.	East Murchison.	Murchison and Yalgoo.	
Circular Saws and Band Saws	9	1	..	1	..	..	..	..	..	..	11
Buzzers	10	..	..	..	..	..	..	..	..	..	10
Other Wood-working Machines	2	..	..	..	..	..	..	..	..	..	2
Ore-treating Machinery—Crushers, Ball Mills, Roasters, etc.	1	1	..	18	..	..	..	..	..	2	21
Flywheels and Pulleys .. ..	..	1	..	2	..	..	..	..	..	..	3
Belting	3	..	..	6	..	..	1	..	1	4	15
Belt Conveyors .. ..	..	..	..	3	..	..	..	..	..	1	4
Winding Engines .. ..	..	..	..	12 (2)	..	..	..	..	..	..	12 (2)
Suction Gas Engines .. ..	..	..	..	..	..	..	..	1	..	..	1
Suction Gas Producers	1	..	..	..	..	..	..	..	..	..	1
Steam Hammers	2	..	..	..	..	..	..	..	..	..	2
Scalds and Burns due to burst pipes, glass water gauges, etc.	2	1	..	1	..	..	..	..	..	1	5
Accident due to burst glass water gauges ..	..	..	..	1	..	..	..	..	..	..	1
Pumps .. ..	..	..	..	..	..	..	..	..	1	..	1
Boilers .. ..	..	..	..	1	..	..	..	..	..	..	1
Friction Winches .. ..	..	..	..	..	..	..	1	..	..	..	1
Steam Engines .. ..	..	..	..	1	..	..	..	..	..	..	3
Air Compressors .. ..	..	..	..	..	..	..	..	..	..	2	2
Passenger Lifts	3 (1)	..	..	..	..	..	..	..	..	..	3 (1)
Goods Lifts	1	..	..	..	..	..	..	..	..	..	1
Goods Hoists	1 (1)	..	..	..	..	..	..	..	..	..	1 (1)
Printing Machinery	7	..	..	..	..	..	..	..	..	..	7
Tinsmith's Machinery (groovers)	2	..	..	..	..	..	..	..	..	..	2
Confectioners' Machinery (cutter)	1	..	..	..	..	..	..	..	..	..	1
Screwing Machine .. ..	..	..	..	1	..	..	..	..	..	..	1
Brickmaking Machinery	1	..	..	..	..	..	..	..	..	..	1
Leather-working Machinery	2	..	..	..	..	..	..	..	..	..	2
Flour-grinding Machinery (roller)	1	..	..	..	..	..	..	..	..	..	1
Rope making Machinery	1	..	..	..	..	..	..	..	..	..	1
Bending Machine	1	..	..	..	..	..	..	..	..	..	1
Emery Wheel	1	..	..	..	..	..	..	..	..	..	1
Locomotives, collision of	2	..	..	..	..	..	..	..	..	..	2
Electric Locomotives .. ..	..	..	..	1	..	..	..	..	..	..	1
Totals	54 (2)	4	..	48 (2)	..	..	2	1	2	12	123 (4)

Figures in parentheses denote fatal accidents.

The above table shows a classification of the accidents, giving districts in which they occurred, and class of machinery causing them. It will be noted that there were 57 more accidents than in 1912, and four accidents were fatal, as against three in 1912.

The following table indicates the class of machinery causing the largest number of accidents, giving the percentage of total accidents caused by each class:—

	Per cent.
Ore-treating machinery, crushers, ball mills, roasters, etc.	17
Belting	12
Winding engines	9.7
Circular saws	9
Buzzers	8

The unusually high percentage of accidents to persons caused by winding engine may give a wrong impression. There were in all 12 persons so injured, but these were the result of accidents to only four winding engines.

The majority of the accidents occurred, as was to be expected, in the South Western and East Cool-

gardie Districts, these two having much the largest number of registrations. The accidents in the South-Western District amount to nearly 44 per cent., and those in East Coolgardie 39 per cent. of the total number of accidents.

The South-Western accidents in regard to total registrations in that district amount to 2.77 per cent., and those in East Coolgardie to slightly over 9 per cent. of the total registrations in that district. The greater percentage of accidents in proportion to registrations in East Coolgardie district is probably to be expected, mining machinery being generally more dangerous than much of the machinery met with in the South-Western District.

DIVISION VI.

Mishaps to Machinery.

A few of the most interesting mishaps to machinery are as follows:—

1. A very peculiar accident which might easily have caused serious injury to person, but, fortunately, did not, occurred on a dredging barge at Greenbushes. The engine cylinder cover has a pro-

jection cast on it about 10 inches diameter. This is turned out at its outer edge, and maker's name plate was turned up a neat fit, and driven into the turned recess. The recess itself was filled with asbestos. The barge upon which engine is erected became flooded, and the water which was up to the centre of the cylinder must have penetrated into the asbestos. When the flood subsided, and when steam was got up and engine started, the driver noticed a little steam issuing from around the name plate. This soon ceased, however, and no notice was taken of the matter. After a short interval a loud explosion was heard by the driver, who was working in front of the cylinder. He then found the name plate had been blown off, shattered in pieces, and parts of it were found twenty yards away.

The accident was due to the water absorbed by the asbestos forming steam which had no means of escape, and so causing the explosion. The driver had a lucky escape.

2. At the Menzies Consolidated Gold Mines, Ltd., on the 29th March, a cotter broke in the cross-head of the mill engine. The piston was smashed, and end of the cylinder was knocked out. After repairs, a stronger cotter was fitted. No damage to persons ensued.

3. On July 20th, at the same Mine's main shaft winding engine, the flange of the main starting valve fractured. A cracking noise was heard while driver was warming up the engine, and on examining the valve, the flange was found to be cracked all round. It was repaired and worked for two weeks when the same thing occurred again. The breakage was undoubtedly due to "water hammer" caused by improper drainage of the steam pipes.

4. At the Kalgurli Gold Mine on the 16th January, the eye of the north clutch band on main winding engine broke, and was discovered by the engine-driver before any further damage occurred. On 9th April a similar fracture took place on the south drum band. As in the first case no damage was done beyond the mere break. On April 23rd, the same band parted at recent repair weld. On 22nd May this band again broke at weld. It was then replaced by a new band with the eye portion much stronger than the original, and has since given satisfaction.

5. An accident to shafting occurred at the Armadale Brickworks. The plant is driven by a suction gas engine, which transmits its power (about 120 H.P.) to a 4in. shaft by means of a rope drive. The pulley on the shaft is about 6ft. 6in. diameter, and has five rope grooves. This pulley was placed midway between two bearings about six feet apart. The shaft broke off short, just inside the boss of the pulley. All the spokes of the pulley were broken. Fortunately no person was near at the time, or the consequences might have been serious.

A new shaft five inches diameter was put in, and a new "spider" fitted to pulley.

The cause of the accident was probably the fact of the shaft being rather small in relation to the distance between bearings. The constant flexure consequent on this, caused severe crystallisation, and subsequent breakage of the shaft.

6. At the Victoria District Co-operative Flour Milling Co.'s Mill Geraldton, the crank shaft of a 54 h.p. suction gas engine broke close to crank web. The fracture appears to have been due to faulty

adjustment of a bearing throwing too much strain on the shaft at point of fracture. A new shaft, made in the State was procured and was started. After running a few days, a flaw was discovered in the crank pin running out through both crank webs. Temporary strengthening bands were shrunk on over the webs, and a new crank shaft was ordered from the makers.

7. At the Geraldton Municipality Electric Light Works, on July 6th, a serious accident occurred in connection with a Suction Gas engine then being installed. The representative of the firm supplying the engine was testing the gas at a cock fixed in the expansion box, when the gas fired back into the box, blew the cover off it, broke every bolt (thirty-two $\frac{3}{8}$ inch bolts), and caused severe injuries to the person who applied the light. See accident No. 59. The explosion was undoubtedly primarily due to the fact of there being no gauze over the testing cock.

On the third December another explosion took place in connection with this same plant, this time fortunately with no ill results to person, except slight shock. The accident occurred about 6.30 p.m., when just about to start the engine. The scrubber had been off for cleaning, when this work had been completed and the fan had been going five minutes, the engine-driver applied a match to the cock on the expansion box to test the gas. This was immediately followed by an explosion which blew off cover of the expansion box (as in the accident of 6th July). This explosion was at once followed by a second one, which blew the top off the scrubber. The total damage, fortunately, consisted of broken bolts, and the plant was at work again at about 9.30 p.m.

This explosion, like the first one, was almost certainly caused by the gas firing back through test cock. The driver stated that the gauze on the cock was in good order, but after the explosion no gauze could be found, and I consider that before the explosion, it must have been either removed, or in a very damaged condition. It is practically impossible for explosions to occur if these test cocks are properly covered with gauze. It is possible as the scrubber had just been opened up that all the air had not been properly removed by the fan, and if so, there would, of course, be an increased tendency to explosion.

The test cock in question has now been removed, and fitted up on the pipe close to engine. This should minimise future risks.

In connection with this accident, I should like to draw pointed attention to the grave danger incurred in applying matches to unprotected cocks. Every test cock should have a covering of fine wire gauze soldered over the opening, and if this is kept in good order, explosion is a practical impossibility.

8. The combustion chamber of a 220 H.P. Suction Gas Engine at the Queen of the Hills Gold Mine, Meekatharra, developed a serious crack. The crack extended from the outside shell, through the water space into the chamber, water leaked through into the cylinder, and the liner was found badly scored. Temporary repairs were tried, but were not successful, and since this a new combustion chamber has been fitted.

The defect was probably due to inherent weakness of design, a considerable area of the inner part of the chamber being unsupported where crack first developed.

9. At the Eclipse Mine, Kalgoorlie, another failure of the drum shaft of winding engine occurred on February 21st (two similar fractures were referred to in my last year's report). On this occasion the fracture occurred just outside the square for south clutch. The shaft had been left with square corners where the round and squared portions meet, and were not filleted as instructed. It was obvious that this engine was not up to its work. The constant shock to the shaft caused by badly fitting and worn spur and pinion wheels is probably largely accountable for the frequent breakage of the shaft.

It was decided to replace the engine by another more suitable one in the Company's possession. This was done early in the year, and the engine has, I believe, been working satisfactorily ever since.

10. The winding engine at the Patterson shaft of the Ivanhoe Mine was found fractured at heel of flange for about 3ft. 6in. in circumference. Temporary repairs were effected, and new drums of stronger design ordered. The cause of the fracture appears to have been the lateral wedging action of the ropes forcing the cheek of the drum outwards.

11. At the Baddera Lead Mine a very similar accident happened, only in this case the crack did not occur in the heel of the drum flange, but seven inches down from edge of flange. The piece, about three feet in circumference and 7 inches wide, fell

out. The drum was satisfactorily repaired by a steel patch.

DIVISION VII.

Engine-drivers' Examinations and kindred matters.

During the year 1913 four (4) examinations were held in Perth, two (2) in Bunbury, two (2) in Kalgoorlie, and one (1) in Cue.

Eight examinations were also advertised to be held at Leonora, Norseman, Sandstone, and Albany, but as the required number of candidates did not make application, these examinations were not held. Candidates were either examined elsewhere, or their applications held over until such time as an examination at these centres is justifiable.

The personnel of the Board remains as it has been for several years past, viz.:—Messrs. H. L. Gill, J. Breydon, and myself as Chairman.

Twenty four (24) days were spent in holding examinations at the various centres by the travelling Board, fifteen (15) days were occupied in travelling and twenty-one (21) days were spent in Perth dealing with applications, reading and marking examination papers, inquiring into overwinds and misdemeanours, and other Board matters.

Two hundred and three (203) applications were dealt with during the year, and one hundred and sixty-three (163) certificates were granted as follows:—

RETURN No. 8.—Showing total Number of Engine-driver's Certificates (all Classes) Granted in 1913.

Class of Certificate.	Number Granted.	
	1913.	1912.
First Class Competency (including Certificates issued under Regulation 27 and Sec. 63 of Act)	15	10
Second do. do. do. do. do. ..	34	39
Third do. do. do. do. do. ..	45	61
Locomotive Competency	8	18
Traction Competency	19	10
Interim	18	26
Copies	24	13
Totals	163	177

The total number of certificates granted since March 1st, 1905, the date on which the Inspection of Machinery Act came into force, is two thousand one hundred and twelve (2,112), as follows:—

Number 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	.. .. ..
<u>2,112</u>	<u>536</u>

The certificates granted in the first two years included a large number of "Service" Certificates. Deducting the Service Certificates from the total number granted, it will be seen that 1,576 Certificates of Competency have been issued, or on an average, 175 per year.

The Revenue from engine-drivers' fees during 1913 was £199 9s., as against £228 1s. in 1912.

Inquiries, Prosecutions, etc.

On the 20th January, 1913, a very serious accident occurred at the Golden Horseshoe Mine, resulting in the death of one person, and more or less severe injuries to nine others. (See accidents Nos. 4 to 13.)

An inquest was held on John Harrington, the person killed, the State Mining Engineer being present on behalf of the Mines Department. Evidence was taken from the driver in charge at the time of the accident, other drivers who had controlled this engine, various mine officials, and Inspectors of Machinery.

The driver in charge stated that at a certain stage of the work, he hoisted the north cage to the 1,200 feet level, geared up and started to pull men from that level. On the second trip up, when the south cage was between the 1,200 feet level, he was watching the indicator when he heard an "unusual noise."

He then noticed the north cage (which was being lowered with two men in it) running away. He shut off steam, jammed on the north drum brake, and applied south drum brake. He then tried to screw in the north clutch, but failed. In the meantime, both cages had gone to the bottom. The driver is of the opinion that the clutch sprang out of gear, accounting for the unusual noise above referred to. There is no doubt that the clutch was out of gear, and that this was the original cause of the whole accident. As to how it got out, no evidence was available. The driver in charge at time of accident stated he had not touched the north clutch since coming on duty. It is almost inconceivable that the previous driver had gone off duty and left the clutch either out, or not screwed home. It was stated by three Inspectors of Machinery that if clutch was properly screwed up, it could not by any possibility come out of gear without breaking the intermediate mechanism, and this was not broken.

When the driver discovered that the north cage was out of gear, he found himself confronted with a terrible emergency, and, unfortunately, appears to have done everything he should not have done. What he should have done was to first put down the North drum brakes as hard as possible, and having done this, which was all that was possible to do in regard to this cage, he should have devoted himself to safely landing the south cage. What he did do, apparently, was to shut off steam and leave the south cage to look after itself while he occupied himself in an utterly impossible and useless attempt to get in the north clutch. The verdict of the jury was that "there is no direct evidence before us to show the cause of the accident." The jury also expressed an opinion that the introduction of friction clutches instead of jaw clutches would minimise the possibilities of similar accidents in the future.

In face of there being no direct evidence as to cause of north drum clutch coming out of gear, the Board of Examiners decided that no action on their part was necessary.

A first-class engine-driver on the South Kalgurli Gold Mine was reported as having been the worse for liquor whilst in charge of a winding engine on April 18th.

On May 29th an official inquiry was held at Kalgoorlie with a view of eliciting the facts of the case. The driver pleaded guilty, but urged in extenuation that drink had been brought to him in the engine-house, that he only had one drink, and that an accident through a log of wood falling on him had made him worse than he would otherwise have been. He had previously borne a good character, and the management reinstated him in his job.

The Board of Examiners in considering the report of the Board of Inquiry, took cognisance of the facts of previous good character, of his being reinstated by the management, and of this being a first offence. They, however, considered that anything in the shape of intoxicants while in charge of a winding engine was an offence so serious as to merit punishment. The Board recommended to the Minister that a fine of £5 5s. be inflicted, and that failing payment in 14 days the driver be reduced to the status of a second-class engine-driver for a period of three months. This was approved and the fine was duly paid.

The case of another first-class engine-driver was inquired into on the same day as the one last referred to.

In this case the engine-driver was employed at the Boulder Perseverance Gold Mine. On the 1st April, while in the act of going on duty, the driver was forbidden to take charge of the engine as he appeared to be under the influence of drink. The respondent pleaded not guilty, stating that he was of an excitable temperament, and lost his temper, and that his state was mistaken for intoxication.

The Board of Inquiry reported that the complaint had not been proved to their satisfaction.

The Board of Examiners on receipt of above report, recommended to the Minister that it appeared inadvisable to take any further action. The Board, however, pointed out that they could not but place some importance on the fact that this driver had been dismissed from the billet he had held for four years on account of the above alleged offence.

On the 20th May, an overwind occurred at the Great Boulder Mine main shaft. Though the damage done in this case was confined to an empty cage hung up in the thimble, and the rope becoming detached, there had been two previous cases of overwinding recorded against this driver. The Board of Examiners, therefore, recommended that an official inquiry be held. The inquiry took place on the 24th September, at Kalgoorlie. The offence was admitted, and a recommendation was made to the Minister, that in view of the two previous overwinds, this driver's First Class Certificate be endorsed with the restriction "not available for first motion winding engines," such restriction to remain in force for twelve months. No fine was recommended. This was approved and certificate endorsed accordingly was issued.

On June 4th, a driver at the Great Fingall Gold Mine was found in a state of intoxication in charge of an engine at No. 4 winze. Proceedings were taken against him under Section 57 of the Mines Regulation Act at Cue, on June 30th, and a fine of £5 and costs was imposed.

The Board of Examiners recommended to the Minister that an official inquiry be held into this case, and this was approved.

The inquiry was held at Cue on August 8th. Evidence showed that the driver had unquestionably been under the influence of liquor whilst in charge of his engine, and that several coils of rope were off the drum and were lying about the engine, owing to driver having started engine in wrong direction. Fortunately, there was no injury to person, and no other damage was done.

On receipt of report of the Board of Inquiry, the Board of Examiners decided that, in consideration of driver having been fined under Mines Regulation Act, and having already lost several weeks' work, they would not deal with his certificate, which they certainly would have done had it not been for the circumstances mentioned. The Board decided, however, to require the driver to remit the amount of £5 towards cost of inquiry, or in default to be reduced to the status of a second class driver for three months. The amount was paid, and driver's certificate restored to him.

On 13th March, an engine-driver, J. Berry, the holder of First Class Certificate No. 853, being employed on the Eclipse Mine, was lowering men from the No. 2 to the No. 5 level, when he suddenly lost consciousness and fell. The engine continued to run until Berry regained consciousness a few seconds

later, when he stopped it. One cage was then at the safety hook, and the other at the bottom of the shaft with nearly all the spare rope off the drum. There were two men in this cage, one of whom was slightly hurt and was off duty two days in consequence. Berry left his work and went for two months holiday in the Eastern States.

The Board decided that Berry must produce a medical certificate before resuming work.

On November 26th, the driver last referred to was killed at the Great Boulder Perseverance Gold Mine. He was in charge of the winding engine at No. 6 shaft, having obtained the medical certificate required.

On the day of the accident he came on shift at 8 o'clock in the morning, and performed his duties as usual, making no complaint as to being unwell. About 10.15 the oiler heard a crash, and turned round in time to see Berry falling. One of the cages was hung up at the thimble, and the rope becoming detached, flew into the engine-room, striking deceased, causing such severe injuries that he died while being removed to the hospital.

There was no evidence to show how the accident happened, but it appears that Berry had again fainted and thus lost control. The day was a very muggy one, and temperature in engine-room a few moments before the accident was reported to have been 106 degrees.

On December 29th an overwind took place at the Great Boulder Gold Mine. The driver had been working at this engine for several days previous to the accident. He was hauling up a truck of ore, and appears to have shut off steam a little earlier than he should have done, necessitating his giving the engine a "slight puff of steam" to carry it up the remaining distance. The valve opened more than he intended and cage went up to the thimble. No damage was done.

The engine in question was a first motion engine and the driver, the holder of a first-class certificate, restricted to geared winding engines, and, therefore, should not have taken charge of this engine.

The Board of Examiners informed the management of the mine that not having the precaution of sighting this driver's certificate, they were, to that extent, responsible for the accident, and that a repetition of the offence, *i.e.*, of employing a driver on an engine his certificate did not entitle him to drive, would lead to prosecution.

The driver was informed that the occurrence would be noted against his record, and that any repetition would be promptly dealt with.

Several other overwinds occurred during the year, some of them, however, are not of sufficient importance to record here. It is, unfortunately, a fact that quite a large number of cases are in existence where overwinding is an extremely easy matter, the distance between the point where the cage should stop and the thimble being much too small.

I consider that wherever an opportunity occurs to make alterations, this distance be increased to such a reasonable length as to give drivers a chance of taking action, should this be necessary from any unforeseen cause.

On the whole, the year's record of winding accidents to persons, with the exception of the one serious case at the Golden Horseshoe, is satisfactory. Driving a winding engine is strenuous work, needing the most constant attention, and requiring the driver to be in perfectly fit physical condition. Considering the climatic conditions, and the incessant nature of the work on some of the big mines, it is perhaps remarkable that more serious accidents do not occur.

A complaint was received from the engine-drivers at the Collie Co-operative Colliery, as to the conditions under which they were working. After carefully looking into the merits of the case certain suggestions were made, and a *modus vivendi* was arrived at which was acceptable both by the management and the drivers.

DIVISION VIII.

General.

Amendment to Inspection of Machinery Act, 1904.

In my last year's report I referred to the fact that a much needed Bill had been prepared with a view of introducing some very necessary reforms and additions into the above Act. I regret that opportunity has not occurred to enable Parliament to deal with this during the year.

Work done for other Departments.

During the year under review, this Department has been requisitioned to make tests, valuations, and reports on several plants for other Departments. A 100 hours' continuous run test was made of the Albany Cold Storage plant. The test started on January 30th and was continued for the stipulated 100 hours without mishap. Many diagrams were taken from the engine, and the horsepower was calculated therefrom. The fuel consumption was computed from data taken during the test, all fuel being weighed accurately, and dealt out to the attendant. Temperatures of the various rooms were taken and recorded at intervals.

The fuel used was Collie coal, which, by the way, was stored in the open, and was therefore not in such good condition as it might have been. The result of the test was entirely satisfactory. The governing of the engine was excellent, the form of the diagrams very good, and the fuel consumption satisfactory. The engine, a 70 Brake horse power Campbell producer gas engine, was not loaded up to its capacity, the average load being 52½ Indicated horse power. The coal consumption was 1.33 lbs. per I.H.P. per hour. This was well within the specified consumption and would, of course, have been even lower had the engine been working nearer its full capacity.

In March the condition of the Gas producers at the Claremont Hospital for the Insane were reported on, with a view of deciding on the necessity, or otherwise, of replacing them by new ones. In the same month computations were made in respect of certain engines proposed to be purchased by the State Saw Mills. In July a producer gas plant was valued for the State Brick-making enterprise.

In September specifications for the steam plant at the Wooroloo Sanatorium were examined, and advised upon; two second-hand boilers were inspected and valued for the Public Works Department with a view to purchase, and a Fairbanks Morse winding plant was reported on as to its suitability for mining purposes.

In November a second-hand Ford motor car was inspected and valued for the Workers' Homes Board.

New Installations.

There is not much to comment on under this head this year.

In my last report I referred to a new winding engine the erection of which was then in hand at the Sons of Gwalia Gold Mine. The engine was procured to replace an old one which was getting quite beyond its work, and had been condemned by this Department.

The new engine was put under steam on 9th April, and officially tested on 29th of same month.

The engine was built by Fraser & Chalmers, and is a fine example of a modern winding engine. A description of the engine was given in my report for the year ending December 31st, 1912. It has, I believe, been giving every satisfactor.

A cold storage plant, under the control of the Agricultural Department, was installed at Albany early in the year. The plant consisted of a 70 Brake H.P. Campbell Suction Gas engine with two Campbell gas producers; a Linde Compressor, with cylinder 9in. diameter and 18in. stroke, with all necessary pumps, fans, etc., and an electric generator for lighting the building.

There is also a Tangye 12 H.P. oil engine installed to drive the fan, dynamo, etc., when the gas engine is not running. This engine also drives a small air compressor for use in starting the gas engine.

The plant includes a small vertical boiler which is used for distilling water for making ice.

The whole plant worked very satisfactorily during the test already alluded to in another part of this report, and should give a good account of itself.

At the Collie Co-operative Colliery a Browett Lindley double cylinder, non-condensing engine of 290 B.H.P., direct coupled to a Crompton & Co., 200 Kilowatt direct current generator, was installed during the year. Steam power for this Colliery was supplemented by the addition of a Lancashire boiler, manufactured by J. Thompson & Co., of Wolverhampton. The boiler is 30 feet long by 8ft. 6in. diameter, and works at a pressure of 130lbs. per square inch. This boiler is built with ends forming portion of a sphere whose radius is equal to the diameter of the boiler, thus doing away with the necessity for any gusset or other stays, a great advantage in the matter of cleaning and inspecting. The flanging of the end plates is an excellent piece of work. The furnace tube consists of ten short sections connected by Adamson's flanged joints, and a 7ft. 6in. length of corrugated tube to provide for ample expansion.

The boiler is a fine example of modern boiler-making and the workmanship is satisfactory throughout.

The plant at Messrs. Millars' Timber & Trading Co.'s Nash Street yard, Perth, which was destroyed by fire in 1912, was re-organised during the year. The power is supplied by three Babcock & Wilcox boilers, fitted with special furnaces for burning sawmill refuse. The engine, which is by Fraser & Chalmers, is a cross compound, with cylinders 16in. and 26in. by 42in. stroke. It is fitted with a Corliss valve gear. The plant includes a 157 Kilowatt electric generator by Westinghouse, Manchester, and many wood-working machines of the most up-to-date type. The whole plant is a model, so far as guarding is concerned.

At Lyall's Mill, Collie, Messrs. Bunning Bros. have recently erected a 150 B.H.P. Bellis and Morcom engine, direct coupled to a 100 Kilowatt Brit-

ish Westinghouse electric generator. This generator supplies power to a 100 H.P. motor, driving a band saw. The generator also supplies power for four other motors for driving other machines. The plant is noticeable in two directions. The installing of an electrically driven plant in the Jarrah Forest, and the introduction of band saws instead of circular saws.

Inspectorial Staff.

This remains as in 1912. During the year the Leonora Office was closed. In future the work for this district will be done in conjunction with the Kalgoorlie Office, and the Leonora Inspector will be available for a good part of his time in the districts worked from that office.

I wish once more to call your attention to the fact that the number of Inspectors is inadequate. The work in the South-Western District is increasing rapidly, as you will see from the tables herein, and if the present staff is not increased, there is, I fear, no hope of overtaking it. Machinery inspections are already very much behind hand with regard to actual registrations, and it is known to the officers of the Department that there is a very large number of plants unregistered. While registered machinery remains uninspected, it is useless to attempt to insist on the registering of plants that there is no chance of being able to inspect. I referred to this matter rather fully in my last two annual reports, to which I beg to refer the Hon. the Minister. I consider the appointment of another Inspector is becoming an urgent necessity, unless the work referred to is to be left in abeyance. It is absolutely impossible to bring the work up to date as at present manned.

Clerical Staff.

During the year the clerical staff has been subjected to many changes. One officer was granted six and a-half months' leave, and his place was temporarily filled by no less than three different clerks during the latter part of the year. The position of clerk in charge again became vacant in May last and was not permanently filled until July. It is hoped that the recent permanent appointments will quickly reduce the state of confusion supervening on the appointment of so many inexperienced temporary clerks.

Since 1911 to the end of the year under review, 24 different clerks have passed through this office. This state of things would be bad enough in an ordinary mercantile business, but in a Department where all the work is of a more or less technical nature, and every new clerk has to be carefully tutored, the waste of time, and confusion due to the inevitable errors induced by such a state of things can easily be imagined.

Revenue.

The amount paid to Revenue from all sources during the year was £4,375.4s. 1d., made up as follows:—

Districts.	Boiler Fees.		Machinery Fees.		Incidentals.		Totals.	
	£	s. d.	£	s. d.	£	s. d.	£	s. d.
South-Western	1,662	19 0	308	8 0	114	9 9	2,085	16 9
Coolgardie and Yilgarn	317	15 4	22	0 0	..	..	339	15 4
Dundas	59	0 0	5	15 0	..	..	64	15 0
East Coolgardie	677	12 10	228	0 0	..	..	905	12 10
North-East Coolgardie	49	10 0	3	10 0	..	..	53	0 0
Broad Arrow	14	0 0	1	10 0	..	..	15	10 0
North Coolgardie	146	5 0	19	15 0	..	..	166	0 0
Mt. Margaret	141	11 4	14	0 0	14	11 10	170	3 2
East Murchison	143	19 6	16	0 0	..	..	159	19 6
Murchison and Yalgoo	187	0 0	27	5 0	0	17 6	215	2 6
Engine-drivers' Fees .. .. .	..	..	..	..	..	..	199	9 0
Totals	£3,399	13 0	£646	3 0	£129	19 1	£4,375	4 1

RETURN No. 9.—Showing Distances Travelled by Inspectors in 1913 and 1912.

District Officers.	Rail Miles.				Road Miles.				Water Miles.				Total Miles.			
	1913.	1912.	Increase in 1913.	Decrease in 1913.	1913.	1912.	Increase in 1913.	Decrease in 1913.	1913.	1912.	Increase in 1913.	Decrease in 1913.	1913.	1912.	Increase in 1913.	Decrease in 1913.
Perth	19,435	19,182	253	..	6,491	6,022	469	..	330	314	16	..	26,256	25,518	738	..
Kalgoorlie	3,665	3,128	537	..	4,750	4,916	..	186	..	..	..	..	8,395	8,044	351	..
Leonora	2,640	2,880	..	240	3,138	4,434	..	1,296	..	..	..	..	5,778	7,314	..	1,536
Geraldton	5,888	3,753	2,135	..	1,856	1,327	529	..	..	..	..	..	7,744	5,080	2,664	..
Totals	31,628	28,943	2,925	240	16,215	16,699	998	1,482	330	314	16	..	48,173	45,956	3,753	1,536
															making total increase of 2,217 miles in 1913.	

The total revenue, it will be seen, shows a decrease of £18 10s. as against that of 1912. During the year thirteen amounts, totalling £21 16s. 1d., were written off as bad debts. It will therefore, be seen that had it been possible to collect these amounts, there would have been a small increase over last year's revenue instead of a decrease.

Miles Travelled per Inspection during 1913.

District Offices.	Total Number of Inspections (Boilers and Machinery).	Total miles travelled.	Average miles travelled per Inspection.
Perth	2,374	26,256	11.06
Kalgoorlie	1,051	8,395	7.98
Leonora	326	5,778	17.72
Geraldton	237	7,744	32.67
Totals	3,988	48,173	12.08

The distance travelled by the various Inspectors during 1913 was 48,173 miles, being an increase on the previous year's figures of 2,217 miles. The following tables show an analysis of mileage travelled in the various districts and whether by road, rail or water.

Mileage.

It will be noticed that there was an increase of 738 miles in the South-Western District, 351 in the districts worked from Kalgoorlie, and 2,644 in the districts worked from Geraldton. The Leonora district shows a decrease of 1,536 miles, a fact mainly due, no doubt, to the prolonged absence on sick leave of the Inspector for this district. The undue increase of the Geraldton mileage is, probably, to some extent, due to the fact that in 1912 a much less distance was covered than usual, owing to sickness and other causes.

The total number of inspections in 1913, including boilers and machinery, was 3,988 as against 3,505 in 1912, and the average distance travelled per inspection in 1913 was 12.08, as against 13.11 in 1912, thus showing a slight reduction. The enormous distance which has to be travelled in this State sometimes for a single emergency inspection, keeps this average up in spite of every effort made to reduce it. During the present year an attempt is being made by a more careful arrangement of work to cut down this average. It is not possible, however, to effect much in this direction.

Insurance Companies undertaking Boiler Risks.

Towards the end of the year my attention was called to the fact that certain Insurance Companies are now prepared to underwrite the risk of boiler explosions. As the State provides for the compulsory inspection of all steam boilers, the Companies practically take no risk. This Department does the work and the Insurance Companies propose to reap the profits.

I have already, as you are aware, drawn the attention of the hon. the Minister to this matter and made certain suggestions in connection with same, which had in view a means of increasing the revenue of this Department.

Before concluding, I desire to thank the officers of other Departments who have rendered assistance in matters pertaining to the Act, and also to record my appreciation of the manner in which the Staff has carried out its duties during the year under review.

I have the honor, etc.,

C. J. MATTHEWS, M. Inst., C.E.

Chief Inspector of Machinery and Chairman Board of Examiners.

Extracts from Inspectors' Reports.

Mr. B. Pryn Jones, Inspector of Machinery in charge of Coolgardie and Yilgarn, Dundas, East Coolgardie, North-East Coolgardie, and Broad Arrow districts, remarks:—

The number of useful boilers in the districts under my charge is sixteen less than last year. Against eleven new registrations, there were fifteen permanently condemned; the latter being mainly boilers which have been used as exhaust steam receivers for years and are obviously unfit to be used as steam generators again. Three boilers have been sent out of the State, and the rest of the shortage has been transferred to other districts.

Machinery on the other hand shows an increase of fourteen groups; while I know of some small plants which have not been registered. As eleven groups were overdue for inspection at end of the year, the new plants could not be inspected.

The number of certificates issued is not, of course, the real test of the work done. In Kalgoorlie for instance, out of 548 groups at the beginning of the year, only 487 certificates were issued, but 36 were found to have been dispersed, 20 new registrations effected and 34 discovered intact but out of use. So that really over 570 inspections were made. In other districts, however, the proportion of the out of use groups is much higher than those of Broad Arrow, North-East Coolgardie, and Dundas having 49 groups idle out of 87 registered.

Although machinery in Kalgoorlie is congested and apparently handy to get at compared to outside districts, it must be remembered that the comparative sizes of groups should be considered. For instance, one group in a back country district might consist of a ten-head stamp mill and Berdan pan worked by a small engine, while the corresponding group here would mean fifty head of stamps, a dozen grit mills, as many grinding pans, willey tables, pumps, etc., etc., with two or three hundred belts and scores of geared wheels running in all directions.

Inspection of Boilers.—The fact of only three boilers being overdue for inspection at the end of the year, in each case at owner's request, and that they were done within a fortnight afterwards, shows that they are our first care.

Twenty-two special inspections were made on behalf of second-hand machinery dealers, for purpose of sale, which indicates clearly that the power purchasing public is becoming alive to the fact that it can obtain expert advice at cheap rates.

New Boilers Constructed.—No new boilers have been constructed here this year, and the local dealers wish they could lighten their stock of second-hand ones of all types, which is slowly mounting up owing to country mines closing down or gas engines replacing steam plants.

Boilers temporarily and permanently condemned.—Seven boilers were closed down temporarily for repairs and fifteen permanently condemned and struck off the registers. I lose no opportunity of condemning all unfit boilers so as to be saved the time and trouble of making inquiries about them once or twice a year. Although such condemnations have not followed thorough inspections, or involved special journeys, and therefore, cannot be counted as such, yet they represent a certain amount of time all the same.

Maintenance and care of Boilers.—Maintenance on the whole is good. Some boilers in Marvel Loch used to give trouble owing to bad feed water, but scheme water reached the town early in the year and I do not anticipate any more trouble.

Explosions or interesting defects.—Happily no explosions have occurred during the year and I cannot recall any defects out of the common.

Prosecutions.—No prosecutions have been instituted for infringement of the Act during the year.

Machinery Inspections.—These have been given all the time and attention available and only nineteen remained to be done at the end of the year.

Dangerous Machinery.—The Golden Mile is crowded with machinery and the wonder is that there are not more accidents than our records show. The bulk of those reported are of very trifling nature, although registered as serious because our Act defines a serious accident as one which incapacitates a person for forty-eight hours.

After remarking on fatal accidents which occurred in his district, and sundry mishaps to machinery

which are dealt with in the body of this report, this Inspector proceeds:—

“Engine-drivers’ Misdemeanours.”—Five cases of overwinding and two of engines becoming out of control have occurred during the year. The two latter are those on the No. 6 shaft of the Golden Horseshoe and Eclipse Mines, mentioned elsewhere. Of the five overwinding cases, one happened at the close of the year and has not yet been dealt with by the Board. Of the remaining four, one ended fatally to the driver himself, two were not considered so serious as to warrant any action, and the fourth was proceeded against under Section 64 of the Act. In this case the overwind which culminated in the inquiry was not in itself beyond forgiveness, but it was the third occasion on which this driver was reported for negligence of this sort.

“Two cases of drunkenness while on duty were investigated here under Section 64, and all evidence forwarded to the Board. In one case the driver had not really taken charge of the engine, and besides there are so many stages or grades of being under the influence of liquor that the evidence was not sufficiently conclusive. In the other case, it was clearly proved that intoxicating liquor was drunk while on duty. The man’s defence was ‘extenuating circumstances.’ Intoxication on duty, however, cannot be too severely put down. The consensus of opinion among engine-drivers is that a high standard of character should be insisted on. The two instances must not, however, be taken as characteristic of the class in Kalgoorlie, especially those engaged on the big winders of the Mile.

Interesting Developments.—A small experimental suction gas engine and generator was put down at the Kalgoorlie School of Mines, and proved of great service to a large circle of men who were anxious to become up to date.

In the Coolgardie and Yilgarn Districts things look much brighter. The Bullfinch Proprietary, which has adopted the modern practice of using a high speed engine to drive an electric generator, and from thence to distribute the power in small units through motors, is a very complete plant. The engine is a vertical cross compound high speed engine by Messrs. James Howden & Co. of 350 H.P., direct coupled to a Bruce Peebles Electric Generator. The electric lighting plant is driven by a small independent Allen High speed engine, so that a breakdown of main engine does not plunge the plant into darkness just when light is most wanted. Exhaust steam is dealt with by six Fouche Aero Condensers. The ore reducing plant consists of a heavy twenty head mill and usual accessories in the shape of tube mills, etc., etc. A well equipped saw mill completes the outfit for which steam is provided by three large Babcock boilers.

The Corinthian North Gold Mine Co., however, have stuck to steam, and have laid down a 16in. x 28 x 36in. Cross Compound Corliss Mill engine by Ruston Proctor & Co., to drive a twenty head stamp mill made by the Kalgoorlie Foundry and fitted with Challenge Ore Feeders, grinding pans, tube mills, etc., while a large air-compressor provides power for underground work. Steam is supplied by three large water tube boilers made by Babcock & Wilcox. The plant was not completely erected at the time of my visit, and some further guarding will no doubt have to be ordered at my next call. The winding engine is a 12in. x 30in. duplex horizontal double drum direct acting one by the Phoenix Foundry, Ballarat, with post brakes worked by foot power.

Another locality which is forging slowly ahead is Weston’s. It is six miles from Carrabin and, therefore, about forty-eight from Southern Cross. The manager has been busy erecting plant since the beginning of the year, and has now a well equipped heavy ten-head mill by the Kalgoorlie Foundry driven by a 85 H.P. Crossley suction gas engine, which also deals with a rock-breaker, Wilfley tables, circular saw, etc., etc. A handy 8in. x 10in. winder by Roberts & Sons, deals nicely with the ore hauled, and the vertical boiler which used to drive it will soon be replaced by a large one of Cornish type.

Mr. H. L. Gill, Inspector of Machinery in the South-Western District (Metropolitan area), remarks:—

“I am pleased to say that during the year no explosion has occurred in that part of the district in which my work lies, though in two cases it came perilously near to it. The first case was that of a small vertical boiler, dangerously corroded externally behind the bed-plate of a vertical engine bolted on to its side, and the second was a case of bad overheating, through deposit, causing a plate to bulge until it punctured through in a small hole. You have, no doubt, dealt with these cases in the body of your report.

“The new registrations of boilers that fell to my lot were very few—five only. On the other hand, I registered 94 new groups of machinery. These new machinery registrations were discovered quite accidentally while inspecting old registrations. If a specific search for unregistered machinery were instituted, I know the number would have been very much larger.

“As, however, the inspection of groups already registered is so much behind hand, it is useless to waste time in searching for machinery of which I have no official knowledge, and which, as you are well aware, I have no chance of inspecting.

“The only machinery accident of any great interest which came under my notice was the fatal lift accident at Viking House. The lift was being used in a somewhat unfinished state conveying material for the building, and office furniture, etc., for proposed tenants. It was protected as well as possible under the circumstances, but at one time some of the temporary protection had to be removed to admit of the permanent panels in certain openings being placed in position. At this stage the deceased in spite of warnings, and a bell ringing all the time it was in motion, put his head through one of the unfinished panels, and was struck by the cage and killed. However regrettable the incident may be, it is quite certain it could not have occurred if deceased had used any ordinary caution. There was no necessity for him to have gone near this opening, and being there it was, to say the least of it, a hazardous and foolhardy thing to put his head through any opening into a lift shaft.

“Several new lifts were installed during the year, and I think all of these are so fitted that the cage cannot move unless all doors are first secured; and nearly all so that the doors cannot be opened unless the cage is opposite the door required.

“I had hoped that the proposed amendments to the Act would have been in force before this, and that by virtue of same it would be possible to have passenger lifts inspected more frequently than is provided for in present Act, and I again wish to emphasise that no Inspector can with any reason sign a certificate guaranteeing that any lift is ‘in good order and fit for the purpose for which it is used’ for a whole year.

"I have had very little trouble in enforcing any orders for protection that I have found necessary to issue, owners generally falling in with my suggestions willingly.

"As the feed water in that part of the South-Western District in which I operate is almost invariably good, I have no interesting cases of internal corrosion to report. In connection with this subject the common practice of hanging zinc plates in the interiors of boilers, on hooks loosely passed through holes in the zinc plates, continues. Unless the plates are securely bolted to some part of the boiler, or to a hook or other contrivance, in such a way that there is good electrical contact between them and the boiler, these plates are useless. Even if the contact is good, in many cases the plates are left in the boiler far too long, in fact till they are no longer zinc, but zinc oxide, of very different electrical potential to the original zinc, in which case, at their latter stage they do rather more harm than good. When used intelligently these plates should be coupled up properly, and be cleaned frequently, *i.e.*, all oxide should be scraped off, and as soon as oxidised throughout, should be renewed.

"A considerable amount of my time has been occupied on the Engine-drivers' Board of Examiners, and it is satisfactory to note in this connection that those candidates who have had the energy and ambition to take a course at the Technical Schools are generally far more satisfactory to examine than those who are content to pick up their knowledge in any haphazard sort of way. The candidates who take these courses are found to be well grounded, and are almost invariably keen on acquiring further knowledge. These men eventually make a better class of driver than the man who despises books, as their education enables them to use their heads as well as their hands in cases of emergency.

"There is nothing of particular interest to record of the year's work, except the fact that the work is getting more and more behind hand, and consequently more disheartening to deal with."

Mr. G. P. McCulloch, Inspector of Machinery in charge of the North Coolgardie, Mt. Margaret, and part of the East Murchison districts, remarks:—

"*Inspection of Boilers.*—The number of useful boilers in the registers is 487 as against 492 at the end of 1912. The number of useful boilers in use is: Mt. Margaret 65, North Coolgardie 64, East Murchison 20, total 149, and shows a further large decrease as compared with the figures for 1912, only partly accounted for by the increase of four in the total number of suction gas engines in the districts.

"The number of thorough inspections made (156) is 44 less than last year. Owing to my absence on sick leave, etc., however, there are 10 boilers overdue for inspection as against one at the end of last year, which fact, taken in conjunction with the lesser number of boilers in use, amply accounts for the reduction.

"The maintenance and care of the boilers in my district has been on the whole good, although in a great many cases it still remains with me, as it always has done, a matter of surprise that some owners should display such a lack of interest and common sense in the safeguarding of their own property and welfare. It is apparently impossible to persuade some of them that dirty flues and boilers, greasy feed water, etc., are a source of direct loss of cash as well as of danger, or to adopt such simple safeguards as treating of feed water with soda-ash before entering

the boiler, painting affected parts with neat cement, or the use of zinc plates. While on this subject I may say that, on the other hand, many owners have thanked me warmly for introducing to them the idea of neat cement wash, and even go so far as to paint the whole boiler below the water line, claiming that besides protecting the plates, this course also renders the cleaning much easier if carried out at reasonable intervals. With regard to the use of zinc plates, this, while thoroughly correct as far it goes, always seems to me a somewhat clumsy method of achieving its object. It is proved beyond all question by recent experiments both in Germany and elsewhere that every boiler under steam becomes to all intents and purposes a galvanic battery, with the hard and soft parts as the poles, the corrosive action being naturally more marked in certain portions than others, *e.g.*, parts exposed to constant contraction and expansion, undue collection of sediment, circulation above and below the average, etc. It is also clearly demonstrated that the electrolytic action is much greater during the periods of raising steam and blowing off, which explains why in so many cases boilers suffer so much more during intermittent than constant work. In a new patent, which I believe is being largely adopted in Europe and America, although I can obtain no particulars here, the use of zinc plates as a corrective (which are hard to renew and only partial in their action) is superseded by that of a soft metal rod connected to a battery or other device, which sends a constant small current of definite amount through the boiler, and practically ensures that all the electrolytic action shall be confined to the rod itself, which can be renewed easily, and in a few minutes, whenever required. This idea seems to be well worthy of further inquiry and testing.

"*Re Explosions, Defects, etc.*—I am glad to say I have nothing to report this year.

"*Prosecutions.*—Nil.

"No mishaps to machinery worth special comment, with the exception of that occurring to the mill engine at the Menzies Consolidated G.M., of which you have full particulars.

"*Re Engine-drivers.*—Nothing has occurred during the year worthy of comment.

"The only winding engine in my district fitted with an overspeed or overwind device is the new one at the Sons of Gwalia Mine, which is fully described in your last Annual Report.

"During the past year, which has been very quiet and uneventful all through, there have been no installations of either boilers or machinery specially worthy of note.

"*General.*—The only work done outside my own districts during the year was attending the inquiry on the accident at Golden Horseshoe Gold Mine.

"The removal of my head-quarters to Kalgoorlie will, I am convinced, prove of great advantage in every way, and greatly facilitate the working of the combined districts, while the re-arrangement of the work which Inspector Pryn Jones and myself have in view should set free nearly half of my time for work in other districts.

"The treatment of the feed-water on the Sons of Gwalia Mine with soda ash to eliminate scale and the alumino-ferrie process to eliminate oil and grease is still giving the greatest satisfaction.

"I wish, in conclusion, to express my thanks to the clerical staff and my colleagues both in the Mines and Machinery Departments for their continued co-operation and assistance in my work."

Mr. J. Stone, Inspector of Machinery in the South-West District, remarks :—

"I have to again report a fairly successful year's work. I have been on tour for practically the whole time. The steady development of this portion of the State still continues, and has necessitated the erection of many new plants, and the enlargement of a number of existing ones. The prospect for future increases is very bright; several new plants are already on order, and others are under consideration. This state of affairs is most pleasing in every respect, but the constant additions and alterations entail much additional work for this Department, and the year has been, to say the least, a most strenuous one.

There has been a steady increase in all classes of machinery; this is most noticeable in the sawmilling industry, which appears to be in a flourishing condition so far as volume of trade is concerned; although two large mills were closed down during the year, all the useful plant has been brought into use again in other centres.

"Several small "spot mills" have been erected during the year. Some of these are on areas which have previously been cut over, others are in virgin bush where a large mill could not be erected and worked profitably owing to the limited area of timber land available. I am of opinion that a large number of these small mills will come into operation in the near future.

"The large new mill at Jarrahdale commenced operations during the year, and is working satisfactorily. No. 1 State Mill and Powellising plant at Manjimup were also opened towards the end of the year, and should be in full swing in the course of a month or two.

