

1908.

WESTERN AUSTRALIA.

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# REPORT

OF THE

# DEPARTMENT OF MINES

FOR THE YEAR

1907.

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

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Hon. H. Gregory, M.L.A.  
Minister for Mines

1908

# MAP OF WESTERN AUSTRALIA

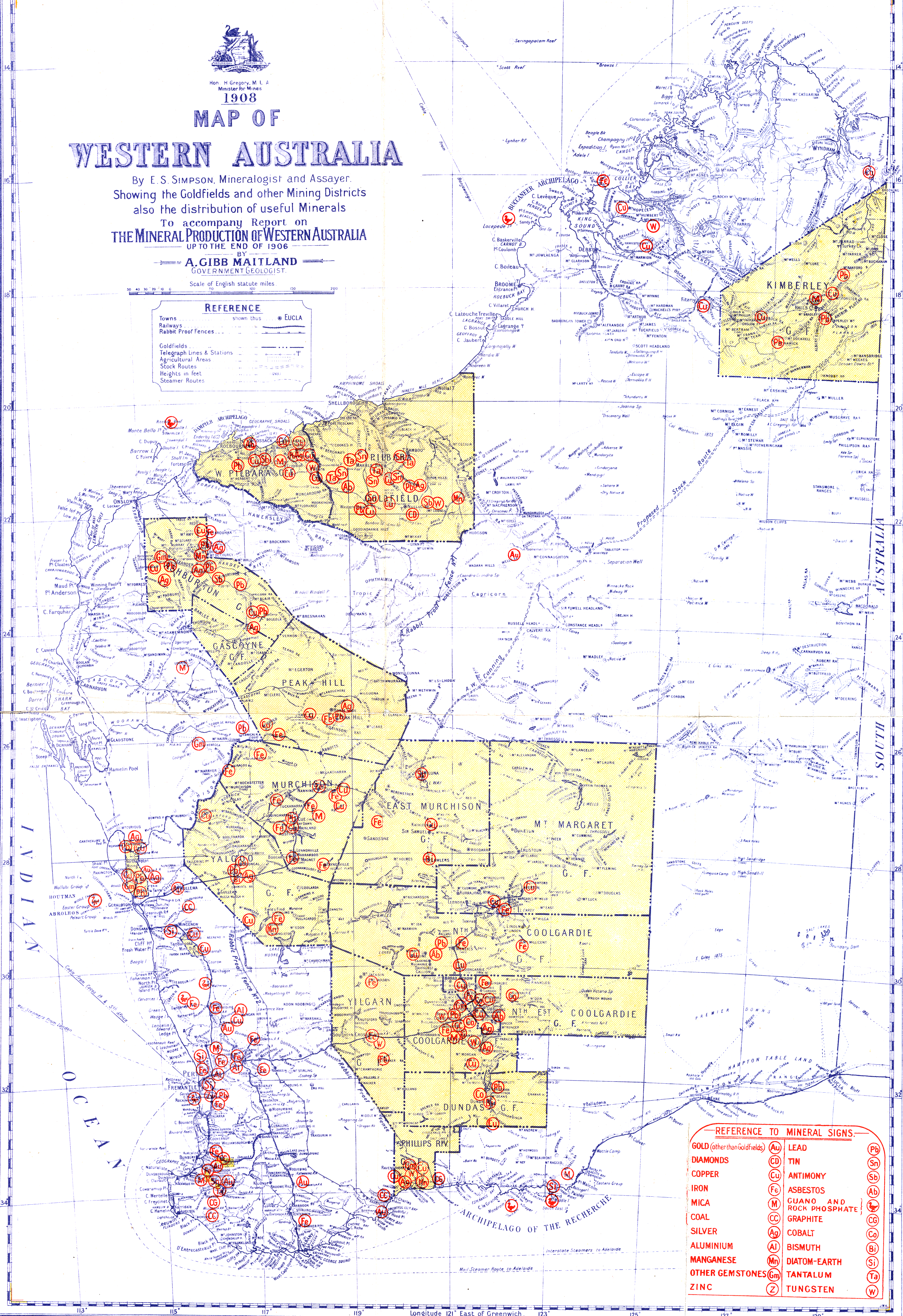
By E. S. SIMPSON, Mineralogist and Assayer.  
Showing the Goldfields and other Mining Districts  
also the distribution of useful Minerals  
To accompany Report on  
**THE MINERAL PRODUCTION OF WESTERN AUSTRALIA**  
UP TO THE END OF 1906

BY  
**A. GIBB MAITLAND**  
GOVERNMENT GEOLOGIST.

Scale of English statute miles



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)	(Au)	LEAD	(Pb)
DIAMONDS	(Cd)	TIN	(Sn)
COPPER	(Cu)	ANTIMONY	(Sb)
IRON	(Fe)	ASBESTOS	(Ab)
MICA	(M)	GUANO AND ROCK PHOSPHATE	(G)
COAL	(C)	GRAPHITE	(Gg)
SILVER	(Ag)	COBALT	(Co)
ALUMINIUM	(Al)	BISMUTH	(Bi)
MANGANESE	(Mn)	DIATOM-EARTH	(Si)
OTHER GEMSTONES	(Gm)	TANTALUM	(Ta)
ZINC	(Z)	TUNGSTEN	(W)

# ANNUAL REPORT OF THE DEPARTMENT OF MINES, WESTERN AUSTRALIA, 1907.

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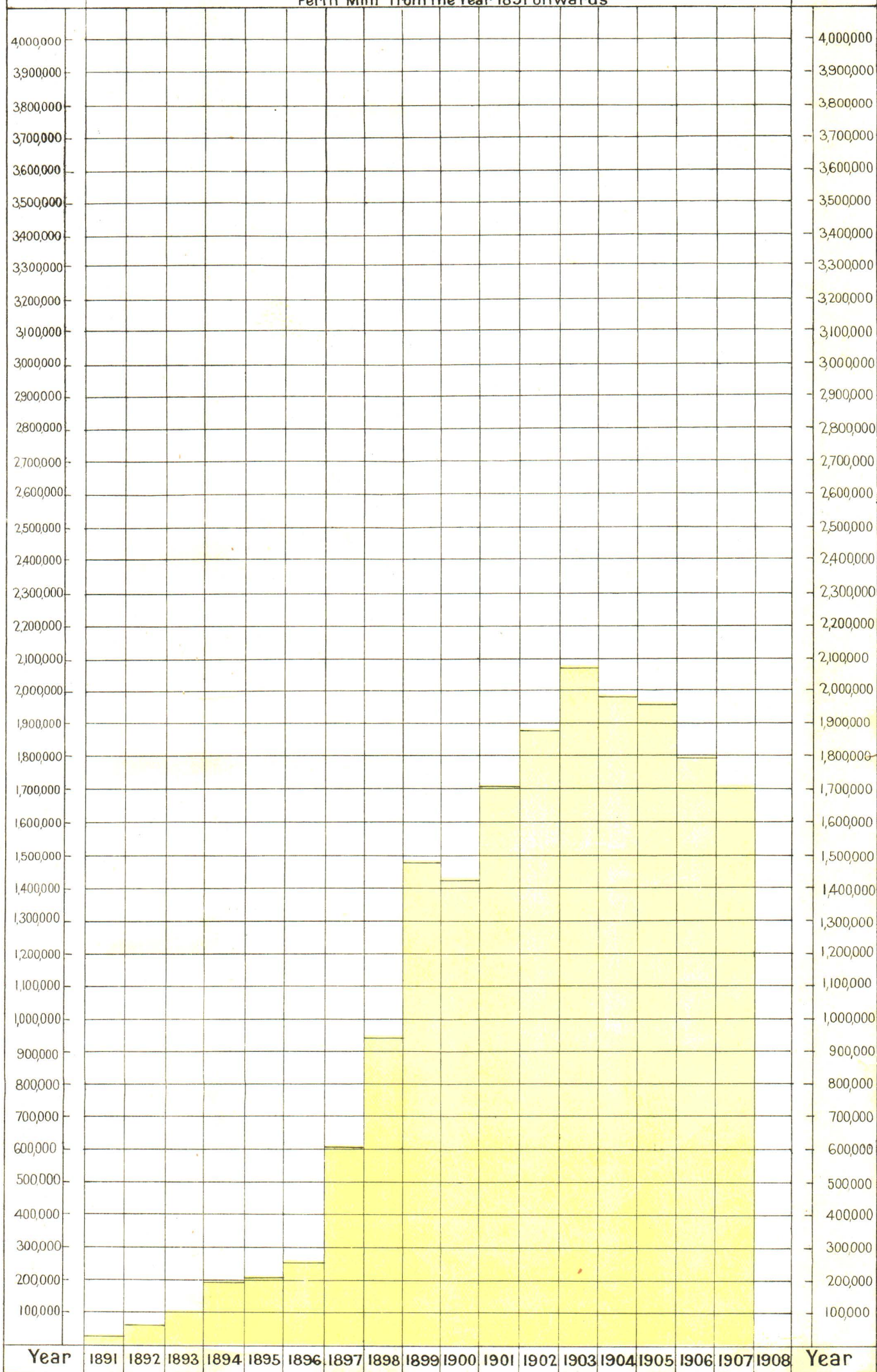
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**DIAGRAM**

Ounces

of Gold output showing the amount in fine ounces of Gold exported & received at the Perth Mint from the Year 1891 onwards

Ounces



Year

1891 1892 1893 1894 1895 1896 1897 1898 1899 1900 1901 1902 1903 1904 1905 1906 1907 1908

Year

1908.

COMMONWEALTH OF AUSTRALIA.

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STATE OF WESTERN AUSTRALIA.

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*Report of the Department of Mines for the State of Western Australia  
for the Year 1907.*

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*To the Hon. the Minister for Mines.*

SIR,

I have the honour to submit the Annual Report of the Department for the year 1907, with summaries of reports from the Wardens and other officers, together with various comparative tables furnishing statistics relating to the mining industry of the State.

Reports from the officers controlling the various Sub-Departments are also submitted.

I have, etc.,

H. S. KING,

Under Secretary for Mines.

Department of Mines, Perth, 31st March, 1908.

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## 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.  
 XI.—DEPARTMENTAL.

#### PART I.—GENERAL REMARKS.

The value of the mineral output of the State for the year 1907 was £7,638,231, being less than that of the previous year by £337,416.

The principal decrease was in the value of the gold output, which fell off to the extent of £412,000, while the copper production increased by £130,050.

The value of the gold yield was £7,210,749, being 94.4 per cent. of the total output, while the value of the copper ore output was £180,387, and of black tin £158,648. The high price of copper during the earlier portion of the year led to increased activity in that class of mining, and while the value of the ore raised in 1906 was but £50,337, in 1907 it was £180,387.

The dividends paid during the year by gold-mining companies amounted to £1,738,163, a decrease of £255,535 as compared with the total for 1906.

To the end of 1907 the value of the total mineral production was £80,628,249, the total gold production was £78,004,409, while the dividends amounted to £17,476,578.

#### GOLD.

The gold yield, which has been steadily declining since 1903, is again less than that of the preceding year, although the decline is not so marked as it was between the years 1905 and 1906. The 1906 yield was less than that for 1905 by 160,769ozs., while that for 1907 is but 96,993ozs. less than that for 1906.

The average value per ton of ore treated in the State as a whole has fallen from 50.54 shillings in 1906 to 46.81 shillings in 1907, and in the East Coolgardie field, from which comes over 50 per cent. of the State's yield, from 56.54 shillings to 49.90 shillings.

Comparing the tonnage of ore treated in the years 1906 and 1907, an increase of 129,792 tons appears in the latter year, during which 3,008,043 tons were treated. The amount of ore treated in the East Coolgardie goldfield increased to the extent of 107,261 tons, while the other goldfields of the State show an increase of 22,531 tons.

It may be noted as in previous years the fall in the gold production of various fields can be traced to the smaller yield of one or two of the larger mines; for example, in the Murchison field, where a decrease of 12,998ozs. is shown, the Great Fingall output decreased by 21,909ozs.; in the North Coolgardie field, whose output decreased by 24,166ozs, the lesser production of two mines amounted to 20,824ozs., while the reduction in the output of one mine alone amounts to 76 per cent of the decline in the yield of the East Coolgardie goldfield, which is about 81 per cent. of the total decrease of the State. In the case of seven goldfields, there is an increase of production for the year, notably in the East Murchison, Peak Hill, Mt. Margaret, Dundas, and Phillips River fields, while in nine others the yield has declined, the most marked decreases being shown in the East Coolgardie, North Coolgardie, Murchison, North-East Coolgardie, and Yilgarn fields.

The area held under mining lease for all minerals has increased from 56,541 acres in 1906 to 61,688 acres. The area held for gold-mining is less by 1,783 acres than in 1906, while that held for mineral leases has increased by 6,330 acres. As regards gold-mining, the area held under lease is by no means an index of the area worked, as a considerable number of prospecting areas are held under very easy conditions, and worked for considerable periods. While in 1906 the area held in this way was estimated at 11,000 acres, during 1907 it had increased to about 18,000 acres. While it is doubtless to the advantage of the gold-mining industry that prospectors should be able to acquire ground for prospecting, with a minimum of expense, and hold it for a reasonable time, in some cases this privilege is abused, and the revenue of the State suffers to a considerable extent.

The number of men engaged in all classes of mining is 19,113, a decrease of 316 as compared with the previous year. The number of men engaged in mining for minerals other than gold has increased by 373, while the gold workers have decreased by 689. The average value of gold produced per man employed on gold-mining leases during 1907 is practically the same as in 1906, the amount being £438.32 and £438 for the two years respectively. The average tonnage raised by each man was 173.31 tons in 1906 as against 187.32 tons in 1907.

In the East Murchison goldfield a considerable amount of prospecting has been done during the year, and the output of a good many mines, principally in the Black Range district, has increased. The mines in the vicinity of Wiluna are showing increased activity and greater promise than during 1906. The total output of this goldfield has increased to the extent of 23,436ozs.

Of the four Districts into which the Murchison field is divided, two, Cue and Nannine, have produced 12,762ozs. more, while the Day Dawn and Mt. Magnet Districts have produced 25,760ozs. less. The mines around Meekatharra show much promise, and there is every reason to suppose that the gold yield



from this locality will continue to improve; there is only one company-owned mine crushing in the locality, but there are a number of leases owned by co-operative parties giving handsome returns.

The production of the Mount Margaret field has increased as compared with that for 1906 by 3,207ozs., and while the output of some of the producing mines has considerably decreased, that of others whose returns had temporarily fallen off has increased. Among the latter may be mentioned the Lancefield and the Westralia Mt. Morgans. The Sons of Gwalia South mine may be mentioned as having become a producer during the year to the extent of 5,320ozs., the reduction plant having started work in August last.

With the exception of the East Coolgardie goldfield, the North Coolgardie field shows the largest decrease of the year, the output for 1907 being 24,166 ozs. less than that for 1906. Several mines contributed to this decrease, notably the Cosmopolitan Proprietary at Kookynie, with 15,919ozs., and the Golden Pole at Davyhurst, with 4,905ozs. A fair amount of prospecting has been done during the year in this extensive field, and it is anticipated that good returns from some of the older centres, as well as from some of those more recently worked, will be obtained during the year 1908.

The North-East Coolgardie field shows a decreased production of 9,443ozs. as compared with the output for 1906, only the Kurnalpi District showing an increase. The number of men engaged in gold-mining has also fallen off, both in the Kanowna and the Bulong districts, the Kurnalpi District showing a small increase.

The output of the Broad Arrow Goldfield shows an improvement as compared with that for 1906, although this is partly accounted for by the inclusion in the goldfield of part of the northern portion of the Coolgardie Goldfield. The number of men working alluvial has decreased by 31, and the reef-workers have increased by 42 men.

The number of men working in the East Coolgardie field during 1907 was 5,812 as against 5,996 in 1906. This goldfield gives employment to about 36 per cent. of the number of men employed in gold-mining in the State, and produced, during the year 1907, 937,239ozs. of gold—about 56 per cent. of the reported yield. The tonnage treated during the year was 1,586,178 tons, being greater than that in 1906 by 107,261 tons. The average grade of the ore fell from 56.54 shillings in 1906 to 49.90 shillings in 1907, and the output for the latter year fell by 5¼ per cent. as compared with the production for 1906. Notwithstanding this, there have been some very important developments in some of the mines on this field during the year, among which may be mentioned those at the 2,200 feet level of the Great Boulder Proprietary, where the reef has more than maintained its size and value. In the Ivanhoe also, excellent values are found at the 1,670 feet level.

Notwithstanding the decreased output of 3,320ozs., which is partly accounted for by the inclusion of a portion of the field in the Broad Arrow Goldfield, the outlook in the Coolgardie Goldfield is promising. A good deal of prospecting is going on, and a number of small mines are being worked by co-operative parties. In Bayley's mine, which has been practically closed down, a party of tributaries unearthed a rich patch, and the mine is now in the hands of a new company, and is being worked.

The output of the Yilgarn Goldfield has decreased as compared with that in 1906 to the extent of 4,255 ozs. Mining has been very quiet in the vicinity of Southern Cross, but in the country to the eastward of Jaccoletti's, several mines have prosecuted vigorous prospecting work, with promising results.

The Dundas Goldfield has more than maintained its position during the year, the increase of output as compared with that of 1906 being 3,167ozs. The prospects of this field, which has for so long been comparatively isolated by reason of the long road journey to Coolgardie, are good, and the completion of the railway now in course of construction should render it possible to work mines that are now lying idle.

The year 1907 was perhaps the most busy year the Phillips River Goldfield has seen, although the activity was mainly in connection with its copper mines. The increase of 1,534ozs. in its gold production is mainly attributable to the gold contained in the copper ores of the field, although some alluvial gold was obtained during the year in the vicinity of Kundip.

In the Northern goldfields—Kimberley, Pilbara, West Pilbara, Ashburton, and the Gascoyne—gold-mining was quiet during the year. Although rich gold-bearing reefs are being worked, the present cost of fuel and transport militates very greatly against their economical equipment. In the Pilbara field an improvement in this respect will eventuate with the building of the railway from Port Hedland to Marble Bar.

#### TIN.

The output of black tin is greater than that for 1906 by 129 tons, although, on account of the drop in prices which took place during the year, the value of the 1907 output has only increased by £1,004.

The Pilbara Goldfield was the largest producer, the output being 854 tons, or 142 tons greater than for the previous year. A considerable amount of activity was shown at Moolyella during the earlier part of the year. Other centres at which tin was mined in this field were Cooglegong, the Shaw, and Wodgina. Although some of the lodes at Wodgina give every promise of opening up well, so far no reduction plants have been erected, and until this takes place the progress of this centre must necessarily be slow. The average number of men engaged in tin mining on this goldfield during the year was 491, as against 497 the previous year.

The Greenbushes Tinfield produced 770 tons of black tin, 13 tons less than in 1906, when the output was the highest recorded. A good deal of machinery is being installed on this field, and three dredging plants are at work; these should considerably add to the production of tin during 1908, especially as the market has considerably improved. The average number of men increased by 119, as compared with the number employed in 1906, and the lower output is accounted for by deposits of lower grade being worked which became payable owing to the high prices prevailing during the earlier part of the year.

#### TANTALITE.

No tantalite was mined during the year, as there was no demand for this mineral, several leaseholders having been compelled to hold fairly large stocks in London and elsewhere.

## COPPER.

The price of copper at the beginning of 1907 encouraged the hope that the output for the year would show a very substantial increase, and this hope was in part realised, as the value of the ore raised was £180,387—by far the highest annual yield recorded.

The West Pilbara field produced no copper ore during 1906, while during 1907 the value of the production was £63,548, the Whim Well mine, near Balla Balla, and several smaller mines in the vicinity of Roebourne, being the principal producers. On an average 130 men were employed during the year.

The Mt. Morgans District, with its mines at Eulamina, comes next on the list with a production valued at £58,888, followed by the Phillips River field, with an output of £57,273. In the latter field, although development work proceeded vigorously at the larger mines, the fall in the price of copper led to the temporary closing of the smelter. Another reason for this was the probability of the early completion of the railway from Hopetoun to Ravensthorpe, a contract for the construction of which was let on 12th August, 1907. The high cost of transport from the coast to the mines has always militated against this field, and with the railway an accomplished fact there is a much brighter future before the mines of the district. The average number of men employed during 1907 was 358, as against 259 in 1906.

Small quantities of copper ore were produced during 1907 from several other fields that had not been producers before.

The average number of men engaged in mining copper was 864, as against 568 in 1906.

## COAL.

Four collieries are still working on the Collie coal-field, but the output for the year, 142,373 tons, is less by 7,382 tons than that of the year 1906. The Railway Department uses the bulk of the coal produced, its consumption during the year being 98,618 tons.

The number of men employed is lower by 54 than in 1906, but the output per man employed above and underground has increased from 488 tons in 1906 to 563 tons in 1907.

No further developments have taken place at Eradu, on the Geraldton-Murchison railway, where a seam of coal was struck in a bore during the year 1906, although boring operations were started towards the latter end of 1907 to prove the extent of the seam above referred to.

## OTHER MINERALS.

The quantity of silver obtained as a bye product and exported was 189,265ozs., valued at £25,382, the quantity and value for the preceding year being 282,145ozs. and £37,612 respectively.

The closing down of the Fremantle and Ravensthorpe smelters during the year affected the amount of ironstone and limestone used for smelting purposes, only 1,094 tons of the former, and 3,602 tons of the latter having been used for this purpose, the outputs of these minerals for the previous year having been 1,280 tons and 9,472 tons respectively.

Although as will be gathered from the foregoing remarks, the progress of the mineral industry of the State during the year 1907 has not been as marked as in some previous years, there are still grounds for belief that it is in a sound condition. The number of men gaining their living by mining has not sensibly decreased. The output of copper and tin has shown a marked advance. Many new deposits of these minerals have been located, and doubtless will be profitably exploited in the future. True, prospecting has not been carried on so vigorously as in former years, but this is explained in a great measure by the difficulty of obtaining capital for working mines whose value is to a certain extent proved, and the still greater difficulty of obtaining it for proving mere surface shows. However, when the number and extent of the mineral belts in the State, and the small area of these that has been systematically worked during the comparatively few years that have elapsed since the existence of payable gold and other minerals was fully established, are considered, it is only reasonable to suppose that other mines not inferior in value to those now working remain to be found, and that the mineral industry will be a profitable one in this State for many years to come.

## PART II.—MINERALS RAISED.

TABLE I.

Quantity and Value of all the Minerals produced during 1906 and 1907.

Description of Minerals.	1906.		1907.		Increase or Decrease for Year compared with 1906.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
		£		£		£
1. Black Tin (raised), statute tons ...	1,495	157,644	1,624	158,648	+	1,004
2. Coal (raised) do. ...	149,755	57,998	142,373	55,158	-	2,840
3. Copper Ore (raised) do. ...	7,430	50,337	18,978	180,387	+	130,050
4. Gold (export and mint), fine ounces ...	1,794,547	7,622,749	1,697,554	7,210,749	-	412,000
5. Ironstone (raised), statute tons ...	1,280	512	1,094	438	-	74
6. Limestone (raised) do. ...	9,472	1,691	3,602	1,382	-	309
7. *Pig Lead (exported) do. ...	2,681	44,460	313	6,087	-	38,373
8. Silver (exported), fine ounces ...	282,145	37,612	189,265	25,382	-	12,230
9. Tantalite (raised), statute tons ...	15	2,644	...	...	-	2,644
Total Values ...	...	7,975,647	...	7,638,231	...	337,416

\* Contained in bullion from the Fremantle Smelters, Ltd.

The above table shows that the total value of minerals raised has fallen from £7,975,647 in 1906, to £7,638,231 in 1907, a decrease of £337,416. This de-

crease applies to all excepting tin and copper, the former showing an advance of £1,004, and the latter £130,050.

**COMPARATIVE STATISTICAL DIAGRAMS**  
 RELATING TO  
**OUTPUT AND VALUE OF GOLD AND OTHER MINERALS, LANDS LEASED FOR GOLD MINING**  
 IN WESTERN AUSTRALIA  
 AND THE **COLD PRODUCTION OF AUSTRALASIA** FOR THE YEAR 1907.

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

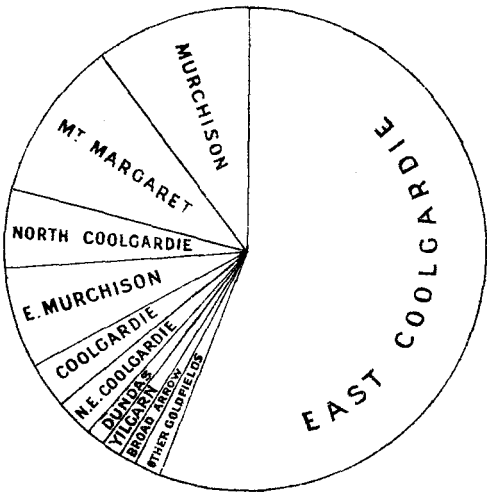


Fig. 2 Gold produced from various Goldfields as given by the Export and Mint Returns.

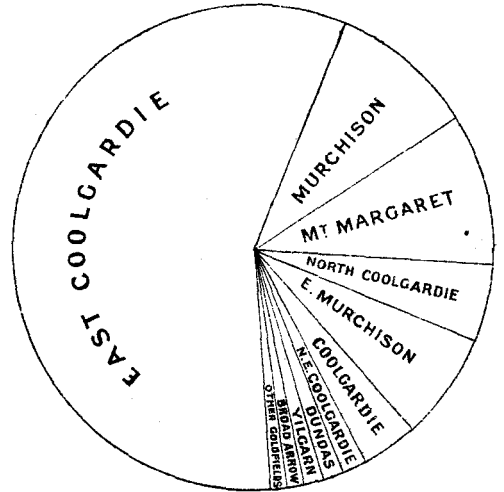


Fig. 3 Value of Gold and other Minerals.

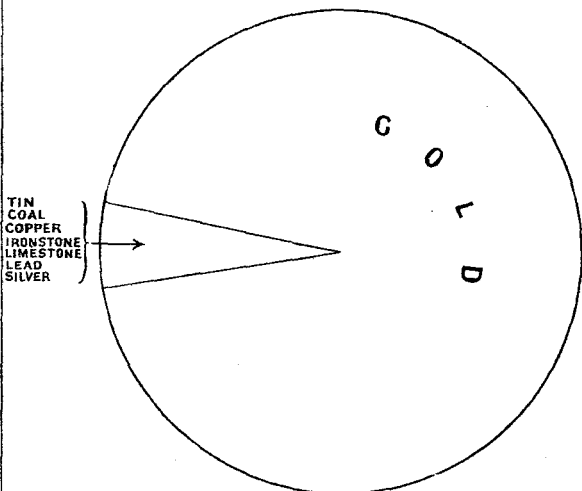


Fig. 4 Value of Minerals other than Gold.

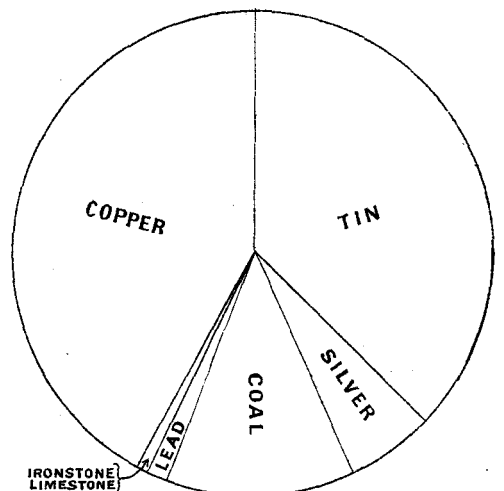


Fig. 5 Areas of Land leased for Goldmining on various Goldfields.

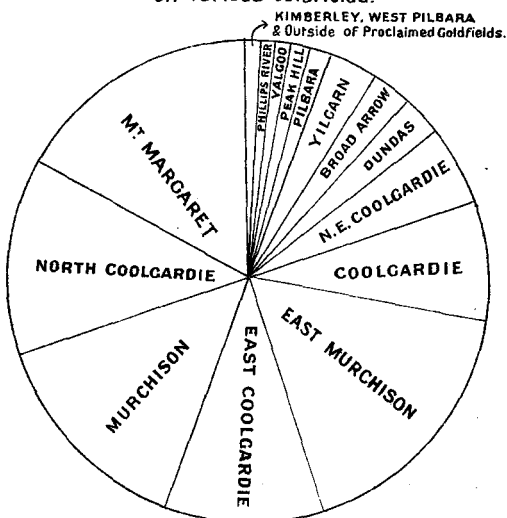


Fig. 6 Output of Gold in the States of Australia and the Colony of New Zealand.

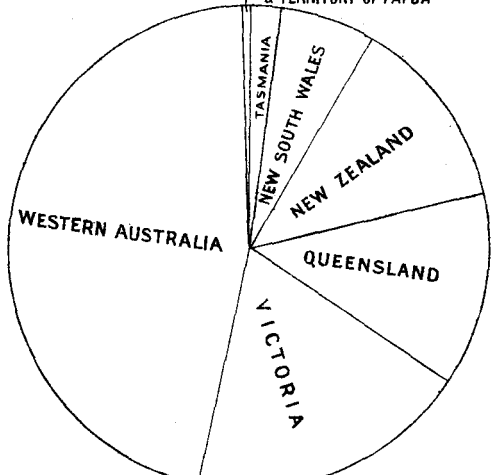


TABLE 2.

Summary of Gold Exported and received at the Perth Branch of the Royal Mint during 1906 and 1907, compared with the yields reported to the Mines Department; also the percentage of the latter for the several Goldfields, and the average value of Gold per ton of ore treated.

Goldfield.	Export and Mint.		Reported Yield.					
	1906.	1907.	1906.	1907.	Percentage for each Goldfield.		Average Value of Gold per ton of Ore treated.	
					1906.	1907.	1906.	1907.
	fine ozs.	fine ozs.	fine ozs.	fine ozs.			shillings.	shillings.
1. Kimberley ... ..	648	362	166	337	.01	.02	...	33.34
2. Pilbara ... ..	4,956	4,131	5,712	10,043	.33	.60	177.11	108.60
3. West Pilbara ... ..	755	332	740	464	.04	.03	63.90	60.84
4. Ashburton ... ..	139	42	278	143	.02	.01	...	...
5. Gascoyne ... ..	79	8	...	...	...	...	...	...
6. Peak Hill ... ..	2,039	5,919	2,008	8,111	.11	.48	16.92	13.20
7. East Murchison ... ..	95,310	120,627	95,771	119,207	5.52	7.13	39.78	40.40
8. Murchison ... ..	189,109	170,309	182,396	169,398	10.50	10.19	51.46	44.82
9. Yalgoo ... ..	4,883	3,200	4,450	4,371	.26	.26	39.90	45.80
10. Mt. Margaret ... ..	158,892	178,049	166,259	169,466	9.57	10.13	39.34	39.92
11. North Coolgardie ... ..	109,031	85,942	110,957	86,791	6.39	5.19	42.88	56.01
12. Broad Arrow ... ..	18,087	17,903	21,511	21,907	1.24	1.31	50.35	48.15
13. North-East Coolgardie ... ..	32,534	28,533	44,573	35,130	2.57	2.10	55.25	44.88
14. East Coolgardie ... ..	1,007,193	966,689	989,357	937,239	56.98	56.02	56.54	49.90
15. Coolgardie ... ..	60,579	62,722	64,030	60,810	3.69	3.63	42.36	45.99
16. Yilgarn ... ..	25,571	23,311	23,547	19,292	1.36	1.15	30.78	32.20
17. Dundas ... ..	21,310	22,831	20,435	23,602	1.18	1.41	72.89	60.26
18. Phillips River ... ..	2,385	5,559	2,780	4,314	.16	.26	107.25	98.79
19. Donnybrook ... ..	...	...	...	...	...	...	...	...
State generally ... ..	1,047	1,085	1,316	1,368	.07	.08	...	...
Totals and averages ... ..	1,794,547	1,697,554	1,736,295	1,671,993	100.00	100.00	50.54	46.81

Throughout this Report, in comparing the outputs of the various fields, the reported yields are referred to. When dealing with the total gold yield of the State, the total compiled from the export and Royal Mint figures is used, as alluvial and other gold not reported to the Department is embraced in this return. The Kimberley, Peak Hill, East Murchison, Mt. Margaret, Broad Arrow, Dundas, and Phillips

River fields all show increases; but the apparent increase at Pilbara is accounted for by the inclusion of figures not previously reported, as explained in the reference to this field at page 24 herein. The other fields show decreases. The average value per ton of ore treated is 46.81 shillings, as against 50.54 shillings in 1906.