"Nos. 2 and 3 State Mills, with Powellising plants attached, which are in course of erection at Big Brook are nearing completion, and should commence operations early in 1914. In addition to these the Kauri Timber Co., Barrabup, are erecting a large mill about 15 miles south of Nannup, which will considerably increase their output. In this mill the band saw is being introduced. Messrs. Bunning Bros. at their Lyall's Mill are also adding this type of saw to their existing plants, the latter being electrically driven.

"The band saw is an innovation as far as the jarrah industry is concerned, circular saws being in general use hitherto. I believe a band saw was tried many years since at Jarrahdale, but did not prove satisfactory; probably the modern plants now in course of erection will give better results.

"In the coal-mining industry there has also been an improvement in the equipment of mines; two high class generating sets have been added during the year, in addition to many small units; others are on order, and will be erected as early as circumstances will permit.

"In the tin-mining industry the increase has not been so great, but a few additional plants have been erected, and the increase in numbers and quality of plants generally in the above and all other industries have been satisfactory.

"The inspection of machinery in this portion of the district is at times most difficult, due to reasons explained in my previous reports, and owing to the increased number of inspections to be made the conditions for an inspector are not improving. I have made inspections as frequently as possible, especially

where new machinery is being erected, or alterations effected, and have generally found owners willing and ready to adopt any reasonable plan for the safeguarding of plants. I fully realise, however, that in many cases new machinery has to be brought into use, and sometimes worked for a number of weeks before inspection can be made; in addition to this there are many small plants in outlying centres which have never been registered or inspected. I have been unable to attend to these, and, so far as I can see, the only means of bringing the district up to date will be to give me assistance for a month or two each year, to relieve me of portion of the district.

"One sometimes sees curious mechanical contrivance and makeshifts in use. On making a working inspection at one of the small mills, I noticed a piece of wood at the end of a conveyor shafting which was slowly revolving; into this a bolt was driven, thus forming a rough crank; a piece of ordinary fencing wire was attached to the bolt, which was alternately tightened and loosened by each revolution of "crank." Being somewhat curious, I followed the wire, which was suspended from hooks driven into trees. After going about a hundred and fifty yards at all sorts of angles, I discovered a well, the water supply for the mill. This was equipped with an ordinary hand pump, to the handle of which the wire was attached, also a weight; when the crank on shafting went forward the wire was tightened and lifted the pump handle, and when the wire was loosened on the back stroke the weight carried the handle down again, and in this way the mill was supplied with water.

"In another case the plunger of an ordinary portable engine pump was worn through; there were no engineering works within 50 miles, and the stoppage was likely to be serious. A rough piece of iron was found about the same diameter as plunger, this was knocked into shape and fitted to pump. The gland was packed with emery cloth, the engine set in motion for about half an hour, and when the emery cloth packing had done its work it was removed and ordinary packing fitted. Work was then resumed.

"Boilers.—There has been a steady increase in the number of boilers in this portion of the State; some of these are second-hand, and have previously been used in other districts, the others are new and have been imported; none were built locally. This is to be regretted, as a very good article is turned out by the local engineering firms. A number of new boilers are on order, and will be erected and brought into use during 1914.

"Serious trouble was experienced with two of the new boilers, both of locomotive type; in one case with the tubes, which were constantly giving out, and in the other case the fracturing of firebox space stays was so serious that a complete new set of stays had to be fitted. Both of these cases have been fully reported to you.

"Maintenance generally has been very fair, but not all that could be desired. As previously reported, the feed water supplies become seriously depleted in many districts towards the end of the summer months, so much so that the greatest economy has to be exercised in the washing out of boilers. In two cases sufficient care was not exercised in cleaning operations, with the result that serious distortion of plates occurred owing to accumulation of scale at inside of boiler.

"Another case of very rapid corrosion of a Cornish boiler occurred in the Collie district; this case has been fully reported and tends to show the extreme unreliability of feed-water supplies in that district, and the necessity for most careful periodical inspection.

"*Accidents.*—There have been a number of accidents of a more or less serious nature, but fortunately no fatal accidents occurred during the year. Full inquiries were made in every case and reports submitted. The majority were purely accidental, but in several cases more than an ordinary working risk had been taken once too often.

"*Engine-drivers.*—In regard to engine-drivers, everything has worked smoothly. A few appeals have been made to this Department to rectify alleged grievances, but upon investigation being made nothing of a serious nature was disclosed, and in every case the matters in dispute between drivers and employers were settled amicably."

Mr. D. F. Booth, Inspector of Machinery in the South-Western District, remarks :—

"During the past year I have inspected and granted certificates to 212 boilers, of which 15 were new registrations. These registrations were all new boilers except one Cornish and a digester imported from the Eastern States. I regret to report that none of the new registrations were locally constructed boilers. In my last year's report I remarked on the want of enterprise shown by our local engineering firms in securing orders for boilers. There is no reason why a considerable portion of the new business should not fall to their share. Good boilers can be, and have been turned out in this State, and steam users might well consider the advantage of placing their orders locally, especially as this would enable them to have them supervised under construction by this Department, which has eventually to pass them.

"Maintenance continues on the up-grade, though not always what it should be.

"I have nothing specially interesting to report in the nature of defects this year, and am pleased to say that no explosion has occurred in the case of any boiler under my personal supervision.

"During the year I inspected 383 groups of machinery. Of these 87 were driven directly by steam, and 296 were driven by electricity, oil, or gas engines.

"The new registrations amounted to 129, and I believe that if everyone owning machinery coming under our Act were to register, this number might possibly be nearly doubled.

"It is out of the question to drive out into the bush 40 or 50 miles on the chance of securing one or two possible registrations, the fees for which would not amount to more than 10s. I understand, however, it is intended to issue a reminder to such owners in the shape of an advertisement in the local papers, calling attention to their liabilities. If this results in a good response, it will probably be possible to arrange to inspect a good many of these new registrations in connection with, and on same trips as those already registered, and thus reduce the expense per inspection.

"I have travelled altogether 6,214 miles during the year, 4,118 of which were by rail, 1,776 by road, and 320 by water. The large area of country to be covered, of course, means a high mileage per inspection, in spite of every effort to cut this down as far as possible by careful arrangement."

Mr. W. Churchill, Inspector of Machinery for Murchison and Yalgoo, Sandstone, and portions of the South-Western District, remarks :—

"During 1913 the work of Murchison and Yalgoo, and East Murchison districts was carried out from Geraldton, as my head-quarters, and work in portions of the South-Western District from Northampton to Gingin was carried out from Perth as my head-quarters.

"Boilers generally have been kept well up to average as regards maintenance, and I am pleased to report that almost all owners are now taking some interest in the matter of feed water, although some arrangements for improving quality are not all that could be desired; yet it is satisfactory to note that something is being accomplished in this direction, and I feel confident that the little that has been done has convinced many owners of the importance and the economy that can be effected in the working of steam plant by having feed water properly treated. There seems to be a steady decline in the number of boilers being used, and this can be readily understood by reference to the increased number of suction gas plants being installed.

"At once the main and most interesting feature in connection with machinery in these districts during the year is the increasing use of gas engines, and the substitution of producers of down-draught wood consuming type in place of the old up-draught charcoal type. In addition to the general use of gas engines for driving batteries and slimes plants where the load to be dealt with is fairly steady and well within the compass of the governors of engine, gas engines are now being used to drive air-compressors, and in some cases pumps; and in this connection I think there is yet much to be learnt as to the best methods of transmitting the power from the engine to the pump or compressor.

"Engine-drivers have not been slow to adapt themselves to the new type of prime mover, and I find many who are most anxious to get more experience in this line and who take an absorbing interest in the comparative merits or demerits of different plants. One matter, I think, is of sufficient importance to warrant further investigation, and that is the question of harmful effects of escaping gas around gas producers and engines upon health of an employee. I have heard of cases of men feeling sick or dazed after some time in engine-room, and this can be easily understood owing to poisonous nature of the gas, and to the inability to detect easily any escape, in consequence of which a man may inhale a good quantity of gas without knowing it, until he feels symptoms of sickness, and for this reason I consider the matter of ample ventilation of engine-rooms wherein employees are constantly working should receive a little more attention.

"Lastly, I would say that experience of users of gas engines in these districts, particularly of larger engines, has not been so entirely satisfactory as could have been desired, much trouble having been encountered in one way or another, which I think would justify the practice of installing duplicate sets of power units wherever constant running is desired.

"I am pleased to report that there has not been any very serious accident during the year. The most serious being a case of broken limbs, but not any involving loss of any limbs.

"I have not any prosecutions to report for breaches of Act, nor have I an occasion to complain of any

want of assistance from owners to enable me to make inspection, which in many cases means a total cessation of operations for ten to fourteen days.

*“Engine-drivers.—*I have not had occasion to prosecute or caution any drivers during the year. On the contrary, I find drivers employed nowadays to be very much interested in their work, and would rather suffer many things than have to face a charge of carelessness or negligence. Of course, the best of men may have a mishap sometimes, and one or two mishaps reported have occurred to men who might be said to be over-cautious rather than careless.”

Mr. E. P. Lee, Inspector of Machinery in the South-Western District, remarks :—

“I beg to report, for your information, that the operations of the “The Inspection of Machinery Act, 1914,” have been fairly successful, and have worked smoothly in the various districts in which I have had occasion to be engaged during the year 1913.

“In the Coolgardie, North-East Coolgardie, and Broad Arrow Districts, the number of plants have decreased somewhat, but the work has been slowly and steadily increasing in the Yilgarn District, and I am pleased to say the inspection work has been kept fairly well up to date.

“Generally speaking the standard of maintenance is very good, with the exception of the agricultural districts, where most of the boilers are of the portable type and travel through various parts of the district chaffcutting, etc., with the result that they have to use many classes of feed water which are detrimental to the life of the boilers.

“The inspection of machinery has been carried out as usual, and, where necessary, the same has been duly fenced and guarded. There has been a number of machinery accidents during the year, some minor, some serious, and one fatal. The fatal accident happened on the Golden Horseshoe Estates, through, it was alleged, the clutch coming out on the north drum of the winding engine. As this matter has already been extensively reported upon I will content myself by pointing out that this is the second serious accident that has occurred on winding engines where it has been alleged that the clutch has slipped or worked out. In both cases the engines were by the same maker, and almost the same type. The clutches were of the jaw type, and operated by a wheel, with screwed gears, and I would like to suggest that the wheels that operate the gears should be fitted with a locking device or trigger similar to the reversing wheel on a locomotive, which would settle all doubts on this question as to whether clutches slip, etc.”

DIVISION VII.

ANNUAL REPORT OF THE GOVERNMENT ANALYST, CHIEF INSPECTOR OF
EXPLOSIVES, AND AGRICULTURAL CHEMIST, FOR 1913.

To the Under Secretary for Mines, Perth.

Sir,

I have the honour to submit, for the information of the Hon. the Minister, my eighteenth Annual Report on the duties performed by me during the year 1913.

Although this report has been signed by me in England, it has been compiled by my acting representatives (Messrs. Stacy and Kirton), and for at least four months of the period under review the work of the office in Western Australia has been conducted by them during my absence in Europe.

I have there been engaged on special inquiries into the chemistry of potable spirits and also into many other subjects coming within the scope of my duties, but these inquiries are not yet complete, nor will their result be known before my return to the State.

PURE FOODS.

The inspectors under the Public Health Act of 1911 have during this year submitted a large and increasing number of samples for analysis, including milks, vinegars, tinned fish, patent medicines, ice cream preparations, etc., the total number of samples examined being 308, and this branch of work is likely to take up the time of a considerable portion of my available staff. The outstanding feature of this work has been the examination of the various brands of tinned fish on the market, nearly all of the samples taken showing large quantities of tin, and in a few cases, lead, and these analyses have led to the confiscation of large consignments.

During the year a conference of the various Health Departments was held in Melbourne, for the purpose of bringing the health regulations of the various States into line. It is satisfactory to note that the Western Australian regulations were very largely adopted by the Conference, including the much-criticised ones regarding the sale of patent medicines.

FEDERAL CUSTOMS WORK.

The work performed for this Department shows a very large increase over last year, 1,081 samples having been examined as against 802 for last year.

AGRICULTURAL WORK.

The series of pot culture experiments referred to in my last report resulted in a pamphlet being issued, a resumé of which was published in the *Western Mail*. The action of manuring wheat with lime and potash was investigated, and it was found on the analysis of the resultant wheats that the use of lime and potash both separately and in conjunction with each other had the effect of increasing the nitrogen content of the wheats, and also the strength of the wheats as determined by Professor Wood's method. The nitrification in the soil was also greatly increased by the use of lime. Unfortunately, through pressure of work, the results of this year's experiments are not to hand, but as far as can be judged with regard to the strength of wheats, the previous year's results are being confirmed.

LIQUORS.

During the year the prosecutions by the State Hotels Department have only been 20, which, I take it, indicates the general improvement of the liquors sold in this State, due to the successful methods of examination and supervision.

POWELLISING PROCESS.

A considerable number of samples of treated jarrah and karri were analysed during the year. A Royal Commission has been appointed by the Federal Government to inquire into the matter, and will probably sit early in the New Year.

Taking into consideration the large amount of money at stake, it seems advisable that a process such as this, when put into operation, should have the services of a consulting chemist to devote his time to the perfecting of the conditions under which the process is applied, and checking its effectiveness or otherwise. Such expenditure, in my opinion, would be well worth while.

IMPORTATION OF EXPLOSIVES.

The following tables give full information with regard to the importation of Explosives into the State of Western Australia:—

TABLE I.

Importation for 1913.

	Quantities.	Values.
	lbs.	£
Gelignite	2,811,430	97,895
Dynamite	8,000	304
Blasting Gelatine	167,000	8,532
Gelatine Dynamite	65,000	3,575
Detonators (Number)	2,006,970	2,973
Fuse (coils)	247,500	4,732
Powder, Blasting	256,500	5,699
Powder, Sporting	1,075	116
Fireworks .. .. .	..	243
Cartridges and Caps .. .. .	..	6,502
Explosives, N.E.I. .. .. .	..	755
	..	£131,326

TABLE II.

Comparison of Importations for the last Five Years.

	1909.	1910.	1911.	1912.	1913.
	£	£	£	£	£
Nitro-Glycerine Compounds	121,813	170,363	143,608	135,006	110,306
Blasting Powder	6,163	7,026	4,090	10,862	5,699
Sporting Powder	65	142	546	235	116
Fuse	10,920	10,723	12,778	3,566	4,732
Fireworks	385	413	214	163	243
Cartridges	9,924	12,908	..	9,014	6,502
Detonators	4,804	5,870	4,796	4,983	2,973
N.E.I.	12	200	159	84	755
Totals	154,086	207,645	166,191	163,913	131,326

TABLE III.

Kinds and Quantities of principal Industrial Explosives Imported in 1912-13.

	1912.	1913.
	lbs.	lbs.
Gelignite	2,779,002	2,811,430
Blasting Gelatine	208,500	167,000
Gelatine Dynamite	241,500	65,000
Dynamite	32,500	8,000
Blasting Powder	448,500	256,500
Sporting Powder	3,946	1,075
Total	3,713,948	3,309,005

TABLE IV.

Comparison with other States.

Explosives.	Western Australia.	New South Wales.	Victoria.	Queensland	South Australia.	Tasmania.	Proportion of total for Australia imported into W.A.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	%
Nitro-Glycerine Compounds	3,051,430	1,903,800	1,101,200	993,189	1,192,450	400,025	
Blasting Powder	256,500	1,237,945	332,600	222,300	480,960	39,375	
Sporting Powder	1,075	12,400	53,756	11,750	55,450	13,000	
	3,309,005	3,154,145	1,487,556	1,227,239	1,728,860	452,400	29.13
	£	£	£	£	£	£	
Fuse	4,732	6,600	1,883	4,877	4,594	Not given	
Detonators	2,973	3,434	3,316	3,082	2,939	1,875	
Explosives, N.E.I. (does not include Naval or Military Explosives)	749	29,379	8,739	2,817	5,747	237	
	8,454	39,413	13,938	10,776	13,280	2,112	9.60
Total Value of Explosives enumerated	£131,326	154,459	154,229	60,374	82,728	26,239	21.55

It will be seen from the above tables that there is a slight falling-off in importations as compared with last year, and in consequence the number of tests made of samples shows a corresponding diminution, there being 1,655 against 2,070 last year.

It will be noticed that there is a very decided drop in the number of tests made on fuse, although Table I. shows the importation to be greater during the last year, the reason for this being that no irregular tests were obtained in shipments, as was the case last year, when any shipment which showed any slight irregularities involved a very thorough sampling and testing. This, I think, is encouraging, as it points to the fact that manufacturers are endeavouring to turn out a fuse with an even rate of burning.

The following samples were submitted to tests during the year:—

TABLE V.

Tests made on Explosives.

	1912.	1913.
Gelignite	1,307	1,198
Fuse	431	295
Gelatine Dynamite	116	39
Blasting Gelatine	212	112
Dynamite	4	3
Miscellaneous .. .. .	..	8
Total .. .. .	..	1,655

Very little work has been done in the special investigation of explosives, on the lines of research commenced during 1912, owing to my absence from the State, but I hope to be able to continue this work on my return.

Storage.

The number of reserves for explosives throughout the State remains the same as last year, namely 49, with a total acreage of 3,023 acres.

The position with regard to the removal of Kalgoorlie Reserve still remains the same, although railway communication has been made for some time with the new site.

The Fremantle Reserve is in very fair condition, although the painting of the fence and other matters, involving fairly heavy expenditure, for which authority was obtained early in the year, have been postponed pending the decision of the Commonwealth authorities as to taking over the land for naval purposes.

A portion of the reserve in the south-east corner has already been transferred to the Commonwealth Government, and a temporary dividing fence erected.

On the reserves throughout the State there are erected 73 magazines, owned by private firms, with a total capacity of 942 tons; also five magazines erected by the Government with a storage capacity of 150 tons, making a total of 1,092 tons of explosives in 78 magazines. This is four buildings short of last year, and is accounted for by the fact of one firm having ceased to do business in this State,

and therefore their magazines have been removed from the reserves. There are also 43 magazines licensed on private property with a storage capacity of 40.5 tons. These magazines for the most part are situated in the agricultural centres and on the different brickworks and quarries.

Owing to the limitation of the trade it is not considered advisable to declare reserves in the agricultural areas.

Stores for the Sale of Explosives.

There were during the year 116 licenses issued to persons for the sale of industrial explosives and 266 licenses for the sale of fireworks.

Inspection Works.

An endeavour is made to have all magazines and stores throughout the State inspected at least once a year, and in this connection 205 inspections were made, and the following centres visited:—Perth, Fremantle, Albany, Hopetoun, Mt. Barker, Gnowangerup, Tambellup, Katanning, Kojonup, Wagin, Dumbleyung, Narrogin, Pingelly, Brookton, Darkan, Beverley, York, Northam, Southern Cross, Kalgoorlie, Norseman, Coolgardie, Kanowna, Broad Arrow, Menzies, Comet Vale, Kookynie, Malcolm, Leonora, Morgans, Laverton, Meekatharra, Nannine, Cue, Day Dawn, Magnet, Sandstone, Youanme, Yalgoo, Geraldton, Northampton, Moora, and Armadale. As a result of these inspections the following prosecutions were instituted:—

Date.	Offence.	Penalty.
March 31st, 1913	Storing explosives on unlicensed premises	Fined 10s. ; £4 2s. costs.
March 31st, 1913	do. do. do. do.	Fined 10s. ; £4 3s. costs.
June 18th, 1913	Overstocking explosives on licensed premises	Fined £1 7s. ; £1 8s. 8d. costs.
June 18th, 1913	do. do. do. do.	Fined 7s. 6d. ; £1 8s. 8d. costs.
June 19th, 1913	do. do. do. do.	Fined £2 ; £1 8s. 8d. costs.

It was found necessary to condemn and destroy the following explosives:—

Date.	Locality.	Kind and Quantity.	Remarks.
March 14th, 1913	Fremantle	200lbs. gelignite	Exudation and bad physical condition.
April 11th, 1913	do.	10lbs. powder	Damp.
April 11th, 1913	do.	1lb. gelignite	Exudation.
April 22nd, 1913	do.	100lbs. gelignite	do.
June 21st, 1913	Albany	1lb. gelignite	do.
July 4th, 1913	Fremantle	20,550lbs. gelignite	Separation of KNO ₃ and dampness.
July 4th, 1913	do.	2,000lbs. blasting gelatine	Low velocity of detonation and heat test.
September 24th, 1913	do.	412lbs. gelignite	Damaged by water.
December 5th, 1913	Yalgoo	1lb. gelignite	Exudation.
December 8th, 1913	Sandstone	3lbs. gelignite	do.

In several of my previous reports I have pointed out the necessity of amendments to the present Explosives Act, which was drafted in 1895. It has become more evident every year that the working of the Department would be greatly facilitated and simplified by the complete revision of the present Act, and with this object in view a draft of the proposed amendments was forwarded to the Parliamen-

tary Draftsman early in the year, but owing to the pressure of work the amended Bill was not drafted in time for presentation to Parliament, but I trust it will be pushed on this year, as there are certain clauses in the present Act which require urgent revision, as one class of explosive, although authorised for use in the State, is practically debarred owing to a technicality contained in the old Act.

GENERAL ANALYTICAL WORK.

The following tables give a summary of the usual laboratory work under my control:—

TABLE VI.

General Classification of Analyses.

Explosives	1,655
Spirits	237
Waters	764
Soils	56
Fertilisers	132
Rocks	7
Essences	35
Oils	199
Foodstuffs	107
Sewage	479
Wheats and Flours	54
Criminal Investigations	205
Lime	53
Fabrics	202
Vinegar	19
Medicinal Compounds	77
Milk	213
Kerosene, Benzine, Turpentine, etc.	70
Toilet Preparations	24
Hydrometers	34
Matches	3
Dairy Thermometers	45
Miscellaneous	307
Total	<u>4,977</u>

TABLE VII.

Departments for which work was performed.

Explosives	1,655
Customs	1,081
Health	308
Mines	9
Public Works	35
Railways	31
Water Supply	1,199
Agricultural	243
Police (Criminal Investigation)	215
Private	118
Liquors	71
Miscellaneous	12
Total	<u>4,977</u>

These show a decrease over last year of 126, due to the decrease in the quality of explosives analysed, other samples showing an increase of 289.

Staff.

The Staff at present consists of:—1 Assistant Government Analyst, 1 Assistant Inspector of Explosives, 7 Analysts, 2 Analysts (temporary), 3 Clerical Staff, 2 Magazine Keepers, 2 Watchmen.

During the year two of my staff have received appointments in the Queensland Government Laboratories at substantially better salaries, and it is expected that it will be found increasingly difficult to

induce my staff to remain at their present low salaries.

I wish to express my appreciation of the zeal and energy displayed by them during the past year.

I beg to acknowledge with thanks the assistance rendered me by the Commissioner of Police and his officers, and also the State Mining Engineer and the Inspectors of Mines.

I have, etc.,

E. A. MANN,
Government Analyst, Chief Inspector of
Explosives and Agricultural Chemist.

WESTERN



AUSTRALIA.

DEPARTMENT OF MINES.

MINING STATISTICS,

1913.

MINING STATISTICS TO 31st DECEMBER, 1913.

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EXPLANATIONS OF SIGNS AND ABBREVIATIONS.

Gf. Goldfield.	M.R.C. Mineral Reward Claim.
Mf. Mineral field.	M.A. Machinery Area.
D. District.	Mach. L. Machinery Lease.
G.M.L. Gold Mining Lease.	P.A. Prospecting Area.
M.L. Mineral Lease.	T.A. Tailings Area.
Loc. Location.	T.L. Tailings Lease.
L.C. Lode Claim.	W.R. Water Right.
Q.C. Quartz Claim.	S.L. Special License
R.C. Reward Claim.	

WESTERN AUSTRALIA.

SUMMARY OF MINERAL PRODUCTS.

GOLD AND OTHER MINERALS PRODUCED DURING 1913, AND THE ESTIMATED VALUE THEREOF, TOGETHER WITH A COMPARISON FOR PREVIOUS YEARS, AND THE TOTAL PRODUCTION TO DATE.

DESCRIPTION OF MINERAL.	1913.		1912.		1911.		1910.		PREVIOUS TO 1910.		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.	313,818	153,614	295,079	135,857	249,899	111,154	262,166	113,699	1,515,992	708,725	2,636,954	1,223,049
4. COPPER { ORE (Exported) do.	4,339	136,622	9,536	58,688	9,825	33,709	6,309	27,271	31,458	461,069	61,467	717,359
	INGOT & MATTE (Exported) do.	82	5,891	28	1,136	828	44,409	1,281	68,657	6,532	417,410	8,751
5. GOLD (Exported and Minted) fine ounces	1,314,043	5,5817,01	1,282,658	5,448,385	1,370,867	5,823,075	1,470,332	6,246,848	21,606,968	91,780,564	27,045,168	114,880,573
6. IRONSTONE (Reported) statute tons	...	...	...	...	...	...	10	12	57,820	36,683	57,830	36,695
7. LEAD ORE (Exported) do.	3,169	59,002	1,868	22,270	1,549	15,002	248	1,433	33,644	364,756	40,478	462,463
8. LIMESTONE (Reported) do.	...	...	...	...	...	...	...	...	93,706	18,290	93,706	18,290
9. MICA (Exported) do.	...	...	...	...	...	...	...	...	*	304	...	304
10. PIG LEAD (Exported) do.	...	...	...	...	...	...	...	...	684	13,306	684	13,306
11. PYRITIC ORE (Reported) do.	10,216	3,658	7,626	2,543	9,939	3,529	...	...	...	...	27,781	9,730
12. SCHEELITE (Exported) do.	...	...	...	...	...	...	...	...	4	140	4	140
13. SILVER (Exported) fine ounces	188,020	23,420	165,371	19,725	169,043	18,333	176,139	18,777	1,916,666	230,385	2,615,239	310,640
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.	484	72,142	651	79,738	495	55,220	500	45,129	10,513	880,228	12,643	1,132,457
17. WOLFRAM (Exported) do.	1	86	...	...	9	826	2	190	1	100	13	1,202
18. GODOLINITE (Reported) do.	1	112	...	...	...	...	...	...	...	...	1	112
19. ZINC (Exported) do.	...	...	14	217	12	189	12	147	103	3,732	141	4,285
UNENUMERATED ... (Exported) ... ..	...	17	...	8	...	407	...	160	...	5,681	...	6,213
TOTAL VALUES ... ..	...	£6,036,265	...	£5,768,567	...	£6,105,853	...	£6,522,263	...	£94,938,187	...	£119,371,135

* 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 1913

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	1,314,043	5,581,701	149,657	635,703	265,735	1,128,768	434,932	1,847,475	33,400	141,876	6,556	27,800	343,595	1,459,499		
Copper statute tons	82	5,891	9,461	598,733	23,655	1,660,178	36	2,829	4,569	364,732	7,161	488,986				
Copper Ore do	4,339	136,622									1,966	10,932				
Pyritic Ore do	10,216	3,658														
Lead do	3,169	59,002	23,554	365,742	3,603	65,683										
Manganese do					27	163										
Platinum fine ounces			442	3,135			127	682								
Silver do	188,020	23,420	2,194,871	244,321	604,979	68,438	16,671	2,074			2,660	300	975,616	103,866		
Silver-Lead Ore ... statute tons			391,262	3,563,804					83,289	319,997	153	1,100				
Tin do					3,197	343,669										
Black Tin do	484	72,142	3,021	421,292												
Tin Ore do								58	6,959	4,010	531,983					
Scheelite do			44	4,457		8							221	22,933		
Wolfram do	1	86	126	13,037	359	35,359		49	68	7,040		10				
Godolinite do	1	112														
Zinc (Spelter and Concentrates) ... do			506,661	1,547,987												
Antimony (Metal and Ore) do			18	407			6,151	31,424								
Bismuth (Metal and Ore) do			9	1,202	2	618			5	1,627						
Alunite do			2,235	8,940												
Coal do	313,818	153,614	10,414,165	3,770,375	1,037,944	403,767	593,912	274,371	55,043	25,367			1,888,005	944,003		
Coke do			298,612	208,989									28	50		
Shale (Oil) do			16,985	7,339					130	130						
Iron do			46,563	186,252												
Iron "Oxide" do			3,204	3,563												
Ironstone do					40,838	27,562					60,658	37,911				
Lime do			33,272	41,428												
Limestone do			42,663	10,686	161,165	38,202					44,300	11,075				
Molybdenite do			79	6,802	66	19,001										
Phosphate Rock do											5,950	6,545				
Precious Stones do																
N.E.I. do		17		460,889		20,173		5,603		12,016		68,899		549,312		
Total Values		£ 6,036,265		£ 12,095,083		£ 3,857,881		£ 2,171,466		£ 1,415,700		£ 642,626		£ 3,079,663		

PART I.—GOLD.

TABLE I.

MONTHLY PRODUCTION OF GOLD, IN FINE OUNCES, SHOWING THE QUANTITY REPORTED TO THE MINES DEPARTMENT DURING 1913.

GOLDFIELD.	DISTRICT.	JANUARY.		FEBRUARY.		MARCH.		APRIL.		MAY.		JUNE.		JULY.	
		District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.
Kimberley	...	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.
Pilbara	Marble Bar	282.37	...	289.24	...	547.09	...	339.58	...	77.32	...	...	...	...	...
Do.	Nullagine	127.42	409.79	27.61	316.85	490.84	1,037.93	7.16	346.74	56.80	134.12	144.82	265.06	75.91	452.76
West Pilbara	...	...	55.51	...	169.30	...	70.45	...	68.75	...	67.48	...	92.38	...	56.97
Ashburton	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Gascoyne	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Peak Hill	...	...	121.40	...	98.94	...	178.40	...	336.99	...	587.67	...	241.30	...	272.84
East Murchison	Lawlers	356.77	...	253.83	...	258.80	...	328.11	...	408.06	...	1,137.39	...	429.06	...
Do.	Wiluna	296.17	6,679.05	488.31	6,562.59	942.96	7,384.33	1,291.59	8,052.88	282.48	6,459.76	208.96	8,387.34	918.33	7,904.32
Do.	Black Range	6,026.11	...	5,820.45	...	6,182.57	...	6,433.18	...	5,769.22	...	7,040.99	...	6,556.93	...
Murchison	Cue	460.08	...	335.10	...	110.53	...	866.73	...	102.67	...	736.53	...	955.44	...
Do.	Meekatharra	3,615.36	7,011.04	3,840.04	7,535.25	5,927.43	9,924.44	6,730.19	10,349.53	6,267.26	9,965.19	6,574.80	10,673.44	6,583.01	11,333.69
Do.	Day Dawn	2,206.18	...	2,185.14	...	2,458.75	...	2,021.59	...	2,776.04	...	2,458.25	...	2,152.46	...
Do.	Mt. Magnet	729.42	...	1,174.97	...	1,427.73	...	731.02	...	819.22	...	903.86	...	1,642.78	...
Yalgoo	...	...	452.87	...	656.36	...	495.50	...	503.38	...	655.39	...	593.61	...	472.19
Mt. Margaret	Mt. Morgans	91.03	...	85.19	...	68.46	...	142.54	...	94.60	...	95.26	...	75.63	...
Do.	Mt. Malcolm	5,484.46	6,407.55	5,099.19	5,599.01	5,772.79	7,211.34	6,158.97	7,644.75	5,605.48	6,761.02	5,500.80	6,942.14	5,255.80	7,377.79
Do.	Mt. Margaret	832.06	...	414.63	...	1,370.09	...	1,343.24	...	1,060.94	...	1,346.08	...	2,046.36	...
North Coolgardie	Menzies	2,640.31	...	3,199.06	...	3,589.92	...	3,176.75	...	3,142.86	...	4,666.15	...	3,220.23	...
Do.	Ularring	836.30	4,428.49	613.77	4,252.83	154.26	5,314.85	704.82	5,665.87	644.06	5,204.01	768.07	7,097.23	357.24	4,576.74
Do.	Niagara	283.46	...	346.08	...	188.68	...	203.09	...	984.35	...	1,044.01	...	514.77	...
Do.	Yerilla	668.42	...	93.92	...	1,381.99	...	1,581.21	...	432.74	...	619.00	...	484.50	...
Broad Arrow	...	...	3,313.55	...	3,180.75	...	3,394.32	...	3,403.54	...	2,655.95	...	2,277.18	...	2,831.75
N.E. Coolgardie	Kanowna	734.50	751.50	766.45	821.88	1,048.96	1,153.18	834.84	950.12	1,131.63	1,165.91	1,051.47	1,068.81	853.39	878.27
Do.	Kurnalpi	17.00	...	55.43	...	104.22	...	115.28	...	34.28	...	17.34	...	24.88	...
East Coolgardie	East Coolgardie	59,569.81	59,613.16	58,062.76	58,072.96	61,637.09	61,654.72	60,737.62	60,791.04	62,029.27	62,084.14	57,299.90	57,316.86	62,131.84	62,131.84
Do.	Bulong	43.35	...	10.20	...	17.63	...	53.42	...	54.87	...	16.96	...	...	...
Coolgardie	Coolgardie	2,000.52	2,090.49	1,750.96	2,040.48	3,755.87	4,081.89	3,026.08	3,290.73	1,488.05	1,609.60	2,669.33	3,037.41	2,840.80	3,211.68
Do.	Kunanalling	89.97	...	289.52	...	326.02	...	264.65	...	121.55	...	368.08	...	370.88	...
Yilgarn	...	...	3,636.32	...	2,517.05	...	7,547.49	...	5,503.99	...	7,737.05	...	6,784.23	...	7,468.00
Dundas	...	...	2,416.43	...	2,099.79	...	2,564.25	...	2,122.85	...	2,599.33	...	2,715.94	...	2,040.92
Phillips River	...	...	123.85	...	278.15	...	382.80	...	433.04	...	88.75	...	470.69	...	296.69
State generally	...	...	6.15	...	6.52	...	7.56	...	9.46	...	11.70	...	7.46	...	8.58
TOTAL	Fine ounces	...	97,517.15	...	94,208.71	...	112,403.45	...	103,473.66	...	107,787.07	...	107,971.08	...	111,315.03
	Sterling value	£414,227		£400,173		£477,460		£465,015		£457,850		£458,632		£472,836	

TABLE I.—Monthly Production of Gold, in Fine Ounces—continued.

GOLDFIELD.	DISTRICT.	AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL FOR 1913.	
		District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.
		ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.
Kimberley ...	...	...	...	...	...	...	...	...	...	...	...	...	...
Pilbara ...	Marble Bar ...	172·89	441·75	62·82	70·82	699·18	711·12	498·97	523·06	655·62	888·21	3,845·81	5,598·21
Do. ...	Nullagine ...	268·86	...	8·00	...	11·94	...	24·09	...	232·59	...	1,752·40	...
West Pilbara ...	...	...	38·51	...	337·36	...	120·80	...	79·45	...	264·19	...	1,421·15
Ashburton ...	...	...	...	...	11·70	...	...	...	...	...	...	...	11·70
Gascoyne ...	...	...	...	...	...	...	...	...	...	...	31·45	...	31·45
Peak Hill ...	...	...	88·79	...	196·47	...	92·38	...	159·32	...	391·09	...	2,765·59
East Murchison ...	Lawlers ...	241·48	...	304·90	...	556·98	...	215·36	...	352·31	...	4,843·05	...
Do. ...	Wiluna ...	893·95	7,307·55	721·18	7,174·68	406·78	7,337·72	677·87	7,148·61	372·53	7,578·64	7,501·11	87,977·47
Do. ...	Black Range ...	6,172·12	...	6,148·60	...	6,373·96	...	6,255·38	...	6,853·80	...	75,633·31	...
Murchison ...	Cue ...	164·93	...	1,592·45	...	237·29	...	171·22	...	792·68	...	6,525·65	...
Do. ...	Meekatharra ...	6,375·08	10,347·88	6,624·04	11,566·68	7,304·98	11,394·58	6,212·30	10,028·95	6,647·32	11,896·89	72,701·81	122,027·56
Do. ...	Day Dawn ...	2,292·11	...	2,295·41	...	2,109·69	...	2,086·79	...	2,084·31	...	27,126·72	...
Do. ...	Mt. Magnet ...	1,515·76	...	1,054·78	...	1,742·62	...	1,558·64	...	2,372·58	...	15,673·38	...
Yaigo ...	...	...	881·35	...	607·48	...	1,129·95	...	895·48	...	819·91	...	8,163·47
Mt. Margaret ...	Mt. Morgans ...	61·34	...	90·19	...	173·75	...	104·50	...	172·98	...	1,255·47	...
Do. ...	Mt. Malcolm ...	5,563·53	6,713·50	6,271·75	7,554·82	5,755·14	8,386·70	5,265·49	7,073·78	11,005·33	13,600·30	72,738·73	91,272·70
Do. ...	Mt. Margaret ...	1,088·63	...	1,192·88	...	2,457·81	...	1,703·79	...	2,421·99	...	17,278·50	...
North Coolgardie ...	Menzies ...	3,808·57	...	4,322·82	...	3,564·73	...	4,369·39	...	4,527·10	...	44,227·89	...
Do. ...	Ularring ...	551·75	5,726·47	405·43	6,499·96	819·24	5,409·68	1,120·82	7,148·32	734·72	7,202·15	7,710·48	68,526·60
Do. ...	Niagara ...	465·83	...	467·65	...	598·21	...	1,100·32	...	744·63	...	6,941·08	...
Do. ...	Yerilla ...	900·32	...	1,304·06	...	427·50	...	557·79	...	1,195·70	...	9,647·15	...
Broad Arrow ...	...	...	2,599·47	...	3,299·49	...	2,919·55	...	2,678·19	...	2,185·59	...	34,739·33
N.E. Coolgardie ...	Kanowna ...	1,355·10	...	666·84	...	817·61	...	749·80	...	1,122·71	...	11,133·30	...
Do. ...	Kurnalpi ...	8·45	1,363·55	11·49	678·33	16·11	833·72	848·27	1,598·07	6·83	1,129·54	1,259·58	12,392·88
East Coolgardie ...	East Coolgardie ...	61,119·49	61,139·37	60,284·70	60,293·98	62,080·00	62,305·69	60,252·37	60,308·52	54,118·57	54,216·44	719,323·42	719,928·72
Do. ...	Bulong ...	19·88	...	9·28	...	225·69	...	56·15	...	97·87	...	605·30	...
Coolgardie ...	Coolgardie ...	2,076·20	2,215·18	2,474·53	2,702·24	2,648·90	2,985·74	1,919·70	2,107·57	1,756·33	2,518·48	23,407·27	31,891·49
Do. ...	Kunanalling ...	138·98	...	227·71	...	336·84	...	187·87	...	762·15	...	3,484·22	...
Yilgarn ...	...	...	7,401·34	...	8,088·06	...	7,772·91	...	9,554·11	...	8,323·41	...	82,333·96
Dundas ...	...	...	2,007·15	...	2,081·44	...	2,123·65	...	1,899·83	...	2,367·89	...	27,039·47
Phillips River ...	...	...	202·69	...	60·93	...	33·16	...	228·40	...	189·32	...	2,788·47
State generally ...	...	...	7·35	...	92·14	...	8·24	...	6·97	...	6·47	...	178·60
TOTAL	Fine ounces ...	...	108,481·90	...	111,316·58	...	113,565·59	...	111,438·63	...	113,609·97	...	1,299,088·82
	Sterling value	£460,802	£472,843	£482,396	£473,361	£482,584	£5,518,179						

TABLE II.

TOTAL YEARLY PRODUCTION OF GOLD, IN FINE OUNCES, AS REPORTED TO THE MINES DEPARTMENT, TO 31ST DECEMBER, 1913.

GOLDFIELD.	DISTRICT.	1913.		1912.		1911.		1910.		1909.		1908.	
		District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.
		ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.
Kimberley ...	...	...	...	...	271·63	...	171·45	...	265·53	...	134·52	...	150·16
Pilbara ...	Marble Bar ...	3,845·81	5,598·21	3,441·44	5,999·11	2,346·74	4,608·08	2,613·40	5,369·94	2,523·16	6,764·49	3,179·76	6,965·61
Do. ...	Nullagine ...	1,752·40	...	2,557·67	...	2,261·34	...	2,756·54	...	4,241·33	3,785·85	...	...
West Pilbara ...	...	...	1,421·15	...	1,118·20	...	983·17	...	1,483·62	...	1,539·62	...	1,005·60
Ashburton ...	...	...	11·70	...	38·73	...	256·33	...	247·63	...	436·32	...	161·71
Gascoyne ...	...	...	31·45	...	6·55	...	7·87	...	26·31	...	...	...	...
Peak Hill ...	...	...	2,765·59	...	1,861·64	...	1,747·01	...	4,327·02	...	7,918·79	...	7,980·10
East Murchison ...	Lawlers ...	4,843·05	...	7,307·72	...	27,193·85	...	45,203·50	...	77,542·23	...	72,109·75	...
Do. ...	Wiluna ...	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	*	144,792·31
Do. ...	Black Range ...	75,633·31	...	84,094·73	...	67,867·11	...	70,909·54	...	78,366·37	...	72,682·56	...
Murchison ...	Cue ...	6,525·65	...	8,993·26	...	11,455·56	...	9,576·29	...	21,271·13	...	24,702·50	...
Do. ...	Meekatharra ...	72,701·81	122,027·56	50,558·26	105,372·78	54,211·79	119,653·40	50,046·60	124,351·38	50,992·21	133,105·86	38,820·52	157,848·40
Do. ...	Day Dawn ...	27,126·72	...	28,283·42	...	37,947·41	...	46,474·13	...	44,447·89	...	84,422·44	...
Do. ...	Mt. Magnet ...	15,673·38	...	17,537·90	...	16,008·64	...	18,254·36	...	16,394·63	...	9,902·94	...
Yalgoo ...	...	...	8,163·47	...	6,165·92	...	1,162·04	...	1,332·72	...	1,805·31	...	551·03
Mt. Margaret ...	Mt. Morgans ...	1,255·47	...	3,438·55	...	5,484·08	...	10,331·24	...	25,722·76	...	28,912·13	...
Do. ...	Mt. Malcolm ...	72,738·73	91,272·70	74,288·81	102,969·60	92,811·29	152,474·39	97,689·68	160,281·18	90,436·33	155,864·99	86,018·61	153,597·15
Do. ...	Mt. Margaret ...	17,278·50	...	25,242·24	...	54,179·02	...	52,260·26	...	39,705·90	...	38,666·41	...
North Coolgardie ...	Menzies ...	44,227·89	...	36,126·25	...	39,062·97	...	40,247·69	...	35,851·38	...	37,023·37	...
Do. ...	Ullaring ...	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	21,598·97	91,251·59
Do. ...	Niagara ...	6,941·08	...	6,342·67	...	8,423·55	...	12,007·07	...	17,061·87	...	21,477·90	...
Do. ...	Yerilla ...	9,647·15	...	6,274·90	...	7,800·32	...	11,822·83	...	11,199·08	...	11,151·35	...
Broad Arrow ...	...	...	34,739·33	...	13,375·43	...	7,152·73	...	15,481·88	...	17,121·70	...	18,429·97
N.E. Coolgardie ...	Kanowna ...	11,133·30	12,392·88	11,364·53	13,855·71	17,958·07	19,554·75	22,203·96	23,027·27	23,785·63	25,462·38	26,355·22	27,072·72
Do. ...	Kurnalpi ...	1,259·58	...	2,491·18	...	1,596·68	...	823·31	...	1,676·75	...	717·50	...
East Coolgardie ...	East Coolgardie ...	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	888,415·37	890,772·70
Do. ...	Bulong ...	605·30	...	1,426·58	...	1,443·14	...	585·66	...	2,389·12	...	2,357·33	...
Coolgardie ...	Coolgardie ...	23,407·27	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	32,820·61	40,029·39
Do. ...	Kumanalling ...	3,484·22	...	4,934·82	...	4,771·67	...	5,983·04	...	5,752·28	...	7,208·78	...
Yilgarn ...	...	...	82,833·96	...	30,675·40	...	18,811·40	...	27,857·93	...	20,909·12	...	22,162·87
Dundas ...	...	...	27,039·47	...	25,314·35	...	28,989·86	...	29,627·34	...	29,549·27	...	23,643·63
Phillips River ...	...	...	2,788·47	...	4,201·36	...	5,656·54	...	8,194·90	...	6,713·52	...	4,404·69
† Donnybrook ...	...	...	...	...	...	...	...	...	...	...	...	...	...
State generally ...	...	...	178·60	...	240·40	...	359·99	...	847·41	...	348·09	...	271·13
TOTAL	Fine Ounces ...	...	1,299,088·82	...	1,267,844·79	...	1,338,986·94	...	1,422,231·40	...	1,576,405·74	...	1,596,090·76
	Sterling Value	£5,518,179	£5,385,462	£5,687,655	£6,041,254	£6,696,146	£6,779,763						

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.	1907.		1906.		1905.		1904.		PREVIOUS TO 1904.		TOTAL TO DECEMBER 31, 1913.	
		District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.
Kimberley ...	...	...	336 57	...	165 72	...	496 14	...	205 84	...	14,815 19	...	17,012 75
Pilbara ...	Marble Bar ...	5,856 44	10,042 96	2,256 97	5,711 90	4,534 25	11,473 83	3,129 37	8,029 65	70,801 98	101,948 64	104,029 32	172,512 42
Do. ...	Nullagine ...	4,186 52		3,454 93		6,939 58		4,900 28		31,646 66		68,483 10	
West Pilbara ...	...	...	464 08	...	749 16	...	801 14	...	3,427 71	...	11,029 68	...	24,023 13
Ashburton ...	...	...	143 01	...	278 24	...	207 53	...	509 96	...	6,585 58	...	8,876 74
Gascoyne ...	...	...	...	...	...	...	...	...	...	...	505 27	...	577 45
Peak Hill ...	...	...	8,111 14	...	2,008 20	...	13,586 87	...	14,113 57	...	176,659 20	...	241,079 13
East Murchison ...	Lawlers ...	61,259 79	119,207 31	60,351 20	95,771 49	68,232 52	84,926 28	78,543 91	89,730 30	373,976 96	375,063 32	876,564 50	1,485,269 86
Do. ...	Wiluna ...	*		*		*		*		*		*	
Do. ...	Black Range ...	57,947 52	169,397 46	35,420 29	182,395 82	16,693 76	206,734 88	11,186 39	214,403 13	1,086 36	917,191 21	571,387 92	2,452,481 88
Murchison ...	Cue ...	25,878 80		18,337 11		15,125 05		18,668 31		145,609 57		321,258 48	
Do. ...	Meekatharra ...	31,792 41	101,591 06	26,572 08	124,047 58	18,549 17	161,507 28	18,668 31	161,163 51	145,609 57	400,974 59	558,552 67	1,217,986 03
Do. ...	Day Dawn ...	101,591 06		124,047 58		161,507 28		161,163 51		400,974 59		558,552 67	
Do. ...	Mt. Magnet ...	10,135 19	4,371 38	13,439 05	4,450 19	11,553 38	4,742 77	19,284 60	2,353 41	206,500 63	48,415 74	354,684 70	83,513 98
Yalgoo ...	...	...		...		...		...		...		...
Mt. Margaret ...	Mt. Morgans ...	28,755 18	169,466 07	30,206 54	166,258 94	35,130 45	188,712 21	55,463 96	187,383 87	246,877 75	801,171 83	471,578 11	2,329,452 93
Do. ...	Mt. Malcolm ...	81,709 00		94,095 06		96,644 33		87,927 26		385,857 24		1,260,216 34	
Do. ...	Mt. Margaret ...	59,001 89	86,790 67	41,957 34	110,957 04	56,937 43	148,771 00	43,992 65	145,064 61	163,436 84	767,619 45	597,658 48	1,694,157 66
North Coolgardie ...	Menzies ...	37,053 24		33,287 86		41,895 33		37,100 73		373,942 72		755,769 43	
Do. ...	Ularring ...	19,072 73	86,790 67	25,210 13	110,957 04	43,387 07	148,771 00	21,769 41	145,064 61	88,945 86	767,619 45	270,650 77	1,694,157 66
Do. ...	Niagara ...	18,881 94		37,418 89		45,520 17		67,230 33		245,559 02		486,864 49	
Do. ...	Yerilla ...	11,782 76	21,907 18	15,090 16	21,510 61	17,968 43	18,583 66	18,964 14	22,180 19	59,171 85	202,935 84	180,872 97	393,418 52
Broad Arrow ...	...	...		...		...		...		...		...
N.E. Coolgardie ...	Kanowna ...	29,244 99	31,197 96	37,267 87	38,098 74	42,341 66	43,174 38	38,648 56	39,799 63	389,072 00	402,824 85	649,375 79	676,461 27
Do. ...	Kurnalpi ...	1,952 97		830 87		832 72		1,151 07		13,752 85		27,085 48	
East Coolgardie ...	East Coolgardie ...	937,238 61	941,170 94	989,357 24	995,831 87	997,193 02	1,006,965 90	1,050,922 89	1,062,078 27	5,141,142 68	5,256,507 58	13,928,806 42	14,084,313 67
Do. ...	Bulong ...	3,932 33		6,474 63		9,772 88		11,155 38		115,364 90		155,507 25	
Coolgardie ...	Coolgardie ...	53,029 44	60,810 37	55,771 11	64,030 18	54,499 04	63,664 27	53,505 01	63,199 76	513,377 24	633,189 92	917,949 15	1,104,796 62
Do. ...	Kunanalling ...	7,780 93		8,259 07		9,165 23		9,694 75		119,812 68		186,847 47	
Yilgarn ...	...	...	19,291 98	...	23,546 75	...	19,291 42	...	25,508 64	...	199,714 98	...	490,104 45
Dundas ...	...	...	23,602 23	...	20,434 84	...	25,960 95	...	31,880 27	...	217,392 72	...	488,384 93
Phillips River ...	...	...	4,313 87	...	2,779 89	...	2,563 26	...	4,016 63	...	15,194 58	...	60,827 71
†Donnybrook ...	...	...	...	...	...	...	...	...	...	...	841 76	...	841 76
State generally ...	...	...	1,367 70	...	1,315 71	...	...	...	...	...	1,889 30	...	6,318 33
TOTAL (Fine Ounces ...)	...	...	1,671,992 88	...	1,736,295 29	...	1,840,656 49	...	1,913,835 44	...	10,150,996 64	...	25,814,425 19
(Sterling Value)	...	...	£7,102,174	...	£7,375,314	...	£7,818,612	...	£8,129,456	...	£43,118,693	...	£109,652,708

* 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 1913.

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.		
		Proclama- tion gazetted.	To take effect from	Latest Amendment of Boundaries gazetted.	To take effect from	Goldfield.	District.	No.	Area in Acres.	Milling.		Cyaniding.			Men employed.		
										Stamps.	Other Mills.	Leach- ing Vats.	Agi- tating Vats.	Vacuum Filters and Presses.	Above Ground.	Under Ground.	Digger
Kimberley ...	...	20-5-86	20-5-86	31-10-02	1-11-02	33,833	...	...	45	1	...	...	...	...	...	...	10
Pilbara ...	{ Marble Bar Nullagine }	1-10-88	1-10-88	1-3-07	1-3-07	32,696	{ 25,809 6,887 }	{ 32 10 }	{ 325 100 }	{ 50 30 }	{ ... 2 }	{ 8 9 }	{	{	{ 55 14 }	{ 59 23 }	{ 23 16 }
West Pilbara ...	...	20-9-95	1-11-95	1-3-07	1-3-07	10,843	...	8	88	25	2	13	...	...	12	16	2
Ashburton ...	...	11-12-90	11-12-90	18-10-01	14-10-01	14,230	...	2	48	...	...	...	...	...	...	...	9
Gascoyne ...	...	25-6-97	15-4-97	18-10-01	14-10-01	5,313	...	...	...	...	...	...	...	...	...	...	3
Peak Hill ...	...	19-3-97	1-4-97	28-11-13	1-1-14	19,532	...	23	299	40	4	11	...	4	10	10	3
East Murchison ...	{ Lawlers Wiluna Black Range }	28-6-95	28-6-95	1-11-12	1-1-13	28,746	{ 9,379 10,496 8,871 }	{ 22 53 106 }	{ 277 903 1,512 }	{ 148 95 135 }	{ 6 10 20 }	{ 32 29 73 }	{ 8 22 12 }	{ 4 8 35 }	{ 55 108 304 }	{ 61 71 444 }	{ 6 }
Murchison ...	{ Cue ... Meekatharra Day Dawn Mt. Magnet }	24-9-91	24-9-91	28-11-13	1-1-14	25,474	{ 8,593 12,250 896 3,735 }	{ 45 93 40 40 }	{ 577 1,226 376 384 }	{ 70 211 60 55 }	{ 2 19 20 10 }	{ 27 51 22 25 }	{ ... 4 13 5 }	{ ... 3 5 1 }	{ 62 930 184 83 }	{ 55 595 161 63 }	{ 11 29 13 13 }
Yalgoo ...	...	8-2-95	23-1-95	...	...	18,833	...	54	713	83	1	21	...	...	66	57	11
Mt. Margaret ...	{ Mt. Morgans Mt. Malcolm Mt. Margaret }	12-3-97	1-4-97	1-3-07	1-3-07	44,860	{ 1,637 3,330 39,893 }	{ 20 83 59 }	{ 321 1,535 1,043 }	{ 65 215 154 }	{ 14 28 14 }	{ 36 79 35 }	{ 17 16 11 }	{ 2 3 6 }	{ 28 253 103 }	{ 21 379 130 }	{ 30 13 30 }
North Coolgardie...	{ Menzies Ularring Niagara Yerilla }	28-6-95	28-6-95	10-10-13	1-11-13	26,116	{ 6,805 3,093 688 15,530 }	{ 54 30 15 42 }	{ 771 383 224 542 }	{ 90 65 70 50 }	{ 19 10 6 4 }	{ 67 42 29 25 }	{ 4 7 3 ...	{ 4 2 2 1 }	{ 197 63 84 158 }	{ 252 91 82 153 }	{ 16 11 15 29 }
Broad Arrow ...	...	17-11-96	20-11-96	8-6-06	1-7-06	1,038	...	79	1,296	88	12	29	7	3	120	223	68
North-East Coolgardie ...	{ Kanowna Kurnalpi }	20-3-96	15-4-96	27-3-08	1-4-08	20,604	{ 1,094 19,510 }	{ 46 6 }	{ 602 84 }	{ 138 5 }	{ 8 1 }	{ 58 ...	{	{	{ 86 16 }	{ 119 15 }	{ 16 8 }
East Coolgardie ...	{ East Coolgardie Bulong }	21-9-94	1-10-94	27-3-08	1-4-08	1,800	{ 810 990 }	{ 168 12 }	{ 2,353 217 }	{ 655 10 }	{ 339 ...	{ 264 5 }	{ 178 ...	{ 125 ...	{ 2,139 24 }	{ 2,990 25 }	{ 10 3 }
Coolgardie ...	{ Coolgardie Kunanalling }	6-4-94	6-4-94	1-3-07	1-3-07	11,702	{ 9,384 2,318 }	{ 59 22 }	{ 773 281 }	{ 253 85 }	{ 13 4 }	{ 105 38 }	{	{	{ 189 55 }	{ 367 49 }	{ 2 2 }
Yilgarn ...	...	1-10-88	1-10-88	10-10-13	1-11-13	17,478	...	174	3,288	177	22	83	9	5	399	385	12
Dundas ...	...	31-8-93	31-8-93	1-3-07	1-3-07	11,430	...	54	631	130	18	49	11	2	103	151	...
Phillips River ...	...	21-9-00	14-9-00	26-1-12	1-2-12	5,300	...	13	210	40	4	4	...	...	31	39	...
State generally ...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	3	...	...
Total ...	Total ...	...	...	...	...	329,828	...	1,464	21,382	3,337	615	1,269	327	215	5,934	7,086	425

TABLE III.—Return showing for the respective Goldfields and Districts, etc.—continued.

Goldfield.	District.	1913 GOLD AND SILVER YIELD—DISTRICTS.						1913 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	..	..	..	..	..	..	..	..	..	..	..	..	..
Pilbara	Marble Bar	120·75	..	3,119·20	3,725·06	3,845·81	..	..	..	..	..	..	..
Do.	Nullagine	94·91	..	897·25	1,657·49	1,752·40	..	215·66	..	4,016·45	5,382·55	5,598·21	..
West Pilbara	..	..	..	..	..	..	..	110·79	7·06	1,242·50	1,303·30	1,421·15	14·77
Ashburton	..	..	..	..	..	..	..	11·70	..	..	..	11·70	..
Gascoyne	..	..	..	..	..	..	..	7·44	..	6·00	24·01	31·45	..
Peak Hill	..	..	..	..	..	..	..	530·06	253·15	1,392·25	1,982·38	2,765·59	..
East Murchison	Lawlers	126·84	16·33	5,818·00	4,699·88	4,843·05	..	..	..	..	..	..	..
Do.	Wiluna	..	82·52	14,967·50	7,418·59	7,501·11	4·40	159·15	1,608·00	184,718·19	86,210·32	87,977·47	2,909·10
Do.	Black Range	32·31	1,509·15	163,932·69	74,091·85	75,633·31	2,904·70	..	..	..	..	..	..
Murchison	Cue	1·46	59·90	6,408·35	6,464·29	6,525·65	..	..	..	..	..	..	..
Do.	Meekatharra	255·61	304·68	129,123·14	72,141·52	72,701·81	804·05	481·66	2,791·34	203,100·81	118,754·56	122,027·56	7,937·88
Do.	Day Dawn	79·27	276·75	59,770·26	26,770·70	27,126·72	7,133·83	..	..	..	..	..	..
Do.	Mt. Magnet	145·32	2,150·01	7,799·06	13,378·05	15,673·38	..	..	..	..	..	..	..
Yalgoo	..	..	..	..	..	..	..	36·59	397·34	10,786·60	7,729·54	8,163·47	..
Mt. Margaret	Mt. Morgans	50·22	..	989·55	1,205·25	1,255·47	75·76	..	..	..	..	..	..
Do.	Mt. Malcolm	172·49	268·74	153,770·25	72,297·50	72,738·73	5,093·19	370·45	1,050·53	176,611·30	89,851·72	91,272·70	5,168·95
Do.	Mt. Margaret	147·74	781·79	21,851·50	16,348·97	17,278·50	..	..	..	..	..	..	..
North Coolgardie	Menzies	4·39	161·82	57,884·10	44,061·68	44,227·89	1,635·54	..	..	..	..	..	..
Do.	Ullaring	..	15·69	7,475·00	7,694·79	7,710·48	10	22·05	206·27	94,674·87	68,298·28	68,526·60	1,667·64
Do.	Niagara	9·48	28·76	16,159·25	6,902·84	6,941·08	32·00	..	..	..	..	..	..
Do.	Yerilla	8·18	..	13,156·52	9,638·97	9,647·15	..	..	..	..	..	..	..
Broad Arrow	..	..	..	..	..	..	..	76·32	489·35	112,805·91	34,173·66	34,739·33	701·30
N.E. Coolgardie	Kanowna	40·78	179·03	20,288·75	10,913·49	11,133·30	1·50	136·19	361·03	20,354·99	11,895·66	12,392·88	1·50
Do.	Kurnalpi	95·41	182·00	66·24	982·17	1,259·58	..	..	..	..	..	..	..
East Coolgardie	E. Coolgardie	118·63	973·97	1,712,021·29	718,230·82	719,323·42	94,555·96	122·78	1,257·57	1,712,697·34	718,548·37	719,928·72	94,555·96
Do.	Bulong	4·15	283·60	676·05	317·55	605·30	..	..	..	..	..	..	..
Coolgardie	Coolgardie	372·21	527·51	46,677·13	27,507·55	28,407·27	3·00	372·79	533·07	51,960·13	30,985·63	31,891·49	3·00
Do.	Kunanalling	58	5·56	5,283·00	3,478·08	3,484·22	..	..	..	..	..	..	..
Yilgarn	..	..	..	..	..	..	..	2·13	105·71	154,495·90	82,226·12	82,333·96	2,494·34
Dundas	..	..	..	..	..	..	..	15·47	1,245·21	54,044·50	25,778·79	27,039·47	1,146·00
Phillips River	..	..	..	..	..	..	..	3·81	..	4,453·50	2,784·66	2,788·47	..
State generally	..	..	..	..	..	..	..	..	..	..	178·60	178·60	2,246·58
Total for 1913	..	..	..	..	..	..	..	2,675·04	10,305·63	2,787,361·24	1,286,108·15	1,299,088·82	118,847·02

*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.	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 .. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	2,885-50	.. ..	17,597-50	14,127-25	17,012-75	.. ..	
Pilbara	Marble Bar ..	10,639-45	3,226-91	58,415-33	90,162-96	104,029-32	574-01	} 16,330-68	} 3,599-10	} 93,629-82	} 152,582-64	} 172,512-42	} 574-01		
Do.	Nullagine ..	5,691-23	372-19	35,214-49	62,419-68	68,483-10	.. ..							
West Pilbara .. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	} 5,053-32	} 244-17	} 16,413-31	} 18,725-64	} 24,023-13	} 314-94
Ashburton .. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	
Gascoyne .. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	} 8,561-10	} 315-64	}	} 8,876-74	} 162-02	
Peak Hill .. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	
East Murchison ..	Lawlers ..	5,602-24	5,986-62	1,945,071-24	864,975-64	876,564-50	24,796-77	} 7,128-41	} 16,639-33	} 2,862,605-70	} 1,461,502-12	} 1,485,269-86	} 35,546-14		
Do.	Wiluna ..	90-79	188-98	80,855-75	37,037-67	37,317-44	20-29								
Do.	Black Range ..	1,435-38	10,463-73	836,678-71	559,488-81	571,387-92	10,729-08	} 14,055-18	} 25,821-19	} 3,348,155-22	} 2,412,605-51	} 2,452,481-88	} 161,115-85		
Murchison	Cue ..	964-95	3,926-39	357,543-70	316,367-14	321,258-48	400-11								
Do.	Meekatharra ..	9,243-03	8,113-75	717,942-94	541,195-89	558,552-67	1,979-03	} 157,604-28	} 1,132-43	} 14,055-18	} 25,821-19	} 3,348,155-22	} 2,412,605-51	} 2,452,481-88	} 161,115-85
Do.	Day Dawn ..	2,226-30	3,740-55	1,788,200-08	1,212,019-18	1,217,936-03	157,604-28								
Do.	Mt. Magnet ..	1,620-90	10,040-50	484,468-50	343,023-30	354,684-70	1,132-43	} 1,310-92	} 1,242-86	} 118,791-84	} 80,960-20	} 83,513-98	} 3-30		
Yalgoo .. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	
Mt. Margaret ..	Mt. Morgans ..	1,561-36	3,297-04	790,971-66	466,719-71	471,578-11	5,758-43	} 6,852-46	} 12,976-06	} 4,117,797-42	} 2,309,624-41	} 2,329,452-93	} 82,248-91		
Do.	Mt. Malcolm ..	2,198-86	6,107-27	2,254,576-13	1,251,910-21	1,260,216-34	44,154-81								
Do.	Mt. Margaret ..	3,092-24	3,571-75	1,072,249-63	590,994-49	597,658-48	32,335-67	} 3,596-01	} 12,557-73	} 2,164,884-00	} 1,678,003-92	} 1,694,157-66	} 22,741-72		
North Coolgardie ..	Menzies ..	966-97	2,619-69	819,040-48	752,182-77	755,769-43	11,724-16								
Do.	Ularring ..	21-46	1,111-70	266,232-99	269,517-61	270,650-77	5,432-91	} 18,699-11	} 4,235-02	} 640,331-40	} 370,484-39	} 393,418-52	} 1,218-56		
Do.	Niagara ..	1,370-90	1,305-76	872,511-72	484,187-83	486,864-49	5,524-18								
Do.	Yerilla ..	1,236-68	7,520-58	197,098-81	172,115-71	180,872-97	60-47	} 116,255-78	} 14,580-74	} 874,441-93	} 545,624-75	} 676,461-27	} 2,530-03		
Broad Arrow .. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	
N.E. Coolgardie ..	Kanowna ..	104,333-15	10,652-70	869,438-22	534,389-94	649,375-79	2,518-81	} 52,725-97	} 37,706-67	} 19,755,970-63	} 13,993,881-03	} 14,084,313-67	} 1,052,303-56		
Do.	Kurnalpi ..	11,922-63	3,928-04	5,003-71	11,234-81	27,085-48	11-22								
East Coolgardie ..	E. Coolgardie ..	26,221-82	22,962-30	19,622,535-29	13,879,622-30	13,928,806-42	1,052,303-56	} 8,312-83	} 13,097-89	} 1,651,916-20	} 1,083,385-90	} 1,104,796-62	} 782-28		
Do.	Bulong ..	26,504-15	14,744-37	133,385-34	114,258-73	155,507-25	760-61								
Coolgardie	Coolgardie ..	7,813-90	8,167-49	1,408,375-73	901,967-76	917,949-15	760-61	} 77-74	} 1,281-72	} 1,053,602-60	} 488,744-99	} 490,104-45	} 6,621-18		
Do.	Kunanalling ..	498-93	4,930-40	243,540-47	181,418-14	186,847-47	21-67								
Yilgarn .. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	} 2,015-27	} 8,423-29	} 661,263-05	} 477,946-37	} 488,384-93	} 34,948-22
Dundas .. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	
Phillips River ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	} 472-20	} 775-33	} 73,835-51	} 59,580-18	} 60,827-71	} 15,182-21
† Donnybrook ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	
State generally ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	} 23-24	} 775-33	} 1,653-30	} 818-52	} 841-76	}
..								
						Total to		266,456-07	157,531-39	37,928,119-14	25,390,437-73	25,814,425-19	1,423,555-81		

* 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 1913, AND THE TOTAL PRODUCTION TO DATE.

Kimberley Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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.	
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	2,885·50	
		Total	2,885·50	..	17,597·50	14,127·25

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Pilbara Goldfield.

MARBLE BAR DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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.
Bamboo Creek	733	Bamboo Queen .. .. .	..	..	61·25	111·88	..	..	..	61·25	111·88	..
Do. ..	718	Bamboo Revenue .. .. .	..	..	80·50	110·75	..	..	392·26	84·50	413·94	..
Do. ..	732	Bonnie Doon .. .. .	..	..	134·50	80·94	..	..	..	150·00	109·09	..
Do. ..	695	Bulletin .. .. .	..	..	..	..	..	..	..	397·00	1,121·79	..
Do. ..	748	Federation .. .. .	..	..	31·75	34·21	..	..	..	31·75	34·21	..
Do. ..	775	Hidden Treasure .. .. .	..	..	18·00	19·24	..	..	..	18·00	19·24	..

Do	707	..	..	Kitchener	..	..	..	157.50	490.75	..	..	210.50	795.40	..
Do	(754)	..	..	Mickey	..	..	..	74.00	11.02	..	..	74.00	11.02	..
Do	740	..	..	Mt. Prophecy	..	..	..	81.00	38.15	..	..	81.00	38.15	..
Do	(756)	..	..	Princess May	..	..	..	17.00	11.48	..	..	17.00	11.48	..
Do	..	..	..	Voided leases	..	..	..	..	..	..	62.35	11,270.75	18,650.38	..
Do	..	..	..	Sundry claims	..	..	..	97.25	66.58	..	307.83	246.00	584.94	..
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	..	..	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	..	..	..	202.50	343.88	..	..	645.00	684.73	..
Do	768	..	..	Homeward Bound	..	..	..	66.00	94.73	..	..	66.00	94.73	..
Do	694	..	..	Jo Jo	..	..	..	695.00	784.40	..	..	1,317.50	1,555.91	..
Do	766	..	..	Last Chance	..	..	..	37.75	64.44	..	..	37.75	64.44	..
Do	735	..	..	Nabob	..	..	..	207.00	232.09	..	..	290.00	354.45	..
Do	(702)	..	..	Railway Signal	..	..	..	64.75	66.57	..	..	367.75	299.38	..
Do	(716)	..	..	Stray Shot	..	..	..	75.00	59.79	..	..	288.00	251.08	..
Do	762	..	..	True Blue	..	..	..	70.000	140.54	..	..	70.00	140.54	..
Do	722	..	..	Viking	..	..	..	273.00	237.11	..	..	593.50	530.82	..
Do	..	..	..	Voided leases	..	..	..	..	..	..	141.73	13,602.95	18,559.43	..
Do	Sundry claims	231.50	208.85	..	38.68	126.22	2,833.14	3,285.00	..
North Pole	(743)	..	..	Greenstone	..	..	..	..	..	..	..	42.00	43.22	..
Do	..	..	..	Voided leases	..	..	..	..	..	..	..	432.00	297.53	..
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.	..	..	..	406.00	451.10	..	..	406.00	451.10	..
Do	627	Klondyke Queen	17.50	36.69	3.80	462.25	603.78	..
Do	(745)	..	..	Wheel of Fortune	..	..	..	..	..	..	..	9.00	7.28	..
Do	Voided leases	13.19	6,318.86	13,671.74	..
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	..	..
Wyman's Well	744	..	..	Euro	..	..	..	..	..	..	..	66.50	38.48	..
Do	Voided leases	33.55	115.04	493.98	..
Do	Sundry claims	16.72	334.86	525.67	..
Yandiccoogina	724	..	..	Thelma	..	..	..	17.70	20.65	..	..	38.70	135.79	..
Do	Voided leases	140.76	2,664.50	5,597.99	..
Do	Sundry claims	238.35	103.75	120.34	..

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 1913.					TOTAL PRODUCTION.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
<i>From District generally:—</i>												
Sundry parcels treated at:												
Sanderson Cyanide Works .. .. .			..	..	..	..	..	..	..	..	48·02	..
Osborne Cyanide Works .. .. .			..	..	..	..	..	..	..	..	6·83	..
Stray Shot Battery .. .. .			..	..	..	..	..	..	..	..	9·75	..
Various Works .. .. .			..	..	..	..	..	..	..	237·95	1,140·31	..
Reported by Banks and Gold Dealers			120·75	..	..	..	..	10,341·08	217·05	..	..	..
Total			120·75	..	3,119·20	3,725·06	..	10,639·45	3,226·91	58,415·33	90,162·96	574·01

NULLAGINE DISTRICT

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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 .. .. .	..	..	50·00	70·62	..	..	..	700·75	1,157·53	..
Do.	176L	(Doherty Reward) .. .. .	..	..	..	..	..	..	..	142·25	171·43	..
Do.	176L (177L)	(Doherty Reward leases) .. .. .	..	..	104·00	436·34	..	..	..	219·00	1,007·68	..
Do.	(177L)	(Harp) .. .. .	..	..	..	..	..	..	..	62·00	79·22	..
Do.	182L	Morning Star .. .. .	..	..	62·00	162·56	..	..	4·19	367·00	834·03	..
Do.	178L	Shamrock .. .. .	..	..	50·00	94·11	..	..	4·00	350·25	590·47	..
Do.	.. .. .	Voided leases .. .. .	..	..	..	..	..	..	..	205·50	134·78	..
Do.	.. .. .	Sundry claims .. .. .	..	..	55·00	70·94	..	..	3·77	260·00	484·34	..
Elsie	.. .. .	Voided leases .. .. .	..	..	..	..	..	..	..	408·25	1,323·85	..
Do.	.. .. .	Sundry claims .. .. .	..	..	4·00	10·63	..	..	..	24·00	27·48	..
McPhee's Creek	196L	Prospector .. .. .	..	..	..	..	..	..	..	10·00	17·42	..
Do.	.. .. .	Voided leases .. .. .	..	..	..	..	..	..	..	7·50	10·62	..
Middle Creek	106L	Barton .. .. .	..	..	..	27·61	..	..	..	5,627·65	6,482·33	..
Do.	136L	Little Wonder .. .. .	..	..	13·00	31·07	..	..	..	984·50	3,763·22	..
Do.	.. .. .	Voided leases .. .. .	..	..	..	..	..	..	..	552·25	1,055·53	..
Do.	.. .. .	Sundry claims .. .. .	..	..	..	..	..	..	..	164·00	262·28	..

Mosquito Creek	(143L)	Ard Patrick									1,228.75	3,282.86	
Do.	79L	(Galtee More)									586.00	1,648.33	
Do.	79L, 145L	Galtee More leases			28.50	15.80					1,592.50	2,792.61	
Do.		Voided leases						1.07	21.42		3,852.55	4,740.20	
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	195L	Billjim			420.50	260.00					860.00	748.23	
Do.	(199L)	Billjim West			42.25	14.25					42.25	14.25	
Do.	(200L)	Binghi			7.75	4.12					7.75	4.12	
Do.	(173L)	Federation									272.25	428.37	
Do.	(167L)	Mountain Maid									314.50	634.00	
Do.		Voided leases									375.95	480.77	
Do.		Sundry claims			60.25	32.08		33.10	20.55		2,429.65	3,494.77	
<i>From District generally:—</i>													
Sundry parcels treated at:													
		Doherty's Works				287.59							493.13
		Enterprise Works											226.29
		Royer's Public Crushing Works											7.53
		State Battery—20-Mile Sandy					139.77						869.76
		Various Works									50.50		2,407.85
		Reported by Banks and Gold Dealers			94.91				5,552.36	35.54			
		Total			94.91		897.25	1,657.49		5,691.23	372.19	35,214.49	62,419.68

West Pilbara Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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	58.44		
Do.		Sundry claims						10.44	2.71	10.00	11.51		
Mallina	156	Naumai Rawwhite			38.00	25.61				38.00	25.61		
Do.		Voided leases								103.60	102.83		
Nicol	(158)	Nicol King			30.00	11.47				30.00	11.47		
Pilbara		Voided leases								48.12	148.00	293.42	
Do.		Sundry claims						1.11	86.24				

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 1913.					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.
Roebourne ..	M.L. 143 ..	Carlow Castle ..	..	..	..	*1·01	*4·85	..	..	..	2·93	4·85
Do. ..	(150) ..	Q.E. ..	..	..	..	*4·60	..	..	..	113·36	562·80	233·06
Do. ..	..	Voided leases ..	..	..	..	..	..	..	..	..	8·18	..
Do. ..	..	Sundry claims ..	..	..	..	*·38	*9·92	..	..	108·60	88·70	77·03
Station Peak ..	157 ..	Momentum ..	..	7·06	..	9·74	..	..	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 ..	..	..	797·00	954·85	..	..	..	797·00	954·85	..
Do. ..	..	Voided leases ..	..	..	..	..	..	..	..	1,934·80	2,088·26	..
Upper Nicol ..	..	Sundry claims ..	..	..	6·50	2·57	..	..	..	6·50	2·57	..
Weerianna ..	151 ..	Hillside ..	..	..	330·00	274·43	..	..	..	650·00	1,304·52	..
Do. ..	151 (152) ..	(Hillside leases) ..	..	..	..	..	..	..	..	640·00	704·69	..
Do. ..	160 ..	Mt. Veale ..	..	..	16·00	11·32	..	..	..	16·00	11·32	..
Do. ..	..	Voided leases ..	..	..	..	..	..	..	..	748·25	522·65	..
Do. ..	..	Sundry claims ..	..	..	25·00	7·32	..	..	..	37·50	37·01	..
From District generally:—			..	..	..	..	..	..	..	..	..	..
Reported by Banks and Gold Dealers ..			110·79	..	..	..	..	4,842·63	82·54	..	6·38	..
Total ..			110·79	7·06	1,242·50	1,303·30	14·77	5,053·32	244·17	16,413·31	18,725·64	314·94

*From copper ore.

Ashburton Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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	Voided leases ..	..	..	..	..	..	..	..	..	..	162·02
From Goldfield generally:—			..	..	..	..	..	..	..	..	..	..
Reported by Banks and Gold Dealers ..			11·70	..	..	..	..	8,206·73	..	..	..	..
Total ..			11·70	..	..	..	..	8,561·10	315·64	..	..	162·02

Gascoyne Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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 .. .. .	..	..	6.00	24.01	..	..	12.29	6.00	24.01	..
		<i>From Goldfield generally:—</i>										
		Reported by Banks and Gold Dealers	7.44	..	..	..	..	..	316.44	..	..	..
		Total	7.44	..	6.00	24.01	..	..	316.44	18.51	242.70	242.50

Peak Hill Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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 ..	(353P)	Excelsior .. .. .	..	..	..	..	..	..	3.75	16.13	..	..
Do. ..	(352P)	Hibernian .. .. .	..	..	300.00	173.35	..	..	498.00	323.95	..	..
Do. ..	.. .. .	Voided leases .. .. .	..	..	..	..	..	..	.91	..	..	..
Do. ..	.. .. .	Sundry claims .. .. .	..	..	..	..	..	..	22.98	10.00	20.27	..
Horseshoe ..	.. .. .	Voided leases .. .. .	..	..	..	..	..	..	1,902.09	712.38	1,937.65	2.00
Do. ..	.. .. .	Sundry claims .. .. .	..	235.05	..	..	..	..	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 .. .. .	..	3.01	37.50	51.93	..	..	3.01	37.50	51.93	..
Do. ..	364P	Harder to Find .. .. .	..	..	14.00	30.62	..	..	46.20	14.00	30.62	..
Do. ..	370P	Lucky Call .. .. .	..	..	..	..	..	..	..	23.00	42.94	..
Do. ..	5P, 306P	No. 1 North Leases .. .. .	..	..	128.50	440.98	..	..	..	128.50	440.98	..
Do. ..	(310)P	Oversight .. .. .	..	..	193.00	48.89	..	..	113.53	1,511.11	795.92	..
Do. ..	386P	Pacific .. .. .	..	4.57	101.50	111.60	..	..	4.57	101.50	111.60	..

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 1913.					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 ..	(1P), (2P), (4P), 5P, (6), (8), (9), (13P), (15P), (16P), (26P), (27P), (28P), (29P), (35P), (36P), (43P), (53P), (54P), (63P), (146P), (152P), (190P), (213P), (222P), (239P), (248P), (252P), (262P), (274P), 306P, (313P)	(Peak Hill Goldfield, Ltd.) .. ..	..	..	..	..	..	..	191·46	462,057·01	223,273·59½	2,285·59
Do. ..	402P	Ravelstone .. ..	..	..	21·00	21·71	..	..	..	21·00	21·71	..
Do. ..	398P	Temperance .. ..	..	..	54·00	85·78	..	..	..	54·00	85·78	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	354·14	2,858·51	2,741·73	..
Do. ..	.. ..	Sundry claims .. ..	..	10·52	527·75	530·38	..	..	115·49	1,450·25	863·05	..
Ravelstone ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	101·64	4,219·85	3,117·68	..
Do. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	..	..	553·60	283·17	..
Wilgeena ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	23·54	128·50	146·79	..
Wilthorpe ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	47·00	20·93	..
<i>From Goldfields generally:—</i>												
Sundry parcels treated at:												
State Battery—Ravelstone .. ..			..	..	15·00	487·14	..	..	3·05	15·00	491·97	..
Various Works .. ..			..	..	..	..	..	..	..	30·00	319·97	..
Reported by Banks and Gold Dealers			530·06	..	..	..	..	1,659·02	345·17	..	..	..
Total			530·06	253·15	1,392·25	1,982·38	..	1,659·02	3,860·24	474,960·01	235,559·87	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 1913.					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	(113)	(Nil Desperandum) .. .. .	..	..	..	..	..	..	17,960-00	7,618-73	..
Do. ..	(113)	Nil Desperandum .. .. .	..	..	4-50	8-16	..	..	1,320-50	813-40	..
Do. ..	(113), (635)	(Nil Desperandum leases) .. .. .	..	..	..	..	..	..	2,722-50	1,625-77	..
Do. ..	382	(Yellow Aster) .. .. .	..	..	..	..	..	..	37,605-00	27,051-42	..
Do. ..	382	Yellow Aster: Yellow Aster G.M. Co., N.L. .. .. .	..	..	132-50	129-91	..	..	8,706-25	4,006-13	..
Do. ..	..	Voided leases .. .. .	..	..	..	..	..	141-57	1,288-50	1,292-34	..
Do. ..	..	Sundry claims .. .. .	..	..	11-50	20-48	..	478-40	1,368-75	782-56	..
Lake Darlot ..	182	Amazon .. .. .	..	3-62	40-00	29-58	..	11-54	3,850-50	6,285-51	..
Do. ..	(1164)	Ballangarry .. .. .	..	..	17-00	7-06	..	..	369-50	115-80	..
Do. ..	1166	British King East .. .. .	..	..	885-00	446-23	..	..	1,211-00	653-85	..
Do. ..	626	Filbandint .. .. .	..	..	..	..	..	..	999-00	918-19	..
Do. ..	375	King of the Hills .. .. .	..	..	269-00	101-59	..	101-48	2,276-00	1,895-18	..
Do. ..	648	Monte Christo .. .. .	..	..	48-25	25-51	..	..	71-25	54-08	..
Do. ..	648, (654), (852)	(Monte Christo leases) .. .. .	..	..	..	..	..	..	6,762-60	3,279-52	..
Do. ..	273	St. George .. .. .	..	..	..	..	..	2,927-22	839-50	7,915-01	..
Do. ..	633	(Zangbar) .. .. .	..	..	..	..	..	..	997-00	505-75	..
Do. ..	633, (823)	Zangbar leases .. .. .	..	..	..	..	..	..	20,340-00	7,664-55	..
Do. ..	..	Voided leases .. .. .	..	..	..	..	..	832-90	27,357-70	19,047-46	..
Do. ..	..	Sundry claims .. .. .	..	..	122-00	110-67	..	1-16	237-43	3,022-14	2,279-05
Lawlers ..	(1149)	Bung Arrow .. .. .	..	..	..	..	..	..	41-00	46-52	..
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
Do. ..	(1125)	Golden Swan .. .. .	..	1-88	10-00	8-81	..	1-88	279-50	579-78	..

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 1913.					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 ..	(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 .. ..	..	..	80·00	16·53	..	..	..	1,530·00	407·85	..
Do. ..	(1038)	Moa .. ..	..	..	..	..	..	..	..	580·00	483·30	..
Do. ..	1173	Never-Can-Tell .. ..	..	6·90	..	..	..	..	6·90	..	..	..
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. .. ..	..	..	810·00	694·74	..	..	..	393,653·50	100,373·59	8,356·89
Do. ..	1172	Queen .. ..	..	..	137·00	162·67	..	..	..	137·00	162·67	..
Do. ..	(889)	(Rajah) .. ..	..	..	..	..	..	..	..	867·00	229·59	..
Do. ..	(889), (895)	Rajah leases .. ..	..	..	..	..	..	..	..	2,998·00	916·01	..
Do. ..	910, 923	Sunrise leases .. ..	..	..	480·00	97·55	..	..	..	8,289·00	3,985·12	..
Do. ..	1165	Vivien .. ..	..	..	1,605·50	512·27	..	..	..	1,997·50	676·64	..
Do. ..	oz., (562), (563)	(Waroonga South leases) .. ..	..	..	..	..	..	..	..	42,150·00	14,329·48	..
Do. ..	1145	White Hope .. ..	..	..	..	..	..	..	..	89·50	58·35	..
Do. ..	(988)	Wild Cat .. ..	..	..	..	..	..	..	..	5,158·50	3,076·53	..
Do. ..	58	(Woronga: London and Western Australian Exploration Co., Ltd)	..	..	..	..	..	..	..	2,438·50	2,755·45	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	419·83	271,824·48	140,467·47	1,794·21
Do. ..	.. ..	Sundry claims .. ..	..	3·93	533·50	564·22	..	14·81	75·38	7,595·35	4,908·73	..

New England		Voided leases ..						57.54	899.00	720.25	
Do.		Sundry claims ..						4.32	554.50	465.23	
Sir Samuel	1177	Bellevue North ..			53.75	28.49			53.75	28.49	
Do.	(1158), (1159)	Bellevue No. 1 leases ..							140.50	161.90	
Do.	1142	Bluey's Release ..			122.25	125.31		4.50	472.25	352.28	
Do.	1176	Canberra ..			41.00	112.03			41.00	112.03	
Do.		Voided leases ..						4.54	264,176.00	137,331.90	10,225.58
Do.		Sundry claims ..			415.25	291.76		21.37	2,300.50	1,790.58	
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	369.60	
Do.	162 [4j]	(Lake Way: Western Australian Gold-fields, Ltd.) ..							2,786.00	1,238.44	
Do.	870 [10j]	(Moonlight) ..							1,856.00	787.66	
Do.	967 [33j]	(Red Page) ..							457.00	434.50	
Do.	917 [12j]	(Squib) ..							276.50	67.00	
Do.	(677) ([9j])	(Try Again) ..							1,185.00	1,143.02	
Do.	(677) ([9j]), (942) ([20j])	(Try Again leases) ..							200.00	114.65	
Do.		Voided leases ..						537.27	35,807.75	28,856.28	124.00
Do.		Sundry claims ..					5.30		2,841.15	1,516.76	
<i>From District generally:—</i>											
Sundry parcels treated at:											
		Black Swan Cyanide Works ..								115.69	11.60
		Cinderella Works ..				383.35			1,202.00	2,206.31	26.00
		Cork Tree Cyanide Works ..								57.39	
		Lawler Public Battery ..				271.90			214.00	2,590.17	
		Old Condor Battery ..				551.06				535.95	
		State Battery—Lake Darlot ..							315.00	1,097.09	
		State Battery—Wiluna ..							390.00	2,047.17	20.00
		Urquhart's Cyanide Works ..								4,276.70	200.00
		Wilk's Bros. Cyanide Works ..								48.48	
		Various Works ..							117.50	3,881.31	506.73
		Reported by Banks and Gold Dealers ..	126.84				5,580.97	67.15		5.74	
		Total ..	126.84	16.33	5,818.00	4,699.88	5,602.24	5,986.62	1,945,071.24	864,975.64	24,796.77

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 LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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.
Collavilla	71j [1083], (72j) [(1084)]	(May Queen leases)	..	..	..	..	..	..	36.00	25.16	..
Do.	71j [1083], (72j) [(1084)]	May Queen Reward, Ltd.	..	..	696.00	243.39	..	..	1,482.00	471.12	..
Do.	..	Sundry claims	..	..	30.00	21.47	..	..	30.00	21.47	..
Mt. Keith	113j	Aurora .. ..	..	..	764.50	734.28	..	..	906.00	1,241.22	..
Do.	167j	Grand Schlam .. ..	..	..	718.00	421.12	..	..	718.00	421.12	..
Do.	168j	Little Schlam .. ..	..	..	122.00	98.15	..	..	122.00	98.15	..
Do.	(131j)	Queen of Scots .. ..	..	..	34.50	17.52	..	..	62.50	60.83	..
Do.	173j	Starlight .. ..	..	..	85.50	54.40	..	..	85.50	54.40	..
Do.	176j	Winifred .. ..	..	..	84.00	40.51	..	..	84.00	40.51	..
Do.	..	Voided leases .. ..	..	..	..	..	..	..	6.50	14.53	..
Do.	..	Sundry claims .. ..	..	78.26	173.00	113.62	..	78.26	197.00	178.77	..
New England	..	Voided leases .. ..	..	..	..	..	..	..	952.00	309.11	..
Do.	..	Sundry claims .. ..	..	..	..	..	..	..	115.00	100.62	..
Wiluna	91j [940]	(Adelaide) .. ..	..	..	..	..	..	..	401.00	33.29	..
Do.	(101j)	Band of Hope .. ..	..	..	..	..	..	..	128.00	49.85	..
Do.	23j	(Bulletin) .. ..	..	..	..	..	..	..	5,787.00	1,427.81	..
Do.	(107j)	Butchers .. ..	..	..	..	..	..	..	120.00	117.29	..
Do.	51j [1039]	Caledonia .. ..	..	..	..	..	..	..	472.00	467.29	..
Do.	165j	Cicely .. ..	..	..	58.00	2.60	..	..	58.00	2.60	..
Do.	2j [140]	Golden Age: Wiluna G.Ms., Ltd. .. ..	..	..	..	..	..	..	60.00	96.10	..
Do.	(111j)	Golden Bracelet .. ..	..	..	5.00	6.36	..	..	88.00	151.47	..
Do.	6j [542], 7j [548], 8j [550], 11j [906], 13j [930], 14j [931], 15j [932], 17j [937] (18j [938]), 21j [943], (22j [944]), 26j [952], 24j [9.0], 25j [9.1], 39j [987], 161j, 163j	Gwalia Consolidated, Ltd. .. ..	..	..	4,030.00	1,227.82	4.40	..	27,872.00	10,592.69	20.29
Do.	119j	(Happy Jack) .. ..	..	..	..	..	..	..	743.00	236.41	..
Do.	(114j)	Joker .. ..	..	..	..	..	..	..	445.00	347.81	..
Do.	161j	(Lake View) .. ..	..	..	..	..	..	..	17.50	1.82	..
Do.	4j [162], 5j [163]	Lake Way leases: Wiluna G.Ms., Ltd. .. ..	..	..	735.00	426.48	..	..	2,044.00	975.78	..
Do.	10j [870]	(Moonlight) .. ..	..	..	..	..	..	..	5,181.00	1,078.40	..
Do.	10j, 37j, 91j, 109j, 123j	Moonlight leases .. ..	..	..	4,618.00	1,965.44	..	..	7,368.00	2,778.44	..
Do.	(157j)	North March .. ..	..	..	..	..	..	..	72.00	26.12	..

Do.	(9J [677])	Try Again								47-00	6-78		
Do.	(9J [677]), (20J [942])	(Try Again leases)								532-00	296-79		
Do.	120J	Ullina			82-00	24-25				1,005-00	223-95		
Do.	12J [917], 23J [946], 28J [954], 30J [959], 33J [967], 36J [975], 43J [1018], 76J [1090], 113J, 124J, 119J, 137J	Wiluna G.Ms., Ltd.			2,234-00	536-58				16,709-50	6,312-63		
Do.		Voided leases							27-92	4,792-50	2,370-07		
Do.		Sundry claims		4-26	473-00	153-03		87-59	79-88	1,961-75	980-16		
<i>From District generally:—</i>													
Sundry parcels treated at:													
State Battery—Wiluna													
Reported by Banks and Gold Dealers													
					25-00	1,331-57		3-20	2-92	155-00	5,427-11		
		Total			82-52	14,967-50		4-40	90-79	188-98	80,855-75	37,037-67	20-29

BLACK RANGE DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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.			31-00	478-42				31-00	478-42	
Do.		Sundry claims			94-00	55-23				94-00	55-23	
Bellchambers		Sundry claims			33-00	32-38				33-00	32-38	
Birrigrin	(757B)	Hawthorne								162-00	57-78	
Do.	128B	(Pelerin)								1,765-46	3,621-53	
Do.	128B	Pelerin			85-00	102-98				391-00	573-31	
Do.	128B, (356B)	(Pelerin leases)								1,066-00	1,445-71	
Do.		Voided leases							820-68	8,152-70	9,067-41	
Do.		Sundry claims			52-00	14-07			34-52	698-00	460-94	
Surrans Find	641B	Red, White, and Blue							24-58	172-00	144-73	
Do.	(669B)	Red, White, and Blue North								20-00	9-89	
Do.		Voided leases							107-70	17-50	28-95	
Do.		Sundry claims							2-08	74-50	111-45	
Errells	(780B)	Light of the World South	14-17					14-17				
Do.	775B [1712]	Mystery: Lupton's G.M., N.L.				67-00	363-76				363-76	
Do.	777B [1764]	Three Star					24-82			67-00	24-82	

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 1913.					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.
Hancock's	478B	Breakaway .. ..	..	112·57	143·00	116·84	..	..	1,673·51	916·00	940·16	..
Do	382B	(Bull Oak) .. ..	..	..	..	..	..	..	725·00	956·77	..	
Do	674B	Comedy King .. ..	..	104·02	356·50	580·04	..	..	204·31	1,103·50	1,730·40	..
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 .. ..	..	124·10	173·00	157·31	..	..	267·00	1,465·00	1,913·16	..
Do	330B	Koinoor North .. ..	..	..	138·00	206·13	..	..	29·76	1,638·00	1,105·85	..
Do	139B	(Lady Ellen) .. ..	..	..	..	..	..	..	..	219·75	458·96	..
Do	139B	Lady Ellen .. ..	..	806·67	11·50	12·41	..	..	1,783·10	163·50	336·69	..
Do	139B, (234B)	(Lady Ellen leases) .. ..	..	..	..	..	..	..	..	259·50	488·61	11·00
Do	633B, 637B	Lady Seddon leases .. ..	..	..	78·00	55·42	..	..	..	499·00	281·22	..
Do	383B	(Maid Marion) .. ..	..	..	..	..	..	..	2·47	373·00	490·40	..
Do	363B, 379B, 382B, 383B	Royal Oak M. Co., N.L. .. ..	..	..	84·00	56·19	..	..	..	84·00	56·19	..
Do	.. ..	Voided leases .. ..	..	..	..	..	..	..	72·44	7,920·50	10,005·28	39·58
Do	.. ..	Sundry claims .. ..	..	..	66·00	89·93	..	..	10·03	772·50	403·77	..
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	1,674·62	..	..	..	371·00	1,674·62	..
Do	53B	(Maninga Marley) .. ..	..	..	..	..	..	..	..	222·75	274·92	..
Do	53B (77B), 100B	Maninga Marley leases .. ..	..	..	273·50	452·43	..	..	..	7,091·83	8,617·76	..
Do	765B	Maninga Marley North .. ..	..	..	409·00	185·11	..	..	..	409·00	185·11	..
Do	.. ..	Voided leases .. ..	..	..	..	..	..	..	195·20	3,960·65	4,978·58	..
Do	.. ..	Sundry claims .. ..	..	..	28·00	12·57	..	..	122·66	567·50	552·81	..
Montagu	(185B)	(Caledonian) .. ..	..	..	..	..	..	..	..	346·90	785·20	..
Do	(185B), 351B	Caledonian leases .. ..	..	..	..	..	..	..	..	510·00	587·01	..
Do	135B	Montague Boulder .. ..	..	..	210·00	295·43	..	..	..	6,964·00	4,541·22	..
Do	.. ..	Voided leases .. ..	..	..	..	..	..	..	94·39	1,312·50	1,310·03	..
Do	.. ..	Sundry claims .. ..	..	43·95	27·50	29·40	..	..	45·67	639·50	332·20	..