TABLE 3.

Number of Gold-producing Mines in the several Goldfields and Districts during 1906 and 1907.

Goldfield.	District.	1906.		1907.		Increase or Decrease.
		District.	Goldfield.	District.	Goldfield.	
Kimberley ... ..	...	...	1	...	1	=
Pilbara ... ..	Marble Bar ... ..	12	30	8	20	- 10
	Nullagine ... ..	18		12		
West Pilbara ... ..	...	...	3	...	3	=
Ashburton ... ..	...	...	...	...	...	...
Gascoyne ... ..	...	...	...	...	...	...
Peak Hill ... ..	...	...	8	...	8	=
East Murchison ... ..	Lawlers ... ..	52	107	49	114	+ 7
	Black Range ... ..	55		65		
	Cue ... ..	54		63		
Murchison ... ..	Nannine ... ..	59	174	68	184	+ 10
	Day Dawn ... ..	16		12		
	Mt. Magnet ... ..	45		41		
Yalgoo ... ..	...	...	13	...	13	=
Mt. Margaret ... ..	Mt. Morgans ... ..	37	161	22	125	- 36
	Mt. Malcolm ... ..	45		45		
	Mt. Margaret ... ..	79		58		
	Menzies ... ..	76		64		
North Coolgardie ... ..	Ularring ... ..	33	198	34	175	- 23
	Niagara ... ..	35		35		
	Yerilla ... ..	54		42		
Broad Arrow ... ..	...	...	48	...	50	+ 2
North-East Coolgardie ... ..	Kanowna ... ..	50	85	50	74	- 11
	Bulong ... ..	29		20		
East Coolgardie ... ..	Kurnalpi ... ..	6	...	4	...	...
Coolgardie ... ..	Coolgardie ... ..	86	123	78	107	- 16
	Kunanalling ... ..	37		29		
Yilgarn ... ..	...	...	35	...	31	- 4
Dundas ... ..	...	...	39	...	32	- 7
Phillips River ... ..	...	...	23	...	24	+ 1
Donnybrook ... ..	...	...	...	...	...	...
Totals ... ..	...	...	1,151	...	1,062	- 89

The number of producing mines is shown as 1,062, being 89 less than in 1906; the main decreases appearing in the Pilbara, Mt. Margaret, North Cool-

gardie, North-East Coolgardie, and Coolgardie gold-fields.

TABLE 4.

Increase or Decrease in Output of certain producing Gold Mines in 1907, as compared with 1906.

Goldfield.	District.	Name of Mine.	Production.		Increase or Decrease for Year compared with 1906.
			1906.	1907.	
			Fine ozs.	Fine ozs.	Fine ozs.
Peak Hill	...	1. Peak Hill Goldfield, Ltd.	675-38	7,375-53	+ 6,700-15
East Murchison	Lawlers	2. Bellevue Proprietary, Ltd.	14,067-24	7,301-93	- 6,765-31
Do.	do.	3. Gwalia Consolidated, Ltd.	5,330-07	10,675-90	+ 5,345-83
Do.	do.	4. Northern Mines, Ltd. (late London and Western Australian Exploration Co., Ltd.)	18,318-70	18,329-90	+ 11-20
Do.	do.	5. Vivien G.M. Co., Ltd.	8,327-81	10,679-04	+ 2,351-23
Do.	Black Range	6. Black Range Kohinoor Mining Co., N.L.	...	1,709-87	+ 1,709-87
Do.	do.	7. Black Range Mining Co., N.L. (late Adelaide leases)	14,076-02	18,344-56	+ 4,268-54
Do.	do.	8. Havilah G.M. Co., N.L. (late Havilah leases)	1,028-67	6,993-09	+ 5,964-42
Do.	do.	9. Meninga Marley leases	1,768-82	3,860-57	+ 2,092-15
Do.	do.	10. Oroya Black Range, Ltd.	1,917-00	13,059-26	+ 11,142-26
Murchison	Cue	11. Barrambie Ranges G.M. Co., N.L.	...	5,683-13	+ 5,683-13
Do.	do.	12. Victory United G.M. Co., N.L.	3,578-77	4,268-39	+ 689-62
Do.	Nannine	13. Fenian	2,914-51	4,192-57	+ 1,278-06
Do.	do.	14. Inghiston Extended G.Ms., Ltd.	4,547-46	6,280-34	+ 1,732-88
Do.	do.	15. New Alliance leases	984-51	2,686-28	+ 1,701-77
Do.	do.	16. New Murchison King G.Ms.	3,093-64	899-10	- 1,194-54
Do.	Day Dawn	17. Great Fingall Consolidated, Ltd.	121,163-20	99,253-43	- 21,909-77
Do.	Mt. Magnet	18. Morning Star Quartz Co., N.L.	3,845-66	3,356-53	- 489-13
Yalgoo	...	19. Reward G.Ms., Ltd.	4-63	1,301-52	+ 1,296-89
Do.	...	20. Royal Standard leases	2,496-25	1,902-68	- 593-57
Mt. Margaret	Mt. Morgans	21. Alex Junior	253-08	1,786-31	+ 1,533-23
Do.	do.	22. Millionaire, Ltd.	1,245-23	393-09	- 852-14
Do.	do.	23. Westralia Mt. Morgans G.Ms. Co., Ltd.	14,342-90	19,600-03	+ 5,257-13
Do.	Mt. Malcolm	24. Great Tower Hill G.Ms., Ltd.	17,683-47	1,043-41	- 16,640-06
Do.	do.	25. Great Western leases	2,705-29	487-87	- 2,217-42
Do.	do.	26. Merton's Reward G.M. Co., Ltd.	3,801-15	5,607-32	+ 1,806-17
Do.	do.	27. Sons of Gwalia, Ltd.	56,280-69	56,905-81	+ 625-12
Do.	do.	28. Sons of Gwalia South G.Ms., Ltd.	...	5,319-91	+ 5,319-91
Do.	Mt. Margaret	29. Craiggiemore Proprietary, Ltd.	5,509-95	65-91	- 5,444-04
Do.	do.	30. Ida H. G.M. Co., Ltd.	10,330-68	9,426-02	- 904-66
Do.	do.	31. Lancefield G.M. Co., Ltd.	3,005-82	25,993-20	+ 22,987-38
North Coolgardie	Menzies	32. Menzies Consolidated, Ltd.	9,478-39	9,953-32	+ 474-93
Do.	do.	33. Menzies Gold Mine leases	3,722-65	4,486-00	+ 763-35
Do.	do.	34. Menzies Mining and Exploration Corporation, Ltd.	1,926-34	2,654-10	+ 727-76
Do.	do.	35. Queensland Menzies G.M. Co., N.L.	1,790-47	1,328-99	- 461-48
Do.	Ularring...	36. Golden Pole G.Ms., Ltd.	11,796-08	6,891-09	- 4,904-99
Do.	do.	37. Lady Gladys G.M. Co., N.L.	2,836-46	2,784-82	- 51-64
Do.	do.	38. Westralia Waihi G.Ms., N.L.	3,922-52	2,843-91	- 1,078-61
Do.	Niagara	39. Englishman: Cosmopolitan Proprietary, Ltd.	23,677-46	7,758-74	- 15,918-72
Do.	do.	40. Hannans Main Reef G.M. Co., Ltd.	4,021-34	1,200-95	- 2,820-39
Do.	Yerilla	41. Neta leases	2,347-61	1,181-85	- 1,165-76
Do.	do.	42. Potosi Consolidated, Ltd.	1,046-22	1,525-25	+ 479-03
Broad Arrow	...	43. New Slug Hill G.M. Co., Ltd.	4,140-87	4,850-42	+ 709-55
N.E. Coolgardie	Kanowna	44. Gentle Polly	3,195-41	3,280-21	+ 64-83
Do.	do.	45. North White Feather G.Ms., Ltd.	9,861-43	7,852-14	- 2,009-29
Do.	do.	46. Queen Margaret G.M. Co., Ltd.	3,153-17	6,080-95	+ 2,907-78
Do.	do.	47. White Feather Main Reef (1906), Ltd.	541-39	1,960-05	+ 1,418-66
Do.	Bulong	48. New Santa Clause G.M. Co., Ltd.	949-33	1,283-57	+ 334-24
Do.	do.	49. Queen Margaret G.M. Co., Ltd.	2,753-02	985-45	- 1,767-57
East Coolgardie	...	50. Associated G.Ms. of W.A., Ltd.	54,416-42	56,023-31	+ 1,606-89
Do.	...	51. Associated Northern Blocks (W.A.), Ltd.	43,010-10	38,829-85	- 4,180-25
Do.	...	52. Brown Hill Consols leases	7,359-41	1,014-35	- 6,345-06
Do.	...	53. Golden Horseshoe Estates Co., Ltd.	152,718-61	147,744-38	- 4,974-23
Do.	...	54. Golden Ridge G.M. Co., N.L.	5,897-90	9,089-91	+ 3,192-01
Do.	...	55. Great Boulder Perseverance G.M. Co., Ltd.	80,648-57	87,352-65	+ 6,704-08
Do.	...	56. Great Boulder Proprietary G.Ms., Ltd.	130,542-23	132,793-33	+ 2,251-10
Do.	...	57. Hainault G.Ms., Ltd.	19,894-15	16,106-00	- 3,788-15
Do.	...	58. Hill End Consols	1,062-99	8,138-79	+ 7,075-80
Do.	...	59. Ivanhoe Gold Corporation, Ltd.	122,460-04	123,118-25	+ 658-21
Do.	...	60. Kalgurli G.Ms., Ltd.	90,645-10	81,832-80	- 8,812-30
Do.	...	61. Lake View Consols, Ltd.	42,242-12	38,436-03	- 3,806-09
Do.	...	62. Oroya Brownhill Co., Ltd.	148,208-10	108,793-89	- 39,409-21
Do.	...	63. South Kalgurli G.Ms., Ltd.	38,391-88	32,401-01	- 5,990-87
Coolgardie	Coolgardie	64. Burbanks Birthday G.Ms., Ltd.	7,673-65	5,892-27	- 1,781-38
Do.	do.	65. Burbanks Main Lode (1904), Ltd.	5,630-07	8,112-41	+ 2,482-34
Do.	do.	66. Redhill Westralia G.Ms., Ltd.	5,785-63	3,440-82	- 2,344-81
Do.	do.	67. Westralia and East Extension Mines, Ltd.	14,875-74	12,374-58	- 2,501-16
Do.	Kunanalling	68. Carbine	1,622-30	1,338-62	- 283-68
Yilgarn	...	69. British and Foreign Development Syndicate, Ltd.	3,961-19	4,642-53	+ 681-34
Do.	...	70. Greenmount Mines, Ltd.	4,554-53	4,035-60	- 518-93
Do.	...	71. Transvaal	3,633-63	2,371-05	- 1,262-64
Dundas	...	72. Cumberland G.M. Co., N.L.	7,295-50	7,159-55	- 135-95
Do.	...	73. Mararoa G.M. Co., N.L.	1,116-84	4,331-84	+ 3,215-00
Do.	...	74. Princess Royal G.M. Co., N.L.	5,108-41	2,756-77	- 2,351-64
Phillips River	...	75. Two Boys	889-18	44-38	- 844-80
Totals			1,413,095-56	1,361,799-71	- 51,295-85

Of the above 75 gold mines, 36 produced 176,519-74 fine ounces less, and 39 produced 125,223-89 fine ounces more than in 1906 being a net decrease of 51,295-85 fine ounces.

TABLE 5.

*Averages of Gold Ore raised and treated, and Gold produced therefrom, per man employed on the several Goldfields of the State, during 1906 and 1907.*

Goldfield.	1906.				1907.			
	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 ... ..	...	...	17-00	17-00	...	...	...	...
2. Pilbara ... ..	35-69	19-13	74-40	39-89	125-35	66-16	160-21	84-56
3. West Pilbara ... ..	133-25	66-63	100-25	50-13	75-75	27-55	54-25	19-73
4. Ashburton ... ..	...	...	...	...	...	...	...	...
5. Gascoyne ... ..	...	...	...	...	...	...	...	...
6. Peak Hill ... ..	325-05	134-92	64-73	26-87	821-03	410-52	127-61	63-81
7. East Murchison ... ..	315-27	150-59	147-62	70-51	321-19	157-96	152-58	75-04
8. Murchison ... ..	349-85	187-19	211-93	113-40	340-21	193-84	179-51	102-29
9. Yalgoo ... ..	168-77	92-67	79-25	43-51	176-34	85-06	95-07	45-86
10. Mt. Margaret ... ..	312-72	162-38	144-81	75-24	322-20	167-79	151-47	78-89
11. North Coolgardie ... ..	202-54	119-97	102-22	60-55	133-73	80-01	88-17	52-75
12. Broad Arrow ... ..	188-59	117-96	111-77	69-91	221-37	130-49	125-46	73-95
13. North-East Coolgardie ... ..	123-51	76-11	80-33	49-51	144-17	92-00	76-16	48-60
14. East Coolgardie ... ..	442-00	247-93	294-19	165-02	491-07	275-76	288-47	161-99
15. Coolgardie ... ..	151-63	94-37	75-61	47-06	147-54	93-56	79-87	50-65
16. Yilgarn ... ..	282-81	146-19	102-37	52-97	290-48	137-02	110-08	51-92
17. Dundas ... ..	121-26	71-57	104-04	61-40	189-99	103-63	134-76	73-51
18. Phillips River ... ..	35-52	20-77	44-84	26-23	80-22	46-13	93-28	53-64
19. Donnybrook ... ..	...	...	...	...	...	...	...	...
<b>Total Averages ... ..</b>	<b>314-08</b>	<b>173-31</b>	<b>186-86</b>	<b>103-11</b>	<b>336-28</b>	<b>187-32</b>	<b>185-25</b>	<b>103-19</b>

The average value of gold produced per man employed above and underground was £438 in 1906, and £438.32 in 1907. The average tonnage of ore raised has increased from 173.31 tons to 187.32 tons. The

average tonnage raised per man is very high in the Peak Hill and East Coolgardie goldfields, viz., 410.52 tons, average value £271 in the former, and 275.76 tons, average value £688, in the later.

TABLE 6.

*Output of Gold from the several States of Australia, the Territory of Papua, and the Dominion of New Zealand during 1907.*

State.	Output of Gold.		Percentage of Output.
	Fine ozs.	Value.	
1. Western Australia ... ..	1,697,554	£ 7,210,749	46-29
2. Victoria ... ..	695,576	2,954,617	18-97
3. Queensland ... ..	466,476	1,981,461	12-72
4. New South Wales ... ..	247,363	1,050,730	6-74
5. Tasmania ... ..	65,354	277,607	1-78
6. South Australia and Northern Territory ... ..	8,617	36,602	·24
7. Territory of Papua ... ..	9,349	39,710	·25
8. New Zealand ... ..	477,311	2,027,490	13-01
<b>Total ... ..</b>	<b>3,667,600</b>	<b>15,578,966</b>	<b>100-00</b>



TABLE 8.

Quantity and Value of Minerals, other than Gold and Coal, reported to the Mines Department during 1907.

Goldfield, District, or Mineral Field.	Quantity.	Value.	Increase or Decrease for Year compared with 1906.	
			Quantity.	Value.
	tons.	£	tons.	£

## BLACK TIN.

Pilbara Goldfield (Marble Bar District) ...	853.69	85,603	+	142.04	+ 7,154
Greenbushes Mineral Field ...	770.00	73,045	-	13.28	- 6,150
Total ...	1,623.69	158,648	+	128.76	+ 1,004

## TANTALITE.

Pilbara Goldfield (Marble Bar District) ...	...	...	-	14.65	- 2,644
Greenbushes Mineral Field ...	...	...	...	...	...
Total ...	...	...	-	14.65	- 2,644

## COPPER ORE.

Pilbara Goldfield (Marble Bar District) ...	7.77	190	+	7.77	+ 190
West Pilbara Goldfield ...	3,365.50	63,548	+	3,365.50	+ 63,548
Murchison Goldfield (Nannine District) ...	...	...	-	133.50	- 2,816
Murchison Goldfield (Day Dawn District) ...	31.71	274	+	31.71	+ 274
Yalgoo Goldfield ...	10.00	130	-	21.91	+ 39
Northampton Mineral Field ...	...	...	...	...	...
Mt. Margaret Goldfield (Mt. Morgans District) ...	5,141.52	58,888	+	780.47	+ 36,954
Mt. Margaret Goldfield (Mt. Margaret District) ...	2.85	26	+	2.85	+ 26
North Coolgardie Goldfield (Menzies District) ...	1.42	18	-	3.28	- 15
Phillips River Goldfield ...	10,414.57	57,273	+	7,529.57	+ 32,003
State generally ...	3.08	40	-	10.42	- 153
Total ...	18,978.42	180,387	+	11,548.76	+ 130,050

## IRONSTONE.

State generally ...	1,093.53	438	-	186.34	- 74
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## LIMESTONE.

Murchison Goldfield (Cue District) ...	298.00	772	+	298.00	+ 772
State generally ...	3,303.95	610	-	6,168.33	- 1,081
Total ...	3,601.95	1,382	-	5,870.33	- 309

## LEAD ORE.

Northampton Mineral Field ...	10.00	128	+	10.00	+ 128
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There was an increase in the output of black tin from Pilbara, but a small decrease at Greenbushes owing to the fall in values, rendering many low grade claims unpayable. The number of men employed in this branch of mining shows an increase of 119 at Greenbushes, and a decrease of six at Pilbara. No

production of tantalite was reported, owing to the absence of a market for this metal. At every copper-producing centre, with the exception of Murchison, Yalgoo, and North Coolgardie, an increased output was reported, and the number of men employed thereat has increased by 315.



TABLE 9.

Quantity of Coal raised during 1906 and 1907, 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	1906	tons. 149,755	£ 57,998	71	236	tons. 635	tons. 488
	1907	142,373	55,158	74	179	795	563

The number of men employed in connection with collieries has decreased by 54 during the year 1907, and the output of coal by 7,382 tons.

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

TABLE 10.

Total Number and Acreage of Leases held for Mining on 31st December, 1906 and 1907.

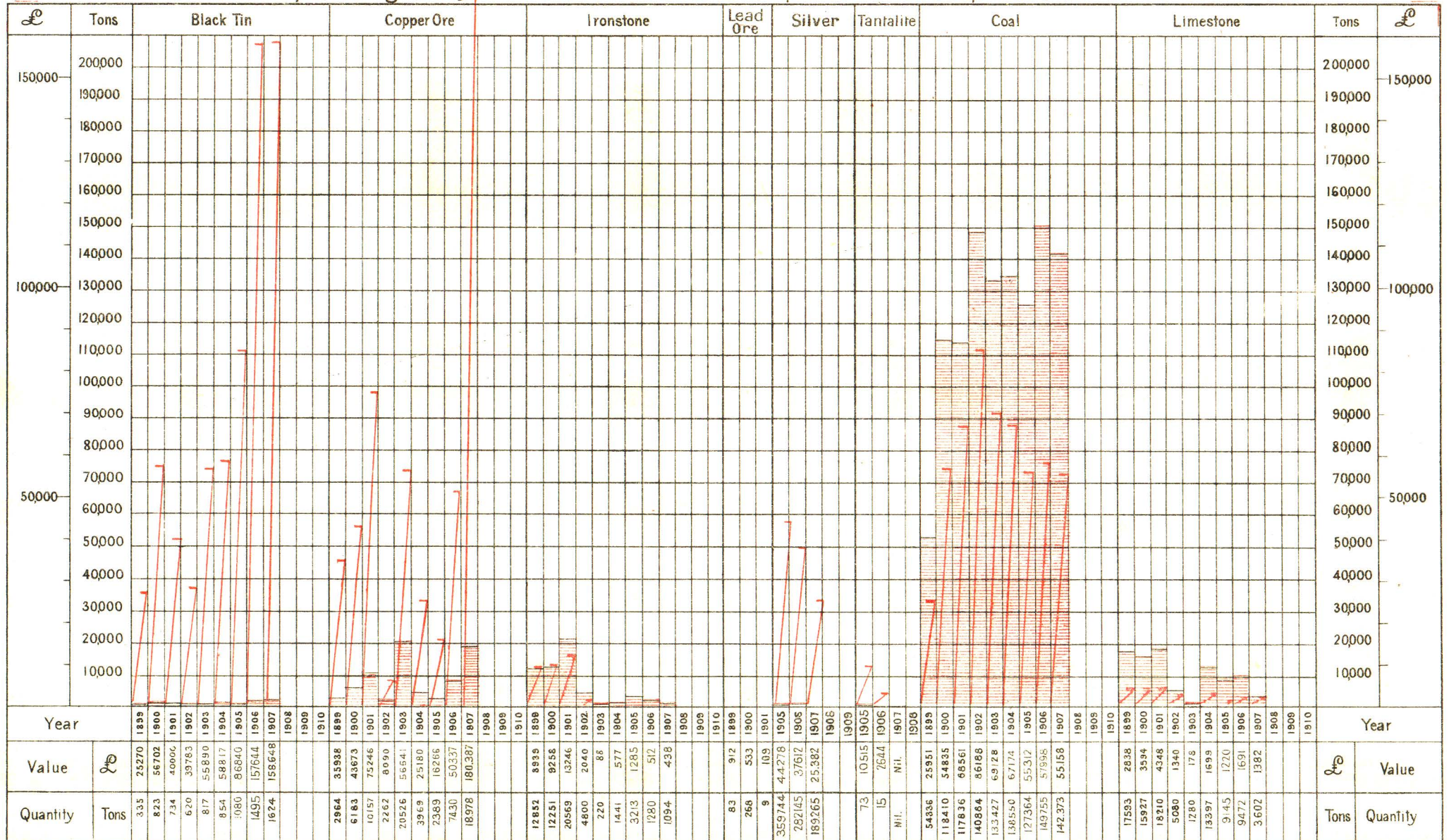
Description of Leases.	1906.		1907.	
	No.	Acreage.	No.	Acreage.
Gold mining leases on Crown land ...	2,181	29,370	2,031	27,587
"   "   "   private property ...	...	...	...	...
Mineral leases on Crown land ...	271	27,121	471	33,962
"   "   private property ...	2	50	5	139
	2,454	56,541	2,507	61,688

The total number of leases held for mining has increased by 53, as compared with 1906, and the acreage by 5,147 acres. Leases for gold-mining have decreased in number by 150, and in area by 1,783 acres. This is largely accounted for by the fact that many more Prospecting Areas are now held owing to the

liberal conditions prevailing. The acreage held under Mineral Leases has increased by 6,330 acres, and the number of leases by 203. The number of leases held for mining on private property has increased by 3, and the acreage by 89 acres.

# DIAGRAM

of the Mineral Output, showing Quantity & Value of Minerals other than Gold, reported to the Mines Department, from the Year -1899- onwards



NOTE. Pink hatching denotes Quantities produced and diagonal lines Values thereof

(025) Previous to 1899 the Quantity and Value of the various Minerals exported amounted to:—

Black Tin	1738	76227
Copper Ore	10641	196255
Lead Ore	33501	364418
Pig	507	12228
<b>Total Value</b>		<b>769728</b>

(a)

TABLE 11.

Number and Acreage of Gold Mining Leases in force each year for the Five Years ending the 31st December, 1907.

GOLDFIELDS.		DISTRICTS.		1903.		1904.		1905.		1906.		1907.		Percentage of Total Acreage.		Increase or Decrease for 1907 compared with 1906.		GOLDFIELDS.	
Name.	Proclaimed.	Name.	Proclaimed.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	1906	1907.	Increase.	Decrease.		
Kimberley	20-5-86	...	...	3	19	2	13	2	13	2	13	2	13	·04	·04	...	...	Kimberley	
Yilgarn	1-10-08	...	...	74	985	62	861	61	924	64	1,017	60	924	3·46	3·34	...	93	Yilgarn	
Pilbara	1-10-88	Marble Bar	6-11-96	27	258	20	204	22	267	19	204	14	92	1·78	1·63	...	...	Pilbara	
		Nullagine	6-11-96	20	244	24	286	30	322	29	320	23	257						
Ashburton	11-12-90	...	...	...	...	...	...	1	12	1	12	...	...	·04	...	...	12	Ashburton	
Murchison	24-9-91	Cue	10-1-96	89	810	113	1,007	110	1,152	111	1,294	111	1,386	14·25	15·11	...	...	19	Murchison
		Nannine	7-12-94	93	1,114	98	1,187	119	1,291	131	1,560	125	1,466						
		Day Dawn	10-1-96	112	1,209	98	1,058	98	1,035	87	890	84	832						
		Mount Magnet	7-12-94	94	834	77	656	66	532	54	443	52	484						
Dundas	31-8-93	...	...	72	793	88	913	84	956	59	732	59	740	2·49	2·69	8	...	Dundas	
Coolgardie	6-4-94	Coolgardie	1-9-97	170	2,076	167	2,104	173	2,273	148	1,949	134	1,709	8·25	7·88	...	...	251	Coolgardie
		Kunanalling	1-9-97	73	908	72	882	55	679	35	475	38	464						
East Coolgardie	21-9-94	...	...	231	3,469	246	3,579	258	3,708	243	3,570	206	2,967	12·15	10·76	...	603	East Coolgardie	
Yalgoo	23-1-95	...	...	28	365	27	284	32	344	37	435	32	365	1·48	1·33	...	70	Yalgoo	
North Coolgardie	28-6-95	Menzies	20-3-96	129	1,508	135	1,649	106	1,335	108	1,403	86	1,185	14·43	12·76	...	...	719	North Coolgardie
		Ularring	23-9-96	81	937	77	909	83	1,016	63	824	57	737						
		Yerilla	20-3-96	96	1,539	81	1,232	86	1,366	66	1,135	42	694						
		Niagara	12-3-97	121	1,455	111	1,297	88	1,090	69	875	69	902						
East Murchison	28-6-95	Lawlers	...	192	2,746	164	2,392	155	2,144	111	1,664	136	2,009	11·05	16·58	1,328	...	...	East Murchison
		Black Range	...	...	...	89	1,017	118	1,486	117	1,581	179	2,564						
West Pilbara	20-9-95	...	...	6	66	5	78	6	102	7	102	9	132	·35	·48	30	...	West Pilbara	
North-East Coolgardie	20-3-96	Kanowna	13-11-96	89	1,118	82	1,073	89	1,151	97	1,240	88	1,054	6·22	5·38	...	...	340	N.E. Coolgardie
		Bulong	13-11-96	67	909	74	1,084	64	944	41	518	28	376						
		Kurnalpi	13-11-96	...	...	27	612	11	198	6	66	5	54						
Broad Arrow	17-11-96	...	...	86	1,098	88	1,144	76	943	84	1,039	63	789	3·54	2·86	...	250	Broad Arrow	
Peak Hill	19-3-97	...	...	59	693	62	719	47	492	42	370	40	337	1·26	1·22	...	33	Peak Hill	
Mount Margaret	12-3-97	Mount Margaret	12-3-97	132	2,089	159	2,454	172	2,676	118	1,953	104	1,753	17·24	16·65	...	...	468	Mount Margaret
		Mount Malcolm	12-3-97	103	1,836	143	2,384	144	2,467	117	2,095	107	2,070						
		Mount Morgans	2-4-02	33	614	55	933	74	1,152	68	1,015	52	772						
Gascoyne	25-6-97	...	...	2	36	5	66	4	54	...	...	...	...	...	...	...	...	Gascoyne	
Donnybrook	11-11-99	Crown Land	...	8	123	5	56	...	...	...	...	...	...	...	...	...	...	...	Donnybrook
		Private Property	...	16	206	13	132	...	...	...	...	...	...	...	...	...	...	...	...
Phillips River	21-9-00	...	...	17	298	15	229	13	149	43	480	22	264	1·64	·95	...	216	Phillips River	
Greenbushes	...	...	...	1	24	...	...	...	...	...	...	...	...	...	...	...	...	Greenbushes	
Newcastle	...	Private Property	...	4	36	4	36	...	...	...	...	...	...	...	...	...	...	Newcastle	
Other Localities	...	...	...	...	...	...	...	...	...	4	96	4	96	·33	·34	...	...	...	
Totals	...	...	...	2,328	30,415	2,488	32,530	2,447	32,273	2,181	29,370	2,031	27,587	100·00	100·00	1,366	3,149	...	

150 Leases : 1,783 acres decrease for 1907.

TABLE 12.

Number and Acreage of Mineral Leases in force 31st December each year, for the Five Years ending 31st December, 1907.

MINING DISTRICTS.		SUB-DISTRICTS.		1903.		1904.		1905.		1906.		1907.		Increase or Decrease for 1907 compared with 1906.		DISTRICTS.	
Name.	Proclaimed.	Name.	Pro-claimed.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Increase.	Decrease.		
														acres.	acres.		
Kimberley	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Kimberley	
Ashburton	11-12-90	...	...	...	...	...	...	...	...	4	126	20	567	...	...	Ashburton	
Murchison	24-9-91	Cue	7-12-94	...	...	...	...	...	...	...	...	...	...	...	...	Cue	
		Nannine	7-12-94	...	...	...	...	...	...	3	80	7	193	58	58	Nannine	
		Day Dawn	10-1-96	...	...	1	6	1	6	1	6	1	6	...	...	Day Dawn	
		Mt. Magnet	7-12-94	...	...	2	10	...	...	...	...	...	...	...	...	Mt. Magnet	
Greenbushes	7-4-92	...	...	38	703	30	597	39	706	62	1,127	100	1,585	458	...	Greenbushes	
Pilbara	16-6-92	Marble Bar	16-6-92	3	80	4	180	11	290	32	768	36	763	...	5	Marble Bar	
		Nullagine	6-11-96	...	...	...	...	...	...	...	...	...	2	72	72	Nullagine	
Yalgoo	23-1-95	...	...	...	...	...	...	...	...	1	24	5	168	144	...	Yalgoo	
Yilgarn	22-3-95	...	...	1	6	1	60	1	3	...	...	...	...	...	...	Yilgarn	
Coolgardie	22-3-95	Coolgardie	22-3-95	2	22	3	42	2	22	3	41	4	61	20	...	Coolgardie	
		Kunanalling	1-9-97	...	...	...	...	...	...	...	...	...	...	...	...	...	Kunanalling
East Coolgardie	22-3-95	...	...	13	180	11	130	10	55	5	20	8	116	96	...	East Coolgardie	
East Murchison	28-6-95	Black Range	...	1	2	3	14	2	12	...	...	3	42	42	...	Black Range	
		Menzies	15-4-96	1	12	1	12	...	...	1	48	1	48	...	...	Menzies	
		Ularring	15-4-96	...	...	1	10	1	4	...	...	...	1	48	48	...	Ularring
		Yerilla	15-4-96	...	...	...	...	...	...	...	...	...	...	...	...	...	Yerilla
West Pilbara	1-11-95	Niagara	1-3-97	1	1	...	...	...	...	...	...	...	...	...	...	Niagara	
Dundas	27-12-95	...	...	8	284	3	194	3	194	15	401	54	1,402	1,001	...	West Pilbara	
Collie	21-2-96	...	...	1	6	1	6	1	6	1	6	1	6	...	...	Dundas	
North-East Coolgardie	15-4-96	Kanowna	15-4-96	94	29,145	68	20,975	74	22,894	74	22,895	80	24,815	1,920	...	Collie	
		Bulong	15-4-96	...	...	...	...	...	...	...	...	...	...	...	...	...	Kanowna
		Kurnalpi	15-4-96	...	...	...	...	...	...	...	...	...	...	...	...	...	Bulong
Broad Arrow	20-11-96	...	...	...	...	1	20	1	48	...	...	1	20	20	...	Kurnalpi	
Northampton	1-1-97	Private Property	...	5	125	1	20	...	...	5	124	21	412	288	...	Broad Arrow	
Peak Hill	1-4-97	...	...	...	...	...	...	...	...	...	...	1	20	20	...	Northampton	
Mt. Margaret	1-4-97	Mt. Margaret	1-4-97	2	6	1	3	1	3	1	3	1	3	...	...	Peak Hill	
		Mt. Malcolm	1-4-97	14	317	10	145	8	51	5	32	3	12	...	20	...	Mt. Margaret
		Mt. Morgans	2-4-02	1	6	...	...	3	55	4	65	13	330	265	...	...	Mt. Malcolm
Gascoyne	15-4-97	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Mt. Morgans	
Yandanooka	1-12-97	Crown Lands	...	13	855	1	65	2	40	1	20	3	60	40	...	Gascoyne	
		Private Property	...	...	...	...	...	2	50	2	50	2	50	...	...	...	Yandanooka
Phillips River	1-7-99	...	...	39	1,093	31	839	28	754	49	1,151	57	1,323	172	...	Phillips River	
Donnybrook	27-11-99	...	...	...	...	2	31	...	...	...	...	...	...	...	...	Donnybrook	
Other localities	...	Crown Lands	...	5	230	6	240	38	1,300	4	184	45	1,845	1,661	...	Other Localities	
		Private Property	...	...	...	...	...	...	...	...	...	...	2	69	69	...	Other Localities
Totals	...	...	...	244	33,083	180	23,589	228	26,493	273	27,171	476	34,101	6,955	25		

Increase for 1907: 203 leases, 6,930 acres.