Nungarra	(568B)	Mac's Addition								242.00	449.27	
Do.	793B	Margaret	57.25	582.50	148.16			57.25	582.50	148.16		
Do.	619B	Nungarra Junction	47.79	244.00	106.32			47.79	1,174.50	560.13		
Do.		Voided leases						25.94	241.47	8,378.50	7,085.46	3.64
Do.		Sundry claims	22.60	143.50	79.75			46.67	1,325.33	2,479.65	1,899.20	
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	5.60	
Do.	4B, 5B, 9B, 11B, 17B, 26B, 70B, 140B, 150B, 256B, 494B, 509B, 620B, 627B	Black Range Mining Co., N.L.		31,330.00	16,894.76	228.00	4.75	199.90	171,187.00	127,434.99	1,315.00	
Do.	255B	Black Range West G.M. Co., N.L.			15	199.72				142.15	249.02	
Do.	(753B)	Cardigan						597.60				
Do.	149B	(Golden Gate)								113.75	62.98	
Do.	151B	(Golden Key)								883.00	1,412.75	
Do.	16B	(Kingoonya)								1,406.00	1,850.40	
Do.	509B	(Mary S.)						275.60		70.00	84.09	
Do.	6B, 10B, 16B, 74B, 81B, 114B, 149B, 151B, 189B, 193B, 206B, 216B, 238B, 463B, 477B, 498B, 553B	(Oroya Black Range, Ltd.)		9,880.00	4,194.85				283,330.00	157,307.04	6,154.63	
Do.	789B	Pyx		188.75	163.53					188.75	163.53	
Do.	187B	(Sandridge: Sandstone Development G.M. Co., N.L.)								263.00	102.22	
Do.	6B	(Sand Stone)								1,439.50	1,938.54	
Do.	174B, 187B, 196B, (229B), 231B, (232B), 236B, (283B), (284B)	(Sandstone Development G.M. Co., N.L.)								26,086.50	15,055.94	242.30
Do.	174B, 187B, 196B, (229B), 231B, (232B), 236B, (283B), (284B)	(Sandstone G.M. Co., N.L.)								8,650.70	4,354.65	
Do.	766B	Trafalgar	107.89	390.50	610.24			203.17	446.50	645.68		
Do.	797B	Two P's		36.00	14.99					36.00	14.99	
Do.	10B	(Undaunted)								80.00	46.04	
Do.	74B	(Undaunted East)								648.25	619.82	
Do.	114B	(Undaunted East Extended)								276.00	181.34	
Do.	174B	(Wonoka)								68.50	36.35	
Do.	174B	(Wonoka: Sandstone Development G.M. Co., N.L.)								165.00	16.12	
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	Yuanm G.M.s., Ltd.		50,249.04	20,736.49	2,346.82			50,249.04	20,736.49	2,346.82	

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 1913.					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	..	Voided leases .. .. .	..	..	..	..	..	..	1,059·73	9,066·63	7,234·61	..
Do.	..	Sundry claims .. .. .	..	81·09	86·75	78·92	..	24·01	678·19	1,429·25	739·73	..		
Youanme	(538B)	Commonwealth .. .. .	..	..	73·00	18·22	..	..	..	625·50	234·31	..
Do.	622B	(Edna) .. .. .	..	..	..	..	..	..	..	320·00	210·17	..
Do.	526B	(Great Western) .. .. .	..	..	..	..	..	..	9·71	553·75	417·43	..
Do.	770B	Hill End .. .. .	..	..	865·00	161·04	..	..	..	865·00	161·04	..
Do.	564B	(Junction) .. .. .	..	..	..	..	..	..	..	975·50	668·33	..
Do.	(760B)	New Moon Extended .. .. .	..	..	13·00	9·60	..	..	..	28·00	29·63	..
Do.	630B	(Oversight) .. .. .	..	..	..	..	..	..	..	132·00	37·05	..
Do.	521B	(Peru) .. .. .	..	..	..	..	..	..	..	98·00	126·86	..
Do.	514B	United .. .. .	..	..	2,362·50	642·66	..	..	..	8,738·50	2,917·12	..
Do.	795B	United North .. .. .	..	..	20·50	6·84	..	..	..	20·50	6·84	..
Do.	518B, 521B, 522B, 525B, 526B, 564B, 585B, 603B, 605B, 611B, 618B, 622B, 626B, 630B, 636B, 688B, 692B	Yuanmi G.Ms., Ltd. .. .. .	..	..	64,060·00	24,468·89	329·88	..	..	117,296·00	46,931·91	528·43
Do.	..	Voided leases .. .. .	..	..	..	..	..	..	36	105·35	4,818·75	1,446·56
Do.	..	Sundry claims .. .. .	..	1·22	676·50	136·47	..	..	1·22	1,454·50	357·09	..
<i>From District generally:—</i>															
Sundry parcels treated at:															
		Reply Works .. .. .	..	..	..	7·30	..	..	..	37·00	2,531·55	..
		State Battery—Black Range .. .. .	..	..	..	147·19	..	..	..	202·00	10,209·53	59·53
		State Battery—Youanme .. .. .	..	..	..	270·42	..	..	..	..	2,223·76	..
		Various Works .. .. .	..	..	..	..	..	..	..	..	3,133·23	..
		Reported by Banks and Gold Dealers .. .. .	..	..	..	..	..	..	1,319·48	11·43	..	..	
		Total	32·31	1,509·15	163,932·69	74,091·85	2,904·70	1,435·38	10,463·73	836,678·71	559,488·81	10,729·08

Murchison Goldfield.
CUE DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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 .. ..	..	5.16	250.00	38.70	..	5.16	250.00	38.70	..
Do. ..	1860	Big Bell .. ..	..	..	200.00	81.32	..	..	200.00	81.32	..
Do. ..	1844	Mad Mull .. ..	..	54.74	184.50	108.45	..	54.74	366.50	233.00	..
Do. ..	..	Voided leases ..	..	..	..	..	..	10.59	34,863.25	43,396.22	15.42
Do. ..	..	Sundry claims ..	..	..	22.44	121.94	..	11.86	398.54	515.28	..
Cue ..	1833	Agamemnon .. ..	..	..	39.00	22.93	..	..	39.00	22.93	..
Do. ..	1809	Bob Bell .. ..	..	..	167.00	418.32	..	..	606.00	1,245.02	..
Do. ..	1875	Buttercup .. ..	..	..	68.00	33.72	..	..	68.00	33.72	..
Do. ..	203, 1148	(Cue Consolidated G.Ms., Ltd.) ..	..	..	..	..	..	..	23,427.50	18,382.10	..
Do. ..	203	Cue No. 1 .. ..	..	..	48.00	28.55	..	..	7,753.00	12,680.69	..
Do. ..	(1838)	Eclipse .. ..	..	..	..	..	..	..	4.50	4.71	..
Do. ..	1637	(Gem of Cue) .. ..	..	..	..	..	..	..	214.50	233.79	..
Do. ..	1637	Gem of Cue .. ..	..	..	534.50	489.25	..	..	666.50	593.06	..
Do. ..	1020	Gem of Cue Extended .. ..	..	..	..	44.82	..	..	38.50	3,646.40	..
Do. ..	1637, (1663)	(Gem of Cue leases) .. ..	..	..	..	..	..	..	3,264.50	1,941.52	..
Do. ..	1020, (1044)	(Gem of Cue, Limited) .. ..	..	..	..	..	..	..	11,724.00	6,746.05	..
Do. ..	1783	Hidden Treasure .. ..	..	..	2,241.50	2,795.02	..	..	9,545.50	11,466.38	..
Do. ..	(1831)	Hidden Treasure North Extended ..	..	..	31.50	5.70	..	..	31.50	5.70	..
Do. ..	(1806)	Hidden Treasure South .. ..	..	..	..	..	..	..	8.07	4.62	..
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 .. ..	..	..	617.00	265.71	..	..	1,309.00	1,088.69	..
Do. ..	(1778)	Lord Nolan .. ..	..	..	5.00	10.34	..	..	1,995.80	1,378.82	..
Do. ..	(222), (653), (1016), (1048), (1114)	(Princess (Murchison) Consolidated, Ltd.) .. ..	..	..	..	..	..	..	6,806.50	6,044.31	..
Do. ..	(222), (653), (1016), (1048), (1114)	Princess Royal leases .. ..	..	..	..	..	..	..	7,104.50	5,720.75	..
Do. ..	1151, 1252, 1362, (1391), 1498, (1689)	(Queen of the May leases) .. ..	..	..	..	..	..	..	6,926.00	6,974.06	..
Do. ..	1248	Rising Sun .. ..	..	..	38.50	27.40	..	..	1,369.00	934.77	..
Do. ..	1325	(Starlight) .. ..	..	..	..	..	..	..	1,506.50	1,473.40	..
Do. ..	1325	Starlight .. ..	..	..	159.50	207.81	..	..	159.50	207.81	..
Do. ..	1325, (1539)	(Starlight leases) .. ..	..	..	..	..	..	..	1,155.50	1,432.07	..

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Murchison Goldfield—continued.

CUE DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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	1706	St. Catherine's Bank	..	..	64.56	44.82	..	..	..	567.56	318.79	..
Do.	1868	Uncle Sam	..	..	320.00	98.75	..	..	..	320.00	98.75	..
Do.	1853	Vera	..	..	287.00	350.83	..	..	..	287.00	350.83	..
Do.	..	Voided leases	..	..	..	..	..	34.72	445.72	128,480.19	81,725.07	43.35
Do.	..	Sundry claims	1.46	..	1,034.00	642.79	..	10.50	277.68	11,823.35	7,513.12	..	
Eelya	..	Voided leases	..	..	..	..	..	..	8.78	966.00	1,774.03	..
Do.	..	Sundry claims	..	..	96.35	117.30	..	..	73.65	440.65	502.62	..
Erroll's	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.	(1764, [777B])	Three Star	..	..	..	..	..	..	..	563.50	483.89	..
Do.	..	Voided leases	..	..	..	..	..	..	3.62	7,578.00	4,779.00	..
Do.	..	Sundry claims	..	..	..	..	..	..	..	227.00	92.86	..
Mindoolah	(1845)	Economic	..	..	..	..	..	..	..	40.00	15.30	..
Do.	..	Voided leases	..	..	..	..	..	3.07	..	7,895.50	4,758.03	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	..
Tuckanarra	1337	Nemesis	..	..	..	..	..	..	608.78	2,132.00	5,607.84	..
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			..	..	..	346.66	..	..	..	1,870.50	4,547.18	..
Gem of Cue Extended Works			..	..	..	163.16	..	..	..	..	875.19	..
Great Saddle Works			..	..	..	..	..	..	..	..	157.29	..
Jasper Queen Works			..	..	..	..	..	..	..	..	11.11	..
Mindoolah Main Reef Works			..	..	..	..	..	..	..	..	542.40	..
State Battery, Tuckanarra			..	..	..	..	..	..	..	518.50	2,791.95	..
Various Works			..	..	..	..	..	..	..	5,055.02	16,982.67	..
Reported by Banks and Gold Dealers			..	..	..	..	..	750.72	7.54	..	..	..
Total ..			1.46	59.90	6,408.35	6,464.29	..	964.95	3,926.39	357,543.70	316,367.14	400.11	

MEEKATHARRA (LATE NANNINE) DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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.
Abbott's	..	Voided leases ..	..	..	..	..	..	..	35,165.60	37,103.60	..
Do.	..	Sundry claims ..	..	..	8.10	5.43	..	..	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.	(408N) ..	New Alliance ..	..	..	..	..	..	21.66	183.45	122.62	..
Do.	(408N), (517N) ..	(New Alliance leases)	..	..	..	..	..	..	12,475.00	15,414.98	13.12
Do.	938N ..	Perseverance ..	..	11.12	35.00	12.49	..	..	11.12	207.00	204.06
Do.	..	Voided leases ..	..	..	..	..	..	3,206.65	4,929.50	5,087.77	13.78
Do.	..	Sundry claims ..	..	..	..	..	..	11.35	29.53	18.90	..
Chesterfield	(1159N) ..	Central ..	..	..	6.00	26.62	..	..	206.10	6.00	26.62
Do.	..	Voided leases ..	..	..	..	..	..	29.02	203.05	6,750.26	7,418.39
Do.	..	Sundry claims ..	..	..	97.10	81.53	..	..	38.83	428.60	472.64
Gabanintha	1224N ..	Faugh-a-Balaugh ..	..	..	45.00	61.57	..	..	..	45.00	61.57
Do.	(1185N) ..	Hidden Gem ..	..	..	35.00	21.19	..	..	..	80.00	38.14
Do.	1068N ..	(New Brew) ..	..	..	..	..	..	..	..	815.00	575.89
Do.	1068N, (1070N), 1223N	New Brew leases	..	..	405.50	255.46	..	..	..	405.50	255.46
Do.	1175N ..	Unexpected ..	..	..	76.00	30.31	..	..	..	76.00	30.31
Do.	..	Voided leases ..	..	..	..	..	..	..	..	18,461.50	11,465.98
Do.	..	Sundry claims ..	..	2.52	48.00	39.74	..	1.33	37.34	844.00	595.50
Garden Gully	1226N ..	Booty ..	..	..	12.10	6.55	..	..	..	12.10	6.55
Do.	1036N ..	(Kanowna) ..	..	..	..	..	..	..	6.49	..	..
Do.	928N ..	(Kyarra) ..	..	..	..	..	..	..	..	761.00	1,145.88
Do.	928N, 1036N, 1037N, 1077N, 1168N	Kyarra G.M., N.L.	..	..	10,644.00	6,821.08	193.80	..	..	10,948.00	7,156.79
Do.	1221N ..	Kyarra View ..	..	..	46.10	74.95	..	..	..	46.10	74.95
Do.	(1222N) ..	Kyarra View North ..	..	2.43	..	..	..	..	2.43	..	..
Do.	..	Voided leases ..	..	..	..	..	..	26.36	27.88	603.33	909.39
Do.	..	Sundry claims ..	..	1.47	16.00	9.30	..	..	1.47	199.60	258.53
Gum Creek	1198N ..	Blue Bell ..	..	..	28.00	32.59	..	..	..	28.00	32.59
Do.	(953N) ..	Connecticut ..	..	..	..	36.69	..	..	..	61.00	284.68
Do.	(1067N) ..	Hero ..	..	..	..	..	..	..	..	182.00	333.36
Do.	(1207N) ..	Jupiter ..	..	..	223.00	336.50	..	..	..	223.00	336.50
Do.	..	Voided leases ..	..	..	..	..	..	25.27	88.12	2,018.08	2,112.82
Do.	..	Sundry claims ..	..	..	..	..	..	..	..	296.00	264.87
Jillawarra	(1187N) ..	Butterfly ..	..	..	..	..	..	..	..	6.00	32.66
Do.	..	Voided leases ..	..	..	..	..	..	..	1,050.64	1,474.55	2,736.29
Do.	..	Sundry claims ..	..	..	..	..	..	169.02	120.55	17.50	43.78

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 1913.					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.		
Meeka Pools	..	Voided leases ..	..	..	..	..	..	..	..	..	..	..	..	..
Do.	..	Sundry claims ..	..	..	..	..	..	..	2.84	..	111.58	82.27	..	..
											211.72	184.83	..	..
Meekatharra.	597N ..	(Commodore) ..	..	..	..	..	..	..	..	..	498.00	1,268.71	..	..
Do.	597N, 1041N ..	Commodore G.M. Co., N.L. ..	..	..	11,070.00	3,639.74	..	..	..	..	19,391.00	6,183.38	..	..
Do.	(1201N) ..	Commodore North ..	..	..	16.00	4.64	..	..	..	..	16.00	4.64	..	..
Do.	477N ..	(Fenian) ..	..	..	..	..	..	..	..	..	8,831.75	18,289.22	..	..
Do.	477N, 814N ..	Fenian leases ..	..	..	30,932.00	24,805.15	..	..	..	..	94,084.00	89,893.22	..	..
Do.	1250N ..	Gilbannia ..	..	28.83	10.10	7.37	..	..	28.83	..	10.10	7.37	..	..
Do.	912N ..	Globe ..	..	..	37.50	23.30	..	..	..	..	792.98	1,183.55	..	..
Do.	1163N ..	Golden Bracelet ..	..	..	183.10	152.23	..	..	..	..	931.42	885.78	..	..
Do.	1246N ..	Gold Queen ..	..	..	17.00	2.07	..	..	..	..	17.00	2.07	..	..
Do.	(313N) ..	Halcyon ..	..	..	..	..	..	..	2.11	..	3,461.75	1,415.71	..	..
Do.	635N ..	Halcyon Extended ..	..	..	..	..	..	..	..	..	882.50	957.77	..	..
Do.	236N ..	Havelock ..	..	..	37.00	11.38	..	..	..	..	4,220.89	2,708.92	..	..
Do.	555N ..	Ingliston ..	..	..	433.10	915.31	..	..	..	..	1,202.49	2,332.27	..	..
Do.	475N ..	(Ingliston Consols Extended) ..	..	..	..	..	..	..	..	..	1,536.25	4,248.25	..	30
Do.	475N, 515N, 729N, 822N ..	Ingliston Consols Extended leases ..	..	..	19,266.00	11,274.06	..	..	..	..	64,975.50	45,670.75	..	..
Do.	398N ..	(Ingliston Extended) ..	..	..	..	..	..	..	..	..	1,320.25	1,106.46	..	..
Do.	398N, 437N, 462N, 529N, 539N, 847N, 881N, 1033N ..	Ingliston Extended G.Ms., Ltd. ..	..	..	6,590.00	3,665.56	..	..	..	..	79,915.95	42,352.75	..	..
Do.	902N ..	Ingliston North ..	..	..	10.00	25.05	..	..	..	..	10.00	25.05	..	..
Do.	637N ..	(Ingliston South Extended) ..	..	..	..	..	..	..	..	..	10.00	10.60	..	..
Do.	507N ..	(Ingliston United) ..	..	..	..	..	..	..	..	..	293.25	147.95	..	..
Do.	1243N ..	King of the Hills ..	..	..	253.00	45.28	..	..	..	..	253.00	45.28	..	..
Do.	(1115N) ..	King of the Hills ..	..	..	..	..	..	..	..	..	566.99	211.03	..	..
Do.	507N, 637N, 931N, 933N, 964N, 1071N, 1142N ..	Lake View and Oroya Exploration, Ltd. ..	..	..	34,989.00	14,469.39	601.57	..	..	..	34,989.00	14,469.39	601.57	..
Do.	(852N) ..	Lone Hand ..	..	..	..	..	..	..	..	..	.50	305.85	447.63	..
Do.	915N ..	Macquarrie ..	..	2.07	91.85	32.26	..	..	..	17.33	3,787.98	1,082.26	..	..
Do.	734N ..	Macquarie North ..	..	..	..	..	..	..	..	29.85	85.25	25.08	..	..
Do.	533N ..	Marmont ..	..	..	5,120.00	2,436.67	..	..	..	..	48,497.00	34,326.85	..	..
Do.	580N ..	(Marmont Extended) ..	..	..	..	..	..	..	..	..	43.00	38.03	..	..
Do.	580N, 888N ..	Marmont Extended leases ..	..	..	..	..	..	..	..	..	152.00	129.61	..	..
Do.	372N ..	Pioneer ..	..	27.64	137.50	59.79	..	..	27.64	..	6,247.08	5,988.05	..	..
Do.	931N ..	(Queen of the Hill) ..	..	..	..	..	..	..	..	..	549.00	158.59	..	..
Do.	(989N) ..	Radium ..	..	..	..	..	..	..	..	..	158.52	127.70	..	..
Do.	(1188N) ..	Stockholm ..	1.88	..	86.26	71.73	..	..	1.88	..	96.20	90.90	..	..
Do.	1233N ..	Victory ..	..	..	63.00	15.40	..	..	..	..	63.00	15.40	..	..
Do.	1072N ..	Wayback ..	..	1.24	37.10	40.68	..	..	..	1.24	85.60	73.11	..	..
Do.	..	Voided leases ..	..	..	..	..	..	..	2.00	176.69	23,185.58	19,196.35	3.0	..
Do.	..	Sundry claims ..	..	6.52	451.11	116.24	..	..	177.68	11.83	2,296.95	1,332.07	..	..

Munara Gully	..	..	Voided leases ..	..	..	..	..	..	..	13,167-75	6,489-65	..
Do.	..	..	Sundry claims	..	..	..	..	..	7-95	63-00	21-75	..
Nannine	(791N)	..	Black Snake	..	..	..	..	..	..	933-60	339-98	..
Do.	(817N), (1039N)	..	Champion South leases	..	..	..	..	..	30-72	1,849-00	595-01	..
Do.	(1197N)	..	Corrigall	..	..	..	..	..	..	60-00	10-59	..
Do.	16N, 25N, 166N	..	Nannine leases	..	2,519-00	582-73	..	..	..	22,386-60	23,869-42	127-60
Do.	25N	..	(Royalist Consolidated)	..	..	..	..	..	19-18	762-53	3,500-70	..
Do.	..	..	Voided leases	..	..	..	..	..	34-02	312-05	38,554-48	39-85
Do.	..	..	Sundry claims	..	33-33	..	..	..	7-63	104-95	1,712-11	..
Quinn's	1218N	..	Bell Bird	..	10-00	5-41	..	..	16-61	10-00	5-41	..
Do.	(835N)	..	Commonwealth	..	372-00	124-31	..	..	..	1,692-10	930-88	..
Do.	1238N	..	Favourite	..	16-73	15-00	..	..	..	16-73	15-00	..
Do.	1174N	..	Forget-me-not	..	70-23	8-00	..	..	..	100-82	8-00	..
Do.	094N	..	Kaladbro	..	13-28	62-00	74-56	..	..	383-98	269-20	344-27
Do.	(1215N)	..	Lady Quinn	..	5-25	10-00	9-53	..	..	5-25	10-00	9-53
Do.	1225N	..	Nowthanna	..	..	163-00	54-02	..	..	..	163-00	54-02
Do.	1055N	..	Parramatta	..	13-33	157-00	43-83	..	..	13-33	936-00	493-81
Do.	(622N)	..	Phoenix	..	..	..	..	..	..	..	4,211-00	1,879-90
Do.	1244N	..	Phoenix Extended	..	..	101-00	52-80	..	..	..	101-00	52-80
Do.	(776N)	..	Phoenix Extended	..	..	175-10	37-73	..	..	..	3,800-21	1,485-53
Do.	(1193N)	..	Wallaby	..	14-21	10-00	13-24	..	..	..	14-21	27-50
Do.	..	..	Voided leases	..	..	..	..	..	..	7-30	271-82	2,046-22
Do.	..	..	Sundry claims	..	31-34	293-00	99-54	..	..	2-25	599-33	1,022-00
Stake Well	..	..	Voided leases	..	..	..	..	..	..	200-12	21,342-00	9,536-07
Do.	..	..	Sundry claims	..	..	18-00	11-63	..	..	31-79	90-00	74-46
Star of the East	..	..	Voided leases	..	..	..	..	..	..	..	27,244-00	20,305-40
Do.	..	..	Sundry claims	..	..	58-62	64-73	..	..	..	127-62	84-69
Yaloginda	1084N	..	Chunderloo	..	501-00	170-80	8-68	..	..	1,050-55	413-91	8-68
Do.	(937N)	..	Hornsby	..	30-00	8-73	..	..	..	505-00	178-46	..
Do.	(899N)	..	Maranui	..	..	..	..	..	..	212-00	261-11	..
Do.	1236N	..	Mystery	..	139-00	90-30	..	..	..	139-00	90-30	..
Do.	1240N	..	Rejected	..	120-00	14-53	..	..	..	120-00	14-53	..
Do.	891N	..	Romsev	..	2,617-00	652-80	..	..	..	28-77	4,140-03	1,081-48
Do.	675N	..	(Two Bells)	..	..	..	..	..	..	..	154-50	200-70
Do.	675N, 859N	..	Yaloginda Consols G.M. Co., Ltd.	..	..	..	..	..	..	..	18-00	31-16
Do.	..	..	Voided leases	..	..	..	..	..	..	463-37	16,994-84	9,929-76
Do.	..	..	Sundry claims	..	23-14	188-90	204-58	..	..	3-71	142-05	980-17
<i>From District generally:—</i>													
Sundry parcels treated at:													
											856-44	1-04	
Champion Cyanide Works											149-71	6-22	
Champion Extended Cyanide Works											42-06	..	
Karangahaki Works											630-13	..	
Purcell's Cyanide Works											31-37	..	
Margueritta Cyanide Works											14-00	9,893-59	
State Battery—Meekatharra											404-11	19-00	
State Battery—Nannine											139-75	2,076-68	
Various Works											..	334-91	
Reported by Banks and Gold Dealers											253-73	..	
Total ..				255-61	304-68	129,123-14	72,141-52	804-05	9,243-03	8,113-75	717,942-94	541,195-89	1,979-03

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Murchison Goldfield—continued.

DAY DAWN DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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 .. ..	..	..	1,339.24	614.94	..	2.49	2,793.62	2,052.40	..
Do. ..	(14D)	(Crocus) .. ..	..	..	..	..	..	..	1,138.00	1,640.41	..
Do. ..	1D, 2D, 86D, 87D, 99D, 119D, 129D, 158D, 159D, 170D, 185D, 191D, 209D, 210D, 211D, 212D, 213D, 224D, 225D, (249D), 424D, 453D, (455D), (467D)	Great Fingall Consolidated, Ltd.	57,373.00	25,704.12	7,133.83	1,699,462.63	1,106,119.20	157,604.04
Do. ..	(464D)	Lone Hand .. ..	..	..	..	..	..	..	190.25	427.50	625.88
Do. ..	(477D)	Lone Hand South .. ..	..	..	..	..	..	..	6.17	136.50	123.63
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 .. ..	..	..	97.89	47.90	..	..	..	124.89	109.53
Do. ..	321D	Richmond .. ..	..	..	..	..	..	..	4.12	..	..
Do. ..	119D	(West Fingall No. 6) .. ..	..	..	..	..	..	..	..	43.00	15.32
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	123.81	310.49	31,704.62	21,605.34
Do. ..	.. ..	Sundry claims .. ..	..	..	258.65	79.64	..	..	125.32	1,479.58	1,154.19
Lake Austin (Island)	497D	Central .. ..	..	..	326.63	168.82	..	..	..	326.63	168.82
Do. ..	443D	Eureka .. ..	..	23.43	20.00	8.45	..	52.93	74.21	101.04	737.25
Do. ..	407D	First Chip	57.93	21.90	49.52	31.45	..	57.93	297.43	377.50	906.56	
Do. ..	(499D)	Skipper .. ..	..	..	..	..	..	..	..	107.70	57.02
Do. ..	(496D)	Sybil .. ..	..	..	..	..	..	..	5.93	..	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	462.24	288.93	28,803.00	43,370.60
Do. ..	.. ..	Sundry claims .. ..	..	29.02	55.08	31.75	..	17.74	179.92	239.04	141.81
Mainland	507D	Enterprise .. ..	..	202.40	..	..	..	..	202.40	..	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	41	1,821.46	7,272.13
Do. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	3.24	12.08	77.45	89.03
Webb's Patch	513D	Comet .. ..	..	..	9.20	12.88	..	..	..	9.20	12.88
Do. ..	512D	Eclipse .. ..	..	..	30.05	27.36	..	..	..	30.05	27.36
Do. ..	510D	Hillend .. ..	..	..	211.00	43.39	..	..	..	211.00	43.39
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	4.90	83.76	5,748.50
Do. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	..	117.99	78.00	308.11
From District generally:—												
Sundry parcels treated at:												
Various Works .. ..			..	..	..	..	..	..	16.61	940.75	1,537.30
Reported by Banks and Gold Dealers			21.34	..	..	..	..	1,500.61	3.48	..	77
Total			79.27	276.75	59,770.26	26,770.70	7,133.83	2,226.80	3,740.55	1,788,200.08	1,212,019.18	157,604.28

MOUNT MAGNET DISTRICT.

MINING CENTER.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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 .. ..	..	..	445.50	2,338.60	..	..	..	783.50	4,301.01	..
Do. ..	(1082M)	Empress View .. ..	..	..	215.00	204.09	..	..	..	215.00	204.09	..
Do. ..	767M	(Galtee Moore) .. ..	..	..	..	..	..	..	6.80	3,025.00	1,180.85	..
Do. ..	767M	Galtee Moore .. ..	..	..	468.00	240.84	..	..	..	4,878.00	1,107.64	..
Do. ..	(963M)	Galtee Moore Extended .. ..	..	..	..	..	..	..	..	892.00	152.50	..
Do. ..	767M, (807M)	(Galtee Moore leases) .. ..	..	..	..	..	..	..	..	578.00	171.97	..
Do. ..	1093M	Iona .. ..	..	..	11.91	16.00	..	..	..	11.91	16.00	..
Do. ..	(1080M)	Lily .. ..	..	..	244.06	151.60	..	..	..	244.06	151.60	..
Do. ..	1061M	Long Reef: Great Boulder No. 1, Ltd. .. ..	..	..	..	1,762.33	..	..	..	..	1,762.33	..
Do. ..	(1065M)	Tripoli .. ..	..	..	5.59	6.70	..	..	..	5.59	6.70	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	..	..	..
Do. ..	.. ..	Sundry claims .. ..	..	..	12.50	32.91	..	..	3,185.81	122,407.42	107,282.32	458.82
..	.. ..	.. ..	..	..	..	..	..	..	22.91	1,614.92	904.62	..
Mt. Magnet ..	(1077M)	Bell Bird	2.43	5.00	4.38	2.43	5.00	4.38	..
Do. ..	1074M	Bertie	171.00	32.20	171.00	32.20	..
Do. ..	(314M), (317M), (320M), 988M, (989M)	(Black Hill Development Coy., Ltd.)	15,702.43	9,416.32	..
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. ..	(905M)	Cushie Doo East .. ..	..	..	..	..	..	..	4.45	46.40	14.64	..
Do. ..	490M, 507M	Cushie Doo leases .. ..	..	..	50.00	41.38	..	..	75.85	1,652.52	702.44	3.05
Do. ..	(1070M)	Diorite .. ..	..	..	..	..	..	..	28.28	8.00	33.92	..
Do. ..	1094M	Don't Forget .. ..	..	..	28.00	17.24	..	..	..	28.00	17.24	..
Do. ..	1032M	Early Bird .. ..	..	..	600.00	294.31	..	..	114.00	952.00	1,062.45	..
Do. ..	752M, (826M), (833M), (1025M)	Great Boulder No. 1, Ltd. .. ..	..	..	11.45	32.96	..	..	..	98,092.95	29,797.24	..
Do. ..	(761M)	Havelock .. ..	..	..	..	..	..	..	125.79	773.30	646.22	..
Do. ..	1048M	Hesperian .. ..	..	55.67	319.00	418.46	..	..	90.07	519.23	638.46	..
Do. ..	(1054M)	Mabel Dorothy .. ..	..	..	14.00	3.74	..	..	..	26.50	15.42	..
Do. ..	1013M	Mars .. ..	..	..	54.41	30.43	..	..	..	273.15	134.99	..
Do. ..	1097	May Queen .. ..	..	..	12.00	19.70	..	..	..	12.00	19.70	..
Do. ..	(314M), (317M), (320M), (942M), (972M), (988M), (989M), 1049M, 1050M, (1051M), (1052M)	Morning Star Gold Mines, Ltd. .. ..	..	..	293.50	261.92	..	..	..	16,591.50	6,251.01	..
Do. ..	445M	Neptune .. ..	..	..	53.00	59.37	..	..	895.33	2,012.91	2,603.34	..
Do. ..	1046M	New Year .. ..	..	..	245.00	505.72	..	..	..	395.00	778.60	..
Do. ..	1095M	Pearl .. ..	..	..	12.78	9.69	..	..	..	12.78	9.69	..
Do. ..	1076M	Polar Star .. ..	..	1,298.23	45.75	361.71	..	..	1,298.23	45.75	361.71	..
Do. ..	(1060M)	Rescue .. ..	..	..	54.75	61.89	..	..	12.06	194.25	206.47	..
Do. ..	1096M	Return .. ..	..	..	64.50	362.03	..	..	..	64.50	362.03	..
Do. ..	911M	(Saturn) .. ..	..	..	..	..	..	..	..	305.00	78.29	..
Do. ..	911M	(Saturn: Black Hill Development Co., Ltd.) .. ..	..	..	..	..	..	..	..	64.00	38.50	..

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Murchison Goldfield—continued.

MOUNT MAGNET DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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. Magnet ..	911M	Saturn : Morning Star G.Ms., Ltd. ..	..	..	53·25	132·82	..	..	..	4,641·75	1,489·50	..
Do. ..	696M	Sirdar .. ..	..	..	2,696·00	1,193·91	..	..	..	13,758·85	4,627·39	..
Do. ..	(1059M) ..	Southern Belle .. ..	..	..	..	..	..	..	..	29·25	11·29	..
Do. ..	(1043M) ..	Speedwell .. ..	..	..	..	..	..	..	..	33·50	44·87	..
Do. ..	752M	(St. George) .. ..	..	..	..	..	..	..	..	3,335·00	1,439·07	..
Do. ..	1041M ..	St. Patrick .. ..	..	..	359·15	392·89	..	..	..	472·60	656·99	..
Do. ..	(1053M) ..	Sunshine .. ..	..	..	..	..	..	..	21·42	30·75	29·94	..
Do. ..	(1064M) ..	Treasure .. ..	..	..	..	..	..	..	..	10·00	3·53	..
Do. ..	1090M ..	Treasury .. ..	..	634·81	..	..	..	..	634·81	..	..	..
Do. ..	1069M ..	Turning Point .. ..	..	..	35·00	31·31	..	..	..	35·50	84·75	..
Do. ..	1058M ..	Two Phills .. ..	..	..	64·75	51·71	..	..	..	79·25	85·45	..
Do. ..	1089M ..	Uncle Sam .. ..	..	13·63	..	..	..	..	13·63	..	..	..
Do. ..	1055M ..	Worker .. ..	..	..	101·00	17·89	..	..	..	101·00	17·89	..
Do. ..	..	Voided leases .. ..	..	..	..	..	..	27·83	726·37	169,987·67	124,334·37	669·56
Do. ..	..	Sundry claims .. ..	..	140·99	1,016·90	944·85	..	..	412·25	11,004·63	7,181·85	..
Mt. Magnet East	..	Voided leases .. ..	..	..	..	..	..	63·29	764·53	5,522·28	2,811·75	..
Do. ..	..	Sundry claims .. ..	..	..	..	..	..	..	37·22	214·50	144·10	..
Moyagee	(973M) ..	Moonlight .. ..	..	..	..	..	..	..	..	152·05	742·73	..
Do. ..	..	Voided leases .. ..	..	..	..	..	..	..	..	1,613·60	1,343·34	..
Do. ..	..	Sundry claims .. ..	..	4·25	36·31	118·21	..	..	89·18	337·88	522·52	..
Youanme	..	Sundry claims .. ..	..	..	..	..	..	..	..	33·00	44·58	..
<i>From District generally :—</i>												
Sundry Parcels treated at :												
		Longreef Treatment Works .. ..	..	..	..	1,580·45	..	..	..	..	1,580·45	..
		Morning Star Battery .. ..	..	..	..	192·13	..	..	..	..	192·13	..
		State Battery—Boogardie .. ..	..	..	..	1,393·75	..	..	..	45·01	9,692·51	..
		State Battery—Lennonville .. ..	..	..	..	57·93	..	..	..	18·06	6,453·32	..
		Various Works .. ..	..	..	..	..	..	..	..	25·00	7,028·75	1·00
		Reported by Banks and Gold Dealers ..	145·32	..	..	..	..	1,529·78	35	..	..	..
		Total	145·32	2,150·01	7,799·06	13,378·05	..	1,620·90	10,040·50	484,468·50	343,023·30	1,132·43

Yalgoo Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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 ..	..	..	262.00	205.06	..	..	404.00	352.31	..
Do. ..	680 ..	Field's Find Extended ..	..	..	179.00	115.69	..	..	179.00	115.69	..
Do. ..	(414), (441), (442), (443)	(Field's Find G.Ms., Ltd)	..	..	..	..	..	..	30,579.00	20,437.49	..
Do. ..	(414), (441), (442), (443)	(Field's Reward G.Ms. Ltd.) ..	..	..	..	..	..	..	138.00	266.95	..
Do. ..	707 ..	Ironclasp ..	..	..	3.00	81.71	..	..	3.00	81.71	..
Do. ..	685 ..	May Bird ..	..	33.85	28.00	83.06	..	33.85	28.00	83.06	..
Do. ..	708 ..	Mug's Luck ..	..	..	34.00	19.86	..	..	34.00	19.86	..
Do. ..	(414), (441), (442), (443), (519)	Reward G.Ms., Ltd. ..	..	..	..	276.72	..	60.78	2,409.00	2,761.51	..
Do. ..	696 ..	Tarrangower ..	..	..	78.00	386.68	..	..	78.00	386.68	..
Do. ..	..	Voided leases ..	..	..	..	..	..	7.85	102.50	79.58	..
Do. ..	..	Sundry claims ..	..	..	..	..	..	42.13	161.75	148.72	..
Goodingnow ..	681 ..	Aster Consolidated ..	..	..	205.50	258.11	..	..	205.50	258.11	..
Do. ..	(612), (644)	Aster leases ..	..	..	..	..	..	..	101.50	39.15	..
Do. ..	690 ..	Blend ..	..	..	100.50	65.95	..	..	100.50	65.95	..
Do. ..	(610)	Blue Bell ..	..	..	21.00	22.64	..	..	61.00	111.60	..
Do. ..	603 ..	Carnation ..	..	..	494.50	669.11	..	..	594.50	894.96	..
Do. ..	(627)	Carnation North ..	..	..	..	..	..	..	19.00	47.36	..
Do. ..	(618)	Coronation ..	..	..	24.00	18.68	..	..	84.00	56.02	..
Do. ..	615 ..	Daphne ..	..	2.55	140.50	180.76	..	2.55	232.50	316.41	..
Do. ..	682 ..	Havela Gold ..	15.82	152.90	22.00	91.91	..	15.82	22.00	91.91	..	
Do. ..	(626)	Jacamar North ..	..	..	..	..	..	..	58.50	15.82	..
Do. ..	606 ..	(Lake View) ..	..	..	..	..	..	..	163.00	185.46	..
Do. ..	606 ..	Lake View: Payne's Find Development Co., N.L.	..	..	794.00	574.52	..	..	944.00	750.15	..
Do. ..	660 ..	Marrigold ..	..	..	211.50	144.09	..	..	316.50	216.25	..
Do. ..	630 ..	Marraposa ..	..	..	301.00	228.22	..	..	501.00	513.56	..
Do. ..	613 ..	Orchid ..	..	..	219.00	495.74	..	..	294.00	823.52	..
Do. ..	(616)	Oversight ..	..	..	..	..	..	..	42.00	138.17	..
Do. ..	(617)	Oversight North ..	..	..	37.00	42.49	..	..	137.00	131.55	..
Do. ..	(601)	Pansy ..	..	..	67.00	53.05	..	..	287.00	160.66	..
Do. ..	(605)	Shamrock ..	..	..	..	..	..	..	26.00	8.32	..
Do. ..	607 ..	(Sweet William) ..	..	..	..	..	..	2.16	4.85	81.59	..
Do. ..	607, 608, 662	Sweet William Consolidated Mines, N.L.	..	7.68	612.50	803.74	..	7.68	760.46	1,352.91	..	
Do. ..	..	Voided leases ..	..	..	..	..	..	..	114.50	59.32	..
Do. ..	..	Sundry claims ..	..	1.19	630.50	396.79	..	148.00	1,123.00	630.83	..
Gullewa ..	(170), 171, (174)	(Monarch M. Syndicate) ..	..	..	..	..	..	..	12.00	9.04	..
Do. ..	(170), 171, (174)	Monarch leases ..	..	..	..	..	..	..	5,571.00	1,640.88	..

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Mount Margaret Goldfield—continued.

MOUNT MORGANS DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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. Morgans..	(29F), (30F)	(Transvaal leases) .. ..	..	..	..	..	..	..	..	5,526.75	1,516.54	..
Do. ..	(29F), (30F), (230F), (261F)	(Transvaal leases) .. ..	..	..	..	..	..	29.18	..	350.00	166.76	..
Do. ..	316F	Transvaal South .. ..	..	..	..	488.35	75.76	..	..	..	488.35	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, (0F), (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. .. ..	..	..	400.00	176.41	..	..	..	400.00	176.41	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	47.38	18,392.50	11,862.22	2.10
Do. ..	.. ..	Sundry claims .. ..	..	..	55.50	41.35	..	6.61	22.66	1,222.75	1,079.84	..
Murrin Murrin	208F	(Alex Junior) .. ..	..	..	..	..	..	..	..	2,182.25	2,791.98	..
Do. ..	208F	(Alex Junior) .. ..	..	..	..	..	..	..	..	170.00	88.73	..
Do. ..	208F, (250)	(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), 203F, (258F), (259F), 269F, (272F), (273F), (274F), (275F), (279F), (280F), (281F), (295F) ..	(Hills Proprietary, Ltd.) .. ..	..	..	..	..	..	..	..	2,563.47	1,636.94	..
Do. ..	193F, 194F, 195F, 196F, (198F), (199F), (200F), (262F), 208F, (258F), 269F, (274F), (281F) ..	Hill's Proprietary, Ltd. .. ..	..	..	57.00	23.84	..	..	..	1,997.00	2,102.67	..
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, 194F, (198F), (199F), (201F), (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>													
<i>Sundry parcels treated at:—</i>													
		Mt. Mo ven Cyanide Works ..	..	..	..	..	129.48	..	..	..	..	129.48	..
		Oratava Works—Kalgoorlie ..	..	..	..	..	..	..	..	..	..	14.16	..
		Various Works ..	..	..	..	..	..	..	..	..	788.50	2,995.91	84.03
		Reported by Banks and Gold Dealers ..	..	..	..	50.22	..	..	1,504.90	32.47	..	..	..
		Total ..	..	..	..	50.22	..	989.55	1,205.25	75.76	1,561.36	3,297.04	790,971.66
			..	..	..								466,719.71
			..	..	..								5,758.43

MOUNT MALCOLM DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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 ..	..	..	34.25	146.47	..	..	..	..	34.25	146.47	..
Do. ..	(1432c) ..	Bower Bird ..	..	..	..	..	..	..	..	..	34.50	169.10	..
Do. ..	(1179c), (1310c) (1340c) ..	Bullfinch, West G.M. Co., N.L. ..	..	..	..	..	..	..	..	..	71.00	28.31	..
Do. ..	1459c ..	King of the Hills ..	..	44.49	92.00	146.66	..	..	44.49	..	92.00	146.66	..
Do. ..	(1451c) ..	King of the Hills ..	..	..	207.00	222.67	..	..	..	..	207.00	222.67	..
Do. ..	(1179c), (1310c) (1340c) ..	(King of the Hills leases) ..	..	..	..	..	..	..	..	..	158.00	97.71	..
Do. ..	(1435c) ..	Mount Stirling ..	..	..	19.50	35.04	..	..	..	..	65.50	96.61	..
Do. ..	..	Voided leases ..	..	..	..	..	..	..	774.66	31,876.78	28,629.08	..	..
Do. ..	..	Sundry claims ..	..	..	48.25	16.59	..	..	65.50	2,273.80	2,787.47	..	..
Dodgers Well	1317c ..	Ivy ..	..	..	102.75	52.22	..	..	..	..	421.25	259.09	..
Do. ..	..	Voided leases ..	..	..	..	..	..	..	54.97	780.05	1,641.52	..	..
Do. ..	..	Sundry claims ..	..	..	66.00	110.01	..	..	3.37	720.25	562.32	..	..
Leonora ..	1356c ..	Auckland ..	..	..	153.50	156.91	..	..	..	..	224.50	243.00	..
Do. ..	1447c ..	Casino ..	..	..	190.00	265.50	..	..	..	..	190.00	265.50	..
Do. ..	(1288c) ..	Casino ..	..	..	71.00	90.36	..	..	133.18	968.95	2,093.16	..	..
Do. ..	198c ..	(Eastern) ..	..	..	..	..	..	..	..	..	302.00	321.72	..
Do. ..	1360c ..	Federal Mint ..	..	..	56.00	118.36	..	..	..	..	78.50	171.46	..
Do. ..	1448c ..	Forrest: Leonora Main Reefs, Ltd. ..	..	..	9.00	40.13	..	..	..	..	9.00	40.13	..
Do. ..	(1437c) ..	Gold Blocks West ..	..	2.12	10.50	26.97	..	..	2.12	..	22.50	90.70	..
Do. ..	1456c ..	Harbour Lights ..	..	..	85.50	17.17	..	..	..	..	85.50	17.17	..
Do. ..	(1407c) ..	Harbour Lights ..	..	..	..	..	..	..	..	..	964.50	121.67	..
Do. ..	1454c ..	Hope of Leonora ..	..	..	14.00	5.23	..	..	..	..	14.00	5.23	..
Do. ..	195c, 196c ..	Leonora Gold Blocks leases ..	..	..	971.00	522.51	..	..	..	..	16,509.00	14,165.46	..
Do. ..	(1424c), (1425c) ..	Leonora Main Reefs, Ltd. ..	..	..	..	..	..	..	..	..	33.00	118.49	..
Do. ..	1446c ..	Mt. Gerमतong ..	..	..	..	..	..	..	..	..	21.00	3.42	..
Do. ..	1466c ..	Nellie Mac ..	..	..	6.00	40.72	..	..	..	..	6.00	40.72	..
Do. ..	1413c ..	Nil Desperandum ..	..	..	59.50	212.18	..	..	..	..	151.50	475.78	..
Do. ..	(1217c) ..	Ping Pong ..	..	..	25.00	49.53	..	..	..	..	1,438.50	2,609.89	..
Do. ..	1216c ..	Rajah ..	..	..	72.50	311.10	..	..	..	..	506.50	1,076.64	..

TABLE IV.—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 1913.					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 ..	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. . . . .	..	..	145,698·00	63,313·47	5,093·19	..	..	1,716,788·50	881,785·60	42,454·87
Do. ..	198c, 1082c	(Sons of Gwalia South G.M. Co., N.L.)	..	..	..	..	..	..	..	631·00	903·61	..
Do. ..	198c, 1082c, (1257c), (1258c), 1259c, (1284c), (1285c), (1300c), (1301c)	(Sons of Gwalia South G.Ms., Ltd.) ..	..	..	..	..	..	..	..	98,239·00	51,593·99	8·66
Do. ..	198c, 1082c, 1259c	(Sons of Gwalia South G.Ms., Ltd.) ..	..	..	..	..	..	..	..	9,909·00	3,169·89	..
Do. ..	1453c	Tiger .. .. .	..	..	72·50	23·32	..	..	..	72·50	23·32	..
Do. ..	263c	(Trump) .. .. .	..	..	..	..	..	..	..	562·50	2,393·40	..
Do. ..	263c	Trump: Gwalia Central G.Ms., Ltd. . .	..	..	232·00	1,130·30	..	..	..	268·00	1,339·60	..
Do. ..	263c, (774c), (793c)	(Trump leases) .. .. .	..	..	..	..	..	..	..	21,794·45	16,002·07	..
Do. ..	1307c	Victor .. .. .	..	205·81	65·00	96·65	..	..	525·16	395·55	563·32	..
Do. ..	..	Voided leases .. .. .	..	..	..	..	..	..	592·78	107,029·50	38,501·34	10·71
Do. ..	..	Sundry claims .. .. .	..	..	606·50	274·48	..	..	42·96	7,769·55	5,732·18	..
Malcolm ..	(1294c)	Great Northern .. .. .	..	..	..	..	..	..	..	381·00	297·97	..
Do. ..	1175c	North Star: Malcolm Prospecting Co., N.L.	..	..	3,330·00	1,706·50	..	..	..	22,515·50	12,986·75	..
Do. ..	991c	Richmond Gem .. .. .	..	..	..	6·84	..	..	..	9,179·00	8,023·70	..
Do. ..	(1442c)	Sunday .. .. .	..	..	..	..	..	..	..	150·00	84·53	..
Do. ..	..	Voided leases .. .. .	..	..	..	..	..	..	..	47·07	26,348·28	24,251·56
Do. ..	..	Sundry claims .. .. .	..	..	82·00	45·29	..	..	..	6·64	2,766·40	2,007·88

Mertondale ..	638c, (645c), (653c), (1178c)	644c, (648c), (1146c)	(Merton's Reward G.M. Co., Ltd.) ..	..	..	..	..	..	..	75,476-50	37,151-80	1,497-58
Do. ..	638c, (648c)	644c, (653c)	Merton's Reward North leases ..	..	..	51-00	428-53	..	..	503-00	1,742-46	..
Do. ..	638c	..	(Merton's Reward, North)	..	..	..	..	..	..	11,396-50	20,033-09	..
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 ..	..	..	394-00	372-62	..	..	532-46	5,360-79	..
Do. ..	..	..	Voided leases ..	..	..	..	..	..	572-66	3,255-50	6,723-50	..
Do. ..	..	..	Sundry claims ..	..	..	..	..	9-75	208-44	635-25	939-05	..
Pig Well ..	(1089c)	..	(Gambier Lass) ..	..	..	..	..	..	..	4,320-50	4,485-26	26-40
Do. ..	(1089c), (1210c)	..	Gambier Lass leases ..	..	..	..	..	..	..	4,415-50	3,588-50	..
Do. ..	1295c	..	(Starlight) ..	..	..	..	..	..	..	181-50	695-73	..
Do. ..	1295c, 1324c	..	Starlight leases ..	..	..	..	..	..	..	75-50	235-87	..
Do. ..	..	..	Voided leases ..	..	..	..	..	..	..	4,246-07	5,464-44	37-28
Do. ..	..	..	Sundry claims ..	..	..	..	..	..	34-61	2,391-40	1,036-51	..
Randwick ..	1401c	..	Triangle ..	..	..	1-00	211-65	..	..	16-15	442-99	..
Do. ..	..	..	Voided leases ..	..	..	..	..	..	235-37	7,931-75	7,150-18	..
Do. ..	..	..	Sundry claims ..	..	16-32	5-00	42-31	..	66-57	96-12	1,246-35	890-24
Webster's Find	(1434c)	..	Malcolm Main Reefs ..	..	5-30	..	..	..	5-30	..	..	..
Do. ..	..	..	Voided leases ..	..	..	..	..	..	25-00	..	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)	..	(Great Western) ..	..	..	..	..	..	..	..	4,770-00	3,206-85
Do. ..	(1120c), (1127c), 1130c	..	(Great Western leases) ..	..	..	..	..	..	..	..	12,698-50	5,572-69
Do. ..	(1120c), (1127c), 1130c	..	Great Western (Wilson's Patch) G.M., Ltd.	..	..	940-00	462-30	..	..	..	5,931-50	2,271-71
Do. ..	..	..	Voided leases ..	..	..	..	..	..	..	99-38	2,948-10	1,405-61
Do. ..	..	..	Sundry claims ..	..	..	..	..	..	..	1-50	638-00	354-85
<i>From District generally:—</i>													
Sundry parcels treated at:—													
Allsop & Howell's Works, Kalgoorlie 5-00													
Drew & Mason's Cyanide Works 93-97													
Fremantle Trading Co's. Works 1-42													
King of the Hills Works 19-00													
Lang's Cyanide Works 751-23													
Mt. Clifford Battery 555-98													
North Star Battery 431-53													
Oratava Works, Kalgoorlie 15-90													
Randwick Battery 88-50													
Richmond Gem Works 10-83													
State Battery, Leonora 95-50													
State Battery, Pig Well 22-00													
Various Works 242-00													
Reported by Banks and Gold Dealers 167-19													
Total													
				172-49	268-74	153,770-25	72,297-50	5,093-19	2,198-86	6,107-27	2,254,576-13	1,251,910-21	44,154-81

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 1913.					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	(1883r)	Birthday Gift	..	..	..	..	..	..	168.00	121.33	..
Do.	1935r	Black Swan	..	..	255.00	459.23	..	..	255.00	459.23	..
Do.	1832r	Boomerang	..	..	117.50	181.78	..	..	504.50	739.56	..
Do.	(1926r)	Dead Horse	..	..	..	..	..	..	22.00	12.32	..
Do.	1553r	Golden Bell	..	..	..	..	..	..	2,463.00	6,889.87	..
Do.	1851r	Golden Bell, North	..	..	262.00	276.04	..	..	1,491.00	1,886.33	..
Do.	(1010r)	(Karridale)	..	..	..	..	..	..	3,727.08	11,278.43	200.00
Do.	(1010r), (1655r)	Karridale leases	..	..	..	..	..	..	309.50	514.54	..
Do.	(1655r)	(Karridale South)	..	..	..	..	..	..	17.00	17.20	..
Do.	(1869r)	Lone Hand	..	..	12.00	17.46	..	..	257.00	409.60	..
Do.	943r	(Mikado)	..	..	..	..	..	..	342.00	206.14	..
Do.	943r, 1124r	Mikado G.M. Co., Ltd.	..	..	..	..	..	..	11,417.10	9,111.15	8.30
Do.	1044r	Nil Desperandum	..	..	451.00	914.33	..	..	4,629.00	8,615.14	..
Do.	1885r	Nulla Nulla	..	7.79	151.00	172.52	..	7.79	291.00	280.29	..	
Do.	1841r	Redeemed	..	..	149.50	161.48	..	..	221.97	711.00	..
Do.	781r	Sailor Prince	..	..	..	..	..	..	4,771.00	4,725.83	16.00
Do.	1931r	Savage Captain	..	..	55.00	34.72	..	1.27	..	55.00	..
Do.	1644r, 1747r	Specimen Hill leases	..	..	483.00	211.97	..	..	3,111.00	1,609.70	..
Do.	..	Voided leases	..	..	..	..	..	1.02	128.78	25,810.00	47,665.88
Do.	..	Sundry claims	..	..	20.00	16.57	..	..	54.75	2,556.15	2,470.61
Duketon	1938r	Great Dolerite, No. 1	3.54	268.16	..	..	..	3.54	268.16	..	..
Do.	1937r	Limonite	..	300.42	33.00	123.55	..	..	300.42	33.00	123.55
Do.	1875r	(Mulga Queen)	..	..	..	..	..	..	..	470.00	221.08
Do.	1875r	Mulga Queen (West Australia) G.M. Co., Ltd.	..	..	300.00	54.05	..	..	..	300.00	54.05
Do.	..	Voided leases	..	..	..	..	..	..	110.53	29,502.00	20,300.54
Eagle's Nest	..	Voided leases	..	..	..	..	..	..	145.34	331.00	1,215.78
Do.	..	Sundry claims	..	..	..	..	..	..	..	55.00	42.21
Eristoun	1923r	Bundoleer	..	..	9.00	11.29	..	..	..	9.00	11.29
Do.	(1382r)	King of Creation	..	..	85.00	23.52	..	..	11.66	904.00	272.95
Do.	(1915r)	May Be	..	..	..	..	..	..	..	13.67	9.58
Do.	(1906r)	Mona	..	..	..	..	..	..	..	..	111.31
Do.	(1665r)	Westralia Tasmania	..	..	650.00	89.49	..	..	..	13,589.00	2,485.77
Do.	..	Voided leases	..	..	..	..	..	..	..	12,496.40	15,570.45
Do.	..	Sundry claims	..	116.81	16.00	5.51	..	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	(1895r)	Aeroplane	..	..	10.00	7.20	..	..	63.79	23.00	81.97
Do.	(1921r)	Aeroplane South	..	..	..	..	..	..	..	21.00	3.48

Do.	371r	(Augusta)							11,216-00	11,670-72		
Do.	371r	(Augusta : Golden Rhine G.Ms. (W.A.), Ltd.)							15,497-50	11,031-75		
Do.	371r, 1650r	(Augusta G.M. Co., N.L.)							1,753-00	2,037-66		
Do.	371r, 1650r	Augusta G.M. Co., N.L.		350-00	92-40				350-00	92-40		
Do.	1918r	Bega		24-50	128-33			12-34	46-50	250-51		
Do.	(1822r)	Brothers United						8-93	124-00	373-19		
Do.	1797r, 1798r	Craiggiemore leases							27,211-00	5,783-75		
Do.	1922r	Fairfield		90-00	112-38				239-00	274-30		
Do.	838r	(General Wabash)							100-00	288-72		
Do.	829r	(Ida H.)							111-00	285-13		
Do.	829r, 838r, 846r, 1219r, 1310r, 1671r, 1894r	Ida H. G.M. Co., Ltd.		16,149-00	10,319-12				167,900-00	123,074-34	4,674-69	
Do.	1897r	(Lady Harriet)							991-00	98-94		
Do.	1897r, 1900r	Lady Harriet leases : Mary Mac G.M. Co., N.L.		351-50	148-71				351-00	148-71		
Do.	715r, 806r, 1206r, 1207r, 1483r, 1523r, 1524r, 1525r, 1542r, 1544r, 1548r	(Lancefield G.M. Co., Ltd.)							153,829-00	58,842-47	5,824-39	
Do.	715r, 806r, 1206r, 1207r, 1483r, 1523r, 1524r, 1525r, 1542r, 1544r, 1548r	(Lancefield G.M. Co., Ltd.)							102,179-78	39,402-81		
Do.	715r, 806r, 1206r, 1207r, 1483r, 1523r, 1524r, 1525r, 1542r, 1544r, 1548r	Lancefield G.M. Co., Ltd.							260,749-00	103,535-54	21,612-29	
Do.	(1840r)	(Mary Mac)							2,434-00	1,426-40		
Do.	(1840r), (1867r)	(Mary Mac G.M. Co., Ltd.)							661-00	262-28		
Do.	(1840r)	Mary Mac : Mary Mac G.M. Co., N.L.		1,523-00	661-94				1,661-50	877-49		
Do.	1949	Pinnacles		96-00	36-51				96-00	36-51		
Do.	(1886r)	Toora		10-00	19-50				39-60	79-92		
Do.		Voided leases						1,241-08	114,019-60	42,183-38		
Do.		Sundry claims	88-61	198-50	258-88		43-56	814-26	2,867-20	2,633-85		
Mt. Barnicoat		Voided leases							652-00	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 :—												
		Brownhill Consols—Kalgoorlie			2-73					2-73		
		Caledonia Works							7-00	53-58		
		Craiggiemore Works								110-28		
		Fremantle Trading Co's. Works			3-24					3-24		
		Mulcahy's Works								67-90		
		Mulga Queen Works								140-39		
		Oratava Works—Kalgoorlie								19-54		
		Prosser's Cyanide Works								31-28		
		State Battery—Burtville			1,804-52				62-00	5,678-71		
		State Battery—Laverton							49-50	740-84		
		Various Works							82-00	2,769-40		
		Reported by Banks and Gold Dealers	144-20					1,867-42				
		Total	147-74	781-79	21,851-50	16,848-97		3,092-24	3,571-75	1,072,249-63	590,994-49	32,335-67

Menzies	(2832z), (2844z), 3100z, (3138z), (4966z), 5392z	Menzies Mining and Exploration Corporation, Ltd.	..	..	468.50	126.95	..	..	..	25,562.00	29,426.94	..
Do.	5359z	No Name	..	..	77.50	32.12	..	..	..	885.50	422.88	..
Do.	5392z	(Revival)	..	..	..	..	..	..	..	22.50	5.90	..
Do.	2823z	Robinson Crusoe	..	..	451.00	296.19	..	..	13.24	3,019.00	1,576.54	..
Do.	2823z	(Robinson Crusoe : Crusoe Gold Claims, Ltd.)	..	..	..	..	..	..	..	33,135.00	32,978.74	1,038.47
Do.	5345z	Seemore	..	..	20.00	4.13	..	..	..	701.00	544.13	..
Do.	5318z	Surprise	..	..	51.25	142.62	..	..	480.50	282.25	749.87	..
Do.	3048z	Warrior	..	..	76.50	14.93	..	..	..	76.50	14.93	..
Do.	3048z, (5336z)	(Warrior leases)	..	..	273.00	175.62	..	..	..	8,099.00	4,733.00	5.00
Do.	3048z	(Warrior : Menzies Gold Mining Co., N.L.)	..	..	..	..	..	..	..	1,165.00	731.48	..
Do.	..	Voided leases	..	..	..	..	..	45.42	543.38	130,900.66	165,828.25	6,819.82
Do.	..	Sundry claims	..	2.90	1,692.25	866.73	..	6.69	343.61	14,273.75	8,268.23	..	
Mt. Ida	5307z	(Copperfield)	..	..	..	..	..	..	..	120.00	24.89	..
Do.	5307z	Copperfield	..	..	147.00	206.95	..	..	..	1,779.00	1,639.72	..
Do.	(5306z), 5307z	(Copperfield leases)	..	..	..	..	..	..	..	158.00	89.34	..
Do.	5035z	Federation	..	..	22.00	74.60	..	..	..	1,823.00	4,752.11	..
Do.	5250z	Forest Belle	..	..	590.00	538.64	..	..	..	3,676.00	3,262.55	..
Do.	5243z, 5321z, (5322z), (5341z), (5355z)	(Mt. Ida Meteor leases)	..	..	..	..	..	..	..	9,472.00	7,148.80	39.00
Do.	5243z, 5321z	Mt. Ida Meteor leases	..	..	240.00	218.36	..	..	..	824.00	1,139.30	..
Do.	5382z	Mount Ida West	..	..	200.00	335.61	..	..	..	200.00	335.61	..
Do.	(5384z)	South Timoni	..	..	21.00	17.88	..	..	..	21.00	17.88	..
Do.	5321z	(Timoni)	..	..	..	..	..	..	..	20.00	36.62	..
Do.	5177z	Unexpected	..	..	595.00	613.82	..	..	..	4,470.00	8,449.80	..
Do.	(5363z)	Unexpected North	..	..	33.00	17.55	..	..	..	171.00	114.16	..
Do.	5290z	Unexpected South	..	..	310.00	172.41	..	..	..	310.00	172.41	..
Do.	5290z, (5329z), (5381z)	(Unexpected South leases)	..	..	70.00	56.83	..	..	..	4,524.00	8,179.29	35.64
Do.	5292z	Wild Rose	..	..	..	15.46	..	..	..	664.00	578.77	..
Do.	..	Voided leases	..	..	..	..	..	..	77.07	23,439.58	28,397.82	23.74
Do.	..	Sundry claims	..	..	78.00	35.29	..	..	9.57	4,632.50	2,432.52	..
<i>From District generally :—</i>													
Sundry parcels treated at :													
		Allsop and Howell's Works—Kalgoorlie	..	..	..	..	..	..	..	..	3.00	..
		Balkis Battery	..	..	..	725.28	..	..	..	..	823.79	..
		Crusoe Wedderburn Cyanide Works	..	..	..	424.73	..	..	..	..	529.27	..
		Cully and Salkild's Works	..	..	..	..	..	..	..	..	41.36	..
		Fremantle Trading Co., Ltd.	..	..	..	97.65	..	..	..	..	182.10	..
		Goongarrie Cyanide Works	..	..	..	..	..	..	..	..	288.51	..
		Lady Harriet Battery	..	..	..	237.82	..	..	..	62.50	619.75	..
		Menzies Milling Co., Ltd.	..	..	..	..	..	..	..	..	365.56	..
		Menzies Mining and Exploration Corporation, Ltd., Works	..	..	..	..	..	..	..	639.50	732.04	..
		Mt. Ida Cyanide Works	..	..	..	..	..	..	..	..	3,323.96	..
		Mt. Ida Meteor Works	..	..	..	370.89	..	..	..	..	623.94	..
		Oratava Works—Kalgoorlie	..	..	..	..	..	..	..	..	82.42	..
		State Battery—Menzies	..	..	..	115.07	..	..	..	1,043.50	13,554.43	..
		State Battery—Mt. Ida	..	..	..	..	..	..	..	1,833.25	4,471.57	..
		Various Works	..	..	..	..	..	..	..	763.55	2,371.64	122.93
		Reported by Banks and Gold Dealers	..	4.39	..	..	..	885.99	195.48	..	..	..
		Total	..	4.39	161.82	57,884.10	44,061.68	1,635.54	966.97	2,619.69	829,040.48	752,182.77	11,724.16

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 1913.					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	(944v)	Corn in Egypt	..	..	117.25	100.14	..	..	..	375.25	376.93	..
Do.	959v	Expansion	..	..	470.00	75.06	..	..	..	470.00	75.06	..
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.	..	..	544.00	508.67	..	..	..	3,027.00	1,985.50	..
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.	..	..	97.00	9.29	..	..	..	1,222.00	169.95	..
Do.	882v	Lady Ellen	..	..	88.50	224.64	..	..	20.33	717.50	1,150.21	..
Do.	(898v)	Light of Israel	..	..	245.00	88.44	..	..	..	3,062.60	731.90	..
Do.	928v	Pirate	..	..	59.00	31.29	..	..	..	482.75	798.00	..
Do.	874v	(Resurgam)	..	..	..	..	..	..	..	415.00	69.72	..
Do.	874v	Resurgam	..	..	110.00	266.46	..	..	..	110.00	266.46	..
Do.	874v (877v)	(Resurgam leases)	..	..	..	..	..	..	..	1,605.25	2,660.93	..
Do.	438v	(Waihi)	..	..	..	..	..	..	4.51	243.50	851.09	..
Do.	438v	Waihi	..	..	117.50	229.74	10	..	..	346.00	725.36	..
Do.	438v	(Waihi: Westralia Waihi G.Ms., N.L.)	..	..	..	..	..	..	..	1,437.00	1,526.94	58.90
Do.	438v	(Waihi: Westralia Waihi G.Ms., N.L.)	..	..	..	..	..	..	..	686.50	465.60	..
Do.	907v, 924v	Westralia United Goldfields, Ltd.	..	..	885.25	543.86	..	..	..	969.75	582.05	..
Do.	438v, (792v)	(Westralia Waihi G.Ms., N.L.)	..	..	..	..	..	..	..	26,192.00	15,004.51	5,225.54
Do.	..	Voided leases	..	..	..	..	..	..	2.93	110.81	17,289.86	118.60
Do.	..	Sundry claims	..	..	207.00	97.09	..	..	..	30.12	4,876.60	..
Diemel's Find	..	Sundry claims	..	7.37	102.50	119.13	..	..	7.37	102.50	119.13	..
Mulline.	955v	Belle Maie	..	..	27.75	86.27	..	..	..	27.75	86.27	..
Do.	(949v)	California	..	..	..	..	..	..	..	22.00	25.76	..
Do.	954v	Cardinal	..	8.32	73.00	61.98	..	..	8.32	73.00	61.98	..
Do.	957v	Crusoe	..	..	33.00	5.89	..	..	..	33.00	5.89	..
Do.	(958v)	Gladiola	..	..	4.00	5.07	..	..	..	4.00	5.07	..
Do.	961v	Golden Horn	..	..	23.50	41.64	..	..	..	23.50	41.64	..
Do.	(934v)	Home Turn	..	..	9.50	7.71	..	..	..	117.50	126.52	..
Do.	139v, 235v, 555v, (670v), (671v), (679v), (732v), (862v)	(Lady Gladys 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.	(670v)	(Lady Gladys Junction)	..	..	..	..	..	..	..	52-78	..
Do.	139v, 235v, 555v, (670v)	Lady Gladys leases	..	..	..	..	..	..	371-50	169-55	..
Do.	139v, 235v, 555v	(Lady Gladys leases)	..	..	..	..	..	170-89	7,741-00	15,025-05	..
Do.	960v	Peach Tree	..	..	28-25	30-07	..	..	28-25	30-07	..
Do.	(872v)	Peach Tree	..	..	..	..	..	..	292-50	354-92	..
Do.	123v	Riverina	..	..	1,728-00	497-79	..	..	5,657-00	3,012-82	..
Do.	123v, (773v)	(Riverina G.M. Co., N.L.)	..	..	..	..	..	..	11,254-00	7,096-21	..
Do.	324v, 600v, 730v	Riverina South leases	..	..	1,030-00	735-32	..	..	15,394-50	11,420-48	..
Do.	763v	(Young Australian)	..	..	..	..	..	..	1,295-00	3,609-26	..
Do.	763v, (938v), 939v	Young Australian leases	..	..	718-75	1,530-60	..	..	2,487-75	5,534-88	..
Do.	..	Voided leases	..	..	..	..	..	..	59-33	21,119-47	2-71
Do.	..	Sundry claims	..	..	306-25	252-26	..	..	33-51	3,921-25	-69
Mulwarrie	951v	Killaloe	..	..	121-50	94-09	..	..	121-50	94-09	..
Do.	919v	Mulwarrie	..	..	110-00	81-69	..	..	551-00	307-01	..
Do.	(494v)	Mulwarrie Main Reef	..	..	..	..	..	..	2,062-50	3,220-59	20-81
Do.	(953v)	Oakley	..	..	22-50	29-00	..	..	22-50	29-00	..
Do.	(947v)	Ularring Westralia	..	..	..	..	..	..	103-00	90-95	..
Do.	..	Voided leases	..	..	..	..	..	..	56-84	15,177-39	21,481-89
Do.	..	Sundry claims	..	..	174-75	195-86	..	..	19-24	1,567-00	1,312-11
Ularring	..	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 :													
		Golden Pole Battery	..	..	..	57-26	..	..	..	57-26	..
		Light of Israel Works	..	..	13-00	100-80	..	..	13-00	100-80	..
		Oratava Works—Kalgoorlie	..	..	..	..	..	..	..	54-39	..
		State Battery—Mulline	..	..	..	1,448-79	..	..	442-50	12,319-38	..
		State Battery—Mulwarrie	..	..	8-25	138-89	..	..	595-20	3,208-70	..
		Various Works	..	..	..	..	..	..	15-82	77-25	44-75
		Reported by Banks and Gold Dealers	..	..	..	..	..	18-53	77	..	..
		Total	15-69	7,475-00	7,694-79	-10	21-46	1,111-70	266,222-99	269,517-61	5,432-91

NIAGARA DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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	..	..	..	..	..	..	..	156-00	326-00	..
Do.	..	Voided leases	..	..	..	..	..	..	5-73	9,207-75	6,905-98	12-04
Do.	..	Sundry claims	..	..	..	..	..	..	8-99	1,331-70	634-19	..
Kookynie	(762G)	Carpathia	..	..	91-00	28-39	..	..	..	138-00	42-89	..
Do.	320G	Champion	..	..	113-00	139-59	..	..	..	19,925-50	9,609-96	2-28
Do.	320G	(Champion: Champion Proprietary, Ltd.)	..	..	..	..	..	..	..	36,310-00	18,381-09	425-32

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 1913.					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, (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.	..	..	283·00	380·66	..	..	..	455·00	694·79	..
Do.	757g	Cosmopolitan No. 2: Cosmopolitan Proprietary, Ltd.	..	..	344·50	397·15	..	..	..	594·00	799·18	..
Do.	(761g)	Moldavia	..	·85	47·00	21·56	..	..	·85	103·50	69·24	..
Do.	(733g)	Rally Again	..	..	75·00	38·46	..	..	..	145·00	75·27	..
Do.	..	Voided leases	..	..	..	..	..	..	256·48	666,557·47	349,324·28	4,948·37
Do.	..	Sundry claims	..	..	116·50	751·42	..	30·59	74·79	3,686·75	3,299·02	..
Niagara	(518g), (529g), (577g)	(Eaglehawk Heather Co., N.L.)	..	..	..	..	..	..	..	6,650·00	2,423·32	..
Do.	419g, 461g	(Hannan's Main Reef G.M. Co., Ltd.)	..	..	..	..	..	..	..	11,119·00	5,910·89	..
Do.	763g	Lone Hand	..	13·64	296·00	149·54	..	..	13·64	715·00	473·71	..
Do.	734g	(Lubra Queen)	..	..	..	..	..	..	..	831·00	285·51	..
Do.	734g, (735g), (744g), 749g	Lubra Queen G.M. Co., N.L.	..	..	2,887·00	1,174·49	..	..	..	3,320·00	1,294·48	..
Do.	734g, (735g)	(Lubra Queen leases)	..	..	..	..	..	..	..	1,230·00	966·71	..
Do.	721g	May	..	..	59·75	82·44	..	..	..	1,129·25	808·51	..
Do.	(518g)	(Missing Link)	..	..	..	..	..	..	23·93	431·00	563·27	..
Do.	(518g), (529g), (577g)	Missing Link leases	..	..	..	..	..	..	..	440·00	342·62	..
Do.	419g	(Opal)	..	..	..	..	..	..	..	552·50	490·53	..
Do.	419g	(Opal: Hannan's Main Reef G.M. Co., Ltd.)	..	..	..	..	..	..	..	119·00	70·99	..
Do.	419g, 461g, (679g), 688g, 689g, (705g)	Orion Mines, Ltd.	..	..	25·25	298·56	..	..	..	24,744·25	12,061·37	..
Do.	461g	(Pearl: Hannan's Main Reef G.M. Co., Ltd.)	..	..	..	..	..	..	..	398·00	224·38	..
Do.	(766g)	Try Again	..	..	87·00	67·72	..	..	..	87·00	67·72	..
Do.	..	Voided leases	..	..	..	..	..	..	66·97	31,006·00	24,602·40	..
Do.	..	Sundry claims	..	1·48	580·75	232·22	..	13·27	46·97	7,844·00	4,744·79	..
Tampa	278g	(Fortuna)	..	..	..	..	..	..	..	109·00	187·42	..
Do.	278g	Fortuna	..	..	30·00	27·06	..	..	..	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.	..	..	11,080·00	2,838·37	32·00	..	..	16,900·00	4,223·03	95·00
Do.	..	Voided leases	..	..	..	..	..	..	15·66	15,950·05	11,748·91	..
Do.	..	Sundry claims	..	2·31	43·50	18·58	..	5·07	4·37	2,514·50	1,404·34	..

From District generally:—												
Sundry parcels treated at:												
Cumberland Cyanide Works	53-00	569-04	..	
Eaglehawk Heather Works	128-00	862-26	..	
Grafter Battery	29-41	..	..	82-00	239-15	..	
Murie's Works—Desdemona	237-41	..	
State Battery—Niagara	227-22	..	..	622-50	8,026-14	..	
Various Works	270-00	4,687-72	41-17	
Reported by Banks and Gold Dealers	9-48	10-48	..	..	..	1,321-97	787-38	..	..
Total	9-48	28-76	16,159-25	6,902-84	32-00	1,370-90	1,305-76	872,511-72	484,187-83	5,524-18

YERILLA DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					TOTAL PRODUCTION.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
Edjudina	(989R)	Anchor	..	..	25-00	8-24	..	..	25-00	8-24	..
Do.	(969R)	Crow's Nest	..	..	225-50	156-22	..	..	402-75	278-97	..
Do.	994R	Digger	..	..	..	..	..	..	27-00	12-20	..
Do.	(491R), (500R)	Edjudina Goldfields, Ltd.	..	..	982-50	608-50	..	..	1,266-10	926-61	..
Do.	(497R)	(Gawler)	..	..	..	..	..	..	130-00	173-15	..
Do.	418R, (497R)	(Gawler G.M. Co., Ltd.)	..	..	..	..	..	..	1,505-50	2,641-43	..
Do.	(968R)	Golden Lizard	..	..	50-00	56-21	..	10-41	469-33	415-50	..
Do.	(401R)	(Neta)	..	..	..	..	..	..	4,280-50	5,466-29	..
Do.	418R	Neta Extended	..	..	61-50	48-61	..	..	61-50	48-61	..
Do.	418R	(Neta Extended)	..	..	..	..	..	..	1,182-50	1,421-81	..
Do.	1010R, 1011R	Neta leases	..	..	32-50	30-32	..	..	32-50	30-32	..
Do.	(401R), 418R, (497R), (500R)	(Neta leases)	..	..	..	..	..	..	5,217-00	9,968-12	34-58
Do.	(401R), (500R)	(Neta leases)	..	..	..	..	..	..	1,274-50	1,264-91	..
Do.	(987R)	Senate	..	..	46-00	80-29	..	..	46-00	80-29	..
Do.	..	Voided leases	..	..	..	..	..	3-65	13,257-58	16,113-20	3-21
Do.	..	Sundry claims	..	..	277-17	227-38	..	13-06	2,358-17	1,997-56	..
Eucalyptus	..	Voided leases	..	..	..	..	..	2,864-77	1,351-35	3,020-68	..
Do.	..	Sundry claims	..	..	..	..	..	367-50	283-50	312-33	..
Linden	998R	Bindah	..	..	922-00	345-35	..	..	922-00	345-35	..
Do.	(951R)	Camel Back	..	..	..	..	..	..	291-00	189-09	..
Do.	965R	Danube	..	..	334-00	324-85	..	..	563-50	643-29	..
Do.	871R	Democrat	..	..	247-00	445-04	..	..	1,698-00	3,532-13	..
Do.	928R	Great Carbine	..	..	672-50	291-42	..	7-53	1,654-00	1,104-25	..
Do.	942R	Great Junction	..	..	80-00	41-64	..	..	661-00	568-61	..
Do.	971R	Linden Star	..	..	75-25	71-37	..	..	103-75	92-75	..
Do.	(972R)	New Year's Gift	..	..	..	..	..	..	353-50	284-37	..
Do.	(1005R)	Olympic	..	..	37-00	17-93	..	..	37-00	17-93	..
Do.	(988R)	Sand King	..	..	..	..	..	..	100-00	24-28	..
Do.	903R, (904R), 985R, (992R)	Westralia United Goldfields, Ltd.	..	..	1,995-00	1,452-42	..	..	1,995-00	1,452-42	..
Do.	..	Voided leases	..	..	..	..	..	516-04	8,160-40	11,740-06	..
Do.	..	Sundry claims	..	..	702-00	650-48	..	77-81	35-11	5,451-50	3,919-48
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 1913.					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. Remarkable	..	Voided leases .. ..	..	..	..	..	..	17.74	23.72	415.09	..
Do.	..	Sundry claims .. ..	..	..	..	..	..	4.00	1.32	..	..
Pinjin	729R	Anglo Saxon .. ..	..	..	382.50	118.92	..	..	6,052.40	5,026.70	..
Do.	(962R)	Unication .. ..	..	..	..	..	..	..	624.00	333.22	..
Do.	..	Voided leases .. ..	..	..	..	..	..	46.99	7,337.90	4,561.82	..
Do.	..	Sundry claims .. ..	..	..	406.00	226.76	..	99.36	3,019.85	2,047.67	..
Yarri	788R	Dostmund .. ..	..	..	80.00	204.38	..	..	775.00	1,625.64	2.00
Do.	947R	Dostmund West .. ..	..	..	138.50	43.55	..	..	402.00	461.13	..
Do.	1017R	Golden Butterfly .. ..	..	..	49.50	71.68	..	..	49.50	71.68	..
Do.	581R	Wallaby .. ..	..	..	1,993.00	359.64	..	41.36	10,483.50	4,020.15	..
Do.	(580R)	(Wallaby Central) .. ..	..	..	..	..	..	..	2,411.00	2,335.30	..
Do.	(580R)	Wallaby Central .. ..	..	..	134.00	89.80	..	14.91	1,852.50	681.94	..
Do.	(580R)	(Wallaby Central; Lake View South, Ltd.) .. ..	..	..	..	..	..	..	10,109.00	4,488.20	..
Do.	..	Voided leases .. ..	..	..	..	..	6.30	30.81	7,530.75	4,721.46	..
Do.	..	Sundry claims .. ..	..	..	378.60	123.20	..	3.31	4,170.60	2,329.16	..
Yerilla	850R	(Central East) .. ..	..	..	..	..	..	..	244.00	166.12	..
Do.	752R, 850R	Viola leases .. ..	..	..	405.50	380.06	..	9.64	1,922.00	1,766.89	2.82
Do.	1001R	Westward Ho .. ..	..	..	210.50	100.12	..	..	210.50	100.12	..
Do.	851R	Yerilla King .. ..	..	..	970.50	837.04	..	..	3,589.50	3,044.99	..
Do.	..	Voided leases .. ..	..	..	..	..	..	3,079.87	6,996.96	5,617.10	8.54
Do.	..	Sundry claims	85.00	68.78	..	19.30	15.88	2,002.50	1,124.98	..	
Yilganie	..	Voided leases .. ..	..	..	..	..	..	..	218.75	295.45	..
Do.	..	Sundry claims .. ..	..	..	..	..	121.67	29.83	25.50	46.17	..
Yundamindera	931R	Battles Ville .. ..	..	..	983.50	251.70	..	..	1,971.50	554.99	..
Do.	979R	Potosi .. ..	..	..	..	..	..	..	41.00	94.53	..
Do.	(990R)	Undaunted .. ..	..	..	..	..	..	..	23.00	11.91	..
Do.	..	Voided leases .. ..	..	..	..	..	..	71.37	65,987.10	44,738.34	5.82
Do.	..	Sundry claims .. ..	..	..	164.50	70.77	..	85.22	2,193.50	1,716.97	..
<i>From District generally :—</i>													
Sundry parcels treated at :													
Edjudina Goldfields Ltd., Works .. ..			..	..	..	..	..	..	..	284.08	..
Fremantle Trading Co.'s Works .. ..			..	..	..	..	..	..	..	4.92	..
Neta Battery .. ..			..	..	..	81.59	..	..	..	81.59	..
State Battery—Linden .. ..			..	..	..	1,396.54	..	..	72.00	3,039.03	..
State Battery—Pinjin .. ..			..	..	10.00	5.70	..	..	125.50	1,184.39	..
State Battery—Yarri .. ..			..	..	..	67.19	..	..	231.50	3,136.36	3.50
State Battery—Yerilla .. ..			..	..	..	285.28	..	2.17	72.00	696.22	..
Various Works .. ..			..	..	..	..	..	..	660.85	3,179.33	..
Reported by Banks and Gold Dealers			8.18	..	..	..	..	1,001.90	154.74	..	..
Total			8.18	..	13,156.52	9,638.97	..	1,236.68	7,520.58	197,098.81	172,115.71	60.47	

Broad Arrow Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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	(1661w)	Wycheproof												
Do.	1659w	Zoroastrian			467.86	183.24						23.20	1.88	
Do.		Voided leases										667.86	207.99	
Do.		Sundry claims			48.00	52.80				256.68	180.70	71,988.16	50,463.63	203.60
												2,423.25	1,770.96	
Black Flag	(1665w)	Alexandra			55.58	99.59						55.58	99.59	
Do.	1681w	Great Wonder		17.43	44.00	17.81					17.43	44.00	17.81	
Do.	1726w	Lady Bountiful			8.46	18.82						8.46	18.82	
Do.	1730w	Stella May			19.00	12.83						19.00	12.83	
Do.		Voided leases												
Do.		Sundry claims			49.31	22.82			27.81	356.56	686.51	39,927.91	24,214.58	
												1,913.26	1,786.09	
Broad Arrow	1636w	Eldorado			14.35	47.45						34.35	83.10	
Do.	1677w	Jumbo			140.23	64.37						140.23	64.37	
Do.	1707w	Pearl			27.20	32.58						27.20	32.58	
Do.	1684w	Surbiton			118.17	86.20						118.17	86.20	
Do.		Voided leases												
Do.		Sundry claims		308.09	145.89	382.25			54.85	817.21	967.96	116,137.38	94,913.63	15.85
												6,645.19	4,407.80	
Paddington	(1639w)	Mount Corlic										199.00	136.37	
Do.	1733w	Mount Eddy			46.00	297.02						46.00	297.02	
Do.	1568w	Star of W.A.			27.35	23.19						93.15	241.66	
Do.	(1650w)	Try it Again			64.97	37.13						147.97	72.81	
Do.		Voided leases												
Do.		Sundry claims			162.04	733.61			5,557.72	257.75	1,714.16	172,905.20	80,560.75	18.96
												9,421.69	6,093.66	
Siberia	1694w	A.N.A.			21.00	7.84						21.00	7.84	
Do.	1399w, 1424w, 1429w, 1442w, 1655w	Associated Northern Blocks (W.A.) Ltd.			93,450.38	27,066.68		701.30				116,363.38	32,322.87	701.30
Do.	1722w	Bonnie Doon			6.25	32.15						6.25	32.15	
Do.	1460w	Brace and Bit			163.50	13.79						163.50	13.79	
Do.	1685w, 1701w	Comedy King leases			31.00	8.51						31.00	8.51	
Do.	1698w	Gimlet Central Extended			107.43	195.27						107.43	195.27	
Do.	1427w	Gimlet Consols			133.00	17.63						133.00	17.63	
Do.	1695w	Gimlet Duke			166.00	31.21						166.00	31.21	
Do.	1452w, 1458w	Gimlet Proprietary, N.L.			30.00	3.76						30.00	3.76	
Do.	1371w	Gimlet South			14,735.00	2,873.96						23,842.50	5,110.77	
Do.	1399w	(Gimlet South Extended)										525.00	835.44	
Do.	1399w, 1424w, 1429w, 1442w	(Gimlet South Extended leases)										215.00	39.98	
Do.	1333w	(Gimlet West)										680.50	482.83	
Do.	1206w, 1403w	Golden leases		11.54	34.50	17.80						374.82	178.41	
Do.	1358w	Golden Mount			280.00	144.59						4.26	1,514.00	871.53
Do.	1693w	Golden Mount South			30.00	9.08						30.00	9.08	
Do.	1644w, 1673w	Home Signal G.M. Synd., N.L.			12.00	15.59						12.00	15.59	
Do.	1710w	Indarra			62.00	9.20						62.00	9.20	
Do.	(1435w)	Invincible South										20.00	12.88	
Do.	1434w	Jack Hugh			44.41	52.00						44.41	622.80	

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 1913.					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	1289w, 1308w	Lady Evelyn leases	..	16.53	575.00	306.03	..	..	23.43	3,254.75	2,976.10	..
Do.	1293w	Mexico	..	..	33.00	19.49	..	..	..	128.00	176.94	..
Do.	1293w, (1298w)	(Mexico leases)	..	..	..	..	..	..	..	457.00	999.75	..
Do.	(1291w)	Missouri	..	..	..	..	..	..	..	8.64	1,434.50	533.29
Do.	(1670w)	New Golden Gimlet	..	..	222.00	41.37	..	..	..	222.00	41.37	..
Do.	1416w	Prince Foot	..	..	..	..	..	..	..	22.50	23.26	..
Do.	1375w	Siberia Consols	..	..	..	..	..	..	41.58	1,013.50	3,136.03	..
Do.	1336w	(Slippery Gimlet)	..	..	..	..	..	..	..	26,110.50	8,217.79	..
Do.	1336w, 1338w, 1419w	Slippery Gimlet leases	..	..	..	..	..	..	..	1,735.00	831.36	..
Do.	1671w	Stirling West	..	..	90.00	39.22	..	..	..	90.00	39.22	..
Do.	(1409w), (1446w)	Stirling West leases	..	..	..	..	..	..	..	389.00	67.96	..
Do.	(1687w)	Victorious Gimlet Junction	..	..	114.00	10.59	..	..	..	114.00	10.59	..
Do.	1705w	Whitehaven	..	..	105.00	34.66	..	..	..	105.00	34.66	..
Do.	(1586w)	Whitehaven Extended	..	..	194.50	23.98	..	..	..	394.50	170.56	..
Do.	..	Voided leases	..	..	..	..	..	..	159.57	15,808.25	6,948.75	..
Do.	..	Sundry claims	38.64	91.35	613.25	515.66	..	122.98	397.15	3,873.35	4,736.07	..
Smithfield	..	Voided leases	..	..	..	..	..	..	..	1,027.00	200.90	..
Do.	..	Sundry claims	..	..	..	..	..	..	23.79	49.50	149.47	..
<i>From Goldfield generally:—</i>												
Sundry parcels treated at:												
Allsop and Howell's Works—Kalgoorlie			..	..	..	..	..	..	..	..	6.70	271.76
Braybrook's Cyanide Works			..	..	..	..	..	..	..	..	427.54	..
Broad Arrow Consols Works			..	..	..	..	..	..	..	..	118.29	..
Brownhill Consols Works—Kalgoorlie			..	..	38.99	15.32	..	..	..	38.99	15.32	..
Duke Cyanide Works			..	..	..	..	..	..	..	..	5.25	..
Fremantle Trading Co., Ltd., Works			..	..	..	..	..	..	..	..	80.10	..
Hannan's Central Works—Kalgoorlie			..	..	8.70	15.47	..	..	..	8.70	15.47	..
New Arrow Proprietary Works			..	..	..	..	..	299.35	..	5,229.08	4,666.06	..
Northey's Venture Works			..	..	..	138.38	..	..	..	..	531.65	..
Ora Banda Works			..	..	19.00	15.08	..	..	..	96.00	5,055.83	..
Oratava Works—Kalgoorlie			..	..	..	..	..	..	..	..	94.89	..
Paddington Consols Works			..	..	..	..	..	..	9.75	6,932.37	..	
Paddington Slimes Works			..	..	..	..	..	..	..	789.17	..	
Pole Works			..	..	..	..	..	..	..	..	356.07	..
Regan's Works			..	..	..	250.39	..	..	..	27.00	598.81	..
State Battery—Siberia			..	..	40.00	21.21	..	..	..	40.00	598.98	..
Vettersburg Cyanide Works			..	..	..	..	..	..	..	..	665.36	..
Zoroastrian Works			..	..	..	..	..	..	..	116.50	1,082.23	..
Various Works			..	..	..	..	..	1,971.82	..	11,306.85	12,401.29	7.09
Reported by Banks and Gold Dealers			37.68	..	..	..	..	7,295.95	..	..	..	..
Total			76.32	489.35	112,805.91	34,173.66	701.30	18,699.11	4,235.02	640,331.40	370,484.39	1,218.56

North-East Coolgardie Goldfield.

KANOWNA DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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.
Black Swan ..	..	Voided leases .. ..	..	..	..	..	..	..	160.00	..	141.76	..
Gambier ..	(434x), (878x) ..	(Atlas G.Ms., Ltd.) .. ..	..	..	..	..	..	..	8,007.00	..	3,378.99	..
Do. ..	(434x)	(Camelia) .. ..	..	..	..	..	..	..	242.50	..	325.82	..
Do. ..	(434x)	Camelia .. ..	..	..	..	..	..	..	3.53	..	2,415.00	1,103.70
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	35.20	..	2,064.50	1,829.79
Do. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	24.70	245.94	..	858.75	750.42
Gindalbie ..	394x, 396x ..	Kalgoorlie Foundry, Ltd. .. ..	..	..	1,162.00	639.47	..	..	..	..	4,524.00	2,468.70
Do. ..	(392x), 394x, 396x, (1048x), (1207x)	(Milton 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
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. ..	(1174x), (1176x)	United leases .. ..	..	..	..	..	..	..	..	..	2,710.50	2,274.44
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	19.94	5,419.55	4,638.93
Do. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	..	674.82	..	1,017.75	1,207.80
Gordon ..	891x	(Sirdar) .. ..	..	..	..	..	..	..	32.60	..	168.50	1,319.35
Do. ..	891x	Sirdar .. ..	..	12.32	1,245.00	405.01	..	..	12.32	..	1,245.00	405.01
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
Kanowna ..	(1270x)	Andrew Fisher .. ..	..	..	..	..	..	..	881.38	..	1.00	122.06
Do. ..	1062x	Gentle Polly .. ..	..	..	..	..	..	..	24.46	..	6,919.25	12,476.27
Do. ..	1238x	Golden Crown .. ..	..	64	35.00	23.11	..	..	10.89	..	1,494.00	413.14
Do. ..	1302x	Golden Valley .. ..	..	..	233.00	50.79	..	..	..	..	381.00	74.70
Do. ..	(1256x)	Havilah .. ..	..	..	..	..	..	..	..	..	205.00	231.61
Do. ..	1342x	Hidden Boulder .. ..	..	..	416.00	194.26	..	..	..	..	416.00	194.26
Do. ..	1344x	Hill .. ..	..	16.23	26.00	26.96	..	..	16.23	..	26.00	26.96
Do. ..	1019x	Kanowna .. ..	..	..	393.00	288.77	..	..	691.94	..	6,648.50	8,867.06
Do. ..	1299x	Kanowna Consol .. ..	..	..	448.50	89.52	..	..	..	..	713.50	129.30
Do. ..	1341x	Kanowna Queen .. ..	..	..	103.00	4.29	..	..	..	..	103.00	4.29
Do. ..	1055x	Kintore .. ..	..	..	139.00	78.22	..	..	..	..	2,103.75	2,570.90
Do. ..	1331x	Lady Alice .. ..	..	..	111.00	24.62	..	..	..	..	111.00	24.62
Do. ..	18x, 19x	(Lily Australis G.Ms., Ltd.) .. ..	..	..	..	..	..	..	..	..	197.00	119.18
Do. ..	1295x	Louisa .. ..	..	..	128.00	47.38	..	..	6.32	..	315.00	97.37

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 1913.					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	1232x	Luck at Last	..	..	136.50	113.30	..	..	..	563.50	498.49	..
Do.	(52x)	(Marquis of Queensbury: Lake View South G.M. (W.A.), Ltd.)	..	..	..	..	..	..	..	23,579.65	10,136.28	24.33
Do.	(52x)	Marquis of Queensbury: Lake View South, Ltd.	..	..	168.00	20.83	..	..	..	2,353.25	994.31	..
Do.	(52x)	(Marquis of Queensbury: Robinson G.Ms., Ltd.)	..	..	..	..	..	..	..	16,478.75	16,215.33	..
Do.	1347x	Nora	..	..	30.00	49.64	..	..	..	30.00	49.64	..
Do.	1206x	North Lead	..	..	1,808.00	534.94	..	..	..	6,720.09	1,479.40	..
Do.	(3x), 14x, 15x, 13x, 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.	..	..	8,717.50	4,503.91	..	..	..	18,370.50	8,747.93	..
o.	1339x	Polly Ann	..	69.63	97.00	41.54	..	..	69.63	97.00	41.54	..
Do.	1261x	Prince Foote	..	..	..	..	..	..	..	429.00	155.03	..
Do.	1332x	Prince Guelph	..	..	137.00	70.32	..	..	..	137.00	70.32	..
Do.	(1301x)	Prince Oscar	..	24.07	..	..	..	..	..	24.07	13.00	..
Do.	1330x	Robinson	..	..	808.00	557.83	..	..	..	808.00	557.83	..
Do.	(1325x)	Ruby	..	..	345.00	38.49	..	..	..	345.00	38.49	..
Do.	1300x	Sunset	..	..	133.00	46.56	..	..	2.27	269.00	80.56	..
Do.	1232x	(Try Again)	..	..	..	..	..	..	..	1,678.50	471.90	..
Do.	1232x	Try Again: Last Chance G.M. Co., N.L.	..	..	57.00	6.87	..	..	..	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.	(10x), 12x, (White Feather Main Reefs (1906), Ltd.)						20.45	24,393.00	9,138.31			
Do.	13x, 72x, (83x), (201x), 855x, (1001x), (1012x), (1108x), (1249x)	(White Feather Reward, Ltd.)						42,767.75	22,255.23	14.80		
Do.	(9x), (10x), 72x, (83x), (180x), (200x), (201x), (431x)											
Do.		Voided leases					3.59	2,542.30	129,888.06	63,062.58	245.93	
Do.		Sundry claims	56.14	151.00	56.53	1.50	88.57	1,353.22	12,135.56	5,832.12	1.50	
Mulgarrie	(1327x)	Gem		154.00	172.54				154.00	172.54		
Do.	1228x	Lady Pratt						148.46	301.00	104.41		
Do.	1284x	Moorilla		365.75	162.01			20.93	700.75	302.82		
Do.	1326x	Palm G.M.		278.00	191.38				278.00	191.38		
Do.	1297x	Valentine		67.00	91.67			3.43	170.00	206.30		
Do.		Voided leases						1,043.81	3,215.00	1,800.62		
Do.		Sundry claims		12.50	19.45			13.29	650.00	386.69		
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 & Co.'s Works								1,677.87		
		Golden Valley Works			188.22					376.52		
		Kalgoorlie Foundry Ltd., Works			317.77					553.56		
		Lady Pratt's Works			4.70					4.70		
		Last Chance Cyanide Works								1,314.62		
		Middleton's Cyanide Works								1,765.01		
		Morrison's Cyanide Works								377.07		
		North White Feather Filter Press Plant								797.46		
		Old Cement Works		18.00	1,106.19				70.00	6,224.58		
		Riedel and Norton's Works			87.72				642.00	1,448.54		
		Robinson's Cyanide Works								5,657.98		
		South Gippsland Cyanide Works			85.50					85.50		
		State Battery Cyanide Works—Kalpini								95.12		
		W.A. Slimes Co., Ltd.								2,420.35		
		Various Works					25.01		903.10	8,244.57		
		Total for Lease and Quartz claims		179.03	18,361.75	10,489.62	1.50	141.87	9,784.32	716,022.06	425,038.15	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:								50.00	12.75	
		Kalgoorlie Foundry Ltd., Works								10,050.00	3,305.89	
		Old Cement Works		1,042.00	277.28					11,785.00	1,602.88	
		Riedel and Norton's Works		885.00	146.59					260.00	22.69	
		State Battery—Kalpini								77,090.21	54,895.82	
		Various Works								27,804.55	36,711.17	
		Treated outside district (not reported by owners)									84.69	
		Reported by Banks and Gold Dealers	40.78					103,885.87	.86			
		Total	40.78	179.03	20,288.75	10,913.49	1.50	104,333.15	10,652.70	869,438.22	534,389.94	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 1913.					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 .. ..	..	..	..	..	..	..	..	..	..	..	..	..
Do.	..	Sundry claims .. ..	..	..	..	..	..	18·87	145·13	1,821·25	1,408·51	..	..	..
Kurnalpi	(378k)	Full Tide .. ..	..	2·55	4·00	22·07	..	..	25·29	4·00	22·07	..	..	..
Do.	329k	Kurnalpie .. ..	..	9·50	..	..	..	..	9·50	..	..	..	..	..
Do.	333k	Kurnalpi King .. ..	..	90·43	7·42	63·09	..	..	823·39	15·51	306·34	..	..	..
Do.	(337k)	Kurnalpi Wonder .. ..	..	33·16	4·57	12·14	..	..	406·25	8·25	105·70	..	..	..
Do.	(420k)	Maori .. ..	..	..	16·00	10·68	..	..	..	60·00	30·27	..	..	..
Do.	(409k)	Minter's Best .. ..	..	4·09	..	..	..	..	4·09	..	..	..	..	..
Do.	(332k)	Turn of the Tide .. ..	..	..	21·00	19·16	..	..	6·83	31·50	49·45	..	..	..
Do.	..	Voided leases .. ..	..	..	..	..	..	371·18	424·72	2,677·05	1,698·95	6·27	..	..
Do.	..	Sundry claims .. ..	..	..	4·00	6·23	..	217·92	76·23	130·00	157·19	..	..	..
Mulgabbie	312k	Mulgabbie Perseverance .. ..	..	..	3·50	457·09	..	..	..	24·40	2,635·79	4·95	..	..
Do.	421k	Star .. ..	..	12·94	2·75	284·47	..	..	12·94	2·75	284·47	..	..	..
Do.	338k	White Elephant .. ..	..	29·33	1·00	80·36	..	..	29·33	2·50	161·75	..	..	..
Do.	..	Voided leases .. ..	..	..	..	..	..	..	514·69	41·00	3,511·60	..	..	..
Do.	..	Sundry claims .. ..	..	..	2·00	25·88	..	6·50	1,430·03	83·00	640·66	..	..	..
<i>From District generally:—</i>														
Sundry parcels treated at:														
Glover's Works .. ..			..	..	..	1·00	..	..	..	..	5·76	..	..	..
Various Works .. ..			..	..	..	..	..	..	..	56·50	187·39	..	..	..
Reported by Banks and Gold Dealers			95·41	..	..	..	..	11,308·16	19·62	..	..	..	..	..
Total			95·41	182·00	66·24	982·17	..	11,922·63	3,928·04	5,003·71	11,234·81	11·22	..	..