Apart from the Collie field, where large areas are held for coal-mining, the largest area under Mineral Lease is in the Greenbushes field, where 1,585 acres are held for tin-mining. West Pilbara follows with an area of 1,402 acres, held principally for copper; then Phillips River, with an area of 1,323 acres, principally for copper; and Pilbara, 835 acres, mostly for tin.

Taking all goldfields, the largest percentage of land leased is in the Mt. Margaret goldfield, in which 16.65 per cent. of the total area is leased, then the East Murchison, Murchison, North Coolgardie, and East Coolgardie goldfields, with percentages of 16.58, 15.11, 12.76, and 10.76 respectively.



TABLE 14.

Claims and Authorised Holdings under "The Mining Act, 1904," and Regulations, existing on 31st December, 1906 and 1907.

Claims, etc.	*Kimberley.		Yilgarn.		Pilbara.				*Ashburton.		Marchison.						Dundas.		Coolgardie.				East Coolgardie.		Yalgoo.		North Coolgardie.									
	1906.	1907.	1906.	1907.	*Marble Bar.		Nullagine.		1906.	1907.	1906.	1907.	Cue.		1906.	1907.	1906.	1907.	1906.	1907.	Coolgardie.		1906.	1907.	1906.	1907.	1906.	1907.	Menzies.		1906.	1907.	1906.	1907.	1906.	1907.
					1906.	1907.	1906.	1907.					1906.	1907.							1906.	1907.							1906.	1907.						
Water Rights ...	...	...	6	5	4	7	6	...	...	10	9	21	23	...	1	...	...	14	14	20	15	11	14	42	31	...	...	14	16	15	7	9	6	19	16	
Area of Water Rights ...	...	...	25	14	13	7	9	...	...	29	23	20	70	...	1	...	...	182	182	25	43	45	60	936	671	...	...	35	38	55	31	26	12	75	38	
Lode Claims ...	...	...	...	11	8	16	16	...	...	3	4	...	...	...	1	2	8	8	...	...	12	12	8	8	48	48	...	2	...	...	...	4	...	11	...	
Alluvial Claims ...	...	...	1	32	33	...	...	...	...	1	...	...	...	...	1	...	...	...	...	...	...	...	...	36	41	...	...	...	...	...	...	...	...	...	...	...
Dredging Claims ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Prospecting Areas ...	...	...	28	10	22	...	1	...	...	33	26	17	9	39	36	24	98	22	28	64	78	27	24	50	32	12	7	58	727	32	23	45	54	34	40	
Residence Areas ...	...	...	...	5	7	6	5	...	...	17	20	8	9	35	42	7	6	22	28	46	46	1	1	70	74	4	4	42	3	...	...	...	...	...	...	
Business Areas ...	...	...	20	18	23	37	4	4	...	22	28	...	...	13	13	8	8	5	3	20	13	7	6	17	14	16	18	7	9	47	...	61	31	2	20	
Machinery Areas ...	...	...	...	4	4	2	3	...	...	3	...	1	...	1	2	1	1	3	3	4	...	3	4	4	5	1	1	1	3	...	4	...	...	5	3	
Tailings Areas ...	...	...	8	2	2	1	1	...	...	4	4	1	1	4	6	2	1	4	2	1	1	1	7	7	2	2	1	1	...	...	2	2	2	6	2	
Garden Areas ...	...	...	3	11	12	4	4	...	...	1	2	7	7	4	7	8	1	2	1	9	...	10	...	...	36	34	3	4	5	...	...	...	...	9	8	
Washing Areas ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

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Claims, etc.	East Murchison.				*West Pilbara.		North-East Coolgardie.				Broad Arrow.		Peak Hill.		Mount Margaret.						Gascoyne.		Green-bushes.		Phillips River.		Outside Goldfields.		TOTAL.		Increase or Decrease for 1907 compared with 1906.				
	East Murchison.		Black Range.		1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.	Mount Margaret.		1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.	Increase.	Decrease.	
	1906.	1907.	1906.	1907.													Mount Margaret.	Mount Malcolm.																	Mount Morgans.
Water Rights ...	37	41	4	...	3	5	6	5	9	9	...	...	14	11	12	13	25	27	56	57	24	23	...	...	39	21	11	13	...	...	427	393	...	34	
Area of Water Rights ...	78	84	4	...	18	23	31	30	39	39	...	...	46	37	125	125	64	73	251	257	87	91	...	...	160	67	58	73	...	...	2,416	2,126	...	290	
Lode Claims ...	2	...	...	...	1	...	109	89	40	40	11	11	14	6	10	...	9	9	5	4	1	1	...	...	...	...	...	...	...	...	314	283	...	31	
Alluvial Claims ...	...	...	...	...	5	...	195	195	35	35	3	3	...	2	...	...	8	7	...	...	...	2	...	...	76	74	...	...	...	...	392	397	5	...	
Dredging Claims ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Prospecting Areas ...	26	45	50	66	13	17	25	24	12	9	3	3	49	56	2	5	70	37	53	74	38	24	...	...	1	...	24	42	8	24	841	1,659	818	...	
Residence Areas ...	20	20	4	32	1	5	10	6	55	55	4	4	...	...	12	11	45	49	2	2	6	5	...	...	34	38	...	...	...	...	496	448	12	...	
Business Areas ...	21	21	11	22	13	10	7	4	5	5	2	2	12	11	1	2	88	46	12	12	26	22	...	...	6	6	2	2	...	...	430	391	...	39	
Machinery Areas ...	7	7	3	2	...	...	8	5	6	6	2	2	6	5	1	1	2	2	2	3	3	...	...	...	9	10	1	1	...	...	84	80	...	4	
Tailings Areas ...	4	5	...	...	...	...	2	2	2	2	...	...	5	3	...	...	2	5	3	...	...	...	...	9	3	1	2	...	...	60	67	7	...		
Garden Areas ...	22	23	3	5	1	2	2	3	...	...	...	...	4	3	...	...	13	14	14	1	2	3	...	...	3	3	15	11	...	...	180	189	9	...	
Washing Areas ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

\* No returns received.

In 1906 there was an increase of 340 in the number of Prospecting Areas held as compared with 1905, and this year the number is greater by 818 than in 1906;

these areas are not surveyed, but the acreage held is about 18,069 acres.

TABLE 15.—*Miners' Rights issued during 1906 and 1907.*

PLACE OF ISSUE.	Miners' Rights.		Consolidated Miners' Rights.		PLACE OF ISSUE.	Miners' Rights.		Consolidated Miners' Rights.	
	1906.	1907.	1906.	1907.		1906.	1907.	1906.	1907.
Albany ...	7	9	...	...	Marble Bar ...	406	516	1	...
Ashburton ...	7	68	...	...	Menzies ...	312	233	...	...
Black Range ...	509	456	...	...	Mount Magnet ...	138	226	...	...
Broad Arrow ...	234	201	...	...	Mount Malcolm ...	307	338	1	...
Broome ...	15	1	...	...	Mount Morgans ...	160	123	...	...
Bulong ...	99	60	...	...	Nannine ...	310	242	...	...
Bunbury ...	9	3	...	...	Newcastle ...	1	7	...	...
Busselton ...	5	6	...	...	Norseman ...	248	183	...	...
Carnarvon ...	18	26	...	...	Northam ...	4	...	...	...
Collie ...	2	5	...	...	Northampton ...	17	75	...	...
Coolgardie ...	577	488	...	...	Nullagine ...	86	70	...	...
Cue ...	414	366	...	...	Peak Hill ...	71	59	...	...
Davyhurst ...	156	120	...	...	Perth ...	225	194	...	...
Derby ...	59	47	...	...	Phillips River ...	297	262	...	...
Esperance ...	27	...	...	...	Port Hedland ...	51	36	...	...
Geraldton ...	11	1	...	...	Roebourne ...	62	152	...	...
Greenbushes ...	536	458	3	3	Southern Cross ...	203	132	...	...
Kalgoorlie ...	937	736	...	...	Wagin ...	79	8	...	...
Kanowna ...	396	257	...	...	Williams ...	3	3	...	...
Katanning ...	17	12	...	...	Wyndham ...	4	9	...	...
Kimberley ...	43	49	...	...	Yalgoo ...	87	145	...	...
Kookynie ...	355	299	...	...	York ...	1	68	...	...
Kurnalpi ...	31	41	...	...					
Laverton ...	374	225	...	...					
Lawlers ...	197	148	...	...					
						8,107	7,163	5	3

NOTE.—Since 1st March, 1904, Business Licenses, Mining Licenses, Consolidated Mining Licenses, and Quarry Licenses have ceased to be issued by the Department.

TABLE 16.

*Number and Acreage of Miners' Homestead Leases in force on 31st December, 1906 and 1907.*

Goldfield.	District.	1906.		1907.		Increase.		Decrease.	
		Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.
Greenbushes ...	...	2	30	6	460	4	430	...	...
Pilbara ...	Marble Bar ...	2	25	2	25	...	...	...	...
	Nullagine ...	1	20	1	20	...	...	...	...
Dundas ...	...	19	823	18	773	...	...	1	50
Broad Arrow ...	...	4	100	5	600	1	500	...	...
Yilgarn ...	...	7	115	9	155	2	40	...	...
	Mt. Morgans ...	4	80	7	140	3	60	...	...
Mt. Margaret ...	Mt. Malcolm ...	12	2,319	13	2,324	1	5	...	...
	Mt. Margaret ...	9	500	9	500	...	...	...	...
	Cue ...	9	1,418	7	719	...	...	2	699
Murchison ...	Day Dawn ...	11	110	13	155	2	45	...	...
	Nannine ...	16	1,984	18	2,007	2	23	...	...
Yalgoo ...	...	1	200	1	200	...	...	...	...
Coolgardie ...	...	41	4,236	44	4,316	3	80	...	...
	Kunanalling ...	1	20	1	20	...	...	...	...
East Coolgardie ...	...	55	2,675	60	2,743	5	68	...	...
Phillips River ...	...	58	4,348	99	6,646	41	2,298	...	...
Peak Hill ...	...	12	2,320	11	1,840	...	...	1	480
North-East Coolgardie ...	Kanowna ...	19	355	18	345	...	...	1	10
	Menzies ...	8	639	9	633	1	...	...	6
	Yerilla ...	1	10	1	10	...	...	...	...
North Coolgardie ...	Niagara ...	5	385	7	405	2	20	...	...
	Ularring ...	...	...	1	20	1	20	...	...
East Murchison ...	...	4	610	5	1,110	1	500	...	...
	Black Range ...	6	1,190	10	1,548	4	358	...	...
		307	24,512	375	27,714	73	4,447	5	1,245

As compared with the year 1906, there is an increase in the number of leases by 68, and in acreage by 3,202 acres.

## PART IV.—MEN EMPLOYED.

TABLE 17.

Average Number of Men engaged in Mining during 1906 and 1907.

Goldfield.	District.	Reef or Lode.		Alluvial.		Total.	
		1906.	1907.	1906.	1907.	1906.	1907.
1. Kimberley ...		1	...	15	9	16	9
2. Pilbara ...	{ Marble Bar ...	71	45	32	31	103	76
	{ Nullagine ...	54	63	15	14	69	77
3. West Pilbara ...		8	11	52	49	60	60
4. Ashburton ...		...	...	8	5	8	5
5. Gascoyne ...		...	...	...	...	...	...
6. Peak Hill ...		53	124	11	8	64	132
7. East Murchison ...	{ Lawlers ...	818	750	51	64	869	814
	{ Black Range ...	524	834	146	130	670	964
	{ Cue ...	380	468	14	16	394	484
8. Murchison ...	{ Nannine ...	283	272	113	80	396	352
	{ Day Dawn ...	750	710	17	25	767	735
	{ Mt. Magnet ...	170	191	9	7	179	198
9. Yalgoo ...		102	85	17	31	119	116
10. Mt. Margaret ...	{ Mt. Morgans ...	388	384	43	44	431	428
	{ Mt. Malcolm ...	1,048	1,032	38	50	1,086	1,082
	{ Mt. Margaret ...	760	725	40	40	800	765
	{ Menzies ...	543	549	9	3	552	552
11. North Coolgardie ...	{ Ularring ...	410	406	48	43	458	449
	{ Niagara ...	538	384	25	22	563	406
	{ Yerrilla ...	334	299	36	36	370	335
12. Broad Arrow ...		243	285	105	74	348	359
13. North-East Coolgardie ...	{ Kanowna ...	629	529	99	82	728	611
	{ Bulong ...	138	100	123	106	261	206
	{ Kurnalpi ...	33	48	15	21	48	69
14. East Coolgardie ...		5,965	5,752	31	60	5,996	5,812
15. Coolgardie ...	{ Coolgardie ...	1,089	950	110	58	1,199	1,008
	{ Kunanalling ...	243	228	58	49	301	277
16. Yilgarn ...		443	371	5	4	448	375
17. Dundas ...		327	319	31	15	358	334
18. Phillips River ...		106	80	2	3	108	83
19. Donnybrook ...		...	...	...	...	...	...
State generally		157	64	...	...	157	64
<b>Total Gold Mining ...</b>		<b>16,608</b>	<b>16,058</b>	<b>1,318</b>	<b>1,179</b>	<b>17,926</b>	<b>17,237</b>
<b>MINERALS OTHER THAN GOLD.</b>							
Tin ...	{ Greenbushes M.F. ...	...	...	*393	*512	393	512
	{ Marble Bar D. ...	...	...	*497	*491	497	491
	{ Mt. Morgans D. ...	34	89	...	...	34	89
	{ Phillips River G.F. ...	259	358	...	...	259	358
	{ Menzies D. ...	1	8	...	...	1	8
	{ Nannine D. ...	1	7	...	...	1	7
	{ Yalgoo G.F. ...	1	11	...	...	1	11
Copper ...	{ Marble Bar D. ...	...	1	...	...	...	1
	{ West Pilbara G.F. ...	...	130	...	...	...	130
	{ Day Dawn D. ...	...	2	...	...	...	2
	{ Mt. Margaret D. ...	...	1	...	...	...	1
	{ East Coolgardie G.F. ...	...	2	...	...	...	2
	{ Northampton M.F. ...	...	1	...	...	...	1
	{ State generally ...	...	1	...	...	...	1
Lead ...	{ Northampton M.F. ...	...	8	...	...	...	8
Limestone ...	{ Cue D. ...	...	1	...	...	...	1
Coal ...	{ Collie River M.F. ...	307	253	...	...	307	253
Tantalite ...	{ Marble Bar D. ...	10	...	...	...	10	...
<b>Total—Other Minerals ...</b>		<b>613</b>	<b>873</b>	<b>890</b>	<b>1,003</b>	<b>1,503</b>	<b>1,876</b>
<b>GRAND TOTAL ...</b>		<b>17,221</b>	<b>16,931</b>	<b>2,208</b>	<b>2,182</b>	<b>19,429</b>	<b>19,113</b>

\* Classified elsewhere as employed at mines.

Compared with the years 1906 and 1907, there has been a decrease of 316 men engaged in mining. This decrease is principally attributable to gold-mining, wherein the number of men employed is less by 689 than in 1906; the men working reefs and lodes

having decreased by 550, and alluvial by 139. In mining for minerals the number of men employed is greater by 373, those working copper showing an increase of 334, and tin 113.



TABLE 18.  
Average Number of Men employed at Mines during 1907.

Mineral.	Above Ground.	Under Ground.	Total.	Percentage of total men employed.	Increase or decrease compared with 1906.
Tin ... ..	*808	195	1,003	5.59	+ 113
Coal ... ..	74	179	253	1.41	- 54
Copper ... ..	296	315	611	3.41	+ 315
Gold ... ..	7,113	8,945	16,058	89.54	- 550
Lead ... ..	5	3	8	.04	+ 8
Limestone ... ..	1	...	1	.01	+ 1
Tantalite ... ..	...	...	...	...	- 10
Total ... ..	8,297	9,637	17,934	100.00	- 177

\*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 mine owners. The percentage employed on gold and mines or employed on wages, and is compiled from coal mines shows a decrease; on other mines an increase returns regularly furnished to the Department by

TABLE 19.  
Average Number of Men employed at Gold Mines during 1907, 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 1906.	Percentage of total men employed.	
					1906.	1907.
1. Kimberley ... ..	...	...	...	- 1	.01	...
2. Pilbara ... ..	51	57	108	- 17	.75	.67
3. West Pilbara ... ..	7	4	11	+ 3	.04	.07
4. Ashburton ... ..	...	...	...	...	...	...
5. Gascoyne ... ..	...	...	...	...	...	...
6. Peak Hill ... ..	62	62	124	+ 71	.32	.77
7. East Murchison ... ..	805	779	1,584	+ 242	8.08	9.86
8. Murchison ... ..	706	935	1,641	+ 58	9.53	10.22
9. Yalgoo ... ..	44	41	85	- 17	.61	.53
10. Mt. Margaret ... ..	1,026	1,115	2,141	- 55	13.22	13.34
11. North Coolgardie ... ..	658	980	1,638	- 187	10.09	10.20
12. Broad Arrow ... ..	117	168	285	+ 42	1.46	1.77
13. North-East Coolgardie ... ..	245	432	677	- 123	4.82	4.22
14. East Coolgardie ... ..	2,522	3,230	5,752	- 213	35.92	35.82
15. Coolgardie ... ..	431	747	1,178	- 154	8.02	7.33
16. Yilgarn ... ..	196	175	371	- 72	2.67	2.31
17. Dundas ... ..	145	174	319	- 8	1.97	1.99
18. Phillips River ... ..	34	46	80	- 26	.64	.50
19. Donnybrook ... ..	...	...	...	...	...	...
State generally ... ..	64	...	64	- 93	.95	.40
Total ... ..	7,113	8,945	16,058	- 550	100.00	100.00

The above table shows that the number of men employed on gold mines, excluding alluvial workers, decreased to the extent of 550, but this is partly compensated for by an increase in the number of men working tin and copper. The principal decreases are

in East Coolgardie, North Coolgardie (which is attributable to the closing down of the Cosmopolitan mine), Coolgardie, and North-East Coolgardie. The principal increases are in East Murchison and Murchison.

TABLE 20.  
Alluvial Gold Workers.

Goldfield.	1906.	1907.	Increase or decrease compared with 1906.
1. Kimberley ... ..	15	9	- 6
2. Pilbara ... ..	47	45	- 2
3. West Pilbara ... ..	52	49	- 3
4. Ashburton ... ..	8	5	- 3
5. Gascoyne ... ..	...	...	...
6. Peak Hill ... ..	11	8	- 3
7. East Murchison ... ..	197	194	- 3
8. Murchison ... ..	153	128	- 25
9. Yalgoo ... ..	17	31	+ 14
10. Mt. Margaret ... ..	121	134	+ 13
11. North Coolgardie ... ..	118	104	- 14
12. Broad Arrow ... ..	105	74	- 31
13. North-East Coolgardie ... ..	237	209	- 28
14. East Coolgardie ... ..	31	60	+ 29
15. Coolgardie ... ..	168	107	- 61
16. Yilgarn ... ..	5	4	- 1
17. Dundas ... ..	31	15	- 16
18. Phillips River ... ..	2	3	+ 1
19. Donnybrook ... ..	...	...	...
Total ... ..	1,318	1,179	- 139

The number of alluvial gold workers decreased by 139, the only increases being in the Yalgoo and Mt. Margaret fields. The North-East Coolgardie goldfield still heads the list with 209 men, followed by the East

Murchison goldfield with 194, Mt. Margaret 134, Murchison 128, Coolgardie 107, and North Coolgardie 104.

TABLE 21.

Table containing Extracts from Awards delivered by the Court of Arbitration and Industrial Agreements made between Parties in Gold Mining Industrial Disputes, showing the Daily Wage, etc., provided for in each Award or Agreement in force on 31st December, 1907.

Locality in which Award or Agreement has effect.	Date of Award or Agreement.	Term.	Rock-drill men and Chuck men in shafts.			Rock-drill men and Chuck men in rises.			Rock-drill men and Chuck men elsewhere.			Miners (Hammer and Drill men).		Miners (wet ground) extra allowance.	Bracemen and Platmen.	Shipmen.	Mullockers and Shovelers.	Truckers filling and trucking.	Men working in Cyanide Vats and Filter-presses.	Timbermen.	Surface Labourers.	Boiler Cleaners.	Horse-driver (including looking after horses).	Drill and Tool Sharpeners.	Mechanics' Labourers.	Oilers and Greasers.	Riggers.	Firemen.	Pipe Fitters (under ground).	Pitmen.	Fitters, Turners, and Blacksmiths.	Patternmakers.	Engine-drivers.					Hours of work per week.			
			Main Shaft.	All other classes of Engines.	Overtime.			Men on Surface.	Underground men.																																
					Up to 4 hours.	After 4 hours.	Sunday.																																		
			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.	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.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Black Range ...	17th May, 1907 ...	From 1st June, 1907, to 31st May, 1910	...	...	...	15 0	14 0	13 4	...	1 3	13 6	...	12 0	12 0	13 10	15 0	11 8	14 0	12 8	14 4	...	...	...	...	...	...	...	15 0	...	...	...	...	...	...	...	...	...	...	...	48	47
*Cue-Nannine ...	17th October, 1904 ...	From 29th July, 1904, to 30th January, 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
Higginsville ...	5th October, 1906 ...	From 1st November, 1906, to 1st May, 1909	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 ...	31st August, 1907 ...	From 31st August, 1907, to 30th June, 1909	14 4	13 10	13 4	11 8	...	...	11 8	...	11 0	11 0	11 8	13 4	10 0	...	...	...	10 0	10 6	...	11 8	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	48	47
Peak Hill ...	6th December, 1906 ...	From 1st October, 1906, to 1st October, 1909	15 0	14 6	13 10	13 0	...	1 3	12 6	...	11 10	11 10	12 6	13 10	11 4	13 0	12 4	14 3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	48	47
Wiluna ...	6th December, 1906 ...	From 1st January, 1907, to 1st January, 1910	15 6	15 0	14 4	13 6	...	1 3	13 0	13 0	12 4	12 4	13 0	14 4	11 10	13 6	12 10	14 9	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	48	47

\* Industrial Agreement.

† Although term has expired the agreement remains in force until retired from.

## PART V.—ACCIDENTS.

TABLE 22.

*Men killed and injured in Mining Accidents during 1906 and 1907.*

Goldfield.	Killed.		Injured.		Total Killed and Injured.	
	1906.	1907.	1906.	1907.	1906.	1907.
1. Kimberley ... ..	...	...	...	...	...	...
2. Pilbara ... ..	1	...	1	1	2	1
3. West Pilbara ... ..	...	...	...	2	...	2
4. Ashburton ... ..	...	...	...	...	...	...
5. Gascoyne ... ..	...	...	...	...	...	...
6. Peak Hill ... ..	...	...	...	2	...	2
7. East Murchison ... ..	4	5	14	30	18	35
8. Murchison ... ..	6	8	24	28	30	36
9. Yalgoo ... ..	...	...	...	...	...	...
10. Mt. Margaret ... ..	7	8	33	29	40	37
11. North Coolgardie ... ..	1	2	11	4	12	6
12. North-East Coolgardie ... ..	2	...	9	6	11	6
13. Broad Arrow ... ..	...	2	3	2	3	4
14. East Coolgardie ... ..	14	12	335	246	349	258
15. Coolgardie ... ..	4	1	9	12	13	13
16. Yilgarn ... ..	1	1	1	5	2	6
17. Dundas ... ..	...	1	4	7	4	8
18. Phillips River ... ..	...	1	...	...	...	1
19. Donnybrook ... ..	...	...	...	...	...	...
<b>MINING DISTRICTS.</b>						
Northampton ... ..	...	2	...	...	...	2
Yandanooka ... ..	...	...	...	...	...	...
Greenbushes ... ..	...	1	3	4	3	5
Collie ... ..	...	1	32	13	32	14
Total ... ..	40	45	479	391	519	436

During the year 1907 forty-five fatal accidents occurred as against 40 in 1906. The number of men injured shows a decrease of 88 as compared with the preceding year. Full details as to the accidents for the year will be found in the report of the State Mining Engineer herein.

TABLE 23.

*Deaths from Accidents at Mines during 1906 and 1907.*

Kind of Mines.	1906.						1907.					
	Number of Persons killed.			Death Rate per 1,000 Persons employed.			Number of Persons killed.			Death Rate per 1,000 Persons employed.		
	Above Ground.	Under Ground.	Total.	Above Ground.	Under Ground.	Total.	Above Ground.	Under Ground.	Total.	Above Ground.	Under Ground.	Total.
Coal Mines ... ..	...	...	...	...	...	...	...	1	1	...	5.58	3.95
Men employed ... ..	...	...	...	(71)	(236)	(307)	...	...	...	(74)	(179)	(253)
Gold Mines ... ..	8	31	39	1.07	3.38	2.35	8	33	41	1.12	3.68	2.55
Men employed ... ..	...	...	...	(7,444)	(9,164)	16,608	...	...	...	(7,113)	(8,945)	(16,058)
Other Mines ... ..	...	1	1	...	3.29	.84	...	3	3	...	5.84	1.85
Men employed ... ..	...	...	...	(892)	(304)	(1,196)	...	...	...	(1,110)	(513)	(1,623)
Total for all Mines	8	32	40	0.95	3.30	2.21	8	37	45	0.96	3.83	2.51
Total number of men employed	...	...	...	8,407	9,704	18,111	...	...	...	8,297	9,637	17,934

With two exceptions, all fatal accidents during the year occurred in gold mines. The death rate per 1,000 persons employed in gold mines was 2.55 as against 2.35 for the preceding year.

TABLE 24.

Deaths from Accidents in Gold Mines during 1907, and the Death Rate per 1,000 Men employed, and per 1,000 tons of Gold Ore raised during 1906 and 1907.

GOLDFIELD.	Number of Deaths.			Death rate per 1,000 Men employed.				Number of Deaths per 1,000 tons of Gold Ore Raised.	
	1907.			1907.			1906.	1907.	1906.
	Above Ground.	Under Ground.	Total.	Above Ground.	Under Ground.	Total.	Total.		
1. Kimberley ... ..	...	...	...	...	...	...	...	...	...
2. Pilbara ... ..	...	...	...	...	...	...	...	...	...
3. W. Pilbara ... ..	...	...	...	...	...	...	...	...	...
4. Ashburton ... ..	...	...	...	...	...	...	...	...	...
5. Gascoyne ... ..	...	...	...	...	...	...	...	...	...
6. Peak Hill ... ..	...	...	...	...	...	...	...	...	...
7. East Murchison ... ..	1	4	5	1.24	5.13	3.15	2.98	.02	.02
8. Murchison ... ..	...	8	8	...	8.55	4.87	3.78	.025	.02
9. Yalgoo ... ..	...	...	...	...	...	...	...	...	...
10. Mt. Margaret ... ..	3	5	8	2.92	4.48	3.73	3.19	.02	.02
11. North Coolgardie ... ..	...	2	2	...	2.04	1.22	.54	.01	.005
12. Broad Arrow ... ..	...	2	2	...	11.90	7.01	...	.05	...
13. North East Coolgardie ... ..	...	...	...	...	...	...	2.50	...	.03
14. East Coolgardie ... ..	3	9	12	1.18	2.78	2.08	2.34	.01	.01
15. Coolgardie ... ..	...	1	1	...	1.33	.84	3.00	.01	.03
16. Yilgarn ... ..	...	1	1	...	5.71	2.69	2.25	.02	.02
17. Dundas ... ..	...	1	1	...	5.74	3.13	...	.03	...
18. Phillips River ... ..	1	...	1	29.41	...	12.50	...	.27	...
19. Donnybrook ... ..	...	...	...	...	...	...	...	...	...
Totals and Averages ... ..	8	33	41	1.12	3.68	2.55	2.35	.013	.01

The number of deaths per 1,000 tons of gold ore raised shows a slight increase, being .013, as against .01 for the preceding year.