East Coolgardie Goldfield.

EAST COOLGARDIE DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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	(4483E)	New Year's Gift .. ..	..	..	..	..	..	..	..	55·80	20·67	..	..	..
Do.	..	Voided leases .. ..	..	..	..	..	..	..	..	120·00	76·93	..	..	..
Do.	..	Sundry claims .. ..	..	..	19·47	7·42	..	..	..	138·47	74·34	..	..	..

Boorara	3908E, 3912E, 4045E, 4327E	3910E, 4033E	Golden Ridge G.M. Co., Ltd.	..	..	..	30,303-00	13,063-33	..	..	..	181,901-75	105,133-66	308-79
Do.	3908E, 3912E	3910E, 4033E	(Waterfall leases)	..	..	..	..	..	..	..	..	2,849-00	2,389-48	..
Do.	..	..	Voided leases	..	..	..	..	..	..	268-28	..	56,587-63	31,157-14	..
Do.	..	..	Sundry claims	..	..	..	4-00	72-41	..	..	49	2-30	49-00	93-28
Boulder	392E	..	(Acrobat : Paringa Consolidated Mines, Ltd.)	..	..	..	..	..	..	..	..	10-25	37-15	..
Do.	392E	..	Acrobat : Paringa Mines (1909), Ltd.	..	..	..	7,626-67	3,836-20	..	..	..	7,626-67	3,836-20	..
Do.	38E, 71E, 72E, (101E)	..	Associated G.Ms. of W.A., Ltd.	..	..	..	114,571-00	36,630-65	385-00	..	8-49	1,328,247-70	847,344-50	27,744-18
Do.	49E, 4211E	..	Associated Northern Blocks (W.A.), Ltd.	..	..	..	14,244-19	15,889-11	1,659-60	..	524-18	329,495-11	409,746-98	4,107-80
Do.	(682E), 923E, (1064E), 1196E, 4075E	902E, 986E	(Boulder Deep Levels, Ltd.)	..	..	..	..	..	..	..	..	3,043-00	1,778-10	26-71
Do.	902E, 923E, 1124E, 4075E	986E, 1196E	(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, 3961E	(1175E)	Brown Hill Extended, Ltd.	..	..	..	1,889-83	701-31	..	..	..	34,022-98	43,968-17	..
Do.	1163E	..	(Cassidy's North)	..	..	..	..	..	..	..	..	67-00	7-95	..
Do.	24E, (888E), 352E	949E	Central and West Boulder G.Ms., Ltd.	..	..	..	8,293-00	2,260-11	..	..	..	54,086-09	29,088-73	..
Do.	352E	..	(Chaffer's G.M. Co., Ltd.)	..	..	..	..	..	..	..	..	4,256-00	1,299-03	161-50
Do.	352E, 873E, 1621E	4334E	Chaffer's G.M. Co., Ltd.	..	..	..	146-00	15-16	..	..	..	111,111-00	44,796-77	..
Do.	1621E	..	(Croesus Proprietary G.M. Co.)	..	..	..	..	..	..	..	..	79-00	45-87	..
Do.	13E, 90E, 989E	302E	Croesus South G.Ms., Ltd.	..	..	..	2,100-85	512-12	..	..	..	65,266-87	25,152-40	..
Do.	351E, 1002E, 1113E, 1326E, 1397E	1001E, 1085E, 1219E	Golden Horseshoe Estates Co., Ltd.	..	..	..	280,512-00	97,918-59	28,164-92	..	..	2,992,970-00	2,098,211-83	262,739-57
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.	..	..	..	761-45	239-96	..	..	..	14,889-01	12,033-77	..
Do.	66E	..	Great Boulder Perseverance G.M. Co., Ltd.	..	..	..	218,605-00	59,625-27	6,865-63	..	..	2,169,758-23	1,354,526-99	102,950-06
Do.	16E, 51E, 102E, 1109E, 4366E	61E, 280E	Great Boulder Proprietary G.Ms., Ltd.	..	..	..	189,469-00	132,700-32	19,386-72	..	..	2,167,901-00	2,137,960-27	177,376-36
Do.	902E, 1124E	..	(Great Boulder South G.M. Co., Ltd.)	..	..	..	..	..	..	..	..	437-00	122-11	..
Do.	3643E	..	(Hainault G.M., Ltd.)	..	..	..	5,544-00	1,671-01	..	..	..	517,345-70	184,570-02	113-30
Do.	6E	..	(Hannan's Block 45, Ltd.)	..	..	..	..	..	..	..	..	2,343-55	3,226-69	..
Do.	131E, 245E, 743E, 969E	269E, 794E	(Hannan's Central G.Ms., Ltd.)	..	..	..	..	..	..	..	..	6,098-00	3,360-33	..
Do.	739E	..	(Hannan's Croesus G.M. Co., Ltd.)	..	..	..	..	..	..	..	..	4,256-75	4,416-90	..
Do.	1004E	..	(Hannan's North Croesus G.M. Co., Ltd.)	..	..	..	..	..	..	..	..	50-00	13-21	..
Do.	15E, 60E, 923E, 1116E, 1196E, 4075E	902E, 986E	(Hannan's Star Consolidated)	..	..	..	..	..	..	..	..	360-00	175-59	..

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 1913.					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, 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	..	167·58	4,239·00	2,948·36	..	2,079·69	19,266·77	17,800·31	..	
Do.	946E, 4370E	Ironsides North leases	..	..	4,405·00	10,889·39	..	..	26,886·50	37,124·08	..
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.	..	..	213,669·00	106,697·29	22,088·43	..	2,541,051·00	1,796,450·68	256,656·84
Do.	1507E, (2899E), (3712E), (3713E)	(Ivanhoe Junction G.M. Co., N.L.)	..	..	..	..	..	..	1,764·00	121·43	..
Do.	6E, 131E, 2245E, 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 G.M.s., Ltd.	..	..	114,224·24	59,173·57	188·24	..	1,136,831·22	812,261·25	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.	..	..	193,009·94	62,803·27	7,198·92	..	603,911·65	208,406·47	24,990·66
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	157-80	22-29		583-30	158-13	
Do.	75E	(Lake View South G.M. (W.A.), Ltd.)				10,712-98	11,393-57	
Do.	75E	Lake View South, Ltd.	1,048-00	286-43		13,939-90	3,584-14	
Do.	4522E	Last Hope	61-65	10-59		61-65	10-59	
Do.	(4487E)	Medindie Hill	281-00	38-61		457-00	61-47	
Do.	33E, 35E, 975E	New North Boulder G.Ms., Ltd.	6,108-78	1,505-12		14,567-90	9,433-20	
Do.	4523E	New Trafalgar	38-40	8-43		38-40	8-43	
Do.	33E, 35E, 975E	(North Boulder G.M. Co., Ltd.)				33,549-15	47,532-52	
Do.	33E, 35E, 975E	(North Boulder G.Ms., Ltd.)				4,542-50	4,256-55	63
Do.	281E, 287E, 444E	(North Kalgurli Co., Ltd.)	3,978-87	1,995-11	43-99	104,116-49	60,229-47	7,202-47
Do.	281E, 287E, 444E	North Kalgurli (1912), Ltd.	6,503-62	2,838-35		6,503-62	2,838-35	
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.	128,047-29	36,540-13	2,730-89	459,314-73	150,918-22	14,308-04
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.	51,420-00	16,633-02	1,745-18	51,420-00	16,633-02	1,745-18
Do.	1208E, 3612E	(South Kalgurli G.Ms., Ltd.)	43,119-00	12,720-89	664-46	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.	404-88	110-43		1,270-66	440-59	
Do.	4525E	West Boulder		2-91			2-91	
Do.		Voided leases				109-90	5,780-86	60,501-20
Do.		Sundry claims	187-21	13-55		24-58	1,313-96	40,060-12
Do.							928-29	
Feysville	Block 43	Hampton Plains Estate, Ltd.			4,565-62	20,583-40	2,413-76	
Do.	Block 5	(Hampton Plains Estate (1906), Ltd.)				85-00	108-82	
Do.	Block 50	(Hampton Properties, Ltd.)				7-26	6,348-00	3,956-22
Do.	Block 45	Hampton Properties, Ltd.				52-75	51-75	76-63
Do.	Block 50	Hampton Properties, Ltd.	161-48	79-97		6-26	515-33	437-22
Do.		Voided leases				22-86	214-85	106-88
Do.		Sundry claims	22-01	5-92			156-01	48-73
Kalgoorlie	796E, 1228E	(Bonnie Lass leases)				160-69	6,011-00	5,945-22
Do.	796E, 1228E, 3771E	Bonnie Lass leases	3,400-00	1,590-67			7,760-00	4,723-01
Do.	4088E	Bonnie Play	21-61	2-52			56-61	10-00
Do.	4505E	C2	35-00	6-87			35-00	6-87
Do.	4E	Cassidy's Hill: Paringa Mines (1909), Ltd.	585-57	621-00	3,029-57	585-57	621-00	3,029-57
Do.	4524E	Corn Cob	73-05	10-93			73-05	10-93
Do.	4515E	Creswick	1,016-86	218-46			1,016-86	218-46
Do.	4037E, 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

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 1913.					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	3770E	(Eagle Hawk United)	..	16.59	..	..	..	..	..	..	..	..	..	..
Do.	4509E	Enterprise	..	..	..	..	..	109.01	828.69	4,161.56	3,180.60	..	..	..
Do.	4052E, 4063E, (4319E)	Fair Play leases	..	..	3.50	25.66	..	..	..	219.00	76.49	..	..	..
Do.	4331E	(Gem)	..	..	..	..	..	..	4.77	2,593.84	3,864.54	..	..	..
Do.	4025E, 4293E, 4486E	Golden Dream G.M. Co., N.L.	..	..	8,042.00	732.73	..	..	30.75	57.00	10.40	..	..	..
Do.	1694E	(Golden Zone)	..	..	..	..	..	..	..	8,042.00	732.73	..	..	..
Do.	1694E	(Golden Zone)	..	..	..	..	..	..	..	5,614.50	2,639.52	..	..	..
Do.	1694E, 4273E, 4274E, 4331E, (4380E)	Golden Zone leases	..	..	4,900.00	9,626.43	..	..	489.50	2,106.00	3,295.08	..	..	..
Do.	4412E	(Gordon)	..	..	..	..	..	..	28.25	39,196.00	55,610.34	..	..	..
Do.	4412E	Gordon: Cunard G.M. Co., N.L.	..	..	..	..	..	..	..	629.00	84.79	..	..	..
Do.	14CE, 415E, 1163E	Hannan's Consols leases	..	65.47	517.00	182.41	..	..	..	4,207.00	452.33	..	..	..
Do.	14CE, 415E, 1163E	(Hannan's Consols, Ltd.)	..	..	409.50	124.89	..	2.84	253.51	45,418.50	6,128.01	..	..	..
D.	(983E)	(Hannan's Golden Group, Ltd.)	..	..	..	..	..	..	..	6,884.00	3,806.65	..	..	..
Do.	4273E, 4274E	(Hannan's North G.Ms., Ltd.)	..	..	..	..	..	..	..	6.00	17.27	..	..	..
Do.	97E, 160E, 211E, 212E, 213E, 1653E	(Hannan's Reward and Mt. Charlotte, Ltd.)	..	..	..	..	..	..	2.58	1,244.00	392.72	..	..	..
Do.	97E, 160E, 211E, 212E, 213E, 1653E	Hannan's Reward, Ltd.	..	..	27,388.00	3,292.21	..	..	..	121,605.10	47,203.84	..	..	..
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	..	..	1,316.87	529.07	..	..	..	10,130.94	14,807.13	43,383.29	..	..
Do.	(4406E)	Hyman	..	..	..	..	..	..	..	80.00	3.44	..	..	..
Do.	4502E	Ineeda	..	..	142.01	54.62	..	..	..	391.01	101.21	..	..	..
Do.	(83E)	Isabel	..	..	38.00	14.41	..	..	..	5,302.26	1,307.41	..	..	..
Do.	4498E	Levant	..	..	99.00	11.00	..	..	108.44	99.00	71.00	..	..	..
Do.	4346E	(Little Wonder)	..	..	..	..	..	..	..	3,796.00	1,530.61	..	..	..
Do.	4346E, 4347E	Little Wonder leases	..	..	803.55	352.38	..	..	..	3,501.55	1,375.27	..	..	..
Do.	4345E	(Lone Hand)	..	..	..	..	..	..	..	6,092.00	408.02	..	..	..
Do.	4345E, 4459E, (4461E)	Lone Hand leases	..	..	1,570.00	316.00	..	..	..	3,180.00	1,375.22	..	..	..
Do.	4477E	Lord Nelson	..	18.11	862.85	160.60	..	..	83.86	1,897.52	454.01	..	..	..
Do.	2E, 279E	(Maritana G.M. Co., N.L.)	..	..	..	..	..	..	32.27	11,373.50	4,628.55	..	..	..
Do.	2E, 279E, 3770E	Maritana leases	..	116.33	3,818.05	1,995.48	..	24.19	309.60	15,617.53	4,657.25	..	..	..
Do.	4293E	(Milanese)	..	..	..	..	..	..	..	7,663.00	1,389.36	..	..	..
Do.	4293E	(Milanese: Golden Dream G.M. Co., N.L.)	..	..	6,711.00	658.59	..	..	..	29,528.00	3,175.71	..	..	..
Do.	4347E	(Mystery)	..	..	..	..	..	..	..	8,783.00	1,815.12	..	..	..
Do.	4520E	Nancy Agnes	..	..	310.00	61.33	..	..	..	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.	(983E)	(New Standard Exploration Co., Ltd.)							213-00	86-76		
Do.	4482E	North Collier		39-50	25-29				214-51	1,407-95		
Do.	4037E, 4039E, 4054E	(North End Gold Mines, Ltd.)							5,876-00	2,425-03	4-00	
Do.	4485E	North End Extended		136-14	44-30				281-14	86-30		
Do.	4037E, 4039E, 4054E	(North End Mines, Ltd.)							1,812-00	883-27		
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.	(4468E)	Sir John							916-00	44-12		
Do.	3771E	(Sons of Gwalia, Kalgoorlie)							1,428-00	844-54		
Do.	(4513E)	Sunlight		65-00	16-16				65-00	16-16		
Do.	(4429E)	Territoria							714-13	145-36		
Do.	4289E	(Union Club)							700-00	257-45		
Do.	4289E	Union Club		1,340-00	200-39		61-09		2,348-00	703-87		
Do.	4289E, 4320E	(Union Club leases)						53-28	4,626-00	1,437-28		
Do.	4037E, 4039E, 4054E, 4231E, 4368E	Westralia United Goldfields, Ltd.		937-89	249-33				1,522-10	455-84		
Do.	4499E	Williamstown		522-20	190-40				604-38	227-32		
Do.	(4496E)	Zelma		19-30	6-31				73-05	29-73		
Do.		Voided leases					45-35	953-55	205,821-07	86,240-07	586-64	
		Sundry claims	4-32	1,670-99	505-61		207-69	157-79	10,501-03	2,440-69		
Wombola	4349E	Sudden Jerk		6-79	78-31				301-49	6-79	78-31	
Do.		Voided leases							312-37	4,708-78	1,882-55	
Do.		Sundry claims								469-13	97-16	
<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		8-00	1,539-77		42-64	35-12	33-00	20,573-12		
		Allsop and Don's Works			137-27					402-15	188-96	
		Allsop and Howell's Works								89-63	231-72	
		Associated Northern Works			213-78					283-59		
		Barnes' Works								1,522-50		
		Bonnie Lass Works							55-00	1,297-73		
		Boulder Puddling Works					2-54			72-89		
		Brown Hill Consols Works			4,468-53					683-85	38,223-34	
		Croesus South Works							9,230-35	13,912-25		
		Dunstan and Cummings' Works			1,404-64	1,194-00				1,404-64	1,194-00	
		Fremantle Trading Coys' Works			1,332-22	2,283-97				3,373-59	4,590-17	
		Glenartney Works								830-97		
		Golden Dream Works								85-87		
		Golden Zone Works								340-97		
		Hannan's Central Lakeside Works								4,585-19		
		Hannan's Central Works			3,646-98				135-00	33,729-78		
		Hannan's Consols Works			172-90					172-90		
		Ironsides North Works							73-00	8,827-06		
		Kalgoorlie Gold Recovery Works			135-20					2,196-84	202-37	
		Leviathan Tailings leases—Barnett's Works								208-58		
		Oratava Works								1,458-29		
		Whitehart Works								24-39		
		Various Works					339-18	15-15	29,452-55	43,397-55	403-37	
		Reported by Banks and Gold Dealers		118-63			9,734-78	9,013-32		4-57		
Total			118-63	973-97	1,712,021-29	718,230-82	94,555-96	26,221-82	22,962-30	19,622,585-29	13,879,622-30	1,052,303-56

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

East Coolgardie Goldfield—continued.

BULONG DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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.
Balagundi ..	1080y ..	Balagundi .. ..	..	213·04	..	..	..	..	542·52	10·00	84·70	..
Do. ..	..	Voided leases .. ..	..	..	..	..	..	1,815·53	1,079·68	1,247·22	..	..
Do. ..	..	Sundry claims .. ..	..	60·42	58·77	68·76	..	64·39	197·42	143·18	..	..
Bulong ..	1067y, 1076y ..	Southern Cross leases .. ..	..	..	478·00	54·35	..	..	..	14,897·66	2,128·17	..
Do. ..	..	Voided leases .. ..	..	..	..	..	..	107·54	8,364·22	84,703·56	80,276·13	..
Do. ..	..	Sundry claims .. ..	..	10·14	115·38	163·46	..	1,648·60	921·23	6,746·80	14,459·46	..
Hogan's Find ..	..	Voided leases .. ..	..	..	..	..	..	..	908·82	309·50	2·6·51	..
Majestic ..	..	Voided leases .. ..	..	..	..	..	..	..	..	1,001·25	318·78	..
Do. ..	..	Sundry claims .. ..	..	..	..	..	..	..	43·20	..	..	..
Mt. Monger ..	..	Voided leases .. ..	..	..	..	..	..	..	1,862·57	1,121·35	969·69	..
Do. ..	..	Sundry claims .. ..	..	..	..	..	..	215·60	..	357·80	220·18	..
Randall's ..	1079y ..	Comstock W.A. .. ..	..	..	..	17·48	..	..	..	143·24	79·01	..
Do. ..	1086, 1087, 1088	Transcontinental leases .. ..	..	..	23·90	13·50	..	..	..	23·90	13·50	..
Do. ..	..	Voided leases .. ..	..	..	..	..	..	..	60·04	11,453·10	5,592·16	..
Do. ..	..	Sundry claims .. ..	..	..	..	..	..	20·45	..	1,646·55	429·65	..
Sudden Jerk ..	..	Voided leases .. ..	..	..	..	..	..	..	63·91	14·25	53·67	..
Do. ..	..	Sundry claims .. ..	..	..	..	..	..	..	..	15	10·23	..
Taurus ..	..	Voided leases .. ..	..	..	..	..	..	2·06	3·70	1,678·15	760·83	..
Do. ..	..	Sundry claims .. ..	..	..	..	..	..	112·69	..	276·00	411·01	..
Woodline ..	..	Voided leases .. ..	..	..	..	..	..	..	..	792·75	610·57	..
Do. ..	..	Sundry claims .. ..	..	..	..	..	..	..	..	39·33	61·57	..
		<i>From District generally :—</i>										
		Sundry claims .. ..	..	..	..	..	..	5·64	41·85	790·75	284·26	..
		Sundry parcels treated at :										
		Hilda Mill .. ..	..	..	..	..	..	..	..	..	150·78	..
		State Battery—Randall's .. ..	..	..	..	..	..	..	..	..	131·73	..
		Various Works .. ..	..	..	..	..	..	..	..	6,102·15	5,565·74	..
		Reported by Banks and Gold Dealers .. ..	..	..	..	..	..	4·15	..	..	..	..
		Total	4·15	283·60	676·05	317·55	..	24,391·57	52·39	133,385·34	114,258·73	..

Coolgardie Goldfield.

COOLGARDIE DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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 .. ..	..	5-38	102-50	48-43	..	..	5-38	338-25	201-83	..
Do. ..	4441	Lorna Doon .. ..	..	..	90-00	32-49	..	..	..	90-00	32-49	..
Do. ..	1552	(New Victoria) .. ..	..	..	..	..	..	..	..	264-00	169-00	..
Do. ..	1552, 4313	New Victoria leases .. ..	..	..	1,185-00	444-80	..	..	..	2,589-00	1,283-73	..
Do. ..	4313	(New Victoria South) .. ..	..	..	..	..	..	..	..	1,065-00	324-87	..
Do. ..	(4449)	Tunnel .. ..	..	..	79-00	53-61	..	..	..	79-00	53-61	..
Do. ..	1552, (3947), (4353)	(Vale of Coolgardie G.Ms., Ltd.) .. ..	..	..	..	..	..	..	..	74,835-00	38,993-49	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	..	..	..
Do. ..	.. ..	Sundry claims .. ..	..	..	164-00	87-34	..	..	..	270,459-85	145,666-92	..
Bulla Bulling	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	1,140-50	591-54	..
Do. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	..	..	..	..	..
Burbanks ..	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. .. ..	..	..	11,607-00	6,169-95	..	..	..	28,081-08	18,057-35	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. .. ..	..	..	20,155-00	11,410-58	..	..	..	52,601-00	31,127-11	..
Do. ..	4409	Burbanks Mainstay .. ..	..	..	..	..	..	..	..	609-00	165-62	..
Do. ..	4168	Glenloth South .. ..	..	..	171-50	242-37	..	..	..	807-00	1,232-92	..
Do. ..	4379	Ivanhoe Burbanks .. ..	..	..	187-00	109-16	..	..	..	963-50	662-48	..
Do. ..	4442	Ivanhoe North .. ..	..	..	23-75	9-53	..	..	..	23-75	9-53	..
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. ..	2160	Lady Robinson .. ..	..	..	2,611-00	790-88	..	..	..	4,446-00	1,353-86	..
Do. ..	(4436)	Lord Bobs .. ..	..	..	395-00	180-76	3-00	..	..	955-00	696-71	16-10

Gnarlbine ..	..	..	Voided leases .. .. .	..	..	..	..	..	..	10-94	1,899-75	1,049-90	..
Do. ..	..	..	Sundry claims .. .. .	..	..	..	..	..	..	1-31	108-00	57-62	..
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.	..	..	..	..	..	..	..	230-00	124-42	..
Do. ..	..	..	Voided leases .. .. .	..	..	..	..	..	..	2-06	5,274-00	1,020-45	..
Do. ..	..	..	Sundry claims .. .. .	..	..	..	..	..	..	16-52	541-50	405-18	..
Londonderry	3834 .. ..	..	Cheapside .. .. .	..	456-50	204-41	..	..	..	..	4,327-75	2,418-60	..
Do. ..	4450 .. ..	..	Fenian .. .. .	..	20-00	12-45	..	..	..	..	20-00	12-45	..
Do. ..	..	..	Voided leases .. .. .	..	..	..	..	..	..	..	46-25	14,498-66	13,130-68
Do. ..	..	..	Sundry claims .. .. .	..	..	..	..	..	..	..	1-06	709-35	490-88
Nungari ..	..	..	Voided leases .. .. .	..	..	..	..	..	..	..	17-71	735-00	331-78
Do. ..	..	..	Sundry claims .. .. .	..	16-16	6-42	..	..	..	..	236-07	86-12	..
Red Hill ..	(4451) .. ..	..	Harvest	102-06	..	..	..	..	..	102-06	..	..	..
Do. ..	..	..	Voided leases .. .. .	..	..	..	..	..	..	1,439-42	40,793-20	31,064-05	..
Do. ..	..	..	Sundry claims	7-44	3-97	8-95	..	..	..	34-62	119-77	59-94	..
Widgiemooltha	4028 .. ..	..	Flinders .. .. .	..	14-00	132-02	..	..	..	29-11	397-10	2,161-94	..
Do. ..	4454 .. ..	..	Horseman	165-65	4-00	18-10	..	..	..	165-65	4-00	18-10	..
Do. ..	(3906) .. ..	..	(Yorkshire Lass) .. .. .	..	..	..	..	..	..	..	1,783-70	1,180-97	..
Do. ..	(3906), (4426) ..	..	Yorkshire Lass leases .. .. .	..	..	..	..	..	..	..	258-50	124-45	..
Do. ..	..	..	Voided leases .. .. .	..	..	..	..	..	..	..	466-02	6,567-40	2,281-14
Do. ..	..	..	Sundry claims .. .. .	..	42-75	16-20	..	3-62	..	..	22-68	1,959-40	809-12
<i>From District generally :-</i>														
Sundry parcels treated at:														
Allsop and Howell's Works—Kalgoorlie														
Burbanks Main Lode Works														
Carswell's Cyanide Works														
Fremantle Smelting Works														
Fremantle Trading Co.'s Works														
Highgate Works														
Howell's Works														
King Solomon Works														
Lady Robinson Cyanide Works														
Moore's Cyanide Works														
Moss' Cyanide Works														
Oratava Works—Kalgoorlie														
Red Hill Westralia Works														
State Battery—Coolgardie														
State Battery—Widgiemooltha														
New Victoria Works														
Various Works														
Reported by Banks and Gold Dealers				372-21	..	..	..	..	..	4-11	2,340-11	9,166-26	..
Total				372-21	527-51	46,677-13	27,507-55	3-00	7,813-90	8,167-49	1,408,375-73	901,967-76	760-61	..

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Coolgardie Goldfield—continued.

KUNANALLING DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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.
Balgarrrie	622s	(Balgarrrie 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	..	..	2,590-00	1,000-00	..	677-13	20,951-50	11,201-46	..
Do.	776s	Spearmint	..	..	..	..	..	..	522-00	633-56	..
Do.	..	Voided leases	..	..	..	..	..	..	2,002-00	2,022-43	..
Do.	..	Sundry claims	..	..	16-00	8-95	..	..	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	..	..	48-00	186-43	..	..	219-00	779-83	..
Do.	(816s)	Wheel of Fortune	..	..	..	..	..	..	233-25	759-39	..
Do.	..	Voided leases	..	..	..	..	..	..	589-50	338-39	..
Do.	..	Sundry claims	..	..	20-00	9-46	..	..	86	507-00	449-22
Dunnsville	..	Voided leases	..	..	..	..	..	..	181-12	17,407-10	7,982-23
Do.	..	Sundry claims	..	5-56	8-00	10-59	..	..	27-63	293-09	265-11
Jourdie Hills	786s	Jourdie Enterprise South	..	..	260-00	27-66	..	..	260-00	27-66	..
Do.	(773s), 786s	(Jourdie Enterprise leases)	..	..	..	..	..	..	9,884-00	3,715-75	..
Do.	786s	(Jourdie Enterprise South)	..	..	..	..	..	..	91-00	39-42	..
Do.	369s, (661s)	(Jourdie Hills G.M. Co., Ltd.)	..	..	..	..	..	..	9,635-00	7,868-08	..
Do.	369s, (661s)	(Jourdie United G.Ms., Ltd.)	..	..	..	..	..	..	1,520-00	1,027-63	..
Do.	514s	Pride of Jourdie North	..	..	139-00	278-59	..	..	2,777-00	2,506-91	..
Do.	369s	(Pride of the Jourdiess)	..	..	..	..	..	..	410-74	465-47	..
Do.	369s	Pride of the Jourdiess: Forwood	..	..	91-00	466-05	..	..	572-00	812-71	1-45
Do.	..	Down & Co., Ltd.	..	..	..	..	..	..	18-00	1,323-00	726-67
Do.	..	Voided leases	..	..	..	..	..	..	760-50	405-00	..
Do.	..	Sundry claims	..	..	..	..	..	..	..	..	..
Kandana	..	Voided leases	..	..	..	..	..	..	465-00	68-12	..
Kintore	767s	Sugarloaf	..	..	..	..	..	..	471-00	610-85	..
Do.	..	Voided leases	..	..	..	..	..	..	143-66	42,556-14	31,136-59
Do.	..	Sundry claims	..	..	10-00	97-58	..	100-30	914-20	1,001-17	..

Siberia	674s, [1286w]	(Golden)							82.17	22.40	120.37		
Do.	728s, [1293w]	Mexico								216.50	427.07		
Do.	718s, [1291w]	(Missouri)								196.00	79.88		
Do.		Voided leases						1.07	1,475.64	7,781.95	9,902.82		
Do.		Sundry claims						30.91		223.00	349.86		
25-Mile	696s	(Blue Bell)							8.05	697.00	429.47		
Do.	727s	(Blue Bell Extended)								113.00	71.32		
Do.	696s, 727s	Blue Bell leases								1,405.00	1,556.53		
Do.	839s	Hopeful			66.50	71.65				217.50	327.85		
Do.	(823s)	Premier			517.00	184.37				2,185.00	952.14		
Do.	852s	Premier			230.50	37.26				230.50	37.26		
Do.	845s	Sadie			367.00	222.40				555.00	388.45		
Do.	586s, 602s	Shamrock leases			159.00	190.48				159.00	190.48		
Do.	645s	Star of Fremantle			182.00	123.09				5,035.50	3,372.38		
Do.	849s	Swallow Extended			45.00	1.01				45.00	1.01		
Do.	603s	Sydney Mint							213.30	1,083.75	2,738.02		
Do.	847s	Turn of the Tide			252.00	229.39				314.00	277.06		
Do.		Voided leases							450.76	83,486.49	64,454.05	18.84	
Do.		Sundry claims			282.00	117.21			6.62	87.17	2,400.93		
<i>From District generally:—</i>													
Sundry parcels treated at:													
	Blue Bell Works					215.91				26.00	658.51		
	Bow and Carswell's Works								9.22	239.00	640.13		
	Lindsay's Works										6.40		
	Oratava Works—Kalgoorlie										71.90		
	Stanley Works								14.86	402.60	370.43		
	Various Works									1,037.66	1,250.15		
	Reported by Banks and Gold Dealers				.58				81.46	1.10			
	Total				.58	5.56	5,283.00	3,478.08	498.93	4,930.40	243,540.47	181,418.14	21.87

Yilgarn Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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								1,282.50	341.37	
Bullfinch	914, 915, 916, 926, 928, 942, 960	(Bullfinch leases)								1,027.52	10,958.88	
Do.	914, 915, 916, 926, 928, 930, 942, 960	Bullfinch Proprietary (W.A.), Ltd.			47,959.00	33,760.96	2,344.06			48,612.42	39,305.38	2,344.06
Do.	(2579)	Derwent Jack								58.60	38.30	
Do.	(2337)	Illawarra: Cosgrove Prospecting Syndicate								15.00	5.13	
Do.	(2494)	Lady Agnes			11.75	6.64				201.40	184.63	
Do.		Voided leases								51.85	90.17	

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 1913.					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.
Corinthian	893	Corinthian	..	..	1,422.50	386.79	..	..	..	2,684.50	1,123.80	..
Do.	896, 934, 946	Corinthian North G.Ms., Ltd.	..	..	18,713.00	4,320.01	..	..	..	18,713.00	4,320.01	..
Do.	..	Voided leases	..	..	..	..	..	..	..	601.50	405.74	..
Do.	..	Sundry claims	..	..	..	..	..	..	..	69.00	68.93	..
Golden Valley	2272	Glide Away	..	..	364.00	309.99	..	..	..	618.00	670.51	..
Do.	(2559)	Golden Valley	..	..	..	..	..	..	..	30.00	2.67	..
Do.	2658	Lady Ellen	..	..	27.50	49.30	..	..	..	27.50	49.30	..
Do.	2255	Manxman South Extended	..	..	49.30	186.09	..	..	..	118.30	348.11	..
Do.	2389	Marie's Find	..	..	40.00	57.16	..	..	..	292.00	374.82	..
Do.	(924)	(Mountain Oaks)	..	..	..	..	..	..	..	302.50	418.46	..
Do.	2541, 2542	New Green Harp leases	..	..	379.90	211.13	..	..	..	609.90	395.52	..
Do.	(829), (920), (924), (1043)	Pine Hill G.M. Co., N.L.	..	..	88.00	38.29	..	..	..	509.00	487.93	..
Do.	(829)	(Pioneer)	..	..	..	..	..	..	..	102.00	336.35	..
Do.	2595	Rosalie	..	..	46.00	92.63	..	..	..	46.00	92.63	..
Do.	(2240)	Sunset: Sunset G.M. Co., Ltd.	..	..	..	..	..	..	..	67.00	14.30	..
Do.	2690	Two Seas	..	..	40.00	42.14	..	..	..	40.00	42.14	..
Do.	(835)	Violet	..	..	..	..	..	..	..	730.00	434.85	..
Do.	2653	Violet	..	..	60.00	12.80	..	..	..	60.00	12.80	..
Do.	(2553)	Wainui	..	..	..	..	..	..	5.00	20.00	17.30	..
Do.	(2239)	Welcome	..	..	12.00	2.68	..	..	..	89.00	39.77	..
Do.	..	Voided leases	..	..	..	..	..	..	12.11	714.75	745.84	..
Do.	..	Sundry claims	..	..	403.00	376.33	..	..	..	640.65	545.05	..
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	..	..	..	23.54	..	..	..	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	..	..	..	..	..	..	4.12	605.00	225.45	..
Hope's Hill	2544	Colleen Bawn	..	..	52.60	109.20	..	..	..	155.20	184.38	..
Do.	(2639)	Last Hope	..	..	34.00	7.42	..	..	..	34.00	7.42	..
Do.	2523	Parisian	..	..	337.00	232.94	..	..	..	533.00	445.16	..
Do.	1432	Phoenix	..	..	527.00	149.09	..	..	50.20	1,382.50	515.50	..
Do.	2571	Phoenix South	..	..	30.00	3.90	..	..	..	30.00	3.90	..
Do.	921	Rodda's Reward	..	..	..	..	..	..	..	312.00	42.13	1.00
Do.	..	Voided leases	..	..	..	..	..	..	2.53	127,180.85	32,739.15	..
Do.	..	Sundry claims	..	..	126.00	21.51	..	..	2.71	584.00	242.91	..

Kennyville	(2574)	Bournville	32.00	13.19			83.00	29.35	
Do.	776	Cornishman	99.00	48.63		13.18	1,465.00	1,259.98	
Do.	570	(Great Leviathan)					3,821.85	2,948.67	
Do.	570	Great Leviathan	701.00	406.02			2,925.00	2,424.81	
Do.	570	(Great Leviathan: Northern Blocks Syndicate, Ltd.)					10,705.00	2,974.64	
Do.	(2539), (2568)	Mornington Prospecting Syndicate, N.L., W.A.					20.00	3.18	
Do.	911	Trafalgar	195.00	176.99			860.00	839.04	
Do.		Voided leases				5.58	945.50	404.13	09
Do.		Sundry claims	32.00	8.43			236.00	138.41	
Koolyanobbing		Voided leases					308.00	116.74	
Do.		Sundry claims					55.00	11.24	
Marvel Loch	(2530)	Beta					40.00	5.76	
Do.	923	Bohemian	353.00	580.27		17.44	1,310.00	973.42	
Do.	1689	Bronco					217.00	22.17	
Do.	(2538)	Cadonia					40.00	43.19	
Do.	1465	Comet	3,014.00	2,022.86			4,003.50	4,144.80	
Do.	(2588)	Dalmore					14.00	38.40	
Do.	768	(Donovan's Find)					1,768.00	1,999.43	
Do.	768	Donovan's Find: Greenmount Mines, N.L.	280.00	58.59			1,337.00	1,009.47	
Do.	1463	Eclipse	389.00	206.72			1,045.00	633.02	
Do.	869	(Eveless Eden)					104.00	44.29	
Do.	(2609)	Geelong					222.50	142.01	
Do.	820	Gentle Annie	115.00	44.97			1,308.00	567.19	
Do.	(2563)	Golden Gate					18.00	3.74	
Do.	719	(Great Victoria)					1,356.00	281.53	
Do.	719, 944, 945, 1227, 1228, 1606	Great Victoria leases	9,382.00	1,211.84			19,572.00	2,623.93	
Do.	490, 517, 558	Jacoletti G.Ms., Ltd.		148.43			6,419.00	2,759.49	
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.	9,203.00	2,988.53			41,628.00	15,782.21	379.96
Do.	852	May Queen				4.07	281.00	1,504.70	
Do.	2684	Mountain King	14.51	92.00		14.51	92.00	58.25	
Do.	805	Mountain Prince		135.00			255.00	106.84	
Do.	803, 838, 948, 949, 950, 951	(Mountain Queen leases)					748.00	208.39	
Do.	803, 838, 948, 949, 950, 951 2543	Mountain Queen, Ltd.	38,632.00	13,259.36	150.08		77,388.00	22,848.61	245.14
Do.	665	(Never Never)					29,395.00	7,709.26	
Do.	2490	New Democrat	134.00	97.49			254.50	210.22	
Do.	(824)	Newry					990.50	218.36	
Do.	1011	Rising Star					140.00	11.48	
Do.	(839)	Scorpio	326.00	47.84		25.69	1,754.50	1,283.68	
Do.	(1435)	Starfinch					149.00	58.10	
Do.	2575	Saint George	847.00	244.14			847.00	244.14	
Do.	490, 517	(Turnbull leases)					2,143.00	1,481.72	
Do.	1452	Undaunted	345.00	50.00			810.00	240.59	
Do.	665, 765	Yilgarn G.M. Co., Ltd.	35.00	4.12			165.00	35.25	
Do.		Voided leases				28.45	7,621.50	3,674.94	
Do.		Sundry claims	36.96	631.00		65.10	3,031.25	1,696.82	

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 1913.					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. Jackson..	1979	Allen's Find	..	..	199.25	213.76	..	..	..	338.55	319.99	..
Do.	(2547)	Best Known	..	..	..	..	..	..	..	20.80	33.35	..
Do.	1933	Butcher Bird No. 1	..	..	215.00	160.01	..	..	..	503.00	426.71	..
Do.	2053	Great Unknown	..	..	306.00	1,094.05	..	..	37.22	754.93	2,735.77	..
Do.	(2444)	Great Unknown North	..	..	14.50	12.46	..	..	30.62	25.50	35.53	..
Do.	(2597)	Just in Time	..	..	10.00	12.20	..	..	..	10.00	12.20	..
Do.	2636	Lone Chance	..	..	10.00	6.77	..	..	..	10.00	6.77	..
Do.	2190	Miner's Dream	..	..	..	..	..	..	..	45.00	16.42	..
Do.	2713	Newmarket	..	42.68	9.00	30.48	..	..	42.68	9.00	30.48	..
Do.	(2548)	Standard	..	..	182.00	522.56	..	..	..	249.00	877.69	..
Do.	(2614)	Titanic	..	..	12.50	6.23	..	..	..	26.00	24.92	..
Do.	(2564)	Victoria Reef	..	..	..	..	..	..	..	27.00	5.14	..
Do.	(2569)	Wellknown	..	..	..	..	..	..	..	6.00	6.96	..
Do.	..	Voided leases	..	..	..	..	..	..	4.36	30,531.25	20,013.86	2,305.28
Do.	..	Sundry claims	..	8.92	752.10	481.11	..	..	10.84	960.50	597.81	..
Mt. Rankin ..	..	Voided leases	..	..	..	..	..	3.84	5.20	496.00	122.17	..
Do.	..	Sundry claims	..	..	..	..	..	..	..	170.00	54.38	..
Parker's Range	508	Australia	..	..	140.00	36.36	..	..	..	2,697.00	1,544.76	..
Do.	2656	Golden Dream	..	..	64.00	126.04	..	..	..	64.00	126.04	..
Do.	2649	Kia Ora	..	..	75.00	32.99	..	..	..	75.00	32.99	..
Do.	2606	King of the Range	..	..	98.00	222.44	..	..	..	149.00	330.83	..
Do.	(1099)	(McIntosh)	..	..	..	..	..	..	..	110.00	54.89	..
Do.	(1099), (1566)	Parker's Range G.Ms., N.L.	..	..	178.50	172.07	..	..	..	213.50	209.55	..
Do.	2683	Referenda	..	..	66.00	148.54	..	..	..	66.00	148.54	..
Do.	(2324)	Searchlight North: Yarloop Prospecting Syndicate	..	..	..	..	..	..	..	150.50	31.77	..
Do.	1779	Searchlight: Ziegler Prospecting and Option Syndicate, N.L.	..	..	56.00	10.81	..	..	..	57.50	40.84	..
Do.	(2611)	Snowdrop	..	..	118.00	157.17	..	..	..	155.00	204.25	..
Do.	2546	South End	..	..	..	..	..	..	4.82	40.00	13.78	..
Do.	2670	Sphinx	..	..	21.00	20.22	..	..	..	21.00	20.22	..
Do.	724	Spring Hill	..	..	1,512.00	267.91	..	..	..	2,228.00	403.37	..
Do.	724, (760)	(Spring Hill leases)	..	..	..	..	..	..	..	8,910.00	2,215.59	..
Do.	2682	Star of the Range	..	..	140.00	146.95	..	..	..	140.00	146.95	..
Do.	..	Voided leases	..	..	..	..	..	..	63.22	8,116.25	5,564.97	..
Do.	..	Sundry claims	..	..	327.00	355.47	..	..	..	1,043.25	808.85	..
Southern Cross	(2529)	Allerton	..	..	..	..	..	..	..	142.00	50.18	..
Do.	(881), (882), 888, 889, (890)	(British and Foreign Development Syndicate, Ltd.)	..	..	..	..	..	..	..	90,791.75	66,545.29	356.35
Do.	(2372)	Central	2.13	..	47.00	27.48	..	2.13	..	47.00	27.48	..

Do.	889	(Fraser's G.M. Co., N.L.)							151,771.00	67,870.33		
Do.	888, 889	Fraser's G.M. Syndicate		201.00	323.59				251.00	647.72		
Do.	2714	Fraser's North Extended		10.00	10.37				10.00	10.37		
Do.	888	(Fraser's South G.M. Co., N.L.)							48,233.00	20,013.23		
Do.	2342	Haddon Consolidated		698.50	340.75				1,198.50	564.01		
Do.	(1042)	Lord Cardigan							432.00	127.61		
Do.	2416	Maori Lass							250.00	52.31		
Do.	2651	Queen Ann		361.00	114.15				361.00	114.15		
Do.		Voided leases						211.22	133,981.20	53,867.66	8.06	
Do.		Sundry claims	2.64	375.00	131.20		3.73	595.45	1,599.30	459.34		
Weston's	(2083)	Christmas Birthday Central							20.75	33.56		
Do.	2180	(Edna May)							581.00	919.27		
Do.	2180, 2605	Edna May G.M. Co., N.L.		9,119.00	8,975.21				9,119.00	8,975.21		
Do.	2688	Elsie		30.00	4.90				30.00	4.90		
Do.	2086, 2087, 2088, 2635	Greenfinch Proprietary G.M., N.L.		2,878.00	585.82				6,800.00	2,612.68		
Do.	2291	Myrtle Central		156.00	53.58				751.00	243.96		
Do.	2168, 2238	Myrtle Consols leases		71.00	35.22		20		112.00	58.03	20	
Do.	2370	Myrtle East		48.00	29.04				48.00	29.04		
Do.	(2565)	Nevertire							12.00	2.13		
Do.		Voided leases							65.50	41.38		
Do.		Sundry claims		301.00	138.32			25	412.75	183.99		
<i>From Goldfield Generally:—</i>												
Sundry parcels treated at:												
		Allsop and Don's Works								989.96		
		Allsop and Howells' Works—T.A. 23								1,026.12		
		André's Cyanide Works								377.33		
		Australia Battery			61.62					61.62		
		Barnett's Cyanide Works								40.88		
		British and Foreign Development Works								199.85		
		Donovan's Find Battery			492.86					492.86		
		Fraser's G.M. Works			473.58					473.58		
		Fraser's South Extended Tailings Works								1,443.31	2.64	
		Fremantle Smelting Works			15.65				21.28	592.34	33.90	
		Greenfinch Proprietary G.M. Works			972.73					1,214.01		
		Greenmount Works								154.77		
		Hope's Hill Cyanide Works			328.00					638.17		
		Jacoletti Works			338.81					1,446.98		
		Jones' Cyanide Works								127.39		
		Lather's Cyanide Works								587.13		
		Marvel Loch Mining Co., N.L.			43.40					43.40		
		Miller's Cyanide Works								120.57		
		Never Never Works								53.83		
		Oratava Works—Kalgoorlie								238.22		
		Spring Hill Works			76.13					235.44		
		Sunbeam Works			921.06				8.00	3,332.20		
		Violet Works			226.09					405.94		
		Yilgarn G.M. Co., N.L., Works			956.41					1,069.63		
		Various Works							59.00	4,479.58		
		Reported by Banks and Gold Dealers					22.05	3.53				
		Total	2.18	105.71	154,495.90	82,226.12	2,494.34	77.74	1,281.72	1,053,602.60	488,744.99	6,621.18

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Dundas Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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 ..	..	..	..	..	..	..	..	..	..	..	..	..
Do.	..	Sundry claims ..	..	..	33·25	38·93	..	..	..	3·02	846·05	708·99	..	..
										36·53	324·27	511·17	..	..
Dundas	..	Voided leases ..	..	..	..	..	..	..	..	..	4,543·23	2,208·48	..	..
Do.	..	Sundry claims ..	..	..	..	..	..	..	..	385·37	182·50	143·88	..	..
Killaloe	..	Voided leases ..	..	..	..	..	..	..	..	..	20·65	6·88	..	..
Norseman	987, 1113	After Years leases ..	..	..	262·00	115·58	..	..	..	..	971·00	363·76	..	..
Do.	1185	Battler ..	..	..	..	..	..	..	..	363·93	..	..	..	..
Do.	1186	Bon Bon Billa ..	..	..	89·00	14·31	..	..	..	..	89·00	14·31	..	..
Do.	1184	Cumberland ..	..	..	126·83	44·50	88·53	..	..	126·83	44·50	88·53	..	..
Do.	1183	Edith Eleanor ..	..	..	103·29	13·50	91·24	..	..	103·29	13·50	91·24	..	..
Do.	966	(Esperanza No. 2)	..	..	..	..	..	..	..	·96	689·00	948·88	..	..
Do.	(1171)	Fire King ..	..	..	..	..	..	..	..	..	185·00	18·13	..	..
Do.	938, 945, 988	(Hampton Plains Estate (1906), Ltd.)	..	..	..	..	..	..	..	9·50	8,493·00	2,229·24	..	..
Do.	938, 945, 988	Hampton Uruguay, Ltd.	..	..	14,979·00	3,496·65	..	..	..	..	30,912·00	7,193·94	..	..
Do.	1160	King ..	..	..	1,390·00	196·37	..	..	..	..	3,519·00	530·77	..	..
Do.	956	(Kirkpatrick West)	..	..	..	..	..	..	..	3·68	214·00	329·54	..	..
Do.	956, (1032)	Kirkpatrick West leases	..	..	41·25	37·79	..	..	..	1·10	252·25	261·89	..	..
Do.	945	(Lady Miller South)	..	..	..	..	..	..	..	..	17·00	4·36	..	..
Do.	(1172)	Last Hope ..	..	..	18·50	2·80	..	..	..	..	31·50	6·59	..	..
Do.	852	(Mararoa)	..	..	..	..	..	..	..	..	9,167·00	4,484·90	..	..
Do.	852, 912, 966, 977, 979, 980, 985, 1031, 1166	Mararoa G.M. Co., N.L.	..	..	28,546·50	13,825·24	1,146·00	..	..	..	157,004·00	82,418·00	23,014·38	..
Do.	1188	Monarch ..	..	..	86·00	7·59	..	..	..	..	86·00	7·59	..	..
Do.	903	(O.K.) ..	..	..	..	..	..	..	..	21·23	1,147·25	1,293·01	..	..
Do.	(995)	O.K. Extended ..	..	..	28·00	14·42	..	..	..	..	1,148·00	944·94	..	..
Do.	903, 1138	O.K. leases ..	..	..	522·50	446·81	..	..	..	..	959·00	786·86	..	..
Do.	(1163)	Oversight ..	..	..	..	..	..	..	..	..	51·50	83·37	..	..
Do.	106, 187, 587, 840, 972	Princess Royal G.M. Co., N.L.	..	..	454·00	537·83	..	..	..	..	166,805·50	141,009·41	9,364·14	..
Do.	1021	Princess Royal North ..	..	..	..	..	..	..	..	..	593·00	1,113·85	..	..
Do.	1021	(Princess Royal North G.M. Co., N.L.)	..	..	..	..	..	..	..	..	1,311·00	1,197·01	..	..
Do.	187	(Princess Royal South)	..	..	..	..	..	..	..	..	358·00	568·05	..	..
Do.	1158	Queen ..	..	..	17·00	4·94	..	..	..	..	216·00	28·93	..	..
Do.	(849)	St. Patrick ..	..	..	..	..	..	..	..	160·91	1,235·50	2,466·62	..	..
Do.	1092	Sun ..	..	..	43·50	40·21	..	..	..	..	43·50	40·21	..	..
Do.	1092	(Sun)	..	..	..	..	..	..	..	142·26	655·50	737·49	..	..
Do.	1092, (1125)	(Sun leases)	..	..	183·00	419·34	..	..	..	..	337·00	692·34	..	..
Do.	989	(Surprise) ..	..	..	..	..	..	..	..	..	806·50	395·44	..	..

Do.	989, 1145	Surprise leases	..	..	191-00	157-38	..	..	..	583-00	370-35	..
Do.	1103	(Swanage)	..	..	..	..	..	..	..	924-00	245-42	..
Do.	1103, 1159	Swanage leases	..	..	387-25	88-84	..	..	..	387-25	88-84	..
Do.	986	Veni Vidi Vici	..	253-98	10-25	64-35	..	..	2,019-37	299-25	752-26	..
Do.	1016	(Viking Extended)	..	..	..	..	..	..	133-35	72-50	419-67	4-90
Do.	990	(Viking No. 1)	..	..	..	..	..	..	..	1,274-00	3,095-95	..
Do.	990, 1060	(Viking No. 1 leases)	..	..	..	..	..	..	..	775-50	1,176-13	16-89
Do.	990, 1016, 1060, 1117	Viking No. 1 leases	..	..	5,628-00	4,764-26	..	..	..	13,937-50	15,447-70	100-49
Do.	1180	Viking South	..	..	227-00	152-58	..	..	..	227-00	152-58	..
Do.	(1034), (1153)	Viking South leases	..	..	..	..	..	..	..	270-50	236-35	..
Do.	1193	Yorkshire Pudding	..	6-07	30-50	8-20	..	..	6-07	30-50	8-20	..
Do.	..	Voided leases	..	..	..	..	..	4-23	3,455-06	227,327-20	172,488-48	914-97
Do.	..	Sundry claims	..	391-11	759-00	620-25	..	996-60	1,378-70	13,391-65	7,075-71	59	
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	..	..	..	16-34	..	..	..	..	105-72	..
		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
		Pike and Ross' Works	..	..	..	..	..	..	..	..	2-73	..
		Rawlings, Bullen, & Rumble's Works	..	..	..	504-71	..	..	..	..	1,291-32	..
		State Battery, Norseman	..	..	60-00	23-30	..	..	..	376-00	9,987-62	885-41
		Various Works	..	..	..	..	..	..	54-52	103-00	2,574-46	607-70
		Reported by Banks and Gold Dealers	..	15-47	..	..	..	1,014-44	..	..	1-04	..
		Total	..	15-47	1,245-21	54,044-50	25,778-79	1,146-00	2,015-27	8,423-29	661,263-05	477,946-37	34,948-22

Phillips River Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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. 184)	Christmas Gift	..	..	..	..	..	26-34	1,167-00	649-35	71-55
Do.	M.L. 349	(Christmas Gift)	..	..	169-50	23-26	..	..	169-50	23-26	..
Do.	M.L. 349, M.L. 355	Christmas Gift leases	..	..	68-00	35-25	..	..	..	35-25	..
Do.	147, 179	Fair Play leases	..	..	932-00	417-72	..	..	1,807-75	1,343-54	12-63
Do.	136, 137, 138, (139)	(Flag Gold and Copper Mining Co., Ltd.)	..	..	..	*183-65	..	..	7,031-50	4,729-53	1,078-38
Do.	136, 137, 138	Flag leases	..	..	15-00	8-70	..	..	615-00	138-75	..
Do.	65	(Gem)	..	..	..	..	..	..	687-50	613-34	..

* 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 1913.					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.	
Kundip	151	(Gem Consolidated)											
Do.	151, 156	Gem Consolidated leases			70.00	{ 55.89				777.50	616.30		
Do.	65, 79	Gem leases			120.00	*68.37				3,430.00	1,470.23	8.00	
Do.	M.L. 52, M.L. 94	Harbour View Gold and Copper Co., Ltd.			283.50	65.04				8,238.35	3,546.35		
Do.	M.L. 52, M.L. 94	(Harbour View leases)				120.38				283.50	120.38		
Do.	M.L. 52, M.L. 94	(Harbour View leases)			207.00	81.15			379.86	3,619.25	1,560.86	61.41	
Do.	M.L. 347	Harbour View North			126.50	33.64				3,403.50	2,227.62	1.88	
Do.	98	Hillsborough			158.00	{ 382.08				126.50	33.64		
Do.	(180)	Jack's Come Home Again				*7.10				1,496.34	2,873.91	118.03	
Do.	174	May Day			93.00	68.51				40.00	8.65		
Do.	M.L. 52, M.L. 94	(Ravensthorpe G.M. Syndicate, N.L.)								454.00	366.36		
Do.	74	Two Boys			1,675.00	722.12				1,124.00	433.94	164.98	
Do.		Voided leases							3.90	9,911.62	6,356.92		
Do.		Sundry claims	3.81		186.00	77.18			113.28	4,752.69	3,800.68	1,920.27	
									79.05	71.58	627.04	382.86	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						4.08	
Do.	M.L. 208	(Desmond)										.77	
Do.	M.L. 208	Desmond: Phillips River Gold and Copper Co., Ltd.				*37.98						132.79	14.55
Do.	M.L. 95	Elverdton: Phillips River Gold and Copper Co., Ltd.				*12.83						2,354.86	6,537.35
Do.	M.L. 95	(Elverdton: Phillips River Option Syndicate, N.L.)										9.63	
Do.	(M.L. 275)	Ironclad										82.41	109.48
Do.	M.L. 109	(Mt. Desmond)										1.40	
Do.	M.L. 109	Mt. Desmond: Phillips River Gold and Copper Co., Ltd.				*7.74						36.97	
Do.	M.L. 199	P.L.P.										220.19	180.06
Do.		Voided leases										13.69	7.41
Do.		Sundry claims								9.00	30.60	42.74	
												.56	
Mt. Purchas		Voided leases											
Do.		Sundry claims							4.38	298.05	260.96		
										4.75	4.68		
Ravensthorpe	(M.L. 345)	James Henry										7.86	
Do.	M.L. 116	Last Chance				*1.50				27.50	25.82		
Do.	153	Maori Queen			237.00	185.59				754.67	501.96	46.57	

Do.	M.L. 16	(Marion Martin)									20-09	
Do.	M.L. 16	Marion Martin: Phillips River Gold and Copper Co., Ltd.				*16-41					231-79	205-97
Do.	M.L. 175	(Mt. Benson)									287-88	
Do.	(M.L. 331)	Mt. Benson Extended									4-39	3-47
Do.	M.L. 175	Mt. Benson: Phillips River Gold and Copper Co., Ltd.									458-77	199-83
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.				*10-63					2,953-44	3,814-45
Do.	(177)	North Revival								51-00	32-22	
Do.	(160)	Revival								225-50	239-61	
Do.	M.L. 342	Surprise				*8-36					8-36	
Do.		Voided leases							141-31	20,629-32	16,967-06	60-86
Do.		Sundry claims			113-00	40-07		157-82		1,805-18	931-75	20-65
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				88-57					138-89	
		Phillips River Smelter				20-86					191-13	398-82
		Two Boys' Works									100-95	
		Various Works									4-76	
		Reported by Banks and Gold Dealers						122-05				
		Total	3-81		4,453-50	2,784-66		472-20	775-33	73,835-51	59,580-18	15,182-21

* From Copper Ore.

† Donnybrook Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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		1,613-30	816-23	
Do.		Sundry claims										40-00	2-29	
		Total								23-24		1,653-30	818-52	

† Abolished 4th March, 1908.

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

State generally.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1913.					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 oza.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
		Sundry parcels treated at:										
		Allsop and Howell's Works—Kalgoorlie .. ..	..	..	..	..	..	..	..	..	69·13	..
		Fremantle Trading Co., Ltd., —Fremantle .. ..	..	..	..	178·60	2,146·58	..	..	..	1,626·40	4,493·52
		Hacke's Works—Boulder .. ..	..	..	..	..	..	..	..	..	22·16	..
		Hannan's Proprietary Works—Kalgoorlie .. ..	..	..	..	..	..	..	..	10·00	·90	..
		Oratava Works—Kalgoorlie .. ..	..	..	..	..	..	..	..	..	164·67	..
		Rasmussen's Works—Boulder .. ..	..	..	..	..	..	..	..	..	1,082·21	..
		Seabrook Works—Northam .. ..	..	..	..	..	..	..	..	..	348·09	..
		Various Works .. ..	..	..	..	..	..	..	..	17·00	2,723·98	481·77
		Sundry specimens .. ..	..	..	..	..	..	..	2·87	..	..	..
		Reported by Banks and Gold Dealers .. ..	..	..	..	..	..	124·89	153·03	..	..	..
		Total .. ..	..	..	..	178·60	2,146·58	124·89	155·90	27·00	6,037·54	4,975·29

VI.

ROYAL MINT, FROM 1ST JANUARY, 1886, TO 31ST DECEMBER, 1913, SHOWING, IN FINE OUNCES, THE GOLDFIELDS, AND THE TOTAL ANNUAL VALUE.

Year.	b GASCOYNE.			c PEAK HILL.			c 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
1892	1,846.83	...	1,846.83
1893	21,789.19	...	21,789.19
1894	18,974.77	...	18,974.77
1895	47,365.54	...	47,365.54
1896	58,575.66	...	58,575.66
1897	63,769.17	...	63,769.17
1898	4,571.38	...	4,571.38	8,457.34	...	8,457.34	74,154.67	...	74,154.67
1899	12,288.93	...	12,288.93	35,303.10	...	35,303.10	83,794.22	...	83,794.22
1899	297.96	76.63	374.59	14,064.24	14,558.64	28,622.88	33,828.08	3,361.95	37,188.03	61,586.09	22,074.71	83,660.80
1900	...	77.02	77.02	9,528.14	16,119.79	25,647.93	23,545.54	28,671.65	52,217.09	53,615.70	43,423.77	97,239.47
1901	6.59	16.82	23.41	231.85	19,352.41	19,584.29	29,780.63	40,557.07	70,337.70	92,149.56	38,096.10	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	263.60	29,395.32	29,598.92	21,578.06	65,384.05	87,212.11	154,012.88	54,348.53	208,361.41
1904	...	10.95	10.95	...	17,475.33	17,475.33	21,296.85	64,550.36	85,847.21	165,232.07	52,683.16	217,915.85
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	224,398.41
1906	...	78.73	78.73	...	2,038.62	2,038.62	140.68	95,168.89	95,309.57	79,172.09	109,936.80	189,109.49
1907	...	8.44	8.44	...	5,918.75	5,918.75	2,581.66	117,735.69	120,627.35	54,811.74	115,497.50	170,399.24
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	157,039.59
1909	...	7.37	7.37	...	7,322.29	7,322.29	11,569.83	136,637.67	148,237.50	24,682.47	107,167.27	181,849.74
1910	...	26.31	26.31	...	3,057.5	3,057.5	1,557.78	137,190.44	138,748.22	19,568.85	111,414.23	180,988.08
1911	...	7.87	7.87	...	134.23	134.23	11.77	96,442.57	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	105,245.32	111,622.49	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
Total	304.55	507.90	812.45	41,099.08	167,107.53	208,206.61	228,088.74	1,236,031.64	1,464,120.38	1,420,220.36	1,281,135.93	2,651,356.29

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	111,919.21	...	111,919.21	17,666.25	...	17,666.25
1897	29,437.40	...	29,437.40	268,411.95	...	268,411.95	61,848.03	...	61,848.03	14,819.20	...	14,819.20
1898	112,039.58	...	112,039.58	402,847.91	...	402,847.91	93,312.00	...	93,312.00	16,037.78	...	16,037.78
1899	57,674.82	14,940.55	72,615.37	795,696.63	29,567.58	826,264.21	101,589.22	24,700.89	126,990.11	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	26,317.30
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	460,462.26	546,964.68	1,007,428.94	2,872.61	80,837.55	83,710.16	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	7,313.63	69,681.38	77,000.01	...	23,761.00	23,761.00
1904	55.09	33,262.10	33,317.19	555,016.43	584,579.88	1,139,596.36	1,100.07	61,073.11	62,173.18	28.87	20,965.37	20,994.24
1905	2,187.11	40,220.19	42,407.30	479,254.37	613,103.20	1,092,357.57	177.80	62,066.34	62,244.14	...	25,291.11	25,291.11
1906	1,590.31	30,943.82	32,534.13	454,645.84	612,548.81	1,067,192.65	103.78	60,474.81	60,578.59	...	23,311.41	23,311.41
1907	3,132.83	25,399.75	28,532.58	323,550.05	643,139.11	966,689.16	1,050.88	61,670.65	62,721.53	...	20,368.10	20,368.10
1908	925.44	25,902.41	26,827.85	267,748.62	637,936.89	925,685.51	871.76	40,982.65	41,854.41	...	21,169.64	21,169.64
1909	1,774.45	24,566.87	26,341.32	306,462.21	620,612.07	927,074.28	350.91	36,311.70	36,662.61	204.41	20,958.23	21,049.13
1910	...	19,082.01	19,082.01	179,062.94	653,211.05	832,273.99	...	38,264.02	38,264.02	...	14,688.17	14,688.17
1911	...	18,528.97	18,528.97	123,160.54	686,356.90	809,547.34	...	33,840.93	33,840.93	...	27,439.38	27,439.38
1912	194.22	14,475.38	14,669.60	71,429.00	717,356.45	738,785.45	...	42,327.65	42,327.65	...	63,679.58	63,679.58
1913	...	11,210.69	11,210.69	70,078.57	722,593.22	792,671.79	...	35,593.00	35,593.00	...	...	...
Total	234,748.07	414,253.27	649,001.34	6,703,942.31	8,032,734.88	14,736,677.19	661,131.91	764,762.81	1,425,894.72	206,721.65	381,234.33	587,955.98

GRAND TOTAL.

Year.	Export.			Mint.			Total.			Value.		
	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	£	s.	d.	£	s.	d.
1886	270.17	...	...	1,147	12	2 1/2
1887	4,359.37	...	...	18,617	8	6 1/2
1888	3,124.82	...	...	13,273	7	10 1/2
1889	13,859.52	...	...	58,871	9	11 1/2
1890	20,402.42	...	...	86,663	19	5
1891	27,116.14	...	...	115,182	0	10 1/4
1892	53,271.65	...	...	226,283	11	8
1893	99,202.50	...	...	421,385	8	8 1/2
1894	185,298.73	...	...	787,098	19	6
1895	207,110.20	...	...	879,748	4	2 1/2
1896	251,618.69	...	...	1,068,808	5	2
1897	603,846.44	...	...	2,564,976	13	9 1/2
1898	939,489.49	...	...	3,990,697	13	10
1899	1,283,360.25	187,244.41	1,470,604.66	6,246,731	10	7 1/2
1900	894,387.27	519,923.59	1,414,310.86	6,007,610	13	4 1/2
1901	923,686.96	779,729.56	1,703,416.52	7,235,653	9	1
1902	707,039.75	1,163,697.60	1,871,037.35	7,947,661	9	7 1/2
1903	833,685.78	1,231,115.62	2,064,801.40	8,770,718	17	0 1/2
1904	810,616.04	1,172,614.03	1,983,230.07	8,424,225	17	3 1/2
1905	655,089.88	1,300,296.00	1,955,315.88	8,305,653	18	5 1/2
1906	562,250.59	1,232,296.01	1,794,546.60	7,622,749	8	7
1907	431,803.14	1,765,750.45	1,697,553.59	7,210,749	6	2 1/2
1908	356,353.96	1,291,557.17	1,647,911.13	6,999,651	10	10 1/2
1909	336,370.58	1,208,898.63	1,595,269.41	6,776,373	14	7 1/2
1910	233,970.34	1,236,661.68	1,470,632.02	6,246,847	15	0
1911	160,422.28	1,210,445.24	1,370,867.52	5,823,075	1	9 1/2
1912	83,577.12	1,199,080.87	1,282,657.99	5,443,384	16	5 1/2
1913	86,265.13	1,227,768.15	1,314,043.28	5,581,701	1	2 1/2
TOTAL	10,817,839.21	16,227,329.21	27,045,168.42	114,880,573	5	0 1/2

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 VII

MONTHLY RETURN OF GOLD, CONTAINED IN BULLION, FURNACE PRODUCTS, AND ORE, ENTERED FOR EXPORT DURING 1913.

MONTH.	UNITED KINGDOM.			VICTORIA.			NEW SOUTH WALES.			TOTALS.			Minted Gold Exported.*
	Bullion.	Furnace Products.	Ore.	Bullion.	Furnace Products.	Ore.	Bullion.	Furnace Products.	Ore.	Bullion.	Furnace Products.	Ore.	
1913.	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	8,110.92	1,169.22	11.00	447.30	...	...	...	...	...	8,558.22	1,169.22	11.00	7,113.83 + 155.28
February	8,057.01	441.88	5.95	275.44	...	...	...	...	...	8,332.45	441.88	5.95	8,801.11
March ... ..	...	462.75	8.88	282.50	...	...	...	...	...	282.50	462.75	8.88	17,763.82
April	6,550.32	1,076.02	11.53	282.50	...	...	...	...	...	6,832.82	1,076.02	11.53	2,370.31 + 134.08
May	6,422.49	395.18	40.94	235.42	...	...	...	...	...	6,657.91	395.18	40.94	7,107.33
June	3,766.72	1,007.97	7.68	329.59	...	...	...	...	...	4,096.31	1,007.97	7.68	2,367.90 + 14.83
July	10,641.03	630.15	9.84	423.76	...	...	...	...	...	11,064.79	630.15	9.84	4,739.92 + 114.82
August	6,410.66	487.26	6.63	706.26	...	...	...	...	...	7,116.92	487.26	6.63	7,106.66
September	834.56	1,537.50	10.25	823.97	...	...	...	...	...	1,658.53	1,537.50	10.25	13,060.62
October	9,962.96	259.20	229.52	1,177.10	...	...	...	...	...	11,140.06	259.20	229.52	22,491.79 + 82.62
November	7,731.66	1,536.84	6.89	306.05	...	...	...	...	...	8,037.71	1,536.84	6.89	16,591.01
December	1,388.98	1,019.30	6.00	164.79	518.16	...	...	26.60	...	1,553.77	1,564.06	6.00	14,201.49
TOTALS	69,877.31	10,023.27	355.11	5,454.68	518.16	...	...	26.60	...	75,331.99	10,568.03	355.11	124,017.42

* 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. 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, 1913, 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	3,284.37	...	124.86	32,637.17	62,357.98	47,623.18	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	183.73	6,033.33	1,014.60	334.38	9.78	165.36	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
Total	6,533.16	121,696.97	26,244.55	2,333.32	591.81	194,630.84	1,478,422.52	1,471,853.67	58,025.71	2,073,012.61	1,661,306.53	185,723.09	487,705.67

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.	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	139,845.90	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	685,289.32	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	5,336,853 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 1 3	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	1,496,346.52	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	...	277.70	1,490,235.42	5,204,738 18 3	697.50	1,247 12 7	1,490,932.92	5,205,986 10 10						
Total	9,610,738.29	902,798.41	450,172.42	561,842.14	47,511.81	630.96	18,210.61	19,359,985.09	68,149,992 8 9	8,606.77	16,520 12 1	19,368,591.86	68,166,513 0 10						

* Prior to 1902 included in State generally.

† Abolished 4th March, 1908.

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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 1913, 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	78,045	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	124.95	139.10	16,506	29.06	429.42	458.48	50,954	43.21	£557.72	£600.93	\$67,717
Total	338.97	4,686.85	5,025.82	428,800	221.72	8,714.32	8,936.04	684,414	560.69	13,406.04	13,966.73	1,113,589	

* 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	2,644	...	...	...	...	1.80	12.85	14.65	2,644
1907
1908
190945	...	113	...	.85	.85	214	...	.45	.85	327
1910
1911
1912
1913
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.		E. MURCHISON GF.			
	Quantity.	||Value.	Marble Bar D.		Nullagine D.		Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Lawlers D.	
			Quantity.	Value.	Quantity.	Value.							Quantity.	Value.
tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	
Previous to 1899
1899	7,018.00	55,270	...	...	...	...	...
1900	2,555.00	29,478	...	...	...	...	...
1901	1,605.00	12,139	...	...	...	...	...
1902	1,162.00	15,891	...	...	...	...	...
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	...	...	...	...	...
...	...	7,625.80	2,543	...	...	...	...	12,284.02	104,289	...	...	...	...	...
...	...	10,216.18	3,658	...	...	...	...	12,621.73	76,878	...	...	...	...	...
Total	27,780.90	9,730	32.87	386	5.00	120	66,794.57	571,632	198.75	2,570	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.	Mt. Morgans District.		Mt. Margaret District.	
	Quantity.	Value.	Quantity.	Value.							Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£
Previous to 1899
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	45,557	...	...
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
Total	741·50	5,639	52·16	495	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.								
	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£		
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	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	120,158		
1913	806·95	9,737	...	...	13,428·68	86,615		
Total	6·12	51	50·67	330	72,997·29	356,487	16·58	233	189,104·26	1,173,057

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.
	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£
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
Total	100·00	300	450·00	247	57,280·00	36,148	57,830·00	36,695	46,485·64	96,360	1,349·65	12,620	2,636,954·31	1,223,049

† 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	17,593·00	2,838	17,593·00	2,838	§	24
1900	269·85	273	15,657·00	3,321	15,926·85	3,594	...	...
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	...	*5·00	90	...	2·83	154	...	...	...	...	...	...	...	...	...	...
1910	...	†42·00	115	...	...	...	...	...	...	...	...	...	...	...	...	...
1911	...	‡194·00	877	...	...	...	...	...	...	...	...	...	...	...	...	...
1912
1913	...	‡4·64	69	1·00	112	...	...	...	...	...	...	...	...	...	...	...
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, 93 miles N.W. of Derby. † Tons 22·00, value £30, the produce of Derby, 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 96-9.

TABLE X.

QUANTITY AND VALUE OF BLACK TIN REPORTED TO THE MINES DEPARTMENT DURING 1913,
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1913.				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 ...	...	61.90	61.90	7,441	...	1,504.37	1,504.37	124,493
Mills Find ...	...	Sundry claims ...	...	...	...	...	...	.85	.85	69
Moolyella ...	...	Voided leases ...	...	...	...	...	...	330.53	330.53	21,340
Do. ...	...	Sundry claims ...	...	62.25	62.25	7,357	...	2,562.86	2,562.86	231,501
Old Shaw ...	...	Voided leases ...	...	...	...	...	...	6.75	6.75	424
Do. ...	...	Sundry claims ...	...	...	...	...	...	214.04	214.04	14,525
Wodgina ...	(195)	Cassiterite No. 1 ...	...	...	...	...	...	.35	.35	49
Do. ...	(192)	Comet ...	...	...	...	...	...	.30	.30	36
Do. ...	84	(Mount Cassiterite) ...	...	...	...	...	133.52	13.85	147.37	14,184
Do. ...	84, 93, 148	Mount Cassiterite leases ...	7.80	.80	8.60	966	162.75	.80	163.55	13,178
Do. ...	93	(Mount Cassiterite North) ...	...	...	...	...	9.67	...	9.67	971
Do. ...	255	Mt. Tinstone ...	1.85	...	1.85	210	1.85	...	1.85	210
Do. ...	(213)	Referenda ...	...	...	...	...	1.05	...	1.05	147
Do. ...	(178)	Siffleet's Reward ...	.80	...	.80	92	3.50	...	3.50	356
Do. ...	(198)	Stannum ...	...	...	...	...	.90	...	.90	126
Do. ...	(203)	Wodgina Queen ...	.70	...	.70	82	1.60	...	1.60	190
Do. ...	...	Voided leases ...	...	...	...	...	18.00	6.10	24.10	2,259
Do. ...	...	Sundry claims ...	3.00	...	3.00	358	5.48	46.70	52.18	4,742
		Totals ...	14.15	124.95	139.10	16,506	333.97	4,686.85	5,025.82	428,800
MURCHISON GOLDFIELD.										
CUE DISTRICT.										
Cuddingwarra ...	...	Sundry Claims ...	...	3.20	3.20	242	...	3.20	3.20	242
Poona ...	...	Sundry claims ...	...	...	...	...	...	1.52	1.52	118
		Totals ...	...	3.20	3.20	242	...	4.72	4.72	360
COOLGARDIE GOLDFIELD.										
COOLGARDIE DISTRICT.										
Bulla Bulling ...	...	Sundry Claims ...	...	.15	.15	15	...	.15	.15	15
		Totals ...	...	.15	.15	15	...	.15	.15	15
GREENBUSHES MINERAL FIELD.										
Greenbushes ...	472	(Aqua) ...	...	...	...	...	...	1.50	1.50	128
Do. ...	436	Battery Hill: Caledonian Tin Mining Co., N.L.	...	.05	.05	6	4.49	.05	4.54	412
Do. ...	563	Bunbury End ...	.56	...	.56	60	.56	...	.56	60
Do. ...	296	(Central) ...	...	...	...	...	...	100.16	100.16	9,728
Do. ...	511	Champion ...	...	14.40	14.40	1,319	...	61.00	61.00	6,172
Do. ...	356, 514	Cornwall Leases ...	5.55	...	5.55	601	54.22	13.63	67.85	6,047
Do. ...	(566)	Dixie ...	.05	...	.05	6	.05	...	.05	6
Do. ...	369	Enterprise ...	.20	.70	.90	98	.20	4.79	4.99	421
Do. ...	472, 497, 510	Excelsior Leases ...	...	13.75	13.75	1,665	...	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. ...	375	(Glasgow) ...	...	...	...	...	.93	.61	1.54	150
Do. ...	35, (169), 218, 272, 287, 295, 296, (331), (375), (395), (421), (425), (428), (432), (448), (453)	Greenbushes Development Co., Ltd.	...	76.10	76.10	7,996	.35	817.75	818.10	70,594
Do. ...	35	(Horan's) ...	...	...	...	...	...	188.35	1.88.35	11,605
Do. ...	(169)	(Horan's No. 1 North) ...	...	...	...	...	...	9.50	9.50	684
Do. ...	515	Kapanga ...	2.25	.76	2.01	330	12.31	.76	13.07	1,417
Do. ...	73, 233, 271	King Tin Leases ...	.50	8.05	8.55	966	5.31	45.68	50.99	5,069
Do. ...	271	(King Tin North) ...	...	...	...	...	...	1.84	1.84	117
Do. ...	552	Last Chance ...	1.55	1.35	2.90	334	1.55	1.35	2.90	334
Do. ...	(331)	(Lady Esther) ...	...	...	...	...	...	10.00	10.00	744
Do. ...	470	Little Wonder ...	...	2.05	2.05	242	5.00	49.73	54.73	5,455

TABLE X.—Quantity and Value of BLACK TIN, etc.—continued.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1913.				TOTALS TO DATE.			
			Quantity.			Value.	Quantity.			Value.
			Lode.	Stream.	Total.		Lode.	Stream.	Total.	
			tons.	tons.	tons.	£	tons.	tons.	tons.	£
GREENBUSHES MINERAL FIELD—continued.										
Greenbushes	(543)	Lost and Found	·25	...	·25	31	4·82	...	4·82	580
Do.	507	Lost and Found North	2·50	...	2·50	293	8·07	·25	8·32	904
Do.	460, 461	Mount Jones Leases	...	24·10	24·10	2,880	...	165·05	165·05	19,586
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
Do.	564	North Cornwall	·25	...	·25	30	·25	...	·25	30
Do.	(396), (397), 460, 461, (479), (480)...	(Norilup Tin Mining and Dredging Co., Ltd.)	...	...	...	...	...	3·82	3·82	291
Do.	504	Old Bunbury	...	...	...	...	...	35·05	35·05	3,129
Do.	498	Rat	...	·74	·74	84	...	·74	·74	84
Do.	531	Scadden	...	1·41	1·41	1·76	...	1·41	1·41	176
Do.	505	Scotia	...	5·09	5·09	499	...	26·24	26·24	2,309
Do.	30 _H (late 300)	South Cornwall	14·65	...	14·65	1,670	28·49	...	28·49	3,140
Do.	450, 458, 485, 486, 487, 488, 489	Stanhope United leases	...	80·50	80·50	9,900	...	321·04	321·04	35,098
Do.	529	Three C's	...	1·22	1·22	150	...	6·60	6·60	789
Do.	565	Turn of the Tide	...	1·69	1·69	171	...	1·69	1·69	171
Do.	218	(W.A. Mt. 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	...	2·15	2·15	210
Do.	Loc. 289, 290	Freehold Ground (Clarth and others)	...	...	...	...	...	318·04	318·04	28,959
Do.	...	Voided leases	...	...	...	...	66·43	450·46	516·89	40,963
Do.	...	Sundry claims	75	195·31	196·06	21·237	22·31	5,809·01	5,831·32	407,645
Totals			29·06	429·42	458·48	50·954	221·72	8,714·32	8,936·04	684,414

TABLE XI.

QUANTITY AND VALUE OF TANTALITE REPORTED TO THE MINES DEPARTMENT DURING 1913,
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1913.				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 1913,
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1913.		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.	8,510.15	3,026	24,296.11	8,409
Murrin Murrin	18F	Nangaroo: Nangaroo Mines, Ltd.	1,706.08	632	3,484.79	1,321
		Totals	10,216.18	3,658	27,780.90	9,730

† 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 1913,
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1913.			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 (14L) ...	...	Tambina ...	...	...	...	5 00	2 22	120
		Totals ...				5 00	2 22	120
WEST PILBARA GOLDFIELD.								
Croydon ...	(M.L. 31)	Evelyn: British Exploration of Australasia, Ltd.	...	...	...	549 00	96 00	6,463
Do. ...	...	Voided leases ...	...	...	...	55 00	12 65	870
Egina ...	...	Voided leases ...	...	...	...	542 00	104 15	6,643
Roebourne ...	M.L. 143...	Carlow Castle ...	27 64	4 78	346	59 28	9 50	662
Do. ...	M.Ls. 145, 146, 164, 165	Good Fortune leases ...	179 55	34 95	2,362	219 15	44 75	2,988
Do. ...	(G.M.L. 150)	Q.E. ...	16 00	3 45	237	319 84	37 91	2,330
Do. ...	(M.L. 138)	Trouble ...	...	...	...	23 21	6 22	343
Do. ...	M.L. 144	Yannery Hill ...	123 00	33 45	2,336	123 00	33 45	2,336
Do. ...	...	Voided leases ...	...	...	...	1,378 62	273 55	23,298
Do. ...	...	Sundry claims ...	3 54	49	28	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.	12,272 00	1,092 90	71,569	61,361 53	8,149 46	512,057
Do. ...	...	Voided leases ...	...	...	...	30 00	5 50	250
		Totals ...	12,621 73	1,170 02	76,878	66,794 57	8,961 75	571,632
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
EAST MURCHISON GOLDFIELD.								
LAWLERS DISTRICT.								
Kathleen Valley 12 ...	...	Shepherd ...	...	...	...	6 77	1 32	69
		Totals ...				6 77	1 32	69
MURCHISON GOLDFIELD.								
MEEKATHARRA DISTRICT.								
Gabanintha ...	...	Voided leases ...	...	...	...	741 50	83 60	5,639
		Totals ...				741 50	83 60	5,639
DAY DAWN DISTRICT.								
Day Dawn ...	(G.M.L. 14D)	Croesus: Murchison Associated G.Ms., Ltd.	...	...	...	6 50	1 02	84
Do. ...	G.M.L. 138D	Rubicon: Murchison Associated G.Ms., Ltd.	...	...	...	4 80	1 00	54
Do. ...	...	Voided leases ...	...	...	...	15 65	3 15	167
Do. ...	...	Sundry Claims ...	...	...	...	25 21	2 50	190
		Totals ...				52 16	7 67	495

TABLE XIII.—Quantity and Value of COPPER ORE, etc.—continued.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1913.			TOTALS TO DATE.		
			Quantity.		Value.	Quantity.		Value.
			Ore.	Metallic Copper.		Ore.	Metallic Copper.	
			tons.	tons.	£	tons.	tons.	£
YALGOO GOLDFIELD.								
Twin Peaks ...	...	Sundry Claims ...	...	...	...	19.50	3.49	227
Wadgingarra ...	...	Voided leases ...	...	...	...	13.91	.98	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], (12c, 37c),	(Mt. Malcolm Copper Mine) ...	...	...	...	13,516.00	1,001.98	70,754
Do. ...	(10c, 11c), 4F, 5F	(Mt. Malcolm Copper Mine) ...	...	...	...	3,839.00	418.00	17,065
Do. ...	[10c, 11c], (12c, 37c),	(Murrin Copper Mines, Ltd.) ...	...	...	...	19,165.00	798.50	45,817
Do. ...	4F, 5F, 11F, 12F	West Australian Copper Co., Ltd. ...	...	...	...	9,794.05	1,976.05	80,199
Mt. Margaret ...	...	Voided leases ...	...	...	...	11.53	2.40	163
Murrin Murrin ...	18F ...	Nangeroo: Nangeroo Mines, Ltd. ...	...	...	...	6.80	3.00	160
Do. ...	...	Voided leases ...	...	...	...	1,525.29	248.04	16,662
		Totals ...	...	...	...	47,857.67	4,448.00	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.	1913.			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	8·00	1·13	72
Do.	(M.L. 184)	Christmas Gift	...	...	...	189·05	19·84	1,226
Do.	G.M.Ls. 147, 179	Fair Play leases...	38·88	2·86	195	130·09	6·74	494
Do.	G.M.Ls. 136, 137, 138 (139)	Flag Gold and Copper Mining Co., Ltd.	...	...	...	2,107·84	144·75	8,494
Do.	G.M.Ls. 151, 156	Gem Consolidated leases	48·00	1·69	126	48·00	1·69	126
Do.	M.Ls. 52, 94	(Harbour View leases)	...	...	...	604·36	76·80	4,524
Do.	M.Ls. 52, 94	Harbour View leases	...	...	...	508·27	64·66	3,642
Do.	G.M.L. 98	Hillsborough	25·00	2·82	190	692·84	12·86	856
Do.	M.Ls. 52, 94	(Ravensthorpe G.M. Syndicate, N.L.)	...	...	...	132·56	24·36	1,382
Do.	...	Voided leases	...	...	...	760·45	84·48	5,524
Do.	...	Sundry claims	...	...	...	64·53	9·13	660
Mt. Desmond	(M.L. 203)	British Flag: Phillips River Gold and Copper Co., Ltd.	19·90	3·64	250	19·90	3·64	250
Do.	M.L. 208...	Desmond: Phillips River Gold and Copper Co., Ltd.	149·05	33·78	2,342	827·84	155·09	11,388
Do.	M.L. 95 ...	(Elverdtton)	...	...	...	130·00	5·70	570
Do.	M.L. 95 ...	(Elverdtton: Phillips River Options Syndicate, N.L.)	...	...	...	2,946·02	401·43	22,657
Do.	M.L. 95 ...	Elverdtton: Phillips River Gold and Copper Co., Ltd.	94·60	14·39	1,018	27,997·88	1,928·73	108,593
Do.	M.L. 168...	(Elverdtton South)	...	...	...	18·48	2·39	119
Do.	M.L. 275...	Ironclad	...	...	...	304·68	53·11	2,951
Do.	M.L. 109...	(Mt. Desmond)	...	...	...	198·87	30·77	1,640
Do.	M.L. 109...	Mt. Desmond: Phillips River Gold and Copper Co., Ltd.	40·85	6·66	485	1,762·22	216·76	18,128
Do.	M.L. 199...	P.L.P.	...	...	...	208·66	33·69	2,277
Do.	...	Voided leases	...	...	...	641·28	102·66	6,170
Do.	...	Sundry claims	...	...	...	34·10	6·58	433
Ravensthorpe	M.L. 116...	Last Chance	26·36	3·75	248	1,134·48	181·72	11,030
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.	176·15	26·40	1,795	1,978·81	238·30	15,362
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.	...	...	...	1,142·40	80·21	5,692
Do.	(M.L. 331)	Mount Benson Extended	...	...	...	60·45	11·68	693
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 ...	(Mount Cattlin: Phillips River Gold and Copper Co., Ltd.)	...	...	...	1,263·76	80·26	7,646
Do.	M.L. 15 ...	Mt. Cattlin: Phillips River Gold and Copper Co., Ltd.	36·20	7·10	483	14,189·15	696·95	39,242
Do.	M.L. 342...	Surprise	115·38	27·36	1,962	115·38	27·36	1,962
Do.	...	Voided leases	...	...	...	3,274·15	405·09	24,274
Do.	...	Sundry claims	...	...	...	148·87	12·51	695
West River	...	Voided leases	...	...	...	44·04	7·41	414
Do.	...	Sundry claims	...	...	...	118·29	22·20	1,698
		From goldfield generally	28·58	9·24	571	830·39	77·99	4,694
		Totals	806·95	140·82	9,737	72,997·29	5,797·86	356,487
STATE GENERALLY.								
Jerramungup	...	...	...	...	...	3·08	1·26	40
Twin Peaks	...	...	...	...	...	13·50	2·27	193
		Totals	...	...	...	16·58	3·53	233

TABLE XIV.

QUANTITY AND VALUE OF IRONSTONE REPORTED TO THE MINES DEPARTMENT DURING 1913,
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1913.		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 1913,
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1913.			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	.. 365 83	262 56	5,120	365 83	262 56	5,120
Do.	..	Sundry claims	..	..	..	225 00	27 00	185
Northampton	.. Loc. 1472	Baddera Lead Mine	.. 26,223 70	2,478 43	45,354	45,702 06	5,209 62	89,206
Do.	..	Voided leases	..	..	..	116 75	72 58	1,176
Victoria..	..	Voided leases	..	..	..	19 00	12 54	212
		Totals	26,589 53	2,740 99	50,474	46,485 64	5,625 91	96,360

TABLE XVI.

QUANTITY AND VALUE OF SILVER-LEAD ORE REPORTED TO THE MINES DEPARTMENT DURING 1913
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1913.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons.	£
ASHBURTON GOLDFIELD.						
Ashburton	...	Voided leases	...	...	56 90	429
Uaroo.	... 43, 49	Uaroo Silver-Lead Mines	... 125 50	1,757	1,292 75	12,191
		Totals	125 50	1,757	1,349 65	12,620

TABLE XVII.

QUANTITY AND VALUE OF COAL REPORTED TO THE MINES DEPARTMENT DURING 1913,
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1913.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons.	£
COLLIE RIVER MINERAL FIELD.						
Collie...	197, etc.	Cardiff Coal Mining Co., Ltd.	75,659.80	33,645	452,113.12	191,404
Do.	151, etc.	(Collie-Boulder Coal Co., Ltd.)	...	...	71,512.70	26,139
Do.	244, etc.	Collie Co-operative Collieries, Ltd.	75,817.15	37,649	474,449.48	225,277
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.	33,188.56	15,573	77,322.66	35,763
Do.	151, etc.	Scottish Co-operative Collieries Co., Ltd.	48,961.65	25,778	349,949.21	136,046
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)	40,921.00	20,840	52,932.00	26,775
Do.	250-254, 256	Westralian Coal Mining Co., Ltd.	39,269.80	20,129	74,822.59	36,497
		Voided leases	...	...	25,569.85	12,930
		Totals	313,817.96	153,614	2,636,954.31	1,223,049

TABLE XVIII.

QUANTITY AND VALUE OF LIMESTONE REPORTED TO THE MINES DEPARTMENT DURING 1913,
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1913.		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 1913,
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1913.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons.	£
PILBARA GOLDFIELD.						
MARBLE BAR DISTRICT.						
Soansville	(155, etc.)	Pilbara Asbestos Co., Ltd.	...	...	42.83	1,754
		Totals	...	...	42.83	1,754

TABLE XX.

QUANTITY AND VALUE OF GODOLINITE REPORTED TO THE MINES DEPARTMENT DURING 1913,
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1913.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons.	£
PILBARA GOLDFIELD.						
MARBLE BAR DISTRICT.						
Cooglegong ..	M.L. 254	Iverna	1·00	112	1·00	211
Totals			1·00	112	1·00	112

TABLE XXI.