	1906.		1907.		Comparison with 1906.	
	Fatal.	Serious.	Fatal.	Serious.	Fatal.	Serious.
1. Explosions ... ..	6	13	3	14	- 3	+ 1
2. Falls of Ground ... ..	17	81	22	64	+ 5	- 17
3. In Shafts ... ..	3	33	8	28	+ 5	- 5
4. Miscellaneous Underground ... ..	11	227	4	183	- 7	- 44
5. Surface ... ..	3	125	8	102	+ 5	- 23
Total ... ..	40	479	45	391		

#### PART VI.—STATE AID TO MINING.

##### STATE BATTERIES.

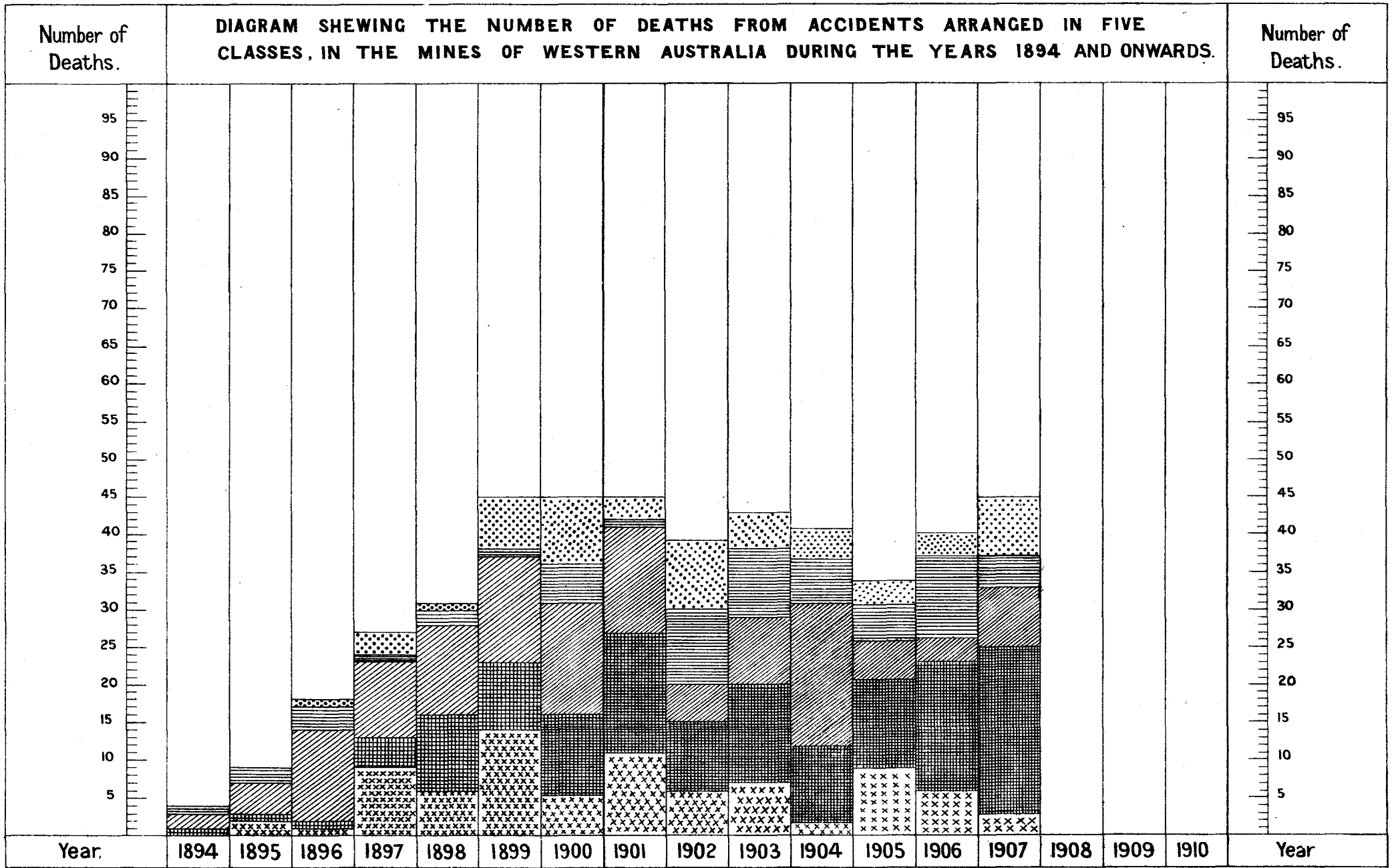
The number of State batteries remains the same as in 1906, viz., 29. During the year the plant at Duketon was dismantled with the object of removing and re-erecting it at Black Range, and a new plant was erected at Nannine. The number of cyanide plants in operation is 21, and in addition there are slimes plants at Mulline, Niagara, and Norseman, the two latter erected during the year. There are two tin dressing plants at Greenbushes, and in the coming year the plant at the Bunbury end will be increased by the addition of a Huntington mill, now at Yundamindera, whence it will be removed.

To the end of 1907, since the first State battery was started, gold and tin to the value of £2,089,071 have been recovered at State owned plants; 505,286 tons of gold ore, producing gold to the value of £2,036,156 having been treated, and 31,166 tons of tin ore, producing tin to the value of £52,915. In

addition, gold to the value of £254,065 has been recovered by cyanide treatment, and £23,101 from slimes.

In 1902, 39,517 tons of gold ore were treated at State batteries; the tonnage increased annually until in 1905, 85,018 tons were treated, while 95,831 tons were treated during 1906, and 95,279 tons during 1907.

The revenue from all State plants, including tin dressing plants, was £91,274 during 1907, and the working expenditure was £91,351; to the latter must be added £1,622 spent in additions and improvements, leaving a net working loss of £1,699. The plants used for the treatment of gold ore only, show a loss on crushing of £8,724, and a profit on cyaniding and slimes treatment of £8,457, and expenditure from revenue in improvements and additions amounted to £1,622, leaving a net working loss of £1,889. To the end of 1907, the capital expenditure on State



EXPLOSIVES.

FALLS OF GROUND.

IN SHAFTS.

MISCELLANEOUS UNDERGROUND.

ON SURFACE.

batteries and tin dressing plants was £237,029, and the working expenses exceeded the receipts by £9,991.

The report of the Metallurgist and Engineer, who controls State batteries, will be found in this volume, and in it there is full information as to the year's operations.

#### WATER SUPPLY.

Although for many years past the main mining centres on the goldfields have been fairly supplied with water, the prospector is pushing further afield, and water supplies must be provided for new centres, and the supplies to the older districts increased to provide water for batteries and other mining machinery. New roads and stock routes must be selected and kept open, and existing wells and other watering places maintained. Work of this nature has fully occupied the Mines Water Supply officers during the year, and detailed statements of the work done will be found attached to the report of the Engineer for Mines Water Supply, and a short summary is as follows:—

Number of bores put down, 102, with an aggregate depth of 9,309 feet.

Wells sunk, 25, with an aggregate depth of 1,598 feet.

Sixty-four wells have been improved in various ways by deepening, driving, re-lining, and providing better surface equipment. One reservoir and three tanks, with an aggregate capacity of 22¾ million gallons, have been completed.

Several important pumping installations for supplying water for mining and domestic purposes have been completed; the longest pipe line being those supplying Leonora, Gwalia, Paddington, Ravenshorpe, and Norseman.

#### GEOLOGICAL SURVEY.

The year was a busy one for the Government Geologist and staff, and the results of their investigations are contained in the Government Geologist's report appearing elsewhere.

Geological examinations were made of the country between the Gascoyne and Roebourne, at Cue, Day Dawn, Cuddingwarra, Bonnievale, Kunanalling, Kintore, and Carbine districts, also Black Range, and Greenbushes (not yet completed). A topographical survey of Greenbushes was effected, and one of Phillips River is at present in hand.

Reports were furnished on the following:—The question of artesian water boring in the Murchison, Gascoyne, and Kimberley districts; the possibility of obtaining artesian water along the coastal belt, between the Gascoyne and Ashburton Rivers; boring for coal at Depot Hill, on the Irwin River, and Eradu, on the Greenough River; a dam site at Kelmescott, in connection with the Metropolitan Water Supply; the Mt. Malcolm copper mines; deep boring at Fraser's mine, at Southern Cross; guano deposits at Watheroo; reported gold discoveries at Mundijong; wolfram and tin finds at York, and copper deposits at Yandanooka. In addition, numerous reports on alienation of mineral lands, and applications for assistance under the Mining Development Act. In the Geological Laboratory a large number of assays were made, the figures being considerably in excess of those for the preceding year. Five geological Bulletins were issued during the year.

#### ASSISTANCE UNDER THE MINING DEVELOPMENT ACT, 1902.

The following statement shows the sums advanced during the year 1907, under the provisions of the Mining Development Act:—

	£	s.	d.
Advances in aid of mining work ..	6,749	0	0
Advances in aid of boring ..	350	3	10
Advances in aid of crushing plants	1,000	0	0
Subsidies to provide crushing plants .. .. .	2,300	11	0
Purchase of boring plants ..	2,490	16	2
Providing means of transport ..	1,052	19	11
<b>Total ..</b>	<b>£13,943</b>	<b>10</b>	<b>11</b>

In addition to the above, amounts totalling £7,832 11s. 4d. 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, drainage, timber tramways, and subsidies for development work done below the 100 feet level in small mines.

Subsidies to the extent of £2,300 11s. were given to private crushing plants, the conditions being that they crushed for the public at fixed rates, in most cases conditions being imposed as to treating or purchasing tailings. The number of tons of stone crushed at these plants during the year was 38,143 tons.

The receipts under the Mining Development Act, exclusive of interest payments, amount to £824 1s. 3d., made up as follows:—

	£	s.	d.
Refunds of advances ..	624	2	11
Sales of plant .. ..	199	18	4

Further particulars are given in the report of the State Mining Engineer.

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

##### ASHBURTON GOLDFIELD.

The output of gold for this field during the year was 143 fine ozs., and for the preceding year 278 fine ozs.; a decrease of 135 fine ozs.

Increased activity in prospecting has been noted, but sufficient time has not elapsed to judge of the results.

A considerable amount of attention has been devoted to mining for the baser metals with encouraging results, and the outlook is considered promising.

##### BROAD ARROW GOLDFIELD.

The output of gold for the year was 21,907 fine ozs., and for the preceding year, 21,511 fine ozs.; an increase of 396 fine ozs.

The only portion of this field where any activity was displayed was at Ora Banda, in which locality a number of leases for fresh ground and several Prospecting Areas were taken up. In the other parts of the field there were no developments worthy of note, and nothing to indicate the likelihood of any marked progress during the coming year.

##### COLLIE MINING DISTRICT.

The output of coal during the year was 142,373 tons, and for the preceding year 149,755 tons, a de-

crease of 7,382 tons. This decrease is the result of a curtailment of the orders by the Railway Department, on which in a great measure the output depends. It has been noted, however, that the private consumption of Collie coal is increasing.

Three serious accidents occurred, one of which was fatal.

#### COOLGARDIE GOLDFIELD.

The output of gold during the year was 60,810 fine ozs., as against 64,030 for the preceding year; a decrease of 3,220 fine ozs.

The number of Prospecting Areas taken up shows an increase, and throughout the field mining has been active. A large amount of gold was won by tributers from the historical Bayley's mine, amounting to £15,000 worth for the six months ending November.

In the Lord Bobs, Widgiemooltha, and Higginsville districts, prospecting has been vigorously pursued. At Kunanalling and Jourdie Hills the outlook is much brighter. The prospects for the whole field are very promising.

#### DONNYBROOK GOLDFIELD.

As anticipated there has not been any revival in mining on this field during the year. The advisability of abolishing this goldfield is under consideration.

#### DUNDAS GOLDFIELD.

The output of gold during the year was 23,602 fine ozs., and for the preceding year 20,435 fine ozs.; an increase of 3,167 fine ozs.

Mining in this field has made steady progress. On most of the mines good developmental work has been carried out, and the indications for the future point to increased prosperity.

The construction of the railway from Coolgardie is now in hand, and on its reaching Norseman, it is hoped that the result will give a marked impetus to the mining industry consequent on the reduction of costs.

#### EAST COOLGARDIE GOLDFIELD.

The output of gold for the year was 937,239 fine ozs., and for the preceding year 989,357 fine ozs.; a decrease of 52,118 fine ozs.

In the mines in the immediate vicinity of Kalgoorlie and Boulder, the developments at the lower levels have mostly continued to be satisfactory.

At the North end of the field mining has for the greater part been confined to prospecting efforts at shallow depths.

A discovery of deep alluvial was made near the suburb of Belgravia, but with the exception of the prospectors claim, no payable run of wash has been met with.

In the outside localities, developments of the Waterfall leases have been exceptionally good, but no other finds of any importance have been reported.

The outlook of this field is considered to be as good as ever.

#### EAST MURCHISON GOLDFIELD.

The output of gold for the year was 119,207 fine ozs., and for the preceding year 95,771 fine ozs.; an increase of 23,436 fine ozs.

In the Lawlers District there has been an improvement, which promises to continue; this is also the

case in the Black Range district, throughout which prospecting has been vigorously pursued, and the outlook for this field is most encouraging.

#### GASCOYNE GOLDFIELD.

This field is still practically deserted, excepting for a few dryblowers at Bangemall, and owing to the distance of this locality from the head quarters of the Warden, no particulars of the result of their operations can be obtained, and no gold has been reported.

#### GREENBUSHES MINERAL FIELD.

The output of black tin for the year was 770 tons, valued at £73,045, and for the preceding year 783 tons, valued at £79,195; a decrease of 13 tons, valued at £6,150.

The average number of men engaged in mining during the year was 512, but at the close of the year it is estimated 458 were so employed, being 57 less than at the end of 1906; this is accounted for by their having left the field consequent on the fall in the price of tin, which rendered many low-grade claims unpayable; this also accounts for the slight decrease in the output, which must be considered very satisfactory, seeing that the production for 1906 was far ahead of any previous year.

This field to 31st December, 1907, has produced a total of 6,283.20 tons of tin, valued at £434,850.

Two dredges were installed during the year, and several initial difficulties having been overcome, they now appear to be giving satisfaction, and the owners look forward to a good run during the year 1908.

An important departure was the commencement of the sinking of a shaft to a depth of 200 feet to prospect the lode on Mineral Lease 300, known as the South Cornwall; this venture is being liberally assisted by the Government, and the work so far done gives encouraging prospects. The discovery of a payable lode will assure the permanency of the field.

It is hoped and anticipated that the slight depression now existent, consequent on the fall in tin values, will disappear during the coming year.

#### KIMBERLEY GOLDFIELD.

The output from this field was 337 fine ozs., and for the preceding year 166 fine ozs.; an increase of 171 fine ozs.

Mining on this field, with the exception of a little alluvial mining, is practically at a standstill, there being only one mine working (the Ruby Queen). Alluvial is worked principally at Dry Creek, an old working situated about 40 miles North-East of Hall's Creek, and at the Brockman, about 10 miles South-South-East of Hall's Creek; at the latter spot some nice slugs were unearthed during the year. While the high prices for copper ruled some Prospecting Areas were applied for, and a few good assay results obtained, but immediately on the fall in values, interest died out. The remoteness of the field and the high prices for cartage to and from the coast, together with the cost of living, militate against much activity in prospecting; but in the coming year a well equipped party intend to set out to examine the country in the vicinity of Tanama, about 250 miles South-East of Hall's Creek. The result of the trip will be awaited with considerable interest.

## MOUNT MARGARET GOLDFIELD.

The output for the year was 169,466 fine ozs., and for the preceding year 166,259 fine ozs.; an increase of 3,207 fine ozs.

Copper ore to the amount of 5,144.37 tons, valued at £58,914 was also raised.

Although very little prospecting has been done away from the settled centres, a good deal of attention has been bestowed upon old and abandoned ground, in many instances with satisfactory results.

Generally, developments in most of the mines have been exceedingly satisfactory, and in all the districts mining has progressed.

The increase in the output of this field is most satisfactory, and its future is regarded as very encouraging.

## MURCHISON GOLDFIELD.

The output for the year was 169,398 fine ozs., and for the preceding year 182,396 fine ozs.; a decrease of 12,998 fine ozs.

In the Day Dawn District, copper to the extent of 31.71 tons, valued at £274 was raised.

Mining operations have been quiet, but a good deal of prospecting and development work has been done.

The centres of Meekatharra, Yallowgindat, Bar-rambie, Errols, Mindoolah, and Cuddingwarra, all give promise of a prosperous future.

At Mt. Magnet there was steady progress, which it is hoped will continue.

The outlook for this field is a good one.

## NORTHAMPTON AND YANDANOOKA MINERAL FIELDS.

The improvement in these fields chronicled in last year's Report, and which was consequent on the high prices ruling for base metals, did not continue, as the result of the fall in values.

At Northampton there are indications of a revival, and the undertaking of vigorous prospecting during the coming year. Ten tons of lead ore were raised, valued at £128.

There is practically nothing doing at Yandanooka.

## NORTH COOLGARDIE GOLDFIELD.

The output for the year was 86,791 fine ozs., and for the preceding year 110,957 fine ozs.; a decrease of 24,166 fine ozs.

Copper ore amounting to 1.42 tons, valued at £18, was raised.

In the Menzies District mining has been active, and the output satisfactory. Many of the mines owned by companies have been worked on tribute, and the tributers have done well.

The copper mine at Goongarrie, mentioned in last year's Report, did not develop up to expectations, and the company owning it has gone into liquidation.

At Comet Vale several shows are looking promising. The Mt. Ida centre had a prosperous year.

At the Menzies Consolidated mine, at Yunndaga, the erection of additional machinery and the sinking of the new main shaft was continued. This mine and the centre give great promise.

At Hill View prospecting has been continued, but nothing sensational has so far resulted.

In the Ularring District developments have not been satisfactory, and there is nothing to justify a prediction of any marked change during the coming year.

The Niagara District shows a decrease in the output, largely accounted for by the closing down of the Cosmopolitan mine.

A revival in the locality known as Desdemona gives indication of a good future.

In the Yerilla District there was renewed activity at Linden, which results have so far justified.

At Edjudina, although the output was not as good as in the past, developments are most promising.

Yundamindera has been quiet, but the acquisition of some leases by a Victorian company may give the locality a further test.

The prospects at Pingin and Yerilla are good, but Yarri has not come up to expectations.

On the whole this field promises well.

## NORTH-EAST GOOLGARDIE GOLDFIELD.

The output for the year was 35,130 fine ozs., and for the preceding year 44,573 fine ozs.; a decrease of 9,443 fine ozs.

In the Bulong District very little progress has been made. A new 10-head battery was erected on G.M. Lease 1005 Y, about eight miles North of the town, and the crushings so far are satisfactory, but the lessee has been somewhat hampered for a water supply, which he hopes shortly to overcome. On the Queen Margaret mine work was principally done by tributers.

In the Kanowna District nothing eventuated of any note.

In the Kurnalpi District fair prospects for deep alluvial were reported, but nothing permanent was located.

At Mulgabbie some very rich specimens were obtained from G.M. Lease 263 K, which were secured for display at the forthcoming Franco-British Exhibition.

There is nothing to indicate any marked improvement in this field during the coming year.

## PEAK HILL GOLDFIELD.

The output for the year was 8,111 fine ozs., and for the preceding year 2,008 fine ozs.; an increase of 6,103 fine ozs.

Operations at the Peak Hill Goldfield, Ltd., were resumed and continued during the year with encouraging prospects. In the outside centres matters still remain very quiet.

## PHILLIPS RIVER GOLD AND MINERAL FIELD.

The output of gold for the year was 4,314 fine ozs., and for the preceding year 2,780 fine ozs.; an increase of 1,534 fine ozs.

The production of copper was 10,414.57 tons, valued at £57,273, and for the preceding year 2,885 tons, valued at £25,270: an increase of 7,529.57 tons, valued at £32,003.

The activity reported at the commencement of the year, as a consequence of the high price ruling for copper was, owing to a fall in prices, not maintained.

At Kundip there are now four batteries at work, and good progress is being made.



It is expected that the completion of the railway, now in course of construction, will result in a reduction of treatment costs, and consequent increased prosperity.

#### PILBARA GOLDFIELD.

The output of gold for the year was 10,043 fine ozs., and for the preceding year 5,712 fine ozs.; an apparent increase of 4,331 fine ozs., but as the output in previous years was understated by 5,228 fine ozs., which have been included this year, there is actually a decrease of 897 fine ozs.

Copper ore to the amount of 7.77 tons, valued at £190, was also raised, and 853.69 tons of black tin, valued at £85,603, as against 712 tons, valued at £78,449, for the preceding year.

*Marble Bar District.*—In Marble Bar and the immediate vicinity very little has been done.

At Warrawoona there has been a slight renewal of activity. Talga Talga was the scene of a small alluvial rush, but nothing sensational was unearthed. At Bamboo, Western Shaw, and Tambourah, a little work was done; at Lallarookh none; whilst at Sharks about a dozen alluvial prospectors were working. Yandicoogina was practically deserted.

*Tin Mining.*—At Moolyella, the activity at the beginning of the year was considerable, but the decrease in values caused a great falling off. At Cooglegong and the Shaw, the slump was not so marked as they had not been boomed, and consequently mining has been more steady. At Wodgina matters are quiet.

There was no output of tantalite owing to the absence of any market for this metal.

*Copper Mining.*—There has not been any marked advance in copper mining.

*Asbestos.*—During the year considerable attention has been paid to the mining of asbestos, good deposits of which are supposed to exist.

Deposits of silver, lead, antimony, and tungsten ores are known, but no active attention has been given them.

*Nullagine District.*—There has been no marked progress in gold mining.

In September a discovery of copper was reported from Brown Creek, 80 miles South-East of Nullagine, and the assay of samples gave good results, but the

great distance from market and low price of the metal have caused a suspension of work for the present.

It is hoped that the construction of a railway from the coast, and the consequent reduction in the high freights now obtaining throughout the whole of the field will result in considerable improvement in mining matters generally.

#### WEST PILBARA GOLDFIELD.

The output for the year was 464 fine ozs., and for the preceding year 749 fine ozs.; a decrease of 285 fine ozs.

Copper ore to the extent of 3,365.50 tons, valued at £63,548, was produced, but none during the preceding year.

The outlook of this field is considered promising.

#### YALGOO GOLDFIELD.

The output for the year was 4,371 fine ozs., and for the preceding year 4,450 fine ozs.; a decrease of 79 fine ozs.

Ten tons of copper ore, valued at £130, were raised.

There was an improvement for the year as compared with the preceding one; the Leases applied for and Miners' Rights issued showing an increase.

Mining generally was quiet, with the exception of Messenger's Patch, where an alluvial rush took place in June, which was responsible for the finding of some gold-bearing reefs; the alluvial is, however, about worked out.

At Wadgingarra, a copper-mining centre, some activity was shown, but presumably owing to the low price ruling for this metal, no great progress has been made. There are no indications, however, from which to predict any great progress during the coming year.

#### YILGARN GOLDFIELD.

The output for the year was 19,292 fine ozs., and for the preceding year 23,547 fine ozs.; a decrease of 4,255 fine ozs.

There has been no marked improvement, but in several of the outlying centres vigorous prospecting has been pursued. There are no indications on which to safely base a prediction as to the future outlook.



## PART VIII.—EXISTING LEGISLATION.

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

- (1.) The Mining Act, 1904.
- (2.) The Sluicing and Dredging for Gold Act, 1899.
- (3.) The Mines Regulation Act, 1906.
- (4.) The Coal Mines Regulation Act, 1902.
- (5.) The Mining Development Act, 1902.

The Mines Regulation Act, 1906, passed during the preceding year, came into operation on the 1st June, 1907, and the Regulations thereunder were gazetted as applicable throughout the portion of the State South of the 24th parallel of latitude from the 1st June, 1907, and throughout the remainder of the State from the 1st July, 1907.

## PART IX.—INSPECTION OF MACHINERY.

The provisions of the Inspection of Machinery Act, 1904, which came into operation on the 1st March, 1905, have been slightly altered since last report. Certain classes of machinery which were not definitely specified in Schedule 2 of the Act, have been included by Order in Council, whilst small plants such as electric and other motors under one horse power have been exempted.

There has been an amendment of the Engine-drivers' Regulations, which now permit of the interchange of certificates with those of the other States of the Commonwealth.

The number of steam boilers registered at the end of 1907 was 3,257, as against 3,178 at the close of 1906; 2,244 thorough inspections were made, and 1,962 certificates were granted.

The total number of machinery plants registered at the end of the year was 2,442, as against 2,064 for the corresponding period of last year; 1,921 inspections were made, and 1,856 certificates granted; an increase of 378 registrations and 296 inspections for the year.

Twenty-one boilers were constructed in the State during 1907, showing an increase of 5 over last year's local manufacture.

The boilers and machinery of 42 vessels registered under the Inspection of Machinery Act and Navigation Act respectively have been surveyed during the year, showing 12 in excess of the number recorded for 1906.

Engine-drivers' examinations were held at Kalgoorlie, Menzies, Malcolm, Cue, and Bunbury, in April and October; in Perth during January, April, July, and October; and at Lawlers, Albany, and Ravens-thorpe in October.

The following return shows the number of certificates granted to engine-drivers during the 12 months ended 31st December, 1907:—

First Competency .. ..	15
Second Competency .. ..	26
Third Competency .. ..	67
First Service .. ..	<i>Nil</i>
Second Service .. ..	3
Third Service .. ..	19
Locomotive Traction Competency	21
Locomotive and Traction Service	11
Traction Competency .. ..	2
Traction Service .. ..	1
Marine Competency .. ..	5
Marine (without examination) ..	8
Interim .. ..	15
Copies of Certificates and Boat Licenses .. ..	18
Total .. ..	211

In carrying out inspection and other work, an approximate distance of 49,495 miles was travelled, the greater part by horse and trap.

## PART X.—SCHOOL OF MINES.

The Director reports that the past year, which is the 4th of the School, has been one of progress. The number of students has increased. Provision has been made for the conduct of all the classes required in the full diploma course, and several of the more advanced students have obtained highly remunerative positions as a consequence of their training at the School.

The attendance at classes has been well maintained throughout the year, and the examination results, although not up to the standard of the preceding year, show that good work has been accomplished, and indicate earnestness on the part of the staff in promoting the welfare of the School.

It is gratifying to record that the first student to obtain the Associateship of the School (Mr. Solomon I. Beech) has been appointed Metallurgist and Manager of one of the up-country mines, and his employers have expressed their satisfaction at the manner in which he has conducted their affairs.

The system of free assays has been continued. A total of 496 assays and determinations of minerals was made.

A museum for the display of minerals and rock samples was opened in December, and attracted a large number of interested spectators, who expressed their appreciation of the wisdom of the provision of

such a valuable aid to the mining man and the prospector. Valuable donations of mineral and rock samples have been received from Mt. Bischoff, Broken Hill, and other parts of Australia, and the mine managers of Western Australia have liberally responded

to a request for samples illustrative of the mineral occurrences of the State.

Full details of the work of the School will be found in the Report of the Director, appearing at page 191 herein.

## PART XI.—DEPARTMENTAL.

TABLE 26.

*Summary of Revenue for Years 1906 and 1907.*

	1906.			1907.		
	£	s.	d.	£	s.	d.
Mines (Revenue under Mining Act) ... ..	45,319	7	9	43,805	5	11
Geological Survey ... ..	167	4	9	124	5	8
State Batteries ... ..	90,836	17	4	91,815	3	0
Water Supply (Mines) ... ..	9,227	14	11	12,534	0	7
Purchase and Treatment of Copper Ore ... ..	27,327	4	1	203	1	6
Mining School... ..	732	16	0	777	6	9
Explosives and Analytical ... ..	3,299	12	2	3,287	0	7
Inspection of Machinery ... ..	5,012	5	6	4,943	16	10
	£181,923	2	6	£157,490	0	10

The above return excludes Gwalia Hotel revenue. These figures show all revenue belonging to their respective years, although not brought to account in the Treasury Books prior to the closing of the year.

Omitting the figures relative to the purchase and treatment of Copper ore for both years, the revenue for 1907 shows a slight increase.

TABLE 27.

*Return showing Revenue collected under the Mining Act and Expenditure in Administration, including the Mines Regulation Act and Development of Mining, for Years 1906 and 1907.*

FIELD.	Revenue, 1906.			Revenue, 1907.			Expenditure, 1906.			Expenditure, 1907.						
	£	s.	d.	Percentage of gross Revenue, 1906.	£	s.	d.	Per centage of gross Revenue, 1907.	£	s.	d.	Percentage of gross Expenditure, 1906.	£	s.	d.	Percentage of gross Expenditure, 1907.
Ashburton ..	62	8	0	.137	457	8	11	1.04	3	15	6	.008	7	0	0	.01
Broad Arrow ..	1,160	16	0	2.56	1,144	9	2	2.61	570	10	3	1.21	512	9	2	1.07
Coolgardie ..	3,847	5	8	8.49	2,986	19	11	6.84	3,015	0	7	6.40	2,769	6	6	5.78
East Coolgardie ..	4,608	15	8	10.17	4,381	14	3	10.00	3,016	7	4	6.402	3,505	12	2	7.31
North Coolgardie ..	5,299	17	0	11.70	4,628	13	5	10.57	3,986	14	2	8.49	3,445	0	6	7.19
N. E. Coolgardie ..	2,628	8	5	5.80	1,854	7	5	4.23	1,446	18	5	3.07	1,018	11	2	2.13
Dundas ..	1,184	5	3	2.62	947	0	10	2.16	954	19	2	2.03	832	12	0	1.74
Gascoyne ..	4	14	0	.001	6	16	0	.02	11	0	0	.023				
Kimberley ..	39	13	6	.087	42	0	6	.09	24	18	1	.052	75	0	0	.16
Mt. Margaret ..	6,127	17	11	13.52	5,696	15	5	13.00	3,152	9	4	6.69	3,234	10	2	6.75
Murchison ..	5,818	12	4	12.84	5,357	8	3	12.23	4,001	2	4	8.495	4,659	17	10	9.72
East Murchison ..	4,634	11	3	10.23	5,239	2	2	11.96	2,038	4	2	4.33	3,532	17	1	7.37
Peak Hill ..	743	1	4	1.64	557	13	11	1.28	728	10	4	1.55	803	0	11	1.67
Pilbara ..	1,374	0	11	3.03	1,326	8	9	3.03	1,760	2	7	3.74	2,167	18	5	4.52
West Pilbara ..	475	17	3	1.05	1,137	15	7	2.60	24	0	9	.05	84	6	2	.18
Yalgoo ..	567	19	3	1.255	719	4	5	1.64	499	10	6	1.06	315	10	0	.66
Yilgarn ..	1,276	15	6	2.82	977	5	9	2.23	715	1	7	1.52	810	17	11	1.69
Phillips River ..	1,834	5	4	3.98	1,489	7	3	3.40	1,369	9	1	2.91	1,482	3	5	3.09
Collie ..	880	10	9	1.94	1,917	1	6	4.37	148	3	10	.30	167	9	10	.35
Northampton ..	227	0	6	.50	321	1	5	.73	100	13	4	.21	148	2	5	.31
Greenbushes ..	1,643	0	7	3.62	1,493	19	9	3.41	647	18	6	1.37	894	13	0	1.87
Head Office ..	909	11	4	2.01	1,122	11	4	2.56	18,879	13	11	40.09	17,465	0	1	36.43
	45,319	7	9	100.00	43,805	5	11	100.00	47,095	3	9	100.00	47,931	18	9	100.00

TABLE 28.

Comparative Return showing Revenue collected during the Years 1906 and 1907 by Departments under control of the Minister for Mines.

Districts.	MINING.									
	Gold Mining.						Other Minerals.			
	Lease Rentals.		Other Rentals.		All other Sources.		Lease Rentals.		Other Rentals.	
	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Perth Head Office—Registrar (includes sundry offices)	24 0 0	13 17 6	122 10 0	81 17 6	58 6 0	130 18 4	249 10 0	333 3 2	25 19 0	32 5 0
Perth Head Office (Machinery)	..	..	..	..	..	..	..	..	..	..
Do. (Water Supply)	..	..	..	..	..	..	..	..	..	..
Do. (Explosives)	..	..	..	..	..	..	..	..	..	..
Do. (Geological)	..	..	..	..	..	..	..	..	..	..
Broad Arrow	686 9 0	703 17 0	222 15 6	223 5 3	107 15 0	63 3 6	1 5 0	8 1 8	..	..
Coolgardie	2,484 2 6	1,865 4 11	501 7 2	478 13 3	198 11 3	218 3 2	14 0 0	3 2 1	..	..
E. Coolgardie—Kalgoorlie	3,173 17 0	2,898 2 1	546 1 3	535 15 9	239 19 8	244 15 8	17 5 6	28 11 0	..	..
N. Coolgardie—Menzies	..	..	..	..	..	..	..	..	..	..
Mulwarrie	3,341 12 3	2,916 6 3	741 8 6	623 9 6	328 1 7	208 9 8	9 5 0	35 8 9	..	..
Kookynie	..	..	..	..	..	..	..	..	..	..
N.E. Coolgardie—Kanowna	..	..	..	..	..	..	..	..	..	..
Bulong	1,541 8 3	1,224 0 11	365 19 10	214 18 6	171 6 10	100 12 0	..	0 15 0	..	..
Collie	..	..	0 15 0	..	0 2 0	..	470 7 0	1,355 16 6	..	2 5 0
Dundas	657 15 9	520 3 1	183 8 0	161 14 6	77 11 6	55 8 6	1 10 0	2 0 0	..	..
Greenbushes	..	..	..	..	..	..	308 6 1	399 0 10	271 4 0	268 8 11
Mt. Margaret—Laverton	..	..	..	..	..	..	..	..	..	..
Mt. Malcolm	3,970 14 5	3,670 4 6	970 19 0	816 19 4	308 12 10	282 5 3	37 10 9	72 18 10	..	0 10 0
Mt. Morgans	..	..	..	..	..	..	..	..	..	..
Murchison—Cue	..	..	..	..	..	..	..	..	..	..
Mt. Magnet	3,076 15 6	2,912 6 11	720 2 3	603 8 6	416 13 7	355 4 0	20 17 6	44 5 1	..	..
Nannine	..	..	..	..	..	..	..	..	..	..
E. Murchison—Lawlers	..	..	..	..	..	..	..	..	..	..
Black Range	2,750 11 9	3,064 12 2	558 12 6	511 6 3	261 4 0	489 8 6	..	7 15 6	..	..
Peak Hill	418 1 4	368 3 5	156 3 6	153 5 0	21 19 6	10 13 6	..	..	..	..
Phillips River	351 14 6	434 18 7	134 1 6	115 19 0	34 12 6	35 3 0	265 19 4	340 12 8	6 0 0	22 15 0
Yalgoo	272 0 0	314 2 6	140 8 2	108 18 3	10 5 6	38 9 2	..	36 15 0	..	0 10 0
Yilgarn	698 4 0	574 2 9	194 1 0	149 4 9	88 4 6	59 14 0	..	..	..	..
State Smelter—Ravensthorpe	..	..	..	..	..	..	..	..	..	..
Kalgoorlie School of Mines	..	..	..	..	..	..	..	..	..	..
Pilbara—Marble Bar	..	..	..	..	..	..	..	..	..	..
Nullagine	401 16 0	193 8 7	320 18 2	415 3 6	39 16 6	37 11 6	150 2 3	181 18 7	23 12 6	9 15 0
W. Pilbara—Roebourne	53 10 9	223 8 3	77 7 0	4 10 0	1 6 0	3 9 0	124 16 6	309 2 10	22 11 0	103 3 9
Northampton	..	..	..	0 5 0	..	3 2 6	90 3 6	130 16 11	3 5 0	22 15 0
Kimberley—Hall's Creek	13 0 0	13 0 0	22 10 0	27 0 0	0 10 0	1 10 0	..	..	..	..
Gascoyne—Carnarvon	..	..	4 5 0	6 10 0	..	..	..	..	..	..
Ashburton—Onslow	..	32 0 0	20 2 6	2 12 6	1 5 0	0 12 6	12 10 0	140 0 5	..	30 2 6
Total	23,915 13 0	21,942 19 5	6,003 15 11	5,234 16 4	2,366 4 9	2,338 13 9	1,774 8 5	3,430 4 10	352 11 6	492 10 2

TABLE 28—continued.

Comparative Return showing Revenue collected during the Years 1906 and 1907 by Departments under control of the Minister for Mines—continued.

Districts.	MINING.									
	Other Minerals.		Other.		Survey Fees.		Exemption Fees.		Examination Fees.	
	All other Sources.									
	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Perth Head Office—Registrar (includes sundry offices)	6 10 6	18 13 0	46 9 7	43 14 4	325 18 9	398 0 0	27 17 6	68 15 0	18 0 0	..
Perth Head Office (Machinery)	..	..	4 10 0	1 7 6	..	..	..	..	..	..
Do. (Water Supply)	..	..	..	..	..	..	..	..	..	..
Do. (Explosives)	..	..	..	..	..	..	..	..	..	..
Do. (Geological)	..	..	..	..	..	..	..	..	..	..
Broad Arrow	..	1 0 0	5 11 6	4 1 9	116 0 0	107 10 0	21 0 0	33 10 0	..	..
Coolgardie	2 10 0	2 5 0	7 17 3	12 1 6	443 0 0	291 10 0	195 17 6	116 0 0	..	..
E. Coolgardie—Kalgoorlie	..	1 10 0	30 12 3	44 17 3	287 17 6	310 0 0	313 2 6	318 2 6	..	..
N. Coolgardie—Menzies	..	..	..	..	..	..	..	..	..	..
Mulwarrie	..	3 0 0	12 16 0	11 8 3	588 10 0	601 6 0	278 3 8	229 5 0	..	..
Kookynie	..	..	..	..	..	..	..	..	..	..
N.E. Coolgardie—Kanowna	..	..	..	..	..	..	..	..	..	..
Bulong	..	..	7 1 0	3 18 6	385 0 0	120 10 0	157 12 6	189 12 6	..	..
Collie	233 10 9	435 19 0	1 2 0	1 6 0	10 0 0	11 0 0	164 14 0	110 15 0	..	..
Dundas	..	..	6 12 6	5 12 3	158 10 0	157 0 0	98 17 6	45 2 6	..	..
Greenbushes	186 14 6	206 17 0	11 3 6	5 15 6	686 10 0	352 10 0	179 2 6	261 7 6	..	..
Mt. Margaret—Laverton	..	..	..	..	..	..	..	..	..	..
Mt. Malcolm	..	..	..	..	..	..	..	..	..	..
Mt. Morgans	4 15 0	21 2 6	13 9 11	18 13 0	573 0 0	459 2 0	248 15 0	355 0 0	..	..
Murchison—Cue	..	..	..	..	..	..	..	..	..	..
Mt. Magnet	..	..	..	..	..	..	..	..	..	..
Nannine	0 7 6	4 12 6	18 8 0	24 15 9	1,186 8 0	864 13 0	379 0 0	548 2 6	..	..
E. Murchison—Lawlers	..	..	..	..	..	..	..	..	..	..
Black Range	..	0 5 0	11 8 0	14 4 9	801 0 0	919 0 0	251 15 0	232 10 0	..	..
Peak Hill	..	..	1 4 6	0 14 6	20 10 0	20 0 0	125 2 6	4 17 6	..	..
Phillips River	47 0 0	51 8 0	8 14 0	7 3 0	857 10 0	358 3 0	98 13 6	123 5 0	..	..
Yalgoo	0 9 6	2 0 0	1 1 0	2 9 6	70 10 0	161 0 0	73 5 0	55 0 0	..	..
Yilgarn	..	..	4 16 0	3 19 3	232 10 0	150 0 0	59 0 0	40 5 0	..	..
State Smelter—Ravensthorpe	..	..	..	..	..	..	..	..	..	..
Kalgoorlie School of Mines	..	..	..	..	..	..	..	..	..	..
Pilbara—Marble Bar	..	..	..	..	..	..	..	..	..	..
Nullagine	22 0 6	41 8 7	6 19 0	8 3 0	239 10 0	263 0 0	169 6 0	176 0 0	..	..
W. Pilbara—Roebourn	3 12 6	69 8 6	3 8 6	3 8 3	167 10 0	253 10 0	21 15 0	167 15 0	..	..
Northampton	8 16 0	35 2 0	0 11 0	2 10 9	114 10 0	108 19 3	9 15 0	17 10 0	..	..
Kimberley—Hall's Creek	..	..	0 13 6	0 10 6	3 0 0	..	..	..	..	..
Gascoyne—Carnarvon	..	..	0 9 0	0 6 0	..	..	..	..	..	..
Ashburton—Onslow	2 12 6	19 16 0	0 18 0	1 7 6	17 0 0	211 10 0	7 0 0	18 7 6	..	..
Total	518 19 3	914 7 1	205 16 0	222 8 7	7,284 4 3	6,118 3 3	2,879 14 8	3,111 2 6	18 0 0	..

TABLE 28—continued.

Comparative Return showing Revenue collected during the Years 1906 and 1907 by Departments under control of the Minister for Mines—continued.

Districts.	Total Mining Revenue.		Government Geologist and Assayer.		State Batteries.		Water Supply.		Mining School Fees.	
	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Perth Head Office—Registrar (includes sundry offices)	905 1 4	1,121 3 10	..	..	..	48 7 7	..	..	..	..
Perth Head Office—(Machinery)	4 10 0	1 7 6	..	..	..	..	9,227 14 11	12,534 0 7	..	..
Do. (Water Supply)	..	..	..	..	..	..	..	..	..	..
Do. (Explosives)	..	..	167 4 9	124 5 8	..	..	..	..	..	..
Do. (Geological)	..	..	..	..	..	..	..	..	..	..
Broad Arrow	1,160 16 0	1,144 9 2	..	..	1,561 6 9	978 10 9	..	..	..	..
Coolgardie	3,847 5 8	2,986 19 11	..	..	5,122 12 0	6,170 0 1	..	..	..	..
E. Coolgardie—Kalgoorlie	4,608 15 8	4,381 14 3	..	..	..	..	..	..	..	..
N. Coolgardie—Menzies	..	..	..	..	37,145 17 6	29,374 7 3	..	..	..	..
Mulwarrie	5,299 17 0	4,628 13 5	..	..	..	..	..	..	..	..
Kookynie	..	..	..	..	..	..	..	..	..	..
N.E. Coolgardie—Kanowna	..	..	..	..	1,267 15 7	502 10 2	..	..	..	..
Bulong	2,628 8 5	1,854 7 5	..	..	..	..	..	..	..	..
Collie	880 10 9	1,917 1 6	..	..	..	..	..	..	..	..
Dundas	1,184 5 3	947 0 10	..	..	3,659 17 1	9,092 8 3	..	..	..	..
Greenbushes	1,643 0 7	1,493 19 9	..	..	2,555 2 5	2,486 9 1	..	..	..	..
Mt. Margaret—Laverton	..	..	..	..	13,417 4 1	9,547 16 8	..	..	..	..
Mt. Malcolm	6,127 17 11	5,696 15 5	..	..	..	..	..	..	..	..
Mt. Morgans	..	..	..	..	..	..	..	..	..	..
Murchison—Cue	..	..	..	..	11,112 14 3	17,130 9 6	..	..	..	..
Mt. Magnet	5,818 12 4	5,357 8 3	..	..	..	..	..	..	..	..
Nannine	..	..	..	..	..	..	..	..	..	..
E. Murchison—Lawlers	..	..	..	..	12,275 4 11	14,483 2 1	..	..	..	..
Black Range	4,634 11 3	5,239 2 2	..	..	..	..	..	..	..	..
Peak Hill	743 1 4	557 13 11	..	..	603 15 8	299 2 6	..	..	..	..
Phillips River	1,804 5 4	1,489 7 3	..	..	..	..	..	..	..	..
Yalgoo	567 19 3	719 4 5	..	..	..	..	..	..	..	..
Yilgarn	1,276 15 6	977 5 9	..	..	245 4 3	..	..	..	..	..
State Smelter—Ravensthorpe	..	..	..	..	..	..	..	..	732 16 0	777 6 9
Kalgoorlie School of Mines	..	..	..	..	..	..	..	..	..	..
Pilbara—Marble Bar	..	..	..	..	1,870 2 10	1,701 19 1	..	..	..	..
Nullagine	1,374 0 11	1,326 8 9	..	..	..	..	..	..	..	..
W. Pilbara—Roebourne	475 17 3	1,137 15 7	..	..	..	..	..	..	..	..
Northampton	227 0 6	321 1 5	..	..	..	..	..	..	..	..
Kimberley—Hall's Creek	39 13 6	42 0 6	..	..	..	..	..	..	..	..
Gascoyne—Carnarvon	4 14 0	6 16 0	..	..	..	..	..	..	..	..
Ashburton—Onslow	62 8 0	457 8 11	..	..	..	..	..	..	..	..
<b>Total</b>	<b>45,319 7 9</b>	<b>43,805 5 11</b>	<b>167 4 9</b>	<b>124 5 8</b>	<b>90,836 17 4</b>	<b>91,815 3 0</b>	<b>9,227 14 11</b>	<b>12,534 0 7</b>	<b>732 16 0</b>	<b>777 6 9</b>

TABLE 28—continued.

Comparative Return showing Revenue collected during the Years 1906 and 1907 by Departments under control of the Minister for Mines—continued.

Districts.	Chief Inspector of Explosives and Government Analyst.		Inspection of Machinery Act.		State Smelter.		Totals.		Increase or Decrease for 1907 as compared with 1906.	
	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.	Increase.	Decrease.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Perth Head Office—Registrar (includes sundry offices)	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	905 1 4	1,169 11 5	264 10 1	.. ..
Perth Head Office (Machinery)	.. ..	.. ..	2,222 13 0	2,168 7 4	.. ..	.. ..	2,227 3 0	2,169 14 10	.. ..	57 8 2
Do. (Water Supply)	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	9,227 14 11	12,534 0 7	3,306 5 8	.. ..
Do. (Explosives)	3,299 12 2	3,287 0 7	.. ..	.. ..	.. ..	.. ..	3,299 12 2	3,287 0 7	.. ..	12 11 7
Do. (Geological)	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	167 4 9	124 5 8	.. ..	42 19 1
Broad Arrow	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	2,722 2 9	2,122 19 11	.. ..	599 2 10
Coolgardie	.. ..	.. ..	45 5 0	.. ..	.. ..	.. ..	9,015 2 8	9,157 0 0	41 17 4	.. ..
E. Coolgardie—Kalgoorlie	.. ..	.. ..	1,507 0 0	1,492 6 1	.. ..	.. ..	6,115 15 8	5,874 0 4	.. ..	241 15 4
N. Coolgardie—Menzies	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..
Mulwarrie	.. ..	.. ..	29 0 0	.. ..	.. ..	.. ..	42,474 14 6	34,003 0 8	.. ..	8,471 13 10
Kookynie	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..
N.E. Coolgardie—Kanowna	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..
Bulong	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	3,896 4 0	2,356 17 7	.. ..	1,539 6 5
Collie	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	880 10 9	1,917 1 6	1,036 10 9	.. ..
Dundas	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	4,844 2 4	10,039 9 1	5,195 6 9	.. ..
Greenbushes	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	4,198 3 0	3,980 8 10	.. ..	217 14 2
Mt. Margaret—Laverton	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..
Mt. Malcolm	.. ..	.. ..	659 17 6	659 5 11	.. ..	.. ..	20,204 19 6	15,903 18 0	.. ..	4,301 1 6
Mt. Morgans	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..
Murchison—Cue	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..
Mt. Magnet	.. ..	.. ..	403 5 0	462 2 6	.. ..	.. ..	17,334 11 7	22,950 0 3	5,615 8 8	.. ..
Nannine	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..
E. Murchison—Lawlers	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..
Black Range	.. ..	.. ..	123 5 0	137 0 0	.. ..	.. ..	17,033 1 2	19,859 4 3	2,826 3 1	.. ..
Peak Hill	.. ..	.. ..	22 0 0	24 15 0	.. ..	.. ..	1,368 17 0	881 11 5	.. ..	487 5 7
Phillips River	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1,804 5 4	1,489 7 3	.. ..	314 18 1
Yalgoo	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	567 19 3	719 4 5	151 5 2	.. ..
Yilgarn	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1,521 19 9	977 5 9	.. ..	544 14 0
State Smelter—Ravensthorpe	.. ..	.. ..	.. ..	.. ..	27,327 4 1	203 1 6	27,327 4 1	203 1 6	.. ..	27,124 2 7
Kalgoorlie School of Mines	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	732 16 0	777 6 9	44 10 9	.. ..
Pilbara—Marble Bar	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..
Nullagine	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	3,244 3 9	3,028 7 10	.. ..	215 15 11
West Pilbara—Roebourne	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	475 17 3	1,137 15 7	661 18 4	.. ..
Northampton	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	227 0 6	321 1 5	94 0 11	.. ..
Kimberley—Hall's Creek	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	39 13 6	42 0 6	2 7 0	.. ..
Gascoyne—Carnarvon	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	4 14 0	6 16 0	2 2 0	.. ..
Ashburton—Onslow	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	62 8 0	457 8 11	395 0 11	.. ..
Total	3,299 12 2	3,287 0 7	5,012 5 6	4,943 16 10	27,327 4 1	203 1 6	181,923 2 6	157,490 0 10	19,737 7 5	44,170 9 1
									Decrease	24,433 1 8



## CORRESPONDENCE.

TABLE 29.

*Letters, Telegrams, etc., despatched during 1907.*

Branch.	Letters.	Telegrams.	Circulars and Advices.	Statistics and Publications.	Total.
Analytical and Explosives	2,330	66	228	300	2,624
Accountant	6,820	138	4,800	...	11,758
Correspondence	7,450	1,132	2,940	12,200	11,522
Drafting	210	3	...	3,694	213
Geological Survey	1,325	59	...	4,464	1,384
Inspection of Machinery	6,602	272	70	46	6,944
Mines Water Supply	3,355	649	342	...	4,346
Registration	7,846	620	...	387	8,466
State Batteries	4,164	418	3,187	...	7,769
Statistical	250	172	540	4,800	962
Survey	588	40	...	...	628
	40,940	3,569	12,107	25,891	56,616

\*The figures in this column are not included in the totals column

*Inward Correspondence.*

Branch.	1906.	1907.
<i>Correspondence Registered.</i>		
Correspondence	8,500	7,680
Analytical and Explosives	1,979	1,985
Geological Survey	1,520	1,550
Mines Water Supply	3,779	4,676

By comparison with 1906, as appearing at page 31 of the 1906 Departmental Report, it will be seen that, with regard to letters, telegrams, etc., despatched, there is a decrease of 242, against the decrease of 2,209 for the year 1906.

The following tables furnish a statement of the number of surveys executed for the Department of Mines during the years 1906 and 1907:—

TABLE 30.

*Surveys of Leases, Areas, etc., exclusive of Groups of Business and Residence Lots.*

	1906.		1907.	
	No.	Area.	No.	Area.
Surveys on Eastern Goldfields	498	acres. 6,674	435	acres. 6,159
Surveys on Central Goldfields	334	4,408	344	4,840
Surveys on all other Fields	289	7,815	223	5,977
	1,121	18,897	1,002	16,976

TABLE 31.

*Business and Residence Areas in Groups.*

1906.		1907.	
No.	Cost.	No.	Cost.
668	£ s. d. 669 6 7	455	£ s. d. 539 0 2

TABLE 32.  
*Surveys of Roads, Connection Traverses, etc.*

	1906.			1907.						
			Cost.			Cost.				
	m.	c.	£	s.	d.	m.	c.	£	s.	d.
Eastern Goldfields ... ..	58	52	229	14	6	34	77	51	11	2
Central Goldfields ... ..	102	60	507	7	0	17	14	57	4	8
Other Fields ... ..	3	16	6	19	2	21	68	81	2	9
	164	48	744	0	8	73	79	189	18	7

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

Department of Mines,  
 Perth, 31st March, 1908.

H. S. KING,  
 Under Secretary for Mines.

## DIVISION II.

### *Report of the State Mining Engineer for the Year 1907.*

*The Secretary for Mines Perth.*

Sir,

For the information of the Hon. the Minister for Mines, I have the honour to submit the following Report of the work of this office for the year 1907.

*Inspection of Mines under "The Mines Regulation Act, 1895" (with amendments), "The Mines Regulation Act, 1906," and "The Coal Mines Regulation Act, 1902."*

On the 1st of June, 1907, "The Mines Regulation Act, 1906," came into force, superseding previous legislation. The new Act and Regulations appear to have met with general appreciation from the mining community on the whole.

During the year Inspector Lightly retired from the service owing to his age. Pending final classification of the offices of Inspector of Mines by the Public Service Commissioner, Messrs. E. K. Beaumont and H. Colbran were appointed temporarily as Inspectors of Mines, the former for the Mt. Margaret district, the latter for the East Murchison district, and Mr. S. Cullingworth was appointed Relieving Inspector and Inspector for the Greenbushes, Phillips River, and Northampton Fields. The number of inspectors remains the same as in the previous year. A redistribution of some of the districts has, however, been effected to better equalise the work, and enable more frequent inspection to be made of all the mines of the State. A new district has been made of the East Murchison Field, with headquarters at Lawlers, taking in Wiluna and Black Range, and the Mt. Margaret inspectorate, having thus been relieved of its northern portion, has been extended south to Niagara. The Menzies inspector's district has also been correspondingly moved southwards to take in the Broad Arrow Goldfield, and part of the North-East Coolgardie field, the remainder of this being worked from Kalgoorlie. The Kanowna Inspector's office has thus been abolished, and its work divided between the Inspectors at Menzies and Kalgoorlie.

Reports have been received from the Inspectors of Mines for the year 1907, the substance of which is contained in the following excerpts:—

#### PILBARA AND WEST PILBARA GOLD-FIELD.

The Acting Inspector of Mines, Mr. P. C. Riches, reports, on the 18th January, 1908:—

"Early in the year the prospects of the field never looked better, the high price of metals having attracted a much larger population than had hitherto existed, with the result that the various tin and copper fields were in a flourishing condition. At Moolyella alone, some six hundred men were profitably employed, and the Cooglegong and Wodgina tinfields were being

Office of the State Mining Engineer,  
Mines Department, Perth, 31st March, 1908.

actively worked. At Whim Creek, the Whim Well copper mine was engaged in mining, and shipping rich ore, and various copper shows in the vicinity of Croyden and Roebourne were all working very rich lodes.

"At Mallina and at the Pewah crossing antimony was being worked, and near Roebourne a silver lead mine was being developed. A considerable quantity of tantalite was also being sent away from Wodgina. Around Nullagine and Mosquito Creek the usual number of steady gold-producing mines were maintaining their output, and in the vicinity of Tambourah preparations were being made to extensively work the asbestos deposits located in that vicinity.

"Unfortunately as the year progressed the prosperous condition of the mining industry that obtained at the commencement of the year did not continue. The principal cause of this has not been that the possibilities of the field have decreased (in fact everything points in the other direction), but to the heavy fall in the price of metals.

"At the commencement of the year tin was quoted at £193 per ton; on the 31st of December its price was £120, a fall of £73 a ton; similarly copper varied from £107 to £62, antimony ore £26 to £14, and lead £20 to £14 a ton; to these facts alone can be attributed the depression that at present exists, still in spite of the adverse circumstances that have prevailed, the output of tin during the past year has been a record one, a total of 853 tons, valued at £86,000 having been won, of this Moolyella contributed 576 tons, Cooglegong 154 tons, and Wodgina 123 tons.

"At Wodgina the Mount Cassiterite Mine has carried out an active policy of development, and the future prospects of the mine looked most favourable. A large ore-dressing plant has been ordered, and is now on the way to the mine, so that the coming year should show a material increase in the output from this centre. During the course of development work at the Mount Cassiterite some large pieces of tin oxide were found, of these the four largest pieces, weighing 872lbs., were secured for exhibition purposes.

"The low price of tantalite has compelled the owners of the tantalite leases to temporarily cease operations, but as soon as the price improves there is a large quantity of this mineral available.

"At the asbestos leases near Tambourah an active policy of development has been commenced. In the deepest shaft, at a depth of 80 feet, the lode is 18 inches wide, containing about 50 per cent. of high grade fibre. Four shafts are being sunk, and in all of them the lode is living down, carrying good fibre. Some magnificent specimens of chrysotile up to eight inches in length were obtained from these leases, and were forwarded to Perth for exhibition purposes.

"At Bamboo Creek, the Bulletin mine has been worked on tribute, and has crushed 230 tons for 500 ounces.

"At Warrawoona, Atkins and party are just finishing a crushing of 500 tons that has every appearance of going three ounces to the ton, this crushing has been obtained from the Klondyke Boulder.

"During the year a couple of small rushes have taken place at Talga Talga, and the Western Shaw. At Talga S. Munn secured two pieces weighing about 12 and 11 ounces respectively, these were also secured for the Franco-British Exhibition.

"At Roebourne, the Porterminna Gold Mining Co. intend to erect a ten-stamp battery, so the coming year should see an increased output from this locality. Leases have also been taken up at the Nicol, and are being worked.

"At Whim Creek the Whim Well Copper mine has been engaged constructing a tramway from Balla Balla to the mine, a distance of about fourteen miles; they are also erecting an ore-dressing plant; when these works are completed it should materially increase the output of this mine, while at the same time considerably lower the costs of working.

"An event of importance during the past year was the visit of the Hon. the Minister for Mines and the State Mining Engineer, accompanied by myself they visited practically the whole of the field, with results that are now well known.

"The decision of Parliament to build a railway line between Port Hedland and Marble Bar has given fresh heart to all engaged in the mining industry. Until this line is built it is practically impossible to work mines on a large scale, the delays and costs of transport being most disheartening. As soon as a commencement is made with the construction, outside capital should come in, and a fresh era of prosperity begin.

"During the year assistance was given to J. Corrin to sink a shaft 200 feet on the All Nations Lease at Nullagine; after a depth of 150 feet was reached, further sinking was stopped by an influx of water; cross-cutting for the reef was commenced, but to date I have not heard the result.

"There have been no fatal accidents during the year, one serious accident happened at Moolyella and two at Whim Creek and Roebourne.

"Several prospecting parties have been equipped with drays, horses, and camels, but at the present time a serious drawback to prospecting is the very dry season we are experiencing; the rainfall for 1907, as recorded at the Marble Bar Post Office, was 9.63 inches, of this 808 points fell in the first three months of the year, so there were only 155 points spread over the last nine months of the year; this approaches drought conditions.

"Boring to locate bore wells between Wodgina and the De Grey River is in progress, and if successful should materially assist prospecting in that locality; similar operations are to be carried out in West Pilbara, to the south of Roebourne.

"With improved prices in the metal market, I think we may anticipate renewed prosperity during the coming year."

#### CENTRAL GOLDFIELDS.

The Report of the Inspector of Mines, Mr. F. J. Lander, is dated 17th February, 1908. He says:—

"For the information of the Minister for Mines, I beg to submit my Annual Report on the Murchison, Peak Hill, and Yalgoo Goldfields for the year 1907.

"Nothing sensational in the way of new finds has occurred during the year in any of the centres. Notwithstanding this, mining still preserves a healthy tone throughout the district.

"The following are some of the mines that call for comment:—

#### CUE DISTRICT.

"*Queen of the May G.M.*—This property is owned by Mr. J. McIntyre. The main shaft is now down to 300ft. During the year the owner has sunk 100ft. and driven 250ft. The daily inflow of water in this mine is about 15,000 gallons per day. From 1,089 tons of ore put through Messrs. Cheeson & Heydon's battery during the year, the return was 1,237.79 fine ounces of gold. The last crushing put through in December gave a return of 107.74 fine ounces for 78 tons.

"*Agamemnon G.M.*—This lease is the property of Mr. E. L. Lloyd. The total crushings put through the battery for the year were 992 tons for 505.47 fine ozs.

#### CUDDINGWARRA.

"*Victoria United G.M.*—The main shaft on this property is now down to a depth of 835ft. The following work has been done up to the present time:—Length of drives, 2,730ft.; cross-cutting, 1,015ft.; winzes, 675ft.; rises, 175ft.

"At the present time new machinery is being erected. The contractors, the Westralian Machinery Corporation, Ltd., expect to have the new plant and poppet legs finished at the end of February, 1908. From 3,358 tons of ore put through their battery during the year, the company has received a yield of 4,009.7 fine ounces of gold; 3,810 tons of sands have been cyanided for a return of 242.27 ounces of gold. From 5.37 tons of concentrates the yield was 15.82 fine ozs.

#### DAY DAWN.

"*Great Fingall G.M.*—The following information may be of interest, which has been kindly supplied by the management:—

Number of stamps running	...	100
Greatest depth of mine	...	1,880ft.
Quantity of shaft sinking done	...	40ft.
Driving	...	2,432ft.
Crosscutting	...	739ft.
Rising	...	2,884ft.
Winzing	...	561ft.
Diamond drilling	...	1,045½ft.
Ore treated	...	261,957 tons.
Accumulated slimes treated	...	3,335 "
" " "	...	1,085 "
Yield of gold over plates	...	56,451.093 fine ozs.
" from sands	...	19,502.630 "
" " slimes	...	4,987.005 "
" " concentrates	...	17,850.071 "
" " accumulations	...	462.628 "

Daily inflow of water about 30,000 gallons per day.  
Quantity of silver or other metals than gold 16,270.019 fine ozs.

Average number of men employed underground	332
" " " surface	278
Cost per ton mined and hauled to the surface	8s. 0.45d.
" of ore treated	7s. 1.76d.

"Developments have proved that the reef in the lower levels is still well defined, although of somewhat lower value than the upper levels.

"*Murchison Associated Rubicon G.M.*—The main shaft on this property is now down to a depth of 817 feet. In the latter part of the year the company have bored 1,337 feet with diamond drill. The total amount of development work done during the year amounts to 794ft. The crushing facilities on this lease

consist of one ten-head battery, and the company is having same put in thorough working order preparatory to starting crushing. During the last year they have added an additional 12 acres, and I believe they are fully determined to thoroughly prospect their property. There are at present employed on this mine 20 men, and the daily inflow of water amounts to about 20,000 gallons.

*"The East Fingall G.M.s.; Ltd.*—The main shaft, 12ft. by 4ft. in the clear, on this property, is down 660 feet. Levels have been opened up at the 250ft., 400ft., 500ft., and 650ft. The old shaft on this property is down 150ft., and levels opened up are at the 60ft., 100ft., and 140ft. The formation consists of quartz, carrying iron and arsenical pyrites. The average daily inflow of water is about 250,000 gallons. It has been known to go so high as 750,000 gallons per day. At the 250ft. level the management met with an underground water course which broke up the reef at that depth. There are 30 men employed on this lease. The company, which has just been reconstructed, intend putting down a certain number of bore holes to further test the lease, and are now waiting for the Government Diamond Drill, which I believe has been promised them after the Murchison Associated Gold Mines, Ltd., have completed their boring operations.

#### LAKE AUSTIN.

*"The Island Eureka G.M.*—The present owners of this mine have done very little in the way of development work owing to the mine having been fairly well opened up by the previous owners, the Eureka G.M. Co. Their work has been chiefly confined to stoping. During the year they have sunk two new shafts—one 50ft. and another about 90ft. On the old shaft sinking has been continued to a depth of 100ft., about 55 feet being on the underlay. The present owners have done a fairly large amount of prospecting work on this lease, but only under difficulties, owing to the cement on the surface. They are of opinion that there exists another reef on this lease which does not correspond with the Eureka stone. Four men have been employed on the lease during the year, and 52 tons crushed gave a return of 230ozs. approximate. There are five head of stamps on this lease, the battery being driven by a gas engine.

"At the present time there is a party taking over the sands on the mine, which they intend to treat. Four men will be employed, and they expect to be engaged about six months on the work. During the two years the owners have been working this lease they have expended £539 on machinery, etc.

#### MOUNT MAGNET.

*"Morning Star G.M.*—The main shaft has been sunk another 100ft. during the year, making a total depth of 412ft. A drive has been extended south at the 400ft. level 160ft., and a drive west 74ft., and a connection between the 300ft. and 400ft. levels has been made by a winze. No development work has been done from the 300ft. level, stoping only being done. Average number of men employed about 68. From 6,325 tons of ore treated, a return of 3,428.44 fine ounces were obtained, about 2,211.93 of which were derived from the sands. There is a ten-head mill on the mine. The daily inflow of water is about 112,000 gallons. £11,804 have been expended during the year in wages.

"During the inception of this company they have put through the battery about 106,187 tons for a yield of £258,500.

*"The St. George G.M.*—About 677ft. of sinking has been done on this lease during the year, and 1,656ft. of driving. The main shaft is now down about 145 feet., and is divided into three compartments. The average number of men employed during the year is 20, and the total amount expended in wages about £3,650. There is a daily inflow of water of 80,000 gallons, approximate. A 10-head battery is being erected with grinding pans, agitators, and Ridgway filters. The power for the mill will be supplied by a 105 B.H.P. Crossley gas engine. The management expect this plant to be at work at the end of March. The total amount crushed during the year amounted to 214 tons, yielding 134.69 fine ozs.

#### BOOGARDIE.

*"The Saturn G.M.*—This mine is held by a local syndicate, and is at present being worked by tributers. The main shaft is down to about 200ft. A cross-cut put in at the 180ft. disclosed ore valued at 7 or 8 dwts. per ton. About 583 tons have been treated for a return of 108 fine ozs. of gold.

*"The Neptune G.M.*—This mine has lately changed hands. Very little underground work has been done. During the year 176 tons were treated for a return of 86 fine ounces approximate.

*"The Invercauld G.M.*—This property is held by Mr. Charles Elliot and party. It is worked on the open-cut system, and during the year they have crushed at the public battery 524.5 tons for a yield of 71.9 fine ounces of gold. There are three men employed on this property.

*"The Brown Hill Extended G.M.*—This lease of six acres has lately been taken up by Mr. Robert Black and party. A shaft has been sunk to a depth of 50ft., from which two crushings were taken. The first of 38 tons gave a return of 1oz. 2dwts. per ton over the plates, and 19dwts. in the sands. The second, a 29-ton crushing went 11½dwts. over the plates, and 9dwts. 18grs. in the sands. This all came from the shaft. No driving has been done on this lease.

*"The Sirdar G.M.*—This is a twelve-acre lease held by a local syndicate. The owners, who are the original prospectors, have unbounded faith in their property, and are working it themselves. The main shaft is down 138ft. During the year they have crushed at the State battery 882 tons for a return of 201.61 fine ozs. of gold. The formation varies from 20ft. to 40ft.

*"The Brownhill North G.M.*—This is a six-acre lease, held by Fidler and party. A shaft has been sunk to a depth of 20ft., and a cross-cut driven 9ft. across the lode, but no wall has yet been touched. About 353 tons have been crushed for a return of 198 fine ozs. of gold. At present four men are working on the property.

#### LENNONVILLE.

*"The Empress G.M.*—This mine was formerly owned by Mr. W. Bray, who abandoned it some time ago. It is now owned by a local syndicate. A new shaft has been sunk 197ft. At the 187ft. they have driven 97ft., and put in a cross-cut 17ft. This work has been done since July, 1907, and before that date the owners were kept going pumping and bailing water from the old workings. During the year the syndicate have expended £1,462 17s. 3d. in wages, and have

employed 12 men during most of the year. The average inflow of water is 2,500 gallons. The machinery on this mine consists of a Cornish boiler, winding engine, oil engine, and pump.

*"The Galtee Moore G.M.*—This is an 18-acre lease held by Messrs. Thring, Warne, and Atkinson. The present owners have crushed during the year 1,062 tons for 337.3 fine ozs. of gold. Altogether some 30,000 tons of ore have been taken out above water level.

*"Dunboyme G.M.*—This property consists of 12 acres, and is owned by C. Gross and A. Green. A shaft has been sunk 50ft. and levels opened up. The formation is about 10ft. wide. The owners have crushed 267 tons for a yield of 40.65 fine ozs. of gold.

#### YALGOO.

*"The Olive Queen Mining Lease, Wadgingarra.*—This is a mineral lease consisting of 94 acres. A main shaft, 6ft. by 3ft in the clear, has been sunk to a depth of 133ft. The lode at the bottom is 15ft. wide, and is valued at 30 per cent copper with a fair percentage of gold. This mine was worked for gold above water level, which is about 100ft. below the surface. Below the water level the reef is heavily charged with copper.

#### YUIN.

*"Royal Standard G.M.*—There is a new main shaft sunk to a depth of 150ft., 300ft. east of the old main shaft on this property. At the 100ft. a level was driven 110ft. east in ore valued at 10dwts. to the ton. The size of the reef at the 150ft. is about 8ft. in width, and is valued at 10dwts. to the ton. The mine is looking better at the present time than it has done for years. The crushings put through the battery totalled 4,590 tons, giving a return of 1902.68 fine ozs of gold.

#### FIELD'S FIND.

*"Reward G.M.*—This mine has lately been under exemption, and the company has been under reconstruction. The only work done during the period, apart from that when under exemption, was a little stoping. The company has expended £3,667 3s. 10d. during the year, having employed an average number of 16 men for the year. The crushings put through their ten-head battery have yielded a return slightly over an ounce to the ton. The total amount put through being 1,109 tons for 1,301.52 fine ozs of gold. From 350 tons of sands they received 33.66 fine ozs. This mine has again started working.

*"Triumph G.M.*—This lease is about 20 miles from Yalgoo. A shaft 70ft. deep has been sunk on this property, practically on the lode, North and South. The reef is about 4ft. wide, and some portions of same assay well. The ore has to be carted to Yalgoo, and from there sent to the Lennonville State battery. The only crushing put through for the year was one in October, and the yield from 45 tons was 19.44 fine ozs. of gold. The property is owned by F. D. Wickstead and party.

#### BARRAMBIE.

*"Barrambie Ranges G.M.*—Four shafts have been sunk on this property on the underlay. The main shaft to a depth of 170ft., No. 2 to 130ft., No. 3 to 200ft., and No. 4 to 100ft. The mine is developed to the 100ft. level for 600ft. in length. The average width of payable ore is about 2ft. Total crushings for the year are 5,172.33 tons, for a return of 5,216.47 fine ozs. of gold. The management estimate that there are about 3,000 tons of ore in sight. At the present time the mill cannot be kept running full

time owing to the scarcity of water. The management anticipate that within three months they will have sufficient water to keep the mill running full time. The plant consists of a ten-head battery, one 40 h.p. engine, two Cornish boilers, and two Wilfley tables. Firewood is fairly plentiful at this centre, costing about 23s. per cord.

#### ERROLLS.

*"Legacy Leases.*—These leases are the property of the Wha Gold Mines, Ltd. During the year the company have crushed 3,082 tons for a yield of 1,438.61 fine ozs, and from 1,740 tons of sands received 436.69 ounces. The battery has only been working 14 hours per day owing to limited boiler power, and the want of water. Lately a new boiler has been installed, and the battery is now working 20 hours a day. The manager informed me that in a few weeks the water difficulty will be got over and the mill will then be kept going full time. About 2,000 tons have been taken out above water level worth 18dwts. per ton. At the present time this mine is a healthy proposition. This company has taken a working option over the Three Star G.M., situated a mile north of the Company's battery.

*"Inheritance G.M.*—This is a 24-acre lease held by Coulter, King, and party. The first shaft sunk on this property was to a depth of 45ft. Total crushings for the year amounted to 34 tons for 65 fine ozs. A quantity of ore is at present at grass waiting to be taken to the public battery at Nannine; it is expected to give a return of 4ozs. to the ton. The average width of the lode is about 2ft. It is a North and South lode, dipping West, about 30 degrees off the vertical. The owners have very great confidence in their property.

#### TUCKANARRA.

*"Cable G.M.*—The owners of this property are Cox, Andrews, and Hull. A shaft has been sunk 75ft. on the underlay on the south end of the lease. At this depth a level has been driven 80ft. North and 100ft. South. Some stoping has been done on the South end from where the last crushings were taken. During the year the owners have crushed 281 tons for a return of 191ozs. over the plates, and cyanided 325 tons for 108.54ozs.

*"The Nemesis G.M.*—This is a 12-acre lease held by McInnes and Wallace. The mine is worked from an underlay 200ft. deep. The opening out was started at the 50ft., 100ft., and 200ft. levels. A drive is being put in at the 200ft. level east, and stoping is being carried on at the 100ft. level. From 260 tons put through the State battery during the year the yield was 683.73 fine ozs., and from 100 tons of sands 22.5 ozs. There are six men employed on this property. The prospects of the mine are very favourable.

#### QUINNS.

*"The Phoenix G.M.*—This lease is owned by Norman and party. The main shaft is down to a depth of 110ft., and levels were driven off the shaft at the 78 feet. The reef is running East and West. The level on the West side has been driven 200ft.; on the East side the level has been driven 108ft. The ore has been stoped to the surface to within 15ft. on the East side. The average width of the reef is about 3ft., and it is very consistent both in size and value. Below water the reef is well over 4ft. in width, both in the main shaft and the winze, which is about 150ft. West of the

shaft. There is a five-head battery on this property. During the year the owners have crushed 851 tons for a return of 292.6 fine ozs.

#### BURNAKURRA.

*Federal City G.M.*—The main shaft is down to 215ft. on this mine. During the year the syndicate have sunk 127ft. and driven 258ft. Total crushings put through their battery for the year totalled 3,536 tons, returning 1,753.54 fine ozs of gold. From 4,547 tons of sand treated, 666.1 fine ozs. were obtained. During the year the syndicate have expended in wages £5,393 6s. 9d., having employed an average number of about 26 men. The great drawback to this mine is the large daily inflow of water at the rate of about 192,000 gallons per 24 hours. During three months of the year the daily inflow averaged from 270,000 to 288,000 gallons. The syndicate have erected during the year one Cornish boiler and a cyanide plant.

*Alliance G.M.*—Again this mine has been taken over by a new lot of tributers, who have done a little sinking, and are opening out the mine at a deeper level. The new tributers have started in earnest, and have ordered three new 20-ton vats, new precipitating box, and a new pump. This is a 24-acre lease with three parallel reefs running through the full length of the property. They are running North and South, dipping East at an angle of 30 degrees. The average width of No. 1 reef is 2ft., No. 2, 2.5ft.; No. 3, 3ft. No. 1 is valued at 1oz. per ton; No. 2, 15dwts.; No. 3, 11dwts. About 1,532 tons have been crushed for 255.8ozs., and 453 tons of sands treated for 104.36 fine ozs. of gold.

#### NANNINE.

*Caledonian G.M.*—The shaft is now down to a depth of 180ft., and is opened out at the bottom at that depth. At this level 110ft. of driving has been done. Up to the present time this level has been disappointing. During the year 1,097.5 tons were crushed for a return of 239.5 fine ozs. of gold.

*Caledonian Extended G.M.*—The owners of this mine have left the deep workings, and are working nearer the surface. From 147 tons crushed during the year, the owners received a return of 29.44 fine ozs. of gold.

*Nannine Group.*—These leases are owned by Mr. J. G. Robinson. The bottom level in the centre shaft is down 200ft. Gold was showing freely going North. The above excepted, there is nothing new to report about this mine.

*Twelve Mile.*—A new find has been made at this place. Messrs. Hunter and Bannet are the prospectors. About four months ago these men arrived from Mertondale. They were guided by several floaters, which carried free gold. After costeening for two months the reef was struck. It is about 4ft. wide, and is nearly vertical. Twenty-one tons were sent to the Government battery at Nannine, which gave a return of 39dwts. 17grs. per ton. The lease is to be known by the weird name of "Oozulem-bird." At the present time only one foot of the reef is being taken out. This foot is worth about two ozs. to the ton. The remainder is valued at 7dwt. per ton. This part of the reef is being left by the owners until a battery has been erected at the 8-Mile, Meekatharra.

#### YELLOWGINDAT.

*Karangahake G.M.*—This mine is under offer to a Sydney syndicate. Since I last visited the mine about 1,500ft. of development work has been done.

Nearly all of this work has been done at the water level, 120ft. The reef averages about 9ft. wide, and is running North and South, and dipping East about 50 degrees. It is a strong quartz lode valued at 15 dwts., this is taking the ore in bulk. There are four distinct chutes of ore on this property. The first is 75ft. long, and the second is 80ft.; the third is 50ft. long, and is vertical. The fourth chute is short but very rich; this is also a vertical chute. Altogether seven shafts have been sunk, and the property thoroughly tested above water level. On the lease there are two other quartz reefs which have never been tested. In March last the owners crushed 44.5 tons for a yield of 38.19 fine ozs. of gold.

*The Gibraltar G.M.*—This lease is owned by D. Henderson and party. Since I last visited the property, the main shaft, 6ft. by 3ft. has been sunk another 22ft., and 45ft. of driving has been done. At the 42ft. the shaft is in solid quartz. Above this is a large formation with quartz veins running as a network through the whole body, which is about 70ft. wide. This vast body is valued at 6dwts. per ton. The ore is too poor to be taken to Meekatharra, and consequently the owners are looking forward to the time when the Hon. the Minister will assist them by erecting a public battery.

*Revenue G.M.*—Since last visiting this mine a block of stone has been stoped out 70ft. by 25ft. above the 205ft. level. About 242lbs. of stone gave the return of 1,215 ozs. of gold. At the present time there is ore at grass valued at 500ozs. The rich leader which has given such a marvellous yield is only three inches wide. It is a pipe about 3ft. long. Outside of this the reef is barren. There are on the property two other reefs.

*Revenue North G.M.*—About 150ft. of sinking, and 50ft. of driving has been done since my last visit to this mine. In addition to this they have stoped 50 tons of ore. The ore is valued at 15dwt. per ton. The owners of this property have crushed 188 tons for a return of 89 fine ozs.

*Batavia G.M.*—This is a 12-acre lease, held by Messenger and party. The shaft from which the greatest quantity of stone has been taken is about 100ft. deep. There is a new shaft being sunk to water level, and up to date it is down 55ft. on the lode. At this level the reef is valued in bulk at 10dwt. per ton. This is a very promising lode, and is well worth opening up more extensively. During the year the owners have crushed 79 tons for a return of 72.32 fine ozs.

#### MEEKATHARRA.

*Ingliston Extended G.M. South.*—This is a 12-acre lease, held by Coombes, Wallace, and Smith. During the last eighteen months 500ft. of sinking and driving has been done. At the 40ft. a cross-cut was put in, and the lode cut. The lode was followed North for 30ft., showing a little gold all the way. At this point the lode up to about 3ft. wide is very rich. This is the most promising development on this centre during the last 12 months.

*Macquarie G.M.*—This lease is held by a local syndicate. A main shaft 6.5ft. by 3.5ft. is sunk to a depth of 112ft. There is about 6ft. of quartz and 20ft. of formation. The quartz is valued at 15dwt. The Northern portion of this lease has been let on a six months' tribute. The tributers are doing well—492 tons for an average of 17dwt. per ton, and 11 dwt. in the sands. This is a mine that improves with depth. Where the tributers are working on the

North, a chute of gold 15ft. wide has been struck, going 15dwt. to the ton. The chute has been driven on for over 30ft., and is still looking well. This property ought to turn out a good gold producer.

*"Multum in Parvo G.M."*—Four shafts have been sunk on this property, totalling a depth of 170ft. These shafts are all connected. Some hundreds of feet have been driven on the various leaders running through this property. None of these leaders will average more than an inch in thickness. From 34.11 tons a return of 1,486.16 fine ozs. of gold were obtained.

*"P.A. 254."*—This property is situated North of the public battery. There is a shaft sunk 40ft. on the lode. It is a pure quartz formation, and is about 2ft. wide. A crushing of 16 tons was put through the Government battery, and yielded about 9dwt. 3grs. to the ton.

*"Lady Lorna G.M."*—This is an 18-acre lease, held by Devine and Holtzmann. About 120ft. of sinking and driving has been done. This is a recent discovery. The reef at first was thought to be barren, but lately has been found to carry good gold. About 12 tons of ore have been crushed for a yield of 7.06 ounces of gold.

*"Marmont G.M."*—This mine is worked from a main shaft 6ft. by 4ft. by 200ft. At the 90ft. the mine was opened out, and gave prospects that have been fully justified in the lower levels. At this point the lode is 28ft. wide. This level has been driven over 400ft. The next opening was at water level, 144ft. This level has also been driven on for 400ft. At the present time sinking is going on for the purpose of obtaining water. This mine is well equipped with machinery. From 3,532 tons put through the battery during the year the yield was 2,887.69 fine ounces of gold.

*"Fenian G.M."*—The deepest shaft on this mine is down 237ft., the size of the shaft being 8ft. by 4ft. in the clear. The shaft is timbered in three compartments from the surface to the bottom. Plats are formed at the Nos. 1, 2, and 3 levels, the depth of which below the surface is 66ft., 148ft., and 233ft. Two air shafts are sunk from the surface to the No. 2 level. The total footage driven on the three levels is 2,638ft., and of winzes and rises 580ft. During the year 1,858 tons were crushed for a return of 4,192.57 fine ozs. of gold.

#### ABBOTTS.

*"New Murchison King G.M."*—This mine is being worked by tributers. They are at present taking out a very rich bit of ore at the back of the 200ft. level. About 1,120 tons have been crushed for a return of 585.6 fine ounces. Last crushing put through by the tributers was 13 tons for 35.03 fine ounces of gold.

#### STAKE WELL.

*"Kohinoor G.M."*—This is a 12-acre lease held by A. Johnson and Williamson. The main shaft being 6ft. by 3ft. in the clear is down 100ft. The reef at this point is 8ft. wide. The reef is really divided into two parts by a kaolin seam about 6in. wide. At the 75ft. level the reef is about 7ft. wide, and is valued at 2oz. to the ton. North of the old shaft a fault was discovered, and the reef lost. A cross-cut was put in at the 50ft. level East, and the reef was again picked up. The chute of ore that has been worked was 80ft. long.

#### PEAK HILL.

*"Peak Hill G.M."*—Since my last visit to this mine the prospects have still continued to improve. The new workings have opened up well, and the new open cut yields a monthly supply of 3,000 tons of profitable ore—ensuring successful operations for some time. The developments on the Bobby Dazzler are good, the new underlay shaft at 200ft. showing ore averaging over an ounce to the ton over a width of from 9 inches to 4 feet. The new tramway and poppet legs have reduced the cost of operations on this lease.

"The management have kindly supplied the following information:—

Sinking	..	94ft. 6in.
Driving	..	4,152ft.
Winzing	..	243ft. 6in.
Rising	..	1,207ft.
Total	..	5,697ft.

Greatest depth of mine—460ft.

Average number of men employed—90.

Amount expended in wages—£19,204 16s. 2d.

Cost of fuel—30s. a cord.

Daily inflow of water—20,000 gallons.

Number of stamps in use—40.

"A large amount of development work is being done continuously. The Condor shaft has been sunk to the No. 4 level, and connected with the No. 4 level North.

*"Lease No. 3—Atlantic No. 1 North."*—This lease, which is situated about the centre of the Eastern boundary of the property of the Peak Hill Goldfields, Ltd., has five shafts sunk thereon as follows:—

No. 1 to a depth of	..	80ft.
" 2	"	50ft.
" 3	"	116ft.
" 4	"	104ft.
" 5	"	120ft.

"No. 4 is a ladder shaft, and No. 5 the main. Numerous drives and crosscuts have also been put in at various depths. Since work was commenced on this lease, 429 tons milled gave a return of 627½ozs., valued at £3 19s. 5d. per oz., and 60 tons of sands have been cyanided for 13ozs. 8dwt.

*"Mt. Frazer G.M."*—This mine is held by Baxter, Durnford, and Vine. It is a 9-acre lease, and is situated about 20 miles West of Peak Hill. It is worked from a compound shaft 40ft. vertical, and 70 feet on the underlay. The lode is running practically East and West, and underlying North, at an angle of about 70 degrees. The average width of the lode is about 2.5ft. The first level was opened up at about 65ft. from the surface, and driven East for about 55ft. This ground was stoped from the level to within 25ft. of the surface. The next opening was at 110ft. level, and was driven on East 60ft., and West 18ft. The syndicate have a vertical main shaft 7ft. by 3ft. in the clear, sunk 95ft. on the hanging wall side of the lode. Five shafts have been sunk on this property, and the reef well tested. This mine would pay well were a battery erected on or near the property. At present the cost of carting ore 20 miles to Peak Hill is so great that the miners can hardly make wages. Moreover, 12 or 15 men more would find employment were a 5-head mill erected.



## ACCIDENTS.

"During the year eight (8) fatal, thirty (30) serious, and eighty-nine (89) minor accidents were reported.

"The fatal accidents were comprised of the following classes:—

Explosives	.. ..	1
Shafts	.. ..	2
Falls of ground	.. ..	5
Miscellaneous underground		Nil
Surface	.. ..	Nil

"The thirty (30) serious accidents are ones inseparable from mining.

"The eighty-nine (89) minor accidents are bruises and cuts, etc., of various kinds.

## PROSECUTIONS.

"One prosecution was undertaken during the year against a braceman employed on the Great Fingall G.M., Day Dawn, for allowing a truck to fall down the shaft. He was convicted of negligence, and fined £5 with costs, £4 12s. 10d.

Inspections during the year—244.

Miles travelled during the year—5,851.

MT. MARGARET AND EAST MURCHISON  
GOLDFIELDS.

"For the first seven months of 1907 these fields were in charge of Inspector of Mines, Mr. W. M. Deeble, whose report on his work for that period is dated 4th February, 1908. He says:—

"During the first seven months of 1907 I was Inspector of Mines for the East Murchison and Mount Margaret Goldfields, and as these goldfields contain an area of over 70,000 square miles, I found it was impossible to keep in close touch with all the mining carried on in them. To keep the main road a distance of over 400 miles would have to be travelled from the mines at North Erlistoun in the Mt. Margaret Goldfield to the mines at Montagu Range in East Murchison. In this large area of country, the greater part of which is auriferous, there are a number of mining camps where there are a number of small mines struggling under adverse circumstances. The disabilities will gradually disappear as the country gets opened up, but it is now that the retarding effect of distance is felt. There are no doubt some good mines in this part of Western Australia often spoilt through not being in the hands of those capable of putting them on a proper footing in their initial stages. A large number of the men working them have the knowledge how to work a mine, but not the necessary capital, and being so far away on the fringe of civilization, they continue to work the richest ore until it gets below the payable stage with the appliances used, and then abandon the place.

"Evidence of this sort of work can be seen in the New England district, a distance of 180 miles North of Leonora, which is at present the end of the railway line in that direction. At this place a five-head battery was erected, and 1,357 tons of ore crushed for a return of 1,309.71ozs. of gold over the plates. As this work was not then payable, the place was abandoned, and the battery removed.

"At the Mulga Queen mine at North Erlistoun, a 10-head mill was erected, and 10,143 tons of ore crushed for a yield of 9,622ozs., worth £33,465. The mine then ceased work underground, and was at that stage when I last visited the district.

"I learn from prospectors who went across from North Erlistoun in the direction of New England that the country is auriferous, but the natives are troublesome, and always take the first opportunity to clean out a prospector's camp when he is away.

"From Erlistoun Creek to Laverton, a distance of about 120 miles, there are a number of small mines varying from 15 to 30 miles apart. From appearances, the country from 30 to 50 miles North of Laverton seems to be the most likely for large mines to be opened up in, as the lode formations are very large and similar in appearance to the lode in the Lancefield G.M., Laverton.

"At Laverton, mining has not improved during the year as much as I expected, although it has been holding its own.

"To the East of Laverton, about 6 miles, are a number of large lodes, and small parcels crushed from some of them gave excellent returns. The three main mines around Laverton are the Lancefield, Augusta, and Ida H. G.Ms. The returns from each are published monthly.

"*Burtville.*—This is the most Eastern mining camp in Western Australia, and is worked chiefly by small parties of miners. The leaders worked are usually small and rich, but rather difficult to pick up at the surface as they very seldom outcrop. The country for the next 20 miles South is very promising, and some rich patches have been got in it, but practically no systematic mining has been done there.

"From Burtville to Mt. Morgans, *via* Euro, a distance of about 40 miles, there is a number of small shows being worked. At Red Flag a large area of alluvial ground has been worked, and rich quartz specimens have been found in the alluvial, but the reefs they came from have not been picked up.

"*Mt. Morgans.*—The principal mine at this place is the Westralia Mt. Morgans G.M., which was rather under a cloud for some time, but when I saw the mine last it gave promise of regaining its former position as a gold producer. There is a number of smaller shows about this place from which some excellent returns have been obtained.

"*Murrin Murrin.*—At this place the Princess Alix, Princess Alix Junior, and W. C. Hill's Malcolm Mines, Limited, G.Ms. have given excellent returns. The Nangaroo Copper mine at this place has been turning out high percentage copper ore which is hand picked on the mine, and sent to the smelter.

"About 15 miles North, there is a belt of country which extends West to Mertondale, a distance of about 30 miles. In this country are the Princess Iris, Waitekauri, Merton's Reward, and a number of smaller shows from which rich patches have been obtained. A rich discovery was reported to have been made about 20 miles North of Mertondale, but up to the time I left the district there had not been enough done to prove its value. A large area of alluvial ground has been worked in this direction.

"*Malcolm.*—Mining in this place has been quiet for some time, but the present prospects seem to indicate that it will soon improve. The mines being worked are the Richmond Gem and the North Star G.Ms. The Richmond Gem has paid well down to the 300ft. depth.

"*Leonora.*—The Sons of Gwalia, two miles from Leonora, is one of the large mines, dealing with over 12,000 tons per month. During the year 1907 this mine paid £65,000 in dividends, making a total of £458,175. South, and adjoining, is the Sons of Gwalia South G.M., on which machinery has lately

been erected. The reefs are large in this mine, and excellent results may be expected from them. There is a large number of smaller shows in this district, and some of them getting excellent returns. The Government water scheme at this place will no doubt be of great assistance to the mines, and tend to reduce the cost of mining.

"From Leonora, in the direction of Lawlers, the first 40 miles is through auriferous country. A number of miners are working on small mines, in most cases making a fair living. About 2½ miles East of King of the Hills is a number of shows, the main one is known as the Homeward Bound. The owners were getting some good stone from a large lode in this mine, but the lode cut off short at a slide crossing it, and had not been picked up on the opposite side. I expected when this was found first, that it was going to turn out another large mine.

"At Diorite, which is about 20 miles from Leonora, there is a number of small mines amongst which is a mine now known as the Kenilworth, but which was originally known as the Little Wonder. This was one of the first claims taken up North of Coolgardie. The first gold taken out was 2,500ozs. dollied, and 4cwts. taken to Southern Cross returned 425ozs. Altogether 11 tons were crushed for 2,935ozs. which, together with the stone dollied, totalled 5,435ozs. There was more stone dollied, but I am unable to get the results. The chute of stone where this gold came from was lost, and has not been picked up since.

"From Diorite to Darlôt, via Mt. Clifford, a distance of about 55 miles, gold has been discovered in places with the exception of a strip of granite country about 20 miles wide, which extends from the East of Mertondale to West of Lawlers, a distance of over 100 miles.

"*Darlôt.*—The mines at this place have mostly been worked by small parties, and the stone crushed at the Government mill erected there. There is one large reef being worked, which extends through three mines, Filbandnit, Zangbar, and Monte Cristo. These mines have each been worked in a small way, and I understand been giving payable returns. If the three had amalgamated, they would have made one good mine, and could have been worked more economically.

"Darlôt to Lawlers, a distance of 50 miles, mostly over granite hills covered by sand and spinifex. In places reefs can be seen out cropping, but I have not heard of anything being found in them.

"*Lawlers.*—Mining at this place has been quiet for some time. The three regular producing mines are the East Murchison, Waroonga, and Vivien G.Ms. There is also a number of small mines within a radius of 10 miles of the town.

"*Sir Samuel.*—Mining at this place has also been very quiet during the last twelve months.

Lawlers to Black Range is about 96 miles. The first 50 miles is mostly through granite country. For the next 26 miles into Maninga Marley there are some large reefs and formations to be seen, and should be worth the attention of prospectors. At Maninga Marley there is a number of small mines, the main ones being the Havilah, Maninga Marley, and Maninga Marley North. These mines have been giving some excellent returns.

"From Maninga Marley on to Black Range, a distance of 20 miles, there is a number of shows worked by prospectors. The mines at Black Range are practically in four groups, within a radius of 10 miles. The main group comprises the Black Range G.M., Oroya Black Range G.M., Sandstone Develop-

ment Co., and a number of small mines. The Black Range G.M., during the year 1907, paid £29,906 in dividends, or a total up to the end of year, of £60,656. The Oroya Black Range Co. have erected a large amount of machinery, and have not had time to show what the mine will yield in dividends. The reef was worked for 68 chains in length, and the lowest return by either of these parties was a crushing of 113¾ tons for 66ozs. 17dwts. 18grs. When I visited Black Range last, there were some promising developments about eight miles South of Black Range.

"Berrigrin is situated about 50 miles North-East of Black Range. At this place there is a number of promising shows, but, owing to distance back and the difficulty of getting material to the place, the mines are being developed slowly.

"About seven miles further on are the Montagu Range mines, which are, in most cases, large low grade reefs.

"When we consider the large area of country, and the distances between the various mining camps, we find that the country has not been prospected properly yet, but only run over. It is only necessary for anyone to go from one mining camp to another throughout these two goldfields to realise how much country there still remains untouched."

The report of Inspector of Mines, Mr. H. Colbran, for the time he has had charge of the East Murchison District, is dated 24th January, 1908. He says:—

"I commenced my duties in this district on the 29th of July, 1907, and between that date and the 31st December made 94 inspections, which necessitated my travelling 2,081 miles.

"*The Outlook of the District.*—Of the six centres of activity of my district, viz., Lawlers, Black Range, Wiluna, Berrigrin, Darlôt, and Mt. Stirling, I think at least four may be said to look most promising.

#### LAWLERS.

"The two main mines of this centre continue to give regular and payable returns.

#### BLACK RANGE AND HANCOCK'S.

"At Black Range or rather Sandstone, there are 40 stamps continuously running (in addition to the public battery stamps), and at Hancock's several very promising reefs are being worked, two of which have been opened up to depths of 150 and 260 feet respectively. At Nungarra, and also at Bellechambers some very well defined reefs are being prospected.

"About 18 miles East of Black Range are a group of mines, of which the Havilah and Maninga Marley North are yielding payable ore.

#### WILUNA.

"At Wiluna the prospectors' attention seems to have diverted from reefs to lode formations, and with very gratifying results. On the Gwalia Consolidated, a new 20-head mill and cyanide plant are in full operation. The lode which is being wrought on this mine has been open cut intermittently for some 2,500ft. in length, and is opened up to over 100ft. in depth.

"On the Moonlight the formation is overlain by stibnite. At and around Wiluna there are several very promising looking lodes being vigorously opened up, and I think the outlook of the place is very bright.

#### BIRRIGRIN.

"On my last visit to this centre, I was told that two stamp batteries, a ten and a five head, were about

to be erected. The principal mines there are the Pelerin, a quartz reef running North and South, and almost vertical, and the Berigrin G.Ms., Limited, also a North and South quartz reef. The former mine is opened up to about 135ft. in depth, and the latter to 155ft.

#### DARLOT.

"At Darlôt mining, except on a small scale, is fairly quiet. The principal mine, the Zangbar, is running 10 stamps, and is being worked to a vertical depth of 110ft.

#### MOUNT STIRLING DISTRICT.

"At and around Mt. Stirling a large amount of work is being done, some of which is on newly discovered reefs, but a greater quantity on reefs, which in the early days were opened up to fair depths, but found too low grade to work profitably under the expensive conditions of those times.

#### ACCIDENTS.

"During my term of office there have been reported to me 21 accidents (none fatal). Two were firing accidents and both caused by neglect on the part of the men firing to give warning to their comrades who were working within danger range of the shots. The men who so fired without giving warning have, I believe, both left the State, and thus escaped prosecution.

"The remaining 19 accidents, which I have thoroughly investigated, were in my opinion quite unavoidable, and were mostly trivial.

#### GENERAL REMARKS.

"I am pleased to be able to report that in the mines throughout the district, strict regard is paid to the efficient securing of bad ground.

"Ventilation is, generally speaking, satisfactory. I do not think, however, that due care has previously been exercised with regard to the regular cleansing, oiling, and examining of winding ropes, safety catches, and detaching hooks. I find that this has been caused by not having a man appointed for the purpose to do this work at regular and specified intervals, and report the same in the record book. I have paid considerable attention to this matter during my term of office, and am pleased to be able to report that the defect pointed out is now remedied."

Mr. E. K. Beaumont, Inspector of Mines, reports on the district in his charge on 28th January, 1908:—

"I beg to furnish herewith report on Mt. Margaret Goldfield—Leonora, Malcolm, Morgans, Laverton, Kookynie, and Niagara districts under my supervision since July last.

"I have been several times over the districts, and inspected the various mines at work, and am pleased to state that in some localities a decided improvement has taken place, and the future looks much more promising than for a long time. Several old mining fields have been again worked, such as Linden and Armidale, and in one instance a new field has been found at Mt. Redcliffe, where the prospects are good, and a trial crushing gave highly payable results. The efforts of the Department in establishing State batteries, together with subsidising private batteries already at work, are greatly appreciated by prospectors in remote fields, and must tend to develop new fields and increase the ardour of prospectors, who formerly had to cart stone such long distances, that

only the highest grade stone could be mined at a profit, and otherwise payable shows were neglected. This also induced prospectors to gouge out only the high grade portions, and frequently led to risks being undertaken which would not be the case were the whole reef taken out between the walls and properly timbered and mullocked up.

"The ropes, chains, cages, and safety appliances have been carefully tested at regular intervals, as required by the new Mines Regulation Act, 1906, and I am pleased to state that mine managers and owners generally readily comply with and appreciate any stipulations made in this direction for the safety of the plant and mine workings, etc., and no accidents due to the breaking of ropes or failing of safety gear have happened.

"Sanitation and ventilation, and the supervision of explosive magazines, etc., have received careful attention—the new regulations dealing with receptacles for waste food, etc., were very necessary, as in many instances, even in the larger mines I found waste food decaying in crib places, even then in use. The ventilation of the mines generally is carefully regarded, and mines are well opened up, and any development work recommended with a view to improving the air supply in stopes or isolated workings has been readily carried out. Mine managers in this district fully appreciate the fact that workmen do more work and better work when the working conditions are made as beneficial as possible. I attribute the lack of serious accidents due to explosive gases or cyanide fumes from filling, etc., underground to be due to the careful attention given to ventilation, and also the free uses of compressed air in rock drills, and used in blowing out after firing, etc.

"In reference to magazines and explosives, I find that the various stipulations *re* the storage and handling of explosives in the new Mines Regulation Act, 1906, were urgently required, for in the course of my inspections there were only about three mines in the whole district where the storage and handling of explosives were at all satisfactory. In almost every case I found detonators kept in same magazines, and often in same boxes as the gelignite or other explosives, and sometimes fuses with primers attached; also in one large mine I found the explosives kept in the main level 'in a tool box,' and loose caps and a primer and plugs of dynamite loose in the bottom, amongst drills, hammers, and spare chucks, and parts of rock drills. Frequently I found men carrying the charges of explosives loose in papers or else inside their shirts, others invariably made up their charges in the magazines, and always took the naked candle into the magazine. These matters are now much improved, and suitable lanterns are provided, and separate magazines and canisters as required by the Act. It is marvellous that during the half-year only one serious accident happened due to explosives, and that was at Mt. Morgans, where a man had his hand shattered whilst inserting the fuse into a detonator, fortunately I inspected the mine a week previously, and had the caps removed from the main magazine, or a serious explosion may have resulted. Only one case has been reported due to defective fuse, and that occurred at the Augusta mine, Laverton, where a miner was firing the cut, and noticed the fuse bursting out and running, and thanks to his watchfulness he got out of the road in about ten seconds, when the charges exploded. I tested the other coils of fuse on the mine, but found them satisfactory—90 seconds to one yard.

"In reference to accidents, I regret to report five fatal accidents, but each case was purely accidental and unavoidable, even though every care and precaution had been taken. With the exception of one at Westralia Mt. Morgans, all these accidents (and in fact most of the trivial ones as well) were caused by the victims being crushed by a fall of ground, but in the Morgans case the man (about 60 years of age) was working on the bank of an open cut in broad daylight, missed his footing and rolled down the bank into the mullock pass in view of his fellow workmen. Another case on the same mine—a miner was on a staging at top of a rise handing tools (in a stooping position) when a scab of rotten rock came off the back only three or four feet above him and broke his back. There was one case at the Lancefield, Laver-ton, where two experienced miners had spent nearly all the morning barring down and trimming the back, and had two bars on to a slab that was wound over an ore pass, and could not move it; after crib an unlucky shoveller started to shovel into the pass, and had only been there a few minutes when the slab came away from the hanging wall and killed him. In this case the back was only 8ft. high. Two almost similar cases occurred in the Gwalia—a man was engaged mullocking up a stope where the shift boss had examined the back, and one of the mullockers took a bar to move a scab off the back, and brought down a few tons of rotten oxidised ore off a soapy head, and smothered himself. The other case at Gwalia—two experienced miners had carried a stope up to 80ft. high over the level without serious accident, and had the sollars down and filling in within 6ft. of the back, and had spent two hours barring down loose ore, and making the back secure, and were in the act of shovelling the ore into a pass when a piece of ore, about two tons, came away from a soapy head on the wall, and crushed one of them. He died before he could be extracted from the fallen ground. I have given these details as they seem to prove that even when work is done by experienced men, and in every case they are within reach of the backs, and can remove any bad ground, and every care is taken it seems almost impossible to guard against these regrettable accidents. The juries in each case who examined the scenes of accidents were practical miners, and their verdicts of "accidental deaths" after every precaution had been taken, etc., go to prove that as far as careful supervision and inspection are concerned everything has been done and every care exercised.

The number of "serious" accidents may seem large, but when it is remembered that every man who is away from work for 14 days must be reported as "serious," there are many accidents, in fact the majority, where the injured man returns to work (from such injuries as a sprain or crushed finger or foot, etc.) in two or three weeks apparently not seriously injured.

"In reference to prosecutions either of mine managers or workmen, I am pleased to say that none have been necessary during the half year—of course there have been several breaches of the new Mining Regulations, but in each a caution had the desired effect, and as the requirements of the new Act were not well known, the various managers have readily complied with same when notified.

"*Development work.*—I am furnishing herewith a tabulated statement of development work, shaft sinking, etc., and tonnage ore mined during the period under review, which I hope in its condensed form

may prove of interest, and show that the various mines are endeavouring to keep their development work well ahead of extraction of ore, and thereby ensure the future life and prospects of the district. The results of development work in deep levels of some mines such as Lancefield and Gwalia have been very gratifying.

"In reference to the various mining districts comprising the Mt. Margaret Goldfield, and starting with the mines nearest Malcolm, my head quarters during the year:—

"*North Star.*—This has resumed mining and milling operations, the mill, 10-head, having been subsidised by the Mines Department, and crushing also for the public. The lower levels have been unwatered, and stoping done over the 300ft. level, also on the intermediate below the 300ft., and the mine generally put in working order. A fair number of men are employed constantly, and every prospect of continuance. The directorate is purely local, and speaks well for local enterprise.

"*Richmond Gem G.M.*—This has been taken over by Mr. T. F. Brimage, who personally supervises the mine. The shaft has been sunk another 40ft. on the reef, and levels driven North and South, which will give a workable amount of backs. A new engine-room has been added to the mine equipment, and machinery generally overhauled and put in working order. The battery of 10-head also crushes occasionally for the public. The water difficulty is felt in the Malcolm district, and the delay in laying on the mains from the railway dam, and having to use mine water in the boilers is having injurious effects; however, Mr. Brimage has now secured as a water right the old water shaft on the Dumbarton mine, and connected with his own mains.

"*The Nine of Hearts G.M.*—This has been given a trial down to water level by tributaries, but having no appliances to handle the water, they have been forced to cease work, and the mine is for sale. Several other shows tried in the early days North of the North Star are again being prospected, and several parcels treated locally gave payable results.

"Mining matters at present are very quiet at Websters, East Lynne, and Pig Well, also at Waitikauri, where the mine and mill have ceased work, and the owners have applied for State aid for purchase of new boiler, as present steam plant is worn out. The mine has again changed hands, and Messrs. Weekly and Meyers have taken over the property.

"At about five miles from Mertondale, on the Leonora Road, is Kelly and Penny's "Gambier Lass" G.M., which during the year has opened up well and been a consistent producer, and the various parcels of stone treated at the State battery, Pig Well, have given handsome profits to the owners, who have recently sunk a winze 45ft. below their former bottom level 100ft., and driven North and South on the reef which is opening up quite as well as the upper levels.

"The Gambier Lass South have sunk a shaft near the boundary, and are cross-cutting for the reef; also have attained State assistance by way of a boring plant in order to test the ground, and try to pick up the Gambier Lass reef, which is dipping South, and underlaying West into their property.

"*Sunday G.M.*—About four miles north of Malcolm; has had several payable crushings treated at State battery, Pig Well, which attracted a Kalgoorlie syndicate, and working option was taken over the property, but was abandoned at the end of the year.

"Mertondale.—The only mine at work is the Merton's Reward (as will be seen from the tabulated statement). Under former management the company did a large amount of development work on all the levels, while the battery was shut down for alterations, four Middleton-Cobb pans having been added. Seven hundred and sixty-eight feet of development work having been done with varying results, and 11,245 tons of ore mined during the first year, whilst during the last half year only 30ft. of development work have been done, and 4118 tons of ore mined. At present time only about half the battery is being worked, and every economy being practised, it is hoped that further developments may again bring this mine into its former place, being the sole support of the town of Mertondale.

"North of Mertondale several small shows are being worked with fair prospects. The "Wild Cat" is being opened up and crushings sent to State battery, Pig Well, 24 miles. Much interest is attached to the new find, about 22 miles North of Mertondale, at Mt. Redcliffe—seven claims have been pegged, and are being actively worked. The original prospector is Mr. Walsh, who claims a reward block; he certainly deserves some recognition of his pluck in going out two and three years in succession till he found the reef. Their shaft is down 70 feet on the reef, and an Eastern cross-cut is in about 40ft. through stringers of quartz and lode material which, when dollied, gave fair pan prospects. A trial crushing of 35 tons taken from the main reef in the shaft, and treated at Pig Well State battery gave 33.8 ozs. of fine gold. The Government bore put down about 2½ miles South-East of the Mines has given the prospectors a good supply of fresh water, and enabled them to work on right through the summer months.

"Another mining field opening up very promisingly is the Desdemona line, about 15 miles South-West of Malcolm. The parent company is now sinking a new shaft to 200ft., and will cross-cut and expect to cut the reef at 40ft. The mine has one underlay and two vertical shafts on the reef from which it was formerly worked to water level with payable results to the syndicate who own it, and as the reef is going strong under foot for a width of two to five feet, and also showing up well in the faces of the drives on the reef and various stopes, there appears every reason to hope that the owners may be rewarded for their enterprise and energy in sinking to test the mine at depth; it is proposed to deal with the water by bailing tanks at present. The new shaft is sunk in solid hanging wall country, and is well timbered and equipped with a pit head frame. The mine also has a five-head battery, which has been used to treat the ore raised, but as it is some distance from the new shaft milling arrangements may have to be reorganised. There are six other properties on this line at work, and all on the reef down to water level, approximately 70ft., the width varying from 2 to 4ft. 6in., and in each case I tested ore from the faces or at grass, and got fair dish prospects. The line is being worked for 1½ miles in length, and the prospectors have now applied for a State battery to treat the average grade of stone in their mines, approximately 10dwts., which will not pay to cart 11 miles to Tampa, at cost of 1s. a mile. Proceeding from Desdemona to Kookynie, the Grafter and Mignonette mines are being worked with success; the former is equipped with a 5-head battery and cyanide plant, and hauling gear. This battery being available for

public treatment has been a great help to many prospectors in the district. Towards Kookynie most of the shows worked in the early days are idle, and the old batteries and surface equipment perishing in the weather. However, a new syndicate have taken on the Champion mine (the former plant having been sold), and are again steadily equipping the mine and opening up the reef. During the year the Cosmopolitan Proprietary resumed working, and ran the battery full time as a result of development work done in the 11 and 12 levels, but unfortunately the ore bodies cut out, and values gave out in other portions of the lower workings, and owing to the heavy charges for pumping, work had to be abandoned at the end of the year, and pumps, etc., raised to No. 8 level, to which the water will be allowed to rise. However, about 60 men have been put on tribute in the upper workings, and also in some stopes of Nos. 2 and 3 levels of the Cumberland mine, and this shaft again equipped with boiler and winch, and it is hoped their efforts will meet with success, and the battery again resume work, which the manager says he can do when the tributers have 1,000 tons of ore ready; and as the town of Kookynie is almost entirely dependent on this mine, it is hoped that it may meet with further developments which will enable it to continue active operations, instead of allowing the splendid plant and surface equipment to remain idle. Tributers are also at work on the Altona blocks, North, South, and Central, belonging to the company, and have already cleaned up for a highly satisfactory and payable amount. The various shafts have been equipped with separate boilers and winding plant, and every facility given to tributers, at same time every care taken to safeguard the men, and see that no unnecessary risks are run.

"Out East from Kookynie, at Yerilla, a fair number of men are at work on what originally appeared to be an alluvial field, but it proved shallow in places and unpayable in deep ground, and in sinking for alluvial several payable reefs have been found which produce more stone than can be treated by the small 5-head Government mill on the field. Messrs. Duncan Bros., owners of the Viola and other claims, recently struck a 10in. reef of very rich specimen stone, two pieces from which were on view at the Union Bank, Kookynie. The Yerilla King, owned by Gunna and party, have a well worked and developed property on the East of Viola, and a reef proven down to 100ft. vertically, and worked from three shafts; several crushings from this mine gave payable results. There was no alluvial mining being carried on towards the end of the last half-year, alluvial being practically abandoned.

"The Niagara district has been quiet during the year. The W.E.G. Orion Main Reef, Eaglehawk, Heather, and others have kept steadily going, and their various batteries occasionally crushing ore for prospectors, and others get their stone treated at the State battery in the district, and though nothing of a sensational nature has been met with, still most of the miners appear to have managed to get a living from their various shows.

"At Yundamindera, the Potosi Consolidated Co. have let their mine, and also "Queen of the May" on tribute. The battery is also subsidised by the Government, and stone treated for prospectors at Government rates. Several crushings have been carted from Linden (32 miles) to this mill. The various workings are being maintained, and the shaft on

Queen of the May being sunk to test the ground at lower levels. The Maori Queen mine has changed hands, and is now being worked by a syndicate, and equipped with a battery and new winding gear, etc., and as it has been a constant producer during the last year it is hoped it may be also under the new management, and with a mill of its own much low grade stone will be profitably treated, which would not pay to cart to the Potosi battery. The mine has been well opened up, and reef proven underfoot by winzes from bottom level. The new name of the mine is the Golden Treasure.

"There are several prospecting shows at work on this line, and sending their stone to Potosi with payable results, and the district looks much more hopeful than for a long time past.

"The Linden field has been fully reported on by me, and data furnished to your office, but I am pleased to augment my then favourable report by the fact that recent developments have opened up so well, so much so that private enterprise has induced a firm to take an option on one of the leases, and equip it with a 5-head mill and plant, even before the Government battery is erected—'Actions speaks louder than words'—and this speaks well for the favourable impressions of private investors in the prospects of the district. The Government boring party having proved a supply of suitable water, and the battery now being on the way will encourage prospectors to continue still further now they have the prospect that their stone will be treated at reasonable rates, and I hope that the coming year may be a very prosperous one, as present appearances indicate; also that the Mines Department may be rewarded and encouraged for the assistance that has been afforded prospectors in this very isolated district.

"Some alluvial gold was found in a gully near 'Pennyweight Point,' about half-way to Linden, and a small rush set in, but the ground was shallow and wash only of medium value, though I saw  $\frac{1}{2}$ oz. slugs got in some of the shakers. The rush came to an early finish, and was very much over-estimated by the original finders; but there is no doubt that further prospecting in the gullies offers strong inducements towards finding payable alluvial in what is at present virgin country.

"From Malcolm Eastward, the Eulimina Copper Mines (formerly called Anaconda) are met with, and during the year very profitably worked and opened up under the experienced copper mine manager, Mr. W. Blakemore, and owing to the high price of copper handsome profits were made, and quite a large number of men employed; also a new main shaft sunk from which to work the lower levels. The mine workings generally are in excellent working order, and also the surface equipment, the whole showing evidence of careful management and supervision. No expense has been spared to carry out almost every requirement of the Mines Regulation Act, 1906 (even before my first inspection since the new Act came into force in June last). A new furnace has been erected to increase the output, but owing to the slump in price of copper the work has been somewhat curtailed. Another copper lode with highly payable prospects has been opened up at Murrin, about 4 miles East of Eulimina, called Nangarra or Nangeroo, but work is somewhat in abeyance or delayed owing to the present low price of copper. This mine is only about  $\frac{1}{4}$  mile East of the gold reef worked by the Princess Alix and Hills Proprietary and Alex Junior lines, and bears evidence of the highly mineralised coun-

try that exists in the locality, and which offers every inducement for further prospecting and development.

"The various mines in the Murrin district have made more solid advancement than almost any other group in this goldfield, and this next year should be a very satisfactory one. Commencing from the South end, the Princess Alix has been putting out a West cross-cut and spending a large amount of capital in the lower levels in development work, and have now been rewarded by cutting a new reef, which has given excellent assay returns, and as the mine is equipped with a 5-head battery and cyanide plant and compact hauling gear, it should soon enter the list of producers.

"During the year Hills Proprietary G.Ms. have been equipped with a 20-head mill and cyanide plant (formerly on the Princess Iris G.M., Australia United, by same owners), and all winding gear put in order; the battery is up to date and equipped with rock breakers, bins, etc., and other labour saving devices, and as the stopes underground are opening up well, and keeping the battery supplied, and the lower levels are still intact, the mine should produce some handsome profits to the fortunate owners. Recently an offer for an option over the mine was made by a large mining company in Kalgoorlie, but this has been declined by the present owners. This mine bears evidence of much personal enterprise—the proprietor owns camel teams—insures his own wood supply, and personally conducts and manages the mine which is in good working order.

"*Alex Junior G.M.*—One of the most favourable developments in this district during the half-year has been the cutting of the reef in the bottom level at 270ft. In cross-cut off the main shaft of this mine the reef is the full width of the drive, and has also been followed down by winzes from the No. 1 or 200 feet level. The reef has been tested and proven payable, and the syndicate who own it should soon be rewarded for their pluck in sinking the shaft against a heavy flow of water and other difficulties, and should soon be in a position to erect a battery of their own adjacent to the main shaft, which is equipped with first motion engine and steam power, good poppet head gear, etc. The mine is within  $\frac{1}{4}$  mile of Murrin railway station and townsite.

"At Australia United, matters are very quiet at present, but several prospecting parties are working small shows with payable results, and since the battery has been removed, now cart their stone into the Malcolm Proprietary company's battery at Murrin, who have a fair battery and plant, but no work excepting a few tributaries being carried on underground.

"At Morgans the Westralia Mt. Morgans Co. have continued operations during the year, the early part much prospecting was done from the 300ft. to 500ft. levels, with the result that a big low-grade formation was found, and trial crushings taken. Work was subsequently suspended below the 300ft. level, and for a time it was thought the mine would change hands owing to financial difficulties, but fortunately recent returns from oxidised ore from upper portions of the mine and open-cuts have shown a good profit, and the deficit wiped out. The company is again running the whole battery of 60 head, and effecting further savings in treatment costs, etc., and the latter half of the year has been much more prosperous than the former one. It would be a serious loss to the town of Morgans should this mine cease or curtail operations, for they are dependent on it for the electric light and water supply. Adjoining

the Westralia Mt. Morgans on the South end, the Lily and Millionaire mines have been let on tribute; the latter is equipped with 5-head battery, with 1,750 lbs. stamps, and occasionally crushes for the public. The reefs are small and patchy, but the tributers, Pond and party, have recently had some very satisfactory returns. The other mines at work are the Sons of Gowrie, Ramornie (with its public battery), Huon Belle (which in November treated 47 tons for a return of 193ozs.), and the Transvaal. This mine has been worked on tribute in the upper workings for some time past with very profitable results, but the lower levels flooded with water, however, it has recently changed hands for a fair sum, Messrs. Wilkie and Archibald being the purchasers; they propose installing a battery, winding plant, and otherwise equipping the mine, which judging from recent returns should soon give employment to a fair number of men, and prove a good investment.

"The Laverton district is full of promise, the Lancefield mine being the largest producer at present, and employs a large number of men. A more satisfactory extraction is being effected in the mill since adjustments and alterations, and it has been running almost constantly during the year. A large amount of development work has been done at the bottom or 400ft. level, and the reef proven in a cross-cut to be of the same average width and grade as in upper levels. The open stopes in the upper levels have been filled with mullock, and it should not be long before all the open stopes will be in same satisfactory condition. New mullock passes to surface being actively put up will control the portions most remote from the main shaft. The water difficulty has been overcome by connecting a pipe line and pumps to a well near the Augusta G.M.

"The Augusta G.M. Syndicate, two miles North-West of Laverton, have opened up very favourably during the half-year. The plant is compact and effective, and mine workings in good order, and development work actively pushed on. Recently a new reef has been met with at bottom of winze at depth of 400ft. and 180ft. North of winze, and 260ft. North of main shaft, average width 15ft., and at time of my last visit had an average assay of 46dwts. The mine is owned and worked by a small syndicate, and has several years ore in sight and blocked out, so should be a constant gold producer for some time to come, and if present developments continue, will soon become one of the big mines in the Laverton district. There is an abundant supply of fresh water in the mine, which is a valuable adjunct in this district.

"*Ida H. G.M.*, seven miles from Laverton. This mine has been a constant producer and dividend payer for some years past, and is now engaged in development work at North end of reef, and also in lower levels. Winzes and travelling ways have been sunk to 500ft. level, and equipped with Holman hoists and winch, and stopes opened up at lower levels; also a winze sunk from bottom level for a depth of 40ft. still in ore. A connection will shortly be made at the North end to an old shaft which will give effective ventilation. The major portion of the mine stoping is now being done over 500ft. North of the main hauling shaft near the battery. The mine has a good surface plant, and bears evidence of careful management. The requirements of the Mines Regulation Act have been carried out, magazines, and storage for explosives, in a very satisfactory state.

"*Euro G.M.*, seven miles from Laverton, is being worked by a co-operative syndicate, who have

equipped the mine with hauling winch and gear, also 10-head battery, and though the ore is low grade, by doing most of the treatment themselves, they manage to make a small profit on the tonnage treated, and the mine appears to have a few years life ahead of it.

"At Burtville there are quite a number of mines nearly all worked and owned by prospectors themselves, and as the reefs are small and in most cases carry fair values, the owners appear to be satisfied and doing well. Owing to the large amount of loose country and heady ground encasing the reefs, the stopes as a rule are close filled and in good order. The Karridale G.M. has a battery and plant of its own, and has had some very satisfactory returns, and as the mine is now about worked out to the bottom or No. 2 level, they will now start to sink the shaft and open up a lower level.

"*Golden Bell G.M.* is a snug little property, with a well equipped winding shaft 180ft., water level being 95ft., and well opened up, it is locally owned and has furnished some good returns. Most of the crushings from these Burtville mines are treated at the State battery, which evidently is appreciated by the prospectors and other leaseholders in the district.

"Outside Burtville there is a number of small mines towards Mt. Weld, and this district has lately received a great impetus, almost all the old shows having been taken up and vigorously worked. The principal mine is the Mikado, about six miles from Burtville, and is a flourishing concern; has a 5-head battery and cyanide plant, and winding gear and powerful pump, as the mine drains a large area it has struck quite a heavy flow of water. The mine has furnished its owner, Mr. Mathea, with some very profitable returns, and has a fair length of life ahead; it is carefully worked and in good order. Towards Mt. Weld the Sailor Prince has been again worked, and new battery put up, also Golden Ring by the same firm; also the old Edith Hope, now called Specimen Hill, is being worked by a small co-operative syndicate of miners; it is low grade but they have their own 5-head mill, and hauling winch and gear, and can work very economically.

"The districts of Burtville and Murrin have certainly a bright outlook for the coming year, and when the Linden and Desdemona districts have the same crushing facilities and machinery adjuncts, they will form four very busy and promising centres of prospecting industry in this Mt. Margaret Goldfield, any one of which is capable of expansion by the addition of further capital and machinery, and even at present they employ quite a fair number of men.

"In reference to Leonora district. The Sons of Gwalia mine is still the leading mine in this district, and the improvements in the treatment plant and additions to slimes plant have improved the recovery and reduced costs. Also the new sands pass from the dumps on surface to lower levels of the mine has enabled the management to fill up the large open stopes in the lower workings effectually and cheaply; also the constant stream of sand down the wooden shoot has assisted the ventilation of the mine and carried down a current of air with it. I had tests made of the sand, and found them practically free from cyanide, the filling-in operations are being continuously carried on, a permit having been granted to employ 12 men filling stopes on Sundays also. The general conditions of the mine have been greatly improved, and made safer for the workmen. The ar-

rangement of explosive magazines has received attention, and requirements of Mines Regulation Act, 1906, complied with. The prospects of development work done in lower levels is very promising, and also on South boundary. The Gwalia South lode is being opened up, and promises to be a valuable adjunct to the ore reserves of the mine. The skips, ropes, and shaft gear and machinery generally have been overhauled and kept in good order—the ropes receiving special attention.

“The Gwalia South, adjoining the Sons of Gwalia, has made good progress during the year; development work having been carried on by a West cross-cut over 200ft., and has exposed new lode formations of payable grade; also the main stopes on 300ft. level have opened up well, and kept battery supplied with payable ore. The mine has been equipped with a 10-head battery and cyanide plant, air compressor, and general surface equipment, and the coming year this mine should be an employer of a fair number of men, and prove a profitable proposition. One serious delay was caused owing to the collapse of the cyanide plant—this has now been overcome, and plant re-erected and strengthened.

“The Great Tower Hill company has ceased operations, and the only work carried on was the retreatment of sands and slimes, and latterly tributes have been let to work the oxidised ore in upper levels from windlass shafts, the battery and main shaft engines not being in use. It is hoped that this mine may again receive attention, as it will employ a fair number of men, who benefit Leonora more directly than other and remote mines.

“North of Leonora there are quite a number of mines being worked by prospectors and small syndicates with success. The Trump G.M. has its own 10-head battery, and a fair surface equipment. The mine is worked from a main underlay shaft, and stopes and levels off same are in good working order, and bear evidence of careful management (the manager being one of the owners).

“*Harbour Lights G.M.*, two miles North of Leonora, is being actively worked by a syndicate of miners who send regular crushings for treatment to the State battery, and generally get very satisfactory results. The Gold Blocks and Leonora Main Reefs are principally owned and worked by same owners; both mines have 10-head batteries and fair surface equipment. The Main Reefs have not been working for some months, having run out of pay ore, and battery is hung up. Other mines in the vicinity, Ping Pong and Savannah, are principally in prospecting stage.

“At Dodger’s Well and Linger and Die districts, the Golden Champion company have a 5-head mill and cyanide plant, and have applied for State aid to subsidise the battery for public crushing. There are a number of shows in this district which a battery might assist in opening up. The district is an isolated one, the nearest battery being at King of the Hills. Mining work is being energetically carried on in this and Mt. Stirling districts, and during the coming year a revival in output can be expected: Quite a number of prospecting syndicates are at work, and should strike some payable reefs amongst the numerous formations in this highly mineralised district.

*Particulars of Mine Development for Year 1907.*

Mine.	Shaft Sinking.	Driving.		Cross-cutting.		Rising.		Winzing.	
		feet.	ft.	in.	ft.	in.	ft.	in.	ft.
Sons of Gwalia South	4	326	0	158	6	265	9	115	6
Sons of Gwalia	164	3,103	6	1,886	6	3,468	0	547	0
Hills Proprietary Extended	100	50	0	...	...	70	0	50	0
Alex Junior G.M.	270	370	0	70	0	90	0	110	0
Ida H.	...	565	0	268	0	196	0	223	0
Augusta	...	329	0	33	0	125	0	119	6
Trump	67	396	0	...	...	...	...	...	...
Cosmopolitan Proprietary	...	2,711	6	348	0	1,460	0	106	0
Merton’s Reward	12	665	0	66	0	53	0	5	0

“I have no doubt you will be gratified to hear of the general improvement in this district, which promises well for the coming year if the present appearances of prospectors’ claims and also of the larger mines are maintained. I regret to say that the Erlistoun District does not coincide with the other portions of this Goldfield in this respect; most of the mines being closed down, under exemption, or only partially worked in prospecting stages. The roads there are bad and waterless, but no doubt after the first rains prospectors will again set out, and this once promising district again receive attention.”

**NORTH COOLGARDIE GOLDFIELD.**

Mr. W. F. Greenard, Inspector of Mines, reports on the 1st January, 1908:—

“I have the honour to submit my Annual Report on the working and administration of “The Mines Regulation Act, 1906,” on the Menzies, Ullaring, the Broad Arrow, and portion of the N.E. Coolgardie Goldfields.

“A systematic routine inspection of all the mines in the above districts has been maintained throughout the year 1907. Any defects noted have been immediately remedied. Special attention has been given to the storage and handling of dynamite and detonators, also to the safety cages and hooks, and winding ropes have been submitted to searching examinations. Pent houses have been provided where sinking operations are carried out, and all gear has been carefully inspected. The filling of stopes has been insisted upon—all stopes reaching a height of 20 feet have been filled, work stopped, or other measures taken for safe working.

“All complaints received from secretaries of Associations, or from the individual have received immediate attention; every complaint has been treated as confidential, and in accordance with the intentions of the Mines Regulation Act.

“Four fatal accidents have occurred during the year; two in the North Coolgardie portion, and two in the Broad Arrow field. Three of these fatal acci-



dents may be termed prospecting accidents, as they occurred in prospecting areas, and under circumstances where it was practically impossible under the Act to insist on proper precautions. The accident to Gresson at the Golden Pole mine, Davyhurst, is one where every care had been exercised, and which almost points to the hand of Fate.

"Out of the six serious accidents, three were due to want of care on the part of the individual injured. In the accident to Bruce Stuart, who started knocking an unexploded charge of dynamite with a pick, which caused an explosion whereby Stuart nearly lost his eyesight, and also endangered his working mate. Some people are of opinion this man should have been summoned, but the idea of bringing a blinded man before the Court to be further dealt with was not recommended by me, and no further action was taken.

"The accident to Anderson, who was assisted by Matheson to remove timber from an abandoned shaft at Menzies, contrary to the Mines Regulation Act, was a miraculous escape. He fell about 60 feet, but has now quite recovered. Matheson, who was uninjured, was prosecuted, fined, and severely reprimanded by the Resident Magistrate.

"The accident to Henderson, at the Unexpected Mine, Mount Ida, is peculiar, inasmuch as he appears to have fallen 18 feet into a 24-foot winze. How he came to fall after descending some 6 or 7 feet, he is unable to explain. So far his injuries are not very serious.

"There have been fifteen minor accidents, consisting of broken fingers, cuts, bruises, and one of sitting on a nail at the Great Ophir Mine, Davyhurst.

"*Mining Generally*—throughout the Goldfields mentioned in this report—is very solid. The average monthly output of gold for the Menzies District for 1907, compares very favourably with the best years, —1900, 1901, 1902, 1903, 1904. I have already forwarded reports on this district, also on Yilganie and Pingin. Yarri is undoubtedly depressed. There are thousands of tons of low-grade ore in the mines, which could be worked were crushing charges lower. This is a mining field that may contain some large mining propositions, and I am of the opinion that it would be wise for the Department to use the State Battery to assist the development. This battery is a fair machine, and can crush ore cheaply. By running it on ore the district would be tested, and there is every probability a good mine or two would be discovered.

"*Edjudina* has probably the longest line of auriferous reef in the State. Last year the Neta, and Senate, and one or two prospecting parties were all that were left. To-day the scene has changed (due in a manner to the dam of fresh water provided). The whole line of reef is being worked. The Senate is turning out splendidly, paying the owners £10 per week per man. The Neta is giving good results. The Gawler and Fingall leases are being worked by a new syndicate, who are sinking a new shaft to a depth of 300 feet; should the values live at this depth, such as has been obtained from the high level, the syndicate will have a good thing.

"The Crow's Nest is being equipped with winding and pumping machinery by Mr. Young. This is also an extremely promising mining proposition. The old Edjudina reef is again being worked by Spittka and party, who are on fair stone; in fact, while driving on the road along the reef for a dis-

tance of seven or eight miles, I counted 27 parties working—erecting windlasses, sinking shafts, etc. It presented quite a busy appearance.

"*At Mulgabbie*, situated 25 miles south of Edjudina, three parties are working what is termed a patchy vein. Two of these parties have done extremely well this year. Clancy and Kilbeg have taken from about 100 feet in depth 1,000ozs. The indicator has been dipping in the right direction for this party longer than it has ever done before. This indicator has various inclinations in the direction of the 'patchy vein.' Gold occurs in 10oz., 20oz., 30oz., pieces of quartz gold. In the recent discovery in the adjoining claim by Cable and Kelly (1) one piece of almost pure gold was obtained, weighing together with the small amount of quartz attached over 102 ounces. Out of this patch over 500 ounces were obtained. Cable and Kelly had been off gold for two years. This find will pay them £500 per year per man. Robb, Philip, Blake, and Vallance are the other party, and I believe they once had an advance from the Mining Development Vote, which they repaid with interest. This year has not been a payable one for them, but the indications at the 200 feet, the deepest shaft they have, are favourable, and they are anticipating the striking of a patch any day.

"This place requires prospecting. There are evidences of a large ore channel with which this patchy vein runs parallel. No cross-cutting has been done. By cross-cutting this country East and West very great discoveries might be made. Taking into consideration the rich telluride that has been obtained, and being only 70 miles north of Kalgoorlie, it is a most remarkable thing that the place is left to be developed by about a dozen miners.

"*Kurnalpi* is practically alluvial mining, at which about 25 miners are making a living. Cable, Lardner, and party discovered deep alluvial near Slater's Gully during the year, and obtained about 140ozs. at a depth of 40 feet. The gold was obtained, as is usual at Kurnalpi, viz., a slug or nothing. One piece was 14ozs., other from 9ozs. to 7ozs., and down to 3oz. and 4oz. pieces. A large number of shafts were sunk on this lead, and 6 and 7 feet of wash located resting on a very kindly puggy bottom.

"Davy Allan, Ellis, Owen, and Haack are still working Cable and party's claim, and the day I visited if they obtained two slugs, one weighing 4ozs. 17dwts. and the other 1oz. 17dwts. Of course, whilst work is proceeding in a place of this kind there is always the chance of something rich being struck.

"Kurnalpi requires a fresh water supply and a small testing battery. This place has produced large quantities of alluvial gold, but very little prospecting has been done on the reefs.

"*At Kalpini* Jenkins and party are working the 'Camelia mine' for fair returns. Kinane, Murphy, and Cummins are now sinking on a good chute of stone, and are down over 70 feet on the West Camelia, from which good crushings may be anticipated. Travers and Kelly, situated on the road to Gindalbie, are also on a very fair prospecting proposition, and raising fair stone.

"*At Gindalbie* the Lady Margaret G.M. Co. are developing the South Gippsland leases, from which excellent returns in the shape of 500 to 700ozs. of gold are being obtained monthly, their best values being got from between 600 and 700 feet. A new shaft, 11 feet x 4 feet, is now down over 200 feet, which is proposed to tap the 700 feet level, and will

eventually be carried on to over 1,000 feet. Messrs. Perry, Harrop, and Binge are working the Eclipse mine. They have already sunk a shaft 200 feet, erected a 5-head battery, winding engine, poppet heads, and condensing plant. They have received some assistance from the Mining Development Vote, which has been well laid out, and from the appearance of the mine there is every reason to think good returns will be forthcoming as soon as the battery starts.

"There are a number of prospecting propositions at Gindalbie, from which good returns are being obtained.

"At *Broad Arrow* the Star of W.A., the Talbot, Allen's lease, the St. George lease, and the Duke mine are being worked by small parties for payable returns.

"At *Paddington* the Paddington Consols and the Mount Corlic are being worked in a desultory fashion.

"The New Slug Hill mine at Vetersburg has been worked down to the 600 feet level. From the 100 feet to the 600 feet a large lense of high-grade ore was worked. The Company is now engaged in sinking a winze below the 600 feet now down 110 feet. They are trying to locate the pay ore chute, but so far the manager informs me without success, and if they do not locate it before March there is every probability that the Company will cease to exist. This is a French company who have spent a considerable amount of money in W.A.

"At *Cane Grass* Robert Howe and party are working the Baden-Powel mine, from which they have obtained some excellent crushings. This property, if properly worked, would give a good account of itself.

"The '*Ora Banda*' is a promising district. The Mines Department have assisted to develop this district by the assistance given Johnson and Friedman in the erection, etc., of their 15-head battery and a water supply.

"The '*Lady Evelyn*' owned by Judd and party is opening up well, and continues to return good payable crushings.

"The '*Slippery Gimlet*' is a very promising property in this district, and has recently been taken under option by Mr. Graham Price for a good sum, and he is busy working—proving the property. Several hundred tons have been crushed for a return of about 1oz. per ton. This is a lode formation 6ft. or 7ft. wide. There are also a number of promising prospecting propositions in the immediate vicinity of the Ora Banda battery.

"At *Siberia*, (*Waverley*), the State battery has done a considerable amount of good, and is kept running full time, or as long as the water supply will permit.

"At *Davyhurst* the mining developments are of a reassuring nature. The '*Golden Pole*' has recently struck payable values at 600ft., and a change has taken place in the structure of the country that may give the mine an extended life.

"The '*Waihi*' is being worked by tributers. One party made upwards of £100 per week per man. 20 to 30 miners are now making from £5 to £7 per week per man and upwards. This mine warrants energetic development at the 280ft. level.

"The '*Great Ophir Gold Corporation*' has been working its new treatment plant for two months. So far there is no evidence as to whether it is a success

or not. If the treatment now being tried at the Great Ophir is a success, it means a great thing for Davyhurst as there are a number of low-grade lode formations that will pay to treat. There is also a number of prospecting claims at Davyhurst which are giving their owners highly payable returns.

"The *Callion Mine* is at a standstill at present. The developments in the winzes off the bottom level of this mine are very promising.

"Not far from the Callion Mine, O'Flaherty and party are working the '*May Belle*'—a promising proposition. At the 110ft. better values were met, and one or two payable crushings have been obtained. There are several other parties prospecting promising claims in this district, and during 1908 it may be necessary for the Department to consider what shall be done in connection with crushing facilities. The carting to Mulwarrie at 12s. to 15s. per ton is too great a handicap.

"At *Mulwarrie*, Mr. C. Wilkinson continues to work the '*main reef*,' and another lease for highly payable returns. He now has a large tonnage ready for crushing at the Mulwarrie State battery.

"The *Mulline* district is somewhat depressed, notwithstanding the Gladys mine continues to turn out 200 tons monthly, for a return of upwards of an ounce per ton.

"The '*Golden Horn*,' owned by Hyde and party, is a property from which several good crushings have been obtained. They are down about 100ft. in the dip, and the reef is about 12in. wide.

"Don and Taylor are working an adjoining claim, and several good crushings have been obtained.

"The '*Young Australia*' is being worked by tributers, who recently struck some good values near the surface.

"The '*Shamrock*' recently had a new ore chute of values located, from which good crushings are being obtained.

"The '*Off Chance*' and '*Red Leap*' have been worked by tributers for indifferent results.

"The *Riverina South* are working away constantly, crushing stone that it was impossible to touch when they had to cart to a public battery. They have added a cyanide plant to their battery, and they are proposing to sink the shaft another 100ft. from the 200ft. Mr. Evans continues to work the Riverina battery on his own stone, and any public stone available for fair returns.

"At *Comet Vale* the '*Gladstone*' continues to open up well, down to 200ft. a large tonnage of good values has been developed. The mine is equipped with poppet heads, winding engine, 10-head battery and cyanide plant.

"The '*Sand Queen*' and the '*Tunnel Mines*,' owned by Macdonald and party, continue to turn out fair crushings. The stone from these mines is trucked to the Zoroastrian battery at Bardoc.

"The '*Happy Jack*,' owned by Fitzpatrick and Nichols, has produced several ounce crushings during the year. The stone is generally trucked by rail to the Menzies State battery. The shaft has been opened on the formation at about the 100ft., and average values being obtained.

"*Mt. Ida* has considerably improved during the year. The '*Unexpected*,' '*Unexpected South*,' '*Meteor*,' '*Forrest Belle*,' and several other leases have been turning out some phenomenal crushings, running from 1oz. to 3oz. and 4oz. for 100 and 200 ton parcels of ore."

## EAST COOLGARDIE GOLDFIELD.

Mr. W. M. Deeble, Inspector of Mines, has forwarded a report dated 13th February, 1908, as follows:—

"I have the honour to submit my Annual Report on the East Coolgardie Goldfield, and am pleased to be able to state there have been some good developments recently in the lower levels in some of the deeper mines in this district. With the ore reserves they have in the deep mines and the highly payable stone at the bottom levels the future of Kalgoorlie, for some years to come at least, seems assured.

"Although East Coolgardie is the smallest Goldfield in Western Australia and contains only about 632 square miles it holds the premier position as regards gold returns and dividends. During the year 1907 £1,489,697 have been paid in dividends by the Kalgoorlie mines.

"The Water Scheme pipes are laid on to the mines and in most of the large mines the railway connects, and the timber required for mining purposes delivered at the place on the mine where it is used for firewood or cut up for underground work.

"During the year 303,133,000 gallons of Scheme water have been used on the eleven largest mines, and during the same time they crushed and treated 1,417,593 tons. This equals 213.8 gallons of water used per ton of ore treated. In some of the plants, the ore is dry crushed, but this does not make a great difference in the amount of water used in the treatment.

"During the year 1908 the water being reduced in price for certain work will allow of it being used in larger quantities.

"The sand dumps around the mines are so high that they have become a nuisance to the town and the cause of a considerable amount of expense in the upkeep of the wearing parts of the machinery on the mines, owing to the sands being carried by the wind. With a view of reducing this, a number of the mines are making arrangements to use the cheaper rate

water to sluice the residues away from the mines. For this purpose the Great Boulder Proprietary G.M. will require about 1,300,000 gallons per month. Great Boulder Perseverance G.M. will also require about 1,200,000 gallons per month. The Lake View Consols is starting with a small retreatment plant and will require about 168,000 gallons per month to start, and will probably increase the quantity soon after starting.

"In the treatment plants generally very good results are obtained, although there are variations in the processes by the different managers.

"In the underground workings in the large mines expenses are down to a fine point, and everything worked on a system. A good system of taking out the ore and refilling the ground not only keeps down the cost per ton of ore broken but also minimises the chances of accidents occurring.

"Taking the serious accidents reported on during the year, a very small percentage can really be called serious accidents, as very few received lasting injuries. For statistical purposes, for comparison with previous years, the deaths by accident is the only reliable basis. Taking that as a standard, I am pleased to have to report we have for 1907 the lowest recorded since 1901.

"The fatal accidents for 1907 are twelve in number, and all these occurred during the first seven months of the year.

"The following are the totals of fatal accidents for the years 1900 to 1907:—

1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.
14	11	17	14	20	14	14	12

"The following is a list of accidents occurring in the East Coolgardie Goldfields during 1907, showing the mines in which they occurred and the percentage of accidents to the approximate number of men employed.

Mine.	Approximate number of men employed.	Fatal.	Serious.	Minor.	Total.	Approximate percentage of fatal accidents to number of men employed.	Approximate percentage of serious accidents to number of men employed.	Approximate percentage of minor accidents to number of men employed.
Associated	427	Nil	18	50	68	...	4.22	11.70
A.W.A. United	65	Nil	1	2	3	...	1.54	3.08
Associated Northern	117	1	4	8	13	.85	3.42	6.83
Brown Hill Extended	14	Nil	3	1	4	...	21.43	7.14
Chaffers	8	Nil	Nil	2	2	...	...	25.00
Croesus South	57	Nil	1	Nil	1	...	1.75	...
Golden Horseshoe	882	4	37	44	85	.45	4.19	5.0
Great Boulder Proprietary	645	1	40	50	91	.15	6.20	7.75
Great Boulder Perseverance	479	1	24	67	92	.20	5.01	4.0
Great Boulder Main Reef	44	Nil	2	7	9	...	4.55	15.91
Golden Ridge	83	Nil	1	2	3	...	1.20	2.41
Golden Eagle	2	Nil	1	Nil	1	...	50.0	...
Hannans Star	8	Nil	Nil	1	1	...	...	12.5
Hainault	230	2	11	26	39	.87	4.78	11.30
Hannan's Reward	70	1	1	Nil	2	1.43	1.43	...
Ivanhoe	635	Nil	34	72	106	...	5.35	11.34
Ivanhoe South Extended	8	Nil	Nil	1	1	...	...	12.5
Kalgurli	415	1	18	28	46	.24	4.34	6.74
Lakeside Reduction Works	12	Nil	1	Nil	1	...	8.33	...
Lady Agnes	4	Nil	1	Nil	1	...	25.0	...
Lake View Consols	354	Nil	18	27	45	...	5.08	7.62
Oroya Brownhill	319	Nil	23	48	71	...	7.21	15.05
Paringa	10	Nil	Nil	1	1	...	...	10.0
South Kalgurli	245	1	7	11	19	.40	2.86	4.49
Waterfall Gold Mine, Boorara	...	...	...	1	1	...	...	...
Total	5,133	12	246	449	706	.234	4.793	8.747

## Work done and Dividends paid, 1907.

Mine.	Shaft Sinking.	Driving.	Cross Cutting.	Rising.	Winzing.	Total Depth of Shaft.	Stone Crushed.	Dividends Yield for Year.	Total Dividends.
Ivanhoe ... ..	feet. 200	feet. 3,129	feet. 1,034	feet. 945	feet. 1,656	feet. 1,924	tons. 206,272	£ 240,000	£ 1,868,750
Hainault ... ..	266	1,743	517	425	206	1,014	46,705	7,500	40,613
Golden Horseshoe ... ..	117	3,566	836	...	1,942	1,650 (1) 630 (2) 2,030 (3)	247,020	255,000	2,520,000
Great Boulder Perseverance ...	196	4,391	1,578	...	1,700*	1,627	178,533	105,000	1,321,250
South Kalgurli ... ..	175	2,993	657	255	Nil	1,500 1,166	88,662	15,000	55,000
Lake View Consols ... ..	...	2,997	968	492	425	1,945	122,253	17,500	1,396,250
Oroya Brown Hill ... ..	141	3,115	3,954	925	217	1,087 (1) 1,533 (2) 600 (3)	133,395	258,750	2,067,491
Great Boulder Proprietary—									
Main Shaft ... ..	140					2,266			
Edwards Shaft ... ..	339	3,955	929	342	1,454	2,253	152,118	262,500	2,644,300
Hamilton Shaft ... ..	304					1,686			
Associated Northern ... ..	...	...	...	...	...	...	...	87,500	525,000
Associated ... ..	...	...	...	...	...	...	...	24,768	555,225
Kalgurli ... ..	...	...	...	...	...	...	...	210,000	585,000

\* Rising and Winzing.

"In addition to the dividends paid during the year, a large amount of machinery has been erected.

"On the Hainault G.M. new machinery erected during 1907 cost £30,787.

"On the Ivanhoe G.M. 3 grinding pans, 2 concentrating tables, 4 filter presses with hydraulic closing gear, 1 Differential Accumulator working pressure 3,000 lbs. sq. inch, 1 Vertical treble ram hydraulic pump, working pressure 3,000 lbs. per sq. inch, 1 Vertical treble ram pump 9in. x 18in. for charging filter presses.

"The Golden Horseshoe Co. have erected during the year a new winding engine at their main shaft, cooling tower, battery water supply tanks, superheaters, extended residue belt conveyor, Saw Mill and Fitting Shop plants, and installed a rock drill sharpening machine. In the main shaft double deck cages are now used. During the coming year an Air Compressor 1,000 H.P. and a Turbo Generator 750 H.P. are to be erected. A very large two-storied change house is being erected on this mine and when finished will be the most complete of its kind in Australasia. It is to be fitted with wash basins, shower baths, and swimming bath. Hot and cold water will be laid on. The swimming bath is to be emptied every day. Fresh water will be let in and when pumped out will be used for battery purposes.

"Great Boulder Perseverance Gold M. Co. have erected during the year 3 single cylinder air winches, 1 A.Z. agitator, binding roll lathe, 16 electric motors, switches, transformer meters, etc., electric fan-foundry complete, 2 sumps for roasters, mining ambulance, Hadfield crusher, ore bin main shaft, pump and pipe line for pumping tailings away.

"The South Kalgurli Co. have erected two Merton furnaces and one electric motor and, during the coming year, intend to erect one No. 8 Krupp Ball Mill.

"The Lake View Consols Co. have not been erecting machinery lately but intend to put up a Vacuum Slimes Plant at an early date.

"On the Great Boulder Proprietary G.M. the following machinery has been added: 10 Ridgeway filtering machines with 5 mixers to break up old tailings from dump for retreatment, also attachments, such as air and water pumps, sand pumps, agitators, etc. The retreatment plant is capable of treating

400 tons daily. Six new zinc boxes and a new zinc room have been added, a steam shovel, steam locomotive and 50 trucks are in use to handle the old tailings dump. The dry crushing mill has had 1 Ball mill and 100 tons Edwards Duplex Furnace added to it and 8 Merton furnaces have been lengthened. A 750ft. x 6ft. cooling conveyor has also been added. At the main shaft two Cornish boilers have been put in. It is intended to erect a vertical compound condensing Twin Tandem Winding Engine at Edward's Shaft capable of hauling from 4,000ft. deep, together with two Babcock boilers having a working pressure of 150lbs. per sq. inch. One Krupp No. 8 Ball Mill to the Sulphide plant together with the necessary conveyors and a 100 tons Duplex Edward's furnace.

"The erection of new machinery like this is a very healthy sign and shows that, although the deepest workings are below 2,200ft., the prospects are sufficient to induce the Companies to erect machinery to go still deeper.

"Explosives used in this district seem to be of good quality, and during the time I have been here I have heard no complaints. The fuse in use, and every fresh consignment, is tested by the Manager or his representative and in some cases the burning rate is posted up in the change houses.

"*Signalling.*—The knocker line signals work best for the signals to engine-drivers, but are not so satisfactory for return signals, and for this purpose the electric system answers best when properly laid down with submarine cables. When ordinary insulated wires are used I find they are very often out of order.

"Winding ropes and safety appliances on cages are generally kept in good order on the mines in this district. On the larger mines special men attend to these. The most systematic examination is carried out on the Golden Horseshoe G.M., where the cages are placed on the surface brace each morning before the men are lowered and every part examined and all moving parts greased. The side catches on cages used in a number of mines are not the best, as they are the old type where the connection with the rope is connected to the catches direct. In a deep mine there is a considerable amount of spring when an empty cage is being lowered quickly, and this is specially noticeable when a cage is being lowered in single gear and is likely to cause the safety catches to come into

action. There are now two departures from the old type of safety cage working on this field, designed for the purpose of preventing the catches gripping when an empty cage is being lowered. The guides in the shafts, on which the safety catches act, are, in most mines, too small. This is recognised and is being altered as early as practicable.

*Winding Engines.*—The winding engines on all the large mines have been kept in first-class order and the engineers deserve credit for the way they keep them. They run smoothly and haul large quantities of ore, as can be seen by the large monthly outputs. The engine rooms are large, but in most cases closed to keep as much dust out as possible. In doing this the fact has been overlooked that the steam increases the temperature of the room considerably above the ordinary shade temperature. In one case I found that when the shade temperature was 100 degrees the temperature at the driver's position at the engine registered 116 degrees.

"In the Mines Regulation Act the highest underground temperature allowed is 87 deg. F. We cannot expect to have anything like that at an engine-driver's position at an engine in summer time, but I think it would only be reasonable to disallow a temperature of over 5 deg. more than the shade temperature. The shade temperature has already registered up to 114 deg. this year, and when we consider that a man has to stand at the handles of an engine for eight hours and raise and lower men and material, I think it will be recognised that this is a matter worth consideration.

"During the five months I have been in the district, three cases of overwinding have been reported. One on the Kalgurli when the safety hook let the rope go but did not hold the cage; the side grippers caught and held the cage. In going over the poppet head wheel, the shackle broke a piece out of the wheel, which shows it must have been going up at a considerable speed.

"On the Great Boulder Perseverance an overwind occurred. The safety hook did not act but the rope pulled through the shoe and the safety side catches held the cage.

"An overwind also occurred at the Hainault G.M., when the safety hook acted and let the rope go and would probably have held the load in the absence of side grippers, but the speed carried it up a little higher and the safety grips caught and hung up, leaving the chain slack."

In an addendum to the above report Inspector Deeble draws attention to the discrepancy not infrequent on the field between the very low values of the tailings from the treatment plants as declared from time to time and the fact that several of the mines are installing retreatment plant. He also points out that the competition among managers for reduction of their figures of cost per ton may at times operate inimically to the interests of the shareholders in the mines. For example, if by incurring a further cost of 3s. per ton another pennyweight of gold, worth 4s., can be extracted, there is a strong temptation for the manager nevertheless to let the profit go, rather than show costs 3s. a ton higher than those of his neighbours.

Mr. S. Cullingworth, Relieving Inspector of Mines, who was associated with Mr. Deeble at the end of 1907 during the absence on leave of Inspector of Mines Mr. J. O. Hudson, has also reported on the

mines of the East Coolgardie Goldfield for which he has been more immediately responsible. He says:—

"The chief mines under my control on the Kalgoorlie field are being steadily developed and the shafts are gradually attaining considerable depths. In the outlying districts the progress is not so marked. It is pleasing to note that during the period, the Mine Managers and Mine-owners have always attended to any defects pointed out or any alterations required.

*Ropes.*—There have been no accidents through breaking of ropes: strict watch is kept on them and the records duly written up.

*Metallurgical.*—There does not appear to have been any radical metallurgical alteration made during the year. The average extraction, however, is now becoming very close and, according to the figures supplied by Managers, reaches in some instances to an extraction of 94 per cent.

"An innovation on this field is the installation of a producer gas engine at the Kalgoorlie Gold Recovery Co.'s Works. It has not yet been running long enough to obtain figures of comparative costs, but it would appear as though this type of engine has a good future before it.

"The Cassell process for the treatment of Slimes has been installed at the Croesus South, and is stated to give satisfactory results: as its installation is much less expensive than a filter press plant it should be of benefit to the smaller mines.

"At some of the mines, machines for sharpening rock drills have superseded hand sharpening and are great factors in saving time.

*Associated.*—Development work: The following particulars of development work and costs were supplied by the Manager:—

Driving ... ..	2,830½ft.	} For the year.
Crosscutting ... ..	3,064½ft.	
Rising and Winzing ... ..	2,106½ft.	
Plats ... ..	34½ft.	
Judd shaft ... ..	120½ft.	
Tetley shaft ... ..	2½ft.	
Total ... ..	8,159½ft.	

"Diamond Drilling 7,958 feet.

"The average working cost per ton of 2,000 lbs. is given as £1 0s. 5.5d. Tonnage and Yield: 118,369 tons (2,000 lbs.) were mined, yielding £237,927.

"An important piece of work now being carried on is the deepening of Waddington shaft from the No. 3 to the No. 10 levels. When this is down to the No. 10 (1,000ft.) it will greatly facilitate the working of the mine: it is intended to be used as a main sand pass. A level is now being driven at 1,700ft., this being the deepest yet attained.

"The mine is well equipped with a system of return electric signals.

*Kalgurli G.M.*—A new lode has lately been discovered on the surface of this property at the boundary of North Kalgurli lease, and some 400 feet E. of the main shaft. It is right in the roadway leading to the Mine offices and, from its trend, should, if it continues, pass underneath these buildings.

"At the point where it is now being worked by an open cut, extending from the boundary towards the mine offices, it is apparently some 30ft. wide and is stated to be of high grade. The dimensions of the cut at present are approximately 30ft. x 50ft. x 12ft. in depth. Sufficient work has not yet been done on it

to express an opinion as to its value. Cross-cuts are being put out from the main shaft to reach it at depth.

"The deepest working level at present is the 1,350 feet, which has disclosed a large ore body. The following extract, taken from Mr. R. S. Black's report to the directors reads:—

"It would appear that you have around the 1,250 feet and 1,350 feet levels, to the West of the main shaft, a high grade zone continuing over considerable length. Further exploration at these points will be full of interest, and deeper sinking is, as remarked above, promising of most valuable results."

"The following figures are taken from the General Manager's annual report;—

"Tonnage treated during the year ending 31st July, 1907—120,150 tons, an average of 10,012.5 tons per month. The total gold recovered was 84,076.55 fine ozs., equal to 14dwts. per ton. The treatment costs are given as 12/6.76 per ton. Mining costs 7/4.85 per ton.

"The amount of development work during the year is given as 10,384ft., including—

Sinking the main shaft—227ft.  
Diamond drill bore holes—777ft.  
Test holes bored—3,610ft.  
Widening—2,805ft.

the remainder being winzing, rising, driving, and cross-cutting in the various levels.

"*The North Kalgurli.*—After lying idle, or almost so, for some years, this mine is again being worked in a vigorous manner—some 50 or 60 men being employed. The new lode mentioned as having been found in the Kalgurli boundary is about to be worked from the North Kalgurli side by means of an open-cut. It is yet too early to say what are the prospects of success. Just South of the main shaft a large low grade ore body is being worked, also on the open-cut system. The ore is of very low grade, the last crushing yielding only 2dwts. 9grs. per ton. The holders, however, expect to make it a payable proposition.

"*Croesus South.*—A few parties of tributers only have been at work during the year, their work has not disclosed any fresh ore body. The large accumulation of slimes is being rapidly treated by the Cassell's process.

"The Kalgoorlie Amalgamated has been worked by tribute parties, but not on any extensive scale.

"*Hannan's Reward and Mount Charlotte.*—Work has been vigorously carried on. The following particulars are supplied by the general manager:—

Tonnage treated for year—28,613 tons.  
Yield therefrom—5,382ozs. 0dwts. 12grs.; value £20,044 15s. 6d.

Development work, in feet—3,000ft.

"The open-cut has now reached large dimensions, being approximately 300ft. long by 50ft. wide by 80 feet in depth. Ore is also being mined and crushed from Nos. 1, 2, and 3 levels in the Hannan's Reward mine.

"*Boulder Deep Levels and Hannan's Star.*—At these mines, now administered from one office, only a small amount of development work has been done. Parties of tributers have been working with varying success. Driving is now being carried on at the 1,100 feet level from the Boulder Deep shaft. It is hoped a more vigorous policy will be pursued in the coming year.

"*Idaho.*—The owners of this lease have lately erected a 10-head battery, and expect to start crushing almost immediately.

"*Kanowna.*—Mining is dull around this centre, the only company carrying on operations of any magnitude being the North White Feather, where, on the Lily lease, work is carried on as usual. The manager has supplied the following figures of development work and costs:—

		feet.
Sinking main shaft	..	116
Rising	.. ..	1,045
Driving	.. ..	1,192
Cross-cutting	.. ..	252
		---
Total	..	2,605
		---

"Tonnage treated, 23,232 tons for 9,223ozs. of bullion. The main shaft has reached a depth of 930ft., and No. 9 level at 914ft. is being opened. The main ore supplies are obtained from the stopes above No. 7 and 8 levels. Judging from appearances, the lower levels appear to be opening up very well, the stopes on the shoots being from 10ft. to 15ft. wide. The manager informs me that although the ore is not high grade, he considers the bottom levels very promising.

"Filter presses are now being installed, and it is expected they will be at work within a few days.

"Milling costs have been reduced from 12s. 5d. to 10s. 6.3d. per ton.

"*White Feather Main Reefs (1906), Ltd.*—The mine has only been worked by tributers, who have raised during the year, according to the figures supplied by the manager, 7,609 tons, yielding 2,116.75 ounces, value (approximately), £7,514 9s. 3d.

"*Gentle Polly Mine, Red Hill.*—Owned by a party of working miners still continues to give satisfactory results; about 22 men are employed. The tonnage from January, 1907, to December 31st, 1907, was 1,324 tons, yielding 3,741.5ozs. The deepest shaft is 120ft., the country is hard and the veins are small flat leaders.

"*Moonlight Lead.*—A 10-head battery has lately been erected on this old alluvial lead, the intention being to crush the bottoms and headings. Some two or three feet of the roof above where the alluvial wash has been and about the same thickness of rock beneath the wash has been found to carry a small quantity of gold. The work is not yet far enough advanced to give any particulars of costs or yields. It is expected, however, that 7s. or 8s. will cover all costs of mining and milling.

"Very little work is being done on the North Lead. A lode formation, apparently of good width, has been found below the old alluvial workings. A trial crushing of 40 tons has yielded 8dwts. by battery, with 9 dwts. in the tailings. Further prospecting will be followed with interest.

"The sands and slimes at the Last Chance are being cyanided by Messrs. Moss Bros.

"In the Bulong and Randall's districts, very little progress has been made during the year. The Queen Margaret is practically shut down with the exception of a few tributers.

"The Majestic has been re-taken up. The present owner calculates there are 4,000 tons of stone of good grade in sight.

"The New Santa Claus has been worked steadily, but appears to be suffering from lack of capital to open up and equip."

## COOLGARDIE, YILGARN, AND DUNDAS GOLDFIELDS.

Mr. J. Crabb, Inspector of Mines, has dealt very fully with his district, in a report dated 16th January, 1908, which is submitted hereunder, in a somewhat abridged form.

The report of the Inspector of Mines, Mr. J. Crabb, is dated 16th January, 1908. He says:—

“Good progress has been made during the period under review. With few exceptions the various mining districts are expanding in productive area, and adding new properties to the list of producers.

“Although there are now slight disadvantages, these fields possess many advantages which tend to secure their permanency as great gold producers.

“Some of the distinctive features of the year’s developments have been the attention directed toward increased efficiency of working, and the determined efforts made to convert to commercial account low-grade ore, which was hitherto regarded as unpayable. In some cases these endeavours have afforded most encouraging results, and must eventually lead to the working of numerous other low-grade ore bodies that are known to exist in many parts of these fields.

At the Never Never G.M., Yilgarn Goldfield, ore is being mined for 1s. 3d. per ton, milled for 3s. per ton, and cyanided for 3s. 6d. per ton, or a total cost of 7s. 9d. per ton for mining and treatment. At the Queen’s Cross G.M., Coolgardie, ore is being mined and milled by a party of tributers for a total cost of 5s. per ton, but a reduction is expected to be made both in mining and milling owing to improved methods in mining, and water being obtained at a lower rate for milling purposes.

“A few years ago it was thought to be practically impossible to mine and treat ore at such low costs, consequently, only high values were sought or mined, the low-grade ores being left in the mines, or from necessity removed to the mine dumps. Improved conditions and methods, however, have changed this, and plants are now erected to reap profits from the large and more persistent low-grade ore bodies rather than from the high-grade ore shoots which characterised the operations a few years ago.

“It is of course obvious that the real interests of the mining industry lie in the mining of our low-grade ore, and by reducing the cost of treatment at the various mills, etc. I feel we can look forward with considerable confidence for much greater prosperity. Up to the present our goldfields have not been half explored, and there is no doubt that for many years to come the mining industry will lead all other industries of this State.

### COOLGARDIE GOLDFIELD.

“Since the year 1894, the value of gold produced from the Coolgardie Goldfield has now almost reached £5,000,000. During the year under review there has been a decrease of about 2,000ozs. compared with previous year, of a few hundred ounces below that of 1896, a period when mining was considered to be in a most flourishing condition. Notwithstanding the slight decrease that has taken place, I fully expect to see an improvement during the next few years.

### THE MINES.

#### COOLGARDIE DISTRICT.

“*Bayley’s Mine* (135, etc.).—In April last this property was sold, and is now known as the ‘New Bayley’s Mines, Ltd.’

“Mr. D. W. Welch, who has been placed in charge, is now having some important development work carried out, and it is expected that before very long good ore will be opened up, and profitably dealt with.

“There are three distinct lines of reef on this property, which have been opened up from three main shafts known as the ‘Sylvester,’ ‘Price,’ and ‘No. 1 South.’

“The Sylvester shaft has been sunk to a depth of 523ft., and levels