QUANTITY AND VALUE OF WOLFRAM REPORTED TO THE MINES DEPARTMENT DURING 1913,
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1913.			TOTALS TO DATE.		
			Ore.	Metallic contents.	Value.	Ore.	Metallic contents.	Value.
			tons.	tons.	£	tons.	tons.	£
MURCHISON GOLDFIELD.								
CUE DISTRICT.								
Callie Spring Cuddingwarra Do.	(M.L. 11)	Sundry Claims	4·64	·70	69	4·64	·70	69
		Socialist	...	...	...	194·00	6·11	877
		Sundry claims	...	...	...	20·00	·85	85
		Totals	4·64	·70	69	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 1913,
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1913.		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.		Philips 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	...	...	...	...	...	...	...	...	...	...	...	...	...
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	...	...	...	...	...	...	...	...	...	...	...	...	...
1890	...	...	...	...	...	...	...	...	...	...	...	...	...
1	263	4,462	...	...	...	...	...	...	263	4,462	...	...	4,462
2	† 412	6,319	155	2,377	...	...	...	...	567	8,696	...	...	8,696
3	50	606	...	...	...	...	...	...	50	606	...	...	606
4	...	...	...	...	...	...	...	...	...	...	...	...	...
5	802	12,832	24	120	...	...	...	...	826	12,952	...	...	12,952
6	6	100	...	...	...	...	...	...	6	100	...	...	100
7	65	731	21	302	...	...	...	...	86	1,033	...	...	1,033
8	281	3,334	75	932	...	...	...	...	356	4,266	...	...	4,266
9	1,404	31,979	587	9,473	...	...	...	...	1,991	41,452	...	...	41,452
1900	544	10,636	...	...	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	3,23	...	...	...	...	...	...	224	2,930	336	6,162	36,529
7	...	...	...	...	...	...	...	...	3,727	61,493	3,727	61,493	203,376
8	...	...	...	...	...	...	...	...	2,503	29,272	2,503	29,272	57,091
9	...	...	...	...	...	...	...	...	6,959	59,541	6,959	59,541	104,641
1910	...	...	...	...	...	...	...	...	6,309	27,271	6,309	27,271	95,928
1911	...	...	...	...	...	...	...	...	9,825	33,709	9,825	33,709	78,118
1912	...	...	...	...	...	...	...	...	9,536	58,688	9,536	58,688	59,824
1913	...	...	...	...	...	...	...	...	4,339	136,622	4,339	136,622	142,513
Total	...	...	...	...	...	...	...	...	61,467	717,359	8,751	537,503	1,254,862

† See Woodward's Mining Handbook, Perth: By Authority, 1895; page 123.

‡ Weight not stated.

XXIII.

ENTERED FOR EXPORT FROM 1850 TO 1913, 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
...	...	171	7,664	...	...	228	11,134	...	...	11,134	4
57	3,470	371	14,325	...	...	390	15,274	...	...	15,274	5
19	949	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	1,389	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	Total
...	11,776	1,015,243	867	117,214	1,132,457	

*† 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	...	...	...	...	...	...	122	2,440	...	...
6	...	...	25	250	...	...	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	...	...	89	800	...	...	...	...	...	...
6	...	...	703	8,436	...	...	...	...	...	...
7	...	...	273	3,282	...	...	...	...	...	...
8	...	...	902	10,824	...	...	†‡	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	...	...	†‡	155	...	...
8	...	...	3,956	47,466	...	...	†	15	...	...
9	...	...	3,618	43,410	...	...	...	...	...	...
1880	...	...	2,775	33,300	...	...	...	...	...	...
1	...	...	1,921	15,368	...	...	†‡	89	...	...
2	...	...	1,401	11,204	...	...	†	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	...	...	†‡	120	...	...
9	...	...	532	5,320	...	...	†	40	...	...
1890	...	...	250	2,500	...	...	...	...	...	...
1	...	...	214	2,135	...	...	...	...	...	...
2	...	...	25	250	...	...	...	...	...	...
3	...	...	30	150	...	...	...	...	...	...
4	...	...	...	...	...	...	...	...	...	...
5	...	...	...	...	...	...	...	...	...	...
6	...	...	...	...	...	...	...	...	...	...
7	...	...	...	...	...	...	...	...	...	...
8	...	...	†	4	...	...	†	11	...	...
9	...	...	5	33	...	...	...	...	...	...
1900	...	...	16	96	...	...	77	1,077	...	...
1	28,749	3,594	27	242	...	...	...	...	...	...
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	176,139	18,777	248	1,433	...	...	...	...	12	147
1912	169,043	18,333	1,679	6,682	...	...	...	...	12	189
1913	165,371	19,725	870	8,320	...	...	...	...	14	217
1913	188,020	23,420	1,868	22,270	...	...	...	...	...	...
1913	188,020	23,420	3,169	59,002	...	...	...	...	...	...
Total	2,615,239	310,640	40,478	462,463	940	8,071	684	13,306	141	4,285

† Weight not stated. ‡ Estimated. § 4 cwt. ¶ Includes Cobalt ore, 2 tons, valued at £41; Plumbago ore, 1 ton, valued at £6. † Concentrates

entered for EXPORT from 1850 to 1913, inclusive—continued.

WOLFRAM.		NON-METALLIC MINERALS.						MINERALS NOT ELSEWHERE INCLUDED.		Total Value of Minerals other than Gold, Exported to Date.	YEAR.	
State generally.		ASBESTOS.		COAL.		MICA.		Quantity.	Value.			
Quantity	Value.	Quantity.	Value.	Collie River Coal Mf.		State generally.				Quantity.	Value.	
tons.	£	tons.	£	tons.	£	tons.	£	tons.	£			
...	55	1850	
...	1	
...	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	
...	25	...	...	22,714	2	
...	4	...	...	11,744	3	
...	15,274	4	
...	3	...	...	22,658	5	
...	4,438	6	
...	209	...	...	4,532	7	
...	1	1	...	...	...	...	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	...	...	3	47	61,551	2	
...	...	5†	10	110	127	...	...	22	230	109,468	3
...	11	7	...	...	7	81	97,132	4	
...	108	87	...	...	80	5,856	192,251	5	
...	86	65	...	...	10	1,035	222,621	6	
...	26	28	...	...	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	...	...	...	...	...	...
...	353	183	11†	263	735	282,650	9
1	100	...	...	*85,647	93,781	...	...	...	...	...	...
2	190	...	...	3	2	...	...	12†	100	200,106	1910
9	826	...	...	*48,876	38,400	...	...	...	...	...	...
...	*40,063	29,344	...	...	14	407	197,439	1911	
...	6	6	...	...	...	...	...	...
...	*42,602	30,721	...	...	14†	8	212,509	1912	
1	86	...	...	*54,228	39,125	...	...	5	17	336,305	1913
13	1,202	...	1,253	285,328	242,876	...	304	...	13,342	3,445,061	Total.	

* Bunker Coal. † Antimony ore. ‡ Includes Tantalite, 18 tons, valued at £5,729. § Includes Antimony ore, 25 tons ... = £680
 Scheelite, 4 tons ... = 140
 N.E.I., 71 tons ... = 817
 Total ... = £1,587
 † Includes N.E.I., † ton ... = £100
 ‡ Includes: Iron ore, 9 tons ... = 7
 Ores, N.E.I., 5 tons ... = 400
 Total ... = £407
 †† Includes Manganese, 2 tons ... = 4
 N.E.I. ... = 4
 Total ... = £8

10† Includes Tantalite, ... = £400
 N.E.I., 42 tons ... = £2,750
 Total ... = £3,150
 †† Includes Other Concentrates, 29 tons ... = £108
 N.E.I., 234 tons ... = £627
 Total ... = £735

PART III.—ALL MINES.

TABLE XXIV.

MILLING AND CYANIDING PLANTS ERECTED IN THE RESPECTIVE GOLDFIELDS, DISTRICTS, AND MINERAL FIELDS
ON THE 31ST DECEMBER, 1913, 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 <i>Ruby Creek.</i> (61) M.A. 9	Mt. Bradley Tunnelling Claim ..	25	..	..	..	1	..	..	..	..	..	..	..	..	..
	Ruby Queen	20	..	..	..	..	..	..	..	..	..	..	..	..	..
	Total	45	..	..	..	1	..	..	..	..	..	..	..	..	£5,000
PILBARA GOLDFIELD.															
MARBLE BAR DISTRICT.															
<i>Bamboo Creek.</i> 695 ^	Bulletin	10	..	..	..	..	..	..	..	..	..	4	..	..	..
	State Battery, Bamboo Creek ..	5	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Marble Bar.</i> (716) ^	Stray Shot	5	..	..	..	..	..	..	..	..	..	..	..	..	..
	State Battery, Marble Bar	5	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Warrawoona.</i> (505) 604	Bow Bells	10	..	..	..	..	..	..	..	..	..	..	..	..	..
	Klondyke Boulder G.M. Co., Ltd. ..	5	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Yandicoogina.</i> (M.A. 26)	Lady Adelaide Battery	10	..	..	..	..	..	..	..	..	..	4	..	..	..
	Total	50	..	..	..	..	..	..	..	..	..	8	..	..	£18,457
NULLAGINE DISTRICT.															
<i>Eastern Creek.</i> 1764, etc.	Doherty's Reward leases	10	1	..	..	..	..	..	..	..	..	6	..	..	..
	<i>Middle Creek.</i> 106	Barton	10	..	..	..	..	..	..	..	..	1	3	..	..
20-Mile Sandy Creek. ^	State Battery, 20-Mile Sandy Creek ..	10	..	..	..	..	..	..	..	..	..	..	..	..	..
	Total	30	1	..	..	..	..	..	..	..	..	1	9	..	£4,924
WEST PILBARA GOLDFIELD.															
<i>Lower Nicol.</i> 106	Ninety-Nine .. .. .	..	1	..	..	..	..	..	..	..	..	..	..	..	..
	<i>Station Peak.</i> 157	Momentum	10	..	..	..	..	..	..	..	..	5	..	..	..
<i>Turwanna.</i> 155	Tauri Tom Tit	10	..	..	..	..	..	..	..	..	1	4	..	..	..
	<i>Weiwianna.</i> M.A. 12	Porteminna Battery	5	..	..	..	..	..	..	..	..	4	..	..	..
Total	25	1	..	..	..	..	..	..	..	..	1	13	..	£3,850	
PEAK HILL GOLDFIELD.															
1P, etc. ^	Peak Hill Goldfields, Ltd.	30	..	..	..	..	..	..	2	..	..	6	..	4	..
	State Battery, Mt. Egerton	5	..	..	..	..	..	..	..	..	..	..	..	..	..
^	State Battery, Ravelstone	5	..	..	..	..	..	..	2	..	..	5	..	..	..
	Pureoll's Works .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total	40	..	..	..	..	..	..	..	4	..	..	11	..	4	£9,943

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.
EAST MURCHISON GOLDFIELD.															
LAWLERS DISTRICT.															
<i>Bronzewing.</i> (1017)	Bronzewing	3									2				
<i>Kathleen Valley.</i> (113) 382	Nil Desperandum	10													
<i>Lake Darlot.</i> 626, etc.	Yellow Aster G.M. Co., N.L.	10									4				
^	Zangbar	10									6	2			
<i>Lawlers.</i> M.A. 24	State Battery, Lake Darlot	10													
M.A. 11	Cinderella Battery	5									7				
58, etc. (908)	Lawlers Public Battery	10									4				
<i>Sir Samuel.</i> M.A. 28	Northern mines, Ltd.	40					2				6	6	4		
^	Vivien Gem	5													
	Bellevue lease	40					1				2				
	State Battery, Sir Samuel	5									3				
	Total	148					2	1		3	32	8	4	£40,61	
WILUNA DISTRICT.															
<i>Collavilla.</i> 71J	May Queen Reward, Ltd.	5													
<i>Mt. Keith.</i> ^	State Battery, Mt. Keith	5													
<i>Wiluna.</i> M.A. 57	Christensen's Battery	1													
6J, etc. (1J)	Gwalia Consolidated, Ltd.	30	1					1			13	13	6		
10J	Monarch	10									3	6	1		
2J, etc. ^	Moonlight	10									2				
	Wiluna G.Ms., Ltd.	25	1	1							9	3	1		
	State Battery, Wiluna	10									4				
	Total	95	2	2				1		5	29	22	8	£93,72	
BLACK RANGE DISTRICT.															
<i>Barrambie.</i> 773B	Barrambie Ranges G.M. Co., N.L.	10									6				
<i>Birrigrin.</i> 128B	Pelerin	5									4				
M.A. 8B	Reply Public Battery	5									4				
<i>Erroll's.</i> 776B	Great Saddle	10									8				
<i>Maninga Marley.</i> 203B	Havilah G.M. Co., N.L.	10									12				
53B	Maninga Marley	10									5				
<i>Montague.</i> 135B	Montagu Boulder	10									4				
<i>Sandstone.</i> 4B, etc.	Black Range M. Co., N.L.	20									4	11	5	32	
6B, etc. ^	Yuanmi G.Ms., Ltd.	20	2		1			1	1		3	14	4	2	
<i>Youanme.</i> 526B, etc. ^	State Battery, Black Range	10									2	3			
	Yuanmi G.Ms., Ltd.	20	2								1	2	3	1	
	State Battery, Youanme	5									2				
	Total	135		4		1			1	1	18	73	12	35	£157,153
MURCHISON GOLDFIELD.															
CUE DISTRICT.															
<i>Cuddingwarra.</i> 1848 (595)	Bell Topper	5													
T.A. 25	Victory United	10													
<i>Cue.</i> 203, etc. 1020	Wright's Plant										3				
<i>Eelya.</i> (1696)	Cue No. 1	20									1	8			
<i>Mindoolah.</i> (1609)	Gem of Cue Extended	15									1	5			
<i>Tuckanarra.</i> ^	Jasper Queen											4			
	Mindoolah Battery	10										3			
	State Battery, Tuckanarra	10										4			
	Total	70								2	27			£32,949	

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.															
MEEKATHARRA DISTRICT (LATE NANNINE).															
<i>Abbott's</i> (171N)	Mt. Vranizan	10	..	..	..	..	..	..	..	..	..	..	..	..
<i>Burnakurra</i> 09N, etc. (408N)	Federal City leases	10	..	..	..	..	..	..	..	..	5	..	..	..
	New Alliance	25	..	..	..	..	..	..	..	..	2	..	..	..
<i>Chesterfield.</i> P.A. 639N	Margueritta Battery	10	..	..	..	..	..	..	..	..	4	..	..	..
<i>Gabanintha.</i> M.A. 10N	Mountain View	5	..	..	..	..	..	..	..	..	2	1	..	..
	New Brew	5	..	..	..	..	..	..	..	..	..	..	..	..
	Tumbulgum	10	..	..	..	..	..	..	..	..	..	..	..	..
<i>Garden Gully.</i> 928N	Kyarra G.M., N.L.	10	..	..	..	..	..	1	..	2	..	..	..	..
<i>Gum Creek.</i> M.A. 11N	Connecticut	5	..	..	..	..	..	..	..	..	6	..	..	..
<i>Meekatharra.</i> 597N, etc.	Commodore G.M. Co., N.L. .. .	10	..	..	..	..	..	..	..	..	4	..	..	..
	Fenian leases	15	..	..	..	..	..	1	..	..	5	..	..	..
	Ingliston Consols Extended .. .	15	..	..	..	..	..	..	1	..	6	..	..	1
	Ingliston Extended G.Ms., Ltd. .	10	..	..	..	..	..	..	..	..	6	..	..	..
	Marmont	10	..	..	..	..	..	..	..	2	5	3	1	..
	Lake View and Oroya Exploration, Ltd.	2	..	..	..	..	..	..	..	1	..	..	..	1
	State Battery, Meekatharra .. .	5	..	..	..	..	..	..	..	..	3	..	..	..
<i>Nannine.</i> (1039N)	Irymple Battery	4	..	..	..	..	..	..	..	..	..	..	..	..
	Nannine leases	10	..	..	..	..	..	..	..	..	4	..	..	..
	Welcome Stranger	10	..	..	..	..	..	..	..	..	..	..	..	..
	State Battery, Nannine	5	..	..	..	..	..	..	..	..	5	..	..	..
<i>Quinn's.</i> (622N)	Phoenix	5	..	..	..	..	..	..	..	..	..	..	..	..
	State Battery, Quinn's	5	..	..	..	..	..	..	..	..	..	..	..	..
<i>Yaloginda.</i> 1084N	Chunderloo .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..
	Hornsby	5	..	..	..	..	..	1	..	..	..	..	..	..
	Rocklee	10	..	..	..	..	..	..	..	..	..	..	..	..
	Total	211	1	3	1	14	51	4	3	£134,929
DAY DAWN DISTRICT.															
<i>Day Dawn.</i> 389D	Crete d'Or	5	..	..	..	..	..	..	..	..	1	5	2	..
	Great Fingall Consolidated, Ltd. .	40	..	..	..	..	..	..	2	..	17	17	11	5
	Murchison Associated, Ltd. .. .	10	..	..	..	..	..	..	..	..	..	..	..	..
<i>Webb's Patch.</i> 510D	Hill End	5	..	..	..	..	..	..	..	..	..	..	..	..
	Total	60	2	..	18	22	18	5	£204,250
MT. MAGNET DISTRICT.															
<i>Boogardie.</i> 696M	Sirdar	5	..	..	..	..	..	..	..	..	..	3	..	..
	State Battery, Boogardie	10	..	..	..	..	..	..	..	..	..	9	..	..
<i>Lennonville.</i> 946M	Empress	5	..	..	..	..	..	..	..	..	1	3	..	..
	Great Boulder No. 1, Ltd. .. .	..	..	..	..	..	..	1	..	..	..	..	5	1
	Welcome .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..
	Wheel of Fortune .. .. .	..	1	..	..	..	..	..	..	..	..	..	..	..
	State Battery, Lennonville .. .	10	..	..	..	..	..	..	..	..	..	4	..	..
<i>Mt. Magnet.</i> (953M)	Britannia .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..
	Early Bird	5	..	..	..	..	..	..	..	..	..	..	..	..
	Great Boulder No. 1, Ltd. .. .	10	..	..	..	..	..	..	..	..	4	..	..	..
	Morning Star G.Ms., Ltd. .. .	10	..	..	..	..	..	..	..	..	1	6	..	..
	Total	55	1	2	1	..	6	25	5	1	£38,041

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.
YALGOO GOLDFIELD.														
<i>Field's Find.</i> 667	Golden Eagle	3												
696	Tarrangower	20								1	6			
<i>Gullewa.</i> 579	Victory United G.M. Co., N.L. ..	10												
<i>Payne's Find.</i> 606	Payne's Find Development Co., N.L. State Battery, Payne's Find ..	5 5									1 3			
<i>Pinyalling.</i> 501, etc.	Westralia United Goldfields, Ltd. ..	10									5			
<i>Yalgoo.</i> 495, etc. (549)	Ivanhoe G.M. Co., N.L. Royal Mint	5 5												
<i>Yuin.</i> 409, etc.	Bullrush Gold Estates, N.L. ..	20									6			
	Total	83								1	21			£41,239
MT. MARGARET GOLDFIELD.														
MT. MORGANS DISTRICT.														
<i>Korong.</i> 313F.	Royal Flush	10												
<i>Morgans.</i> 299F	Multi-Millionaire	5												
5F, etc.	Westralia Mt. Morgans, N.L. ..	20								5	24	10	1	
314F	Mt. Morven	5									6			
<i>Murrin</i> <i>Murrin.</i> 208F	Alix Junior	5								1				
194F	Hill's Proprietary	20						4		3	6	7	1	
200F	Princess Alix									1				
	Total	65						4		10	36	17	2	£14,000
MT. MALCOLM DISTRICT.														
<i>Diorite King.</i> 1459c	King of the Hills	5									4			
<i>Leonora.</i> (218c)	(Gwalia Proprietary, Ltd.)	20									12			
195c	Leonora Gold Blocks	10									5			
1448c	Leonora Main Reefs, Ltd.	10								5				
1217c	Ping Pong	10									3			
190c, etc.	Sons of Gwalia, Ltd.	50								21	10	10	1	
198c, etc.	Sons of Gwalia, Ltd. (South) State Battery, Leonora	10 10						1		3 1		4	2	
<i>Malcolm.</i> 1175c	North Star	10									2			
991c	Richmond Gem	10									4			
<i>Mertondale.</i> 638c	Merton's Reward	10						1			8	2		
<i>Mt. Clifford.</i> 1261c	Bannockburn	5									5			
M.A. 9c	Mt. Clifford Battery	10									2			
1329c	Victory No. 1	5												
<i>Pig Well.</i> ^	State Battery, Pig Well	10									4			
<i>Randwick.</i> 987c	Anglo-Saxon	5												
978c	Randwick	10									2			
<i>Webster's Find.</i> 1224c	Webster's	5												
<i>Wilson's Patch</i> 1120c	Great Western	10								1	6			
	Total	215						2		26	79	16	3	£210,730

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.
MT. MARGARET GOLDFIELD— continued.															
MT. MARGARET DISTRICT.															
<i>Burtville.</i>															
943r, etc.	Mikado G.M. Co., Ltd.	5	..	..	..	..	..	..	..	..	2	..	..	..
1935r	Black Swan	1	..	..	..	..	..	..	..	..	..	..	..	..
781r	Sailor Prince	5	..	..	..	..	..	..	..	..	..	..	..	..
1644r	Specimen Hill	5	..	..	..	..	..	..	..	..	..	..	..	..
M.A. 17r	Sunrise	8	..	..	..	..	..	..	..	..	..	..	..	..
^	State Battery, Burtville	10	..	..	..	..	..	..	..	1	3	..	..	..
<i>Erhistoun.</i>															
M.A. 18r	Little Dorris	5	..	..	..	..	..	..	..	..	..	..	..	..
1875r	Mulga Queen	10	..	..	..	..	..	..	..	..	4	..	..	..
M.A. 20r	Westralia Tasmania	5	..	..	..	..	..	..	1	..	4	..	..	..
<i>Laverton.</i>															
371r, etc.	Augusta G.M. Co., N.L.	10	..	..	..	..	..	..	..	..	4	..	..	..
1797r	Craiggiemore	10	..	..	..	..	..	1	..	..	6	4	..	..
829r, etc.	Ida H. G.M. Co., Ltd.	10	..	..	..	..	..	..	1	..	2	..	..	..
806r, etc.	Lancefield G.M. Co., Ltd.	50	..	..	..	..	..	..	..	8	7	7	6	..
1897r, etc.	Mary Mac G.M. Co., N.L.	10	..	..	..	..	..	..	..	..	7	..	..	..
^	State Battery, Laverton	10	..	..	..	..	..	..	..	1	3	..	..	..
	Total	154	1	2	..	11	35	11	6	£121,058
NORTH COOLGARDIE GOLD-FIELD.															
MENZIES DISTRICT.															
<i>Comet Vale.</i>															
5217z	Gladsome	10	..	..	..	..	..	..	..	..	2	..	..	..
5300z	Happy Jack	..	..	..	..	1	..	..	..	..	..	..	..	..
5211z	Sand Queen G.Ms., Ltd.	10	..	..	..	..	..	..	..	..	3	9	..	..
<i>Menzies.</i>															
5354z	Balkis	5	..	..	..	..	..	..	..	..	6	..	..	..
T.A. 46z	Gidney's Works	..	..	..	..	..	..	..	..	..	8	..	..	..
5302z	Lady Harriet	5	..	..	..	..	..	..	..	..	4	..	..	..
4913z	Menzies Consolidated G.Ms., Ltd.	20	..	..	..	..	..	..	..	..	11	16	4	1
2820z	Menzies Gold Mine	10	..	..	..	..	..	..	..	..	1	11	..	..
3100z	Menzies Mining and Exploration Corporation, Ltd.	10	..	..	..	..	..	..	..	..	8	..	1	..
^	State Battery, Menzies	10	..	..	..	..	..	..	..	..	1	3	..	2
<i>Mt. Ida.</i>															
5243z	Mt. Ida Meteor	5	..	..	..	..	..	..	..	..	2	..	..	..
^	State Battery, Mt. Ida	5	..	..	..	..	..	..	..	..	..	..	..	..
	Total	90	1	18	67	4	4	£86,574
ULARRING DISTRICT.															
<i>Davyhurst.</i>															
959r	Expansion	..	..	..	..	1	..	..	..	..	3	..	..	..
468r, etc.	Golden Pole G.Ms., Ltd.	20	..	..	..	..	..	..	..	..	4	3	1	..
613r, etc.	Great Ophir Gold Corporation, N.L.	..	..	..	..	1	..	..	2	..	12	2	..	..
438r	Waihi	10	..	..	..	..	..	..	..	..	6	..	..	..
<i>Mulline.</i>															
123r	Riverina	10	..	..	..	..	..	..	..	..	4	..	..	..
600r	Riverina South	5	..	..	..	..	..	..	..	..	4	..	..	..
^	State Battery, Mulline	10	..	..	..	..	..	..	..	3	5	2	1	..
<i>Mulwarrie.</i>															
^	State Battery M. Iwarrie	10	..	..	..	..	..	..	..	..	4	..	..	..
	Total	65	2	2	..	6	42	7	2	£26,879

TABLE XXIV.—Milling and Cyaniding Plants erected in the respective Goldfields, Districts, etc.—continued.

Mining Centre and Lease or Arec.	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.														
NIAGARA DISTRICT.														
<i>Kookynie.</i> 756g 320g	Cosmopolitan Proprietary Champion	10	..	..	..	..	..	..	..	..	6	..	..	..
<i>Niagara.</i> M.A. 35 T.L. 108H	Heather (W. Bright)	10	..	..	..	..	..	..	..	..	4	..	..	..
734g	Lubra Queen G.M. Co., N.L.	5	..	..	..	..	..	1	..	..	..	..	..	..
419g	Orion Mines, Ltd.	10	..	..	..	..	..	..	..	..	6	..	..	..
(755g)	W.E.G.	10	..	..	..	..	..	..	..	..	..	..	..	..
^	State Battery, Niagara	10	..	..	..	..	..	..	..	2	6	..	..	..
<i>Tampa.</i> 759g, etc. M.A. 59g	Golden Butterfly G.M. Co., N.L. Grafter	10 5	..	..	..	..	..	1	..	2	5 2	3	2	..
	Total	70	..	..	..	..	..	2	..	4	29	3	2	£18,565
YERILLA DISTRICT.														
<i>Edjudina.</i> 1011R	Neta Battery	10	..	..	..	..	..	..	..	..	3	..	..	..
<i>Linden.</i> 928R	Great Carbine State Battery, Linden	.. 10	1	..	..	..	..	..	..	..	..	..	..	..
^	State Battery, Linden	10	..	..	..	..	..	..	..	2	..	..	..	..
903R, etc.	Westralia United Goldfields, Ltd.	5	..	..	..	..	..	..	..	..	3	..	1	..
<i>Pinjin.</i> ^	State Battery, Pinjin	5	..	..	..	..	..	..	..	1	4	..	..	..
<i>Yarri.</i> ^	State Battery, Yarri	10	..	..	..	..	..	..	..	..	4	..	..	..
<i>Yerilla.</i> ^	State Battery, Yerilla	5	..	..	..	..	..	..	..	..	6	..	..	..
<i>Yundamindera</i> 931R	Battles Ville	5	..	..	..	..	..	..	..	..	5	..	..	..
	Total	50	1	..	..	..	..	..	..	3	25	..	1	£19,906
BROAD ARROW GOLDFIELD.														
<i>Black Flag.</i> 1384w	Lady Bountiful	13	..	..	..	..	..	..	..	..	..	..	..	..
<i>Broad Arrow.</i> (1209w) 1391w	Dixie Duke	5 10	..	..	..	..	..	..	..	..	..	..	..	..
(75w)	Liberty Extended	10	..	..	..	..	..	..	..	..	3	..	..	..
<i>Carnage.</i> M.A. 22w	Regan's Carnage Battery	10	..	..	..	..	..	..	..	..	4	..	..	..
<i>Paddington.</i> (1639w)	Mt. Corlie	10	..	..	..	..	..	..	..	..	..	..	..	..
W.R. 68w	Northey's Venture Mill	10	..	..	..	1	..	..	..	..	5	..	..	..
53w	Paddington Cyanide Works .. .. .	..	..	..	..	..	..	..	..	..	11	3	..	..
<i>Siberia.</i> 1286w	Golden .. .. .	..	1	..	..	..	..	..	..	..	..	..	..	..
1289w	Lady Evelyn	5	..	..	..	..	..	..	..	..	..	..	..	..
M.A. 29w	Pole Battery	5	..	..	..	..	..	..	..	..	3	..	..	..
1424w, etc.	Associated Northern Blocks (W.A.), Ltd.	..	..	..	..	4	..	1	..	4	..	4	3	..
^	State Battery, Ora Banda	5	..	..	..	..	..	..	..	1	..	..	..	..
^	State Battery, Siberia	5	..	..	..	..	..	..	..	..	3	..	..	..
	Total	88	1	..	..	5	..	1	..	5	29	7	3	£41,180

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.		
		Batter-ies.	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-EAST COOLGARDIE GOLDFIELD.																	
KANOWNA DISTRICT.																	
<i>Gindalbie.</i> (1047x) (1123x)	Eclipse	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
394x, etc.	Kalgoorlie Foundry, Ltd.	10	..	..	..	..	..	3	..	..	3	12	..	..	..	..	..
891x	Sirdar	10	..	..	..	..	..	..	..	..	..	4	..	..	..	..	..
1174x	United	5	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
<i>Kanowna.</i> 1302x (918x)	Golden Valley Cyanide Works ..	..	..	..	..	..	..	..	..	..	..	8	..	..	..	..	..
M.A. 19x	Government Well	3	..	..	..	..	..	..	..	..	..	8	..	..	..	..	..
M.A. 56x	Martin's Works	15	..	..	..	..	..	..	..	..	..	8	..	..	..	..	..
Q.C. 57x	North White Feather G.Ms., Ltd. ..	60	..	..	..	..	..	..	..	..	..	16	..	..	..	..	..
<i>Mulgabbie.</i> 1228x	Reidel and Norton's Works	10	..	..	..	..	..	..	..	..	1	6	..	..	..	..	..
	Lady Pratt	10	..	..	..	..	..	..	..	..	..	4	..	..	..	..	..
	Total	138	..	..	..	..	..	3	..	5	58	..	..	..	..	..	£26,910
KURNALPI DISTRICT.																	
<i>Kurnalpi.</i> (2x)	Success	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Mulgabbie.</i> 1x	Glover's Works .. .. .	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Total	5	1	..	..	..	..	..	..	..	..	..	..	..	..	..	£150
EAST COOLGARDIE GOLDFIELD.																	
EAST COOLGARDIE DISTRICT.																	
<i>Boorara.</i> 3908E	Golden Ridge G.M. Co., Ltd.	20	..	..	..	..	..	..	..	..	..	6	6	1	..	..	..
<i>Boulder.</i> 38E, etc.	Associated G.Ms. of W.A., Ltd. ..	10	..	12	..	..	..	1	..	20	..	6	9	..	..	..	..
49E, etc.	Associated Northern Blocks (W.A.), Ltd.	..	..	3	..	..	..	1	..	8	..	5	1	..	..	..	..
352E, etc.	Chaffer's G.M. Co. (1913), Ltd. ..	..	..	..	3	..	..	..	..	8	..	4	4	..	..	..	..
13E, etc.	Croesus South G.Ms., Ltd.	20	..	..	..	..	..	..	..	1	5	..	..	..	..	..	..
351E, etc.	Golden Horseshoe Estates, Co., Ltd. ..	170	..	1	..	..	..	1	6	15	24	20	22	20	..	..	..
50E, etc.	Great Boulder No. 1, Ltd.	10	..	..	..	..	..	1	..	..	..	6	..	..	..	..	..
66E, etc.	Gt. Boulder Perseverance G.M. Co., Ltd.	..	..	8	..	..	..	..	4	2	17	..	24	13	..	..	..
16E, etc.	Great Boulder Proprietary G.Ms., Ltd.	..	1	4	13	..	..	9	..	20	..	23	15	..	..	..	..
M.A. 5E	Hannan's Central Battery	20	..	..	..	..	..	..	..	1	15	3	2	..	..	..	..
4317E	Idaho leases	5	..	..	1	..	..	..	..	..	6	..	..	..	..	..	..
946E	Ironsides North	10	..	..	..	..	..	..	..	2	7	3	1	..	..	..	..
31E, etc.	Ivanhoe Gold Corporation, Ltd. ..	100	..	..	..	..	..	3	2	25	32	11	9	..	..	..	..
22E, etc.	Kalgurli G.Ms., Ltd. .. .. .	..	..	9	..	..	..	5	..	18	..	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	4	..	..	..	..	..	..
287E, etc.	North Kalgurli (1912), Ltd.	20	..	..	..	..	..	..	..	..	9	3	1	..	..	..	..
410E, etc.	Oroya Links, Ltd.	55	..	..	2	..	..	..	..	6	3	11	10	..	..	..	..
1208E, etc.	South Kalgurli Consolidated, Ltd. ..	40	..	4	..	..	..	4	..	15	36	11	10	..	..	..	..
M.A. 63E	White Hart Battery	10	..	..	..	..	..	..	..	..	5	..	..	..	..	..	..
<i>Feyersville.</i> Block 50	Hampton Properties, Ltd.	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Kalgoorlie.</i> (4222E)	Adeline Mills .. .. .	..	..	..	1	..	..	..	..	2	4	..	..	..	..	..	..
796E	Bonnie Lass (Raven Battery)	10	..	..	..	..	..	..	..	..	12	..	..	..	..	..	..
M.A. 3E	Brownhill Consols, Ltd.	20	..	..	..	..	..	..	..	..	18	3	2	..	..	..	..
4E	Cassidy Hill .. .. .	..	..	..	1	..	..	1	..	1	4	..	..	..	..	..	..
4515E	Creswick .. .. .	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
M.A. 60E	Dunstan and Cumming's Plant .. ..	..	..	..	..	..	..	..	..	..	12	..	..	..	..	..	..
4025E	Golden Dream G.M. Co., N.L. .. ..	..	..	..	1	..	..	..	..	..	6	..	..	..	..	..	..
1694E	Golden Zone	15	..	..	..	..	..	2	..	2	8	..	..	..	..	..	..
1163E, etc.	Hannan's Consols leases .. .. .	..	..	..	2	..	..	..	..	..	10	..	..	..	..	..	..
97E, etc.	Hannan's Reward, Ltd.	20	..	..	..	..	..	..	..	..	7	..	..	..	..	..	..
4001E	Hidden Secret	5	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..
4345E	Lone Hand .. .. .	..	..	..	1	..	..	..	..	..	5	..	..	..	..	..	..
4346E	Mystery .. .. .	..	..	..	1	..	..	..	..	..	3	..	..	..	..	..	..
4492E	Successful .. .. .	..	..	..	1	..	..	..	..	..	10	..	..	..	..	..	..
4037E	Westralia United Goldfields, Ltd. ..	15	..	..	..	..	..	..	..	..	5	..	..	..	..	..	..
	Total	655	1	42	18	12	..	2	42	38	189	264	178	125	..	..	£1,686,548

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.					
EAST COOLGARDIE GOLDFIELD																
<i>—continued.</i>																
BULONG DISTRICT.																
<i>Bulong.</i> 1067Y	Southern Cross	10	..	..	..	..	..	..	..	..	..	..	5	..	..	..
	Total	10	..	..	..	..	..	..	..	..	..	..	5	..	..	£3,500
COOLGARDIE GOLDFIELD.																
COOLGARDIE DISTRICT.																
<i>Bonnievale.</i> (595) 4313 (144, etc.)	Gem lease	15	..	..	..	..	..	..	..	..	..	..	2	..	..	..
	Vale of Coolgardie	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Burbanks.</i> 134 3444 2160	Westralia and East Extension Ms., Ltd.	40	..	..	..	..	..	..	1	..	1	..	27	..	..	..
	Burbanks Birthday G.Ms., Ltd.	60	..	..	..	..	..	..	1	..	..	..	6	..	..	..
	Burbanks Main Lode (1904), Ltd.	20	..	..	..	..	..	..	..	..	..	..	12	..	..	..
	Lady Robinson G.M. Co., N.L.	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Coolgardie.</i> (336) (3918) (4392)	Carswell's Cyanide Works .. .. .	..	..	..	..	..	..	..	..	..	..	..	6	..	..	..
	Coolgardie Redemption	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Garden Gully	10	..	..	..	..	..	..	..	..	..	..	1	..	..	..
133, etc.	New Bayley's Mines, Ltd.	10	..	..	..	..	..	..	..	..	..	..	10	..	..	..
33, etc.	Tindal's Coolgardie Co., N.L.	20	..	..	..	..	..	..	..	..	..	..	20	..	..	..
^	State Battery, Coolgardie	10	..	..	..	..	..	..	..	..	1	..	9	..	..	..
<i>Eundynie.</i> 4253	Hidden Secret North	10	..	..	..	..	..	..	..	..	..	..	6	..	..	..
<i>Gibraltar.</i> 4418	Reform	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Gnarlbine.</i> (4401)	Baroota Wonder	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Higginsville.</i> 4184	Sons of Erin	10	..	..	..	..	..	..	..	..	..	..	6	..	..	..
<i>Red Hill.</i> (4331)	Edquist .. .. .	..	..	..	..	..	..	..	..	..	..	8	..	..	..	..
<i>Widgiemooltha</i> M.A. 63	Highgate Battery	3	..	..	..	..	..	..	..	..	1	..	..	..	..	..
	Total	253	..	..	..	..	..	..	2	..	11	105	..	..	..	£106,671
KUNANALLING DISTRICT.																
<i>Balgarric.</i> M.A. 13s	Stanley Battery	5	..	..	..	..	..	..	..	..	1	3	..	..	..	..
<i>Carbine.</i> 33s	Carbine	10	..	..	..	..	..	..	..	..	2	..	..	..	..	..
<i>Dunnsville.</i> (17s)	North Coolgardie	20	..	..	..	..	..	..	..	..	..	4	..	..	..	..
<i>Jourdie Hills.</i> 786s	Jourdie Enterprise G.M. Syndicate	5	..	..	..	..	..	..	1	..	..	6	..	..	..	..
	Pride of the Jourdies	10	..	..	..	..	..	..	..	..	..	5	..	..	..	..
	Pride of Jourdie North	5	..	..	..	..	..	..	..	..	..	4	..	..	..	..
<i>Kintore.</i> 603s	Hands across the Sea	5	..	..	..	..	..	..	..	..	..	5	..	..	..	..
<i>25-Mile.</i> 696s	Blue Bell	5	..	..	..	..	..	..	..	..	..	7	..	..	..	..
	Shamrock	5	..	..	..	..	..	..	..	..	..	4	..	..	..	..
	Star of Fremantle	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Swallow	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Total	85	..	..	..	..	..	..	1	..	3	38	..	..	..	£12,350

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.
YILGARN GOLDFIELD.															
<i>Bullfinch.</i> 914, etc.	Bullfinch Proprietary (W.A.), Ltd. . .	20	..	..	..	..	..	1	2	2	..	5	3	..
<i>Corinthian.</i> 896, etc.	Corinthian North G.M.S., Ltd. . .	20	..	..	..	..	..	1	..	2	2	4	1	..
<i>(Golden Valley.</i> M.A. 11	Violet Battery	5	..	..	..	..	..	..	..	1	5	..	..	..
<i>Greenmount.</i> 503	Greenmount	10	..	..	..	..	..	..	..	..	6	..	..	..
550	Sunbeam	5	..	..	..	..	..	..	..	..	13	..	..	..
<i>Hope's Hill.</i> M.A. 14	Lakeside Battery	10	..	..	..	..	..	..	..	1	7	..	..	..
<i>Koolyannob-</i> <i>bing.</i> M.A. 12	(Hewitt and Moor)	5	..	..	..	..	..	..	..	..	..	..	..	..
<i>Marvel Loch.</i> 768	Howlett's Battery	5	..	..	..	..	..	..	..	..	6	..	..	..
714	Marvel Loch M. Co., N.L.	10	..	..	..	..	..	1	..	2	6	..	..	..
803	Mountain Queen, Ltd.	2	..	..	..	..	..	..	..	3	..	..	1	..
(490)	Tallings Treatment, Ltd.	10	..	..	..	..	..	..	..	..	8	..	..	..
<i>Mt. Jackson.</i> ^	State Battery, Mt. Jackson	10	..	..	..	..	..	..	..	..	..	..	..	..
<i>Nevoria.</i> 719	Great Victoria	10	..	..	..	..	..	..	..	..	..	..	..	..
T.A. 40	Yilgarn G.M. Co.	10	..	..	..	..	..	..	..	..	12	..	..	..
<i>Parker's</i> <i>Range.</i> 508	Australia	5	..	..	..	..	..	..	..	..	5	..	..	..
724	Spring Hill	5	..	..	..	..	..	..	..	1	3	..	..	..
<i>Southern</i> <i>Cross.</i> 889	Fraser's G.M. Syndicate .. ..	..	..	..	..	..	..	..	..	1	6	..	..	..
536	Transvaal	20	..	..	..	..	..	..	..	..	..	..	..	..
<i>Weston's.</i> 2180	Edna May G.M. Co., N.L.	10	..	..	..	..	..	..	..	2	..	..	..	..
2087	Greenfinch Proprietary G.M. Co., N.L.	5	..	..	..	..	..	..	..	..	6	..	..	..
Total		177	1	2	4	15	83	9	5	£166,378
DUNDAS GOLDFIELD.															
<i>Norseman.</i> 1173	Benson	10	..	..	..	..	..	..	..	..	..	..	..	..
M.A. 36	Break O'Day Cyanide Works	10	..	..	..	..	..	..	..	..	4	..	..	..
938, etc.	Hampton Uruguay, Ltd.	10	..	..	..	..	..	..	..	1	6	..	..	..
T.A. 24	Jones' Cyanide Works .. ..	..	..	..	..	..	..	..	..	..	5	..	..	..
M.A. 33	Lady Mary Battery	10	..	..	..	..	..	..	..	..	..	..	..	..
M.A. 31	Mararoa G.M. Co., N.L.	20	..	..	..	..	..	..	..	5	17	4	1	..
(914)	Oversight	5	..	..	..	..	..	1	..	2	..	..	..	..
106, etc.	Princess Royal G.M. Co., N.L.	20	..	..	..	..	..	2	..	..	5	3	..	..
1021	Princess Royal North	10	..	..	..	..	..	..	..	2	2	2	..	..
M.A. 18	Rawlings, Bullen, and Rumble's Works	10	..	..	..	..	..	..	..	3	4	..	..	..
990	Viking No. 1 Syndicate	10	..	..	..	..	..	..	..	..	..	..	..	..
821, etc.	Westralia Waihi G.Ms., N.L.	10	..	..	..	..	..	1	..	..	..	..	..	..
^	State Battery, Norseman	5	..	..	..	..	..	..	..	1	6	2	1	..
Total		130	..	..	..	..	..	4	..	14	49	11	2	£183,958
PHILLIPS RIVER GOLDFIELD.															
<i>Kundip.</i> 136, etc.	Flag leases	5	..	..	..	..	..	..	..	..	..	..	..	..
79	Gem	5	..	..	..	..	..	..	..	..	4	..	..	..
M.L. 52	Harbour View Gold and Copper Co., Ltd.	10	..	..	..	..	..	..	..	1	..	..	..	..
74	Two Boys	10	..	..	..	..	..	..	..	..	..	..	..	..
<i>Mt. Purchas.</i> M.A. 19	Mt. Purchas Prospecting Plant .. ..	..	1	..	..	..	..	..	..	..	..	..	..	..
<i>Ravensthorpe.</i> 153	Maori Queen .. ..	..	1	..	..	..	..	1	..	..	..	..	..	..
M.A. 4	Ravensthorpe Battery Co., Ltd.	10	..	..	..	..	..	..	..	..	..	..	..	..
Total		40	2	..	..	..	..	1	..	1	4	..	..	£12,880
State generally .. ..		..	..	1	..	..	..	1	..	..	..	..	..	..
Total .. ..		..	..	1	..	..	..	1	..	..	..	..	..	£50,000

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.	Trenain Mills.	Puddlers.	Other Crushers.					Flint Mills.	Grinding Pans.
GOLD MINING.														£	
KIMBERLEY .. .. .	.. .. .	45	..	..	..	1	..	..	..	..	..	..	..	5,000
PILBARA	{ Marble Bar	50	..	..	..	..	..	..	..	..	8	..	..	13,457
	{ Nullagine	30	1	..	..	..	..	..	..	..	9	..	..	4,924
WEST PILBARA .. .. .	.. .. .	25	1	..	..	..	..	..	..	..	13	..	..	3,850
ASHBURTON .. .. .	.. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..
GASCOYNE .. .. .	.. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..
PEAK HILL .. .. .	.. .. .	40	..	..	..	..	..	..	..	..	..	..	..	..
EAST MURCHISON	{ Lawlers	148	..	..	..	..	..	..	..	..	11	..	4	9,943
	{ Wiluna	95	2	2	..	..	..	2	1	..	32	8	4	40,461
	{ Black Range	135	..	4	..	1	..	..	..	..	29	22	8	93,972
	{ Cue	70	..	..	..	..	..	..	..	..	73	12	35	157,153
MURCHISON	{ Meekatharra	211	..	..	..	..	..	..	1	3	14	51	4	32,949
	{ Day Dawn	60	..	..	..	..	..	..	..	2	18	22	13	134,929
	{ Mt. Magnet	55	1	..	..	..	..	..	2	1	22	13	5	204,250
YALGOO .. .. .	.. .. .	83	..	..	..	..	..	..	..	..	6	25	5	38,041
MT. MARGARET	{ Mt. Morgans	65	..	..	..	..	..	..	..	..	1	21	..	41,239
	{ Mt. Malcolm	215	..	..	..	..	..	..	..	4	10	36	17	14,100
	{ Mt. Margaret	154	..	..	..	..	..	..	1	2	26	79	16	210,730
	{ Menzies	90	..	..	..	1	..	..	..	..	11	35	11	121,053
NORTH COOLGARDIE	{ Ularring	65	..	..	..	2	..	..	..	..	18	67	4	66,574
	{ Niagara	70	..	..	..	..	..	..	..	2	6	42	7	26,879
	{ Yerilla	50	1	..	..	..	..	..	..	..	4	29	3	18,566
BROAD ARROW .. .. .	.. .. .	88	1	..	..	5	..	..	..	1	5	29	7	41,180
N.E. COOLGARDIE	{ Kanowna	138	..	..	..	..	..	..	..	..	3	58	..	26,910
	{ Kurnalpi	5	1	..	..	..	..	..	..	..	..	..	..	150
EAST COOLGARDIE	{ East Coolgardie	655	1	42	18	12	..	2	42	33	189	264	178	1,636,548	
	{ Bulong	10	..	..	..	..	..	..	..	..	5	..	..	3,500
COOLGARDIE	{ Coolgardie	253	..	..	..	..	..	..	..	2	11	105	..	106,671
	{ Kunanalling	85	..	..	..	..	..	..	..	1	3	38	..	12,350
YILGARN .. .. .	.. .. .	177	..	..	..	..	..	1	2	4	15	83	9	166,378
DUNDAS .. .. .	.. .. .	130	..	..	..	..	..	..	..	4	14	49	11	183,958
PHILLIPS RIVER .. .. .	.. .. .	40	2	..	..	..	..	..	..	1	1	4	..	12,880
STATE GENERALLY .. .. .	.. .. .	..	..	1	..	..	..	..	..	1	..	..	..	50,000
	Total Gold Mining Machinery	3,337	11	49	18	22	2	8	81	39	385	1,269	327	215	£3,498,500
LEAD MINING.															
NORTHAMPTON M.F.	1
	Total Lead Mining Machinery	1	£9,300
TIN MINING.															
PILBARA	Marble Bar	1	1	25,000
GREENBUSHES TINFIELD	10	..	1	..	1	4	5	36,085
	Total Tin Mining Machinery	10	..	1	..	2	4	6	£61,085
COPPER MINING.															
PHILLIPS RIVER	10	..	2	82,660
WEST PILBARA	91,635
MT. MARGARET	Mt. Morgans	2,260
	Total Copper Mining Machinery	10	..	2	£176,555
COAL MINING.															
COLLIE RIVER COALFIELD	52,674
	Total Coal Mining Machinery	£52,674
	Total Machinery other than Gold Mining	10	..	1	..	2	..	4	14	..	2	£299,614
	Total all Mining Machinery	3,347	11	50	18	24	2	12	95	39	387	1,269	327	215	£3,798,114

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 " " 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.

11th May, 1914.

J. F. CAMPBELL,
Deputy Master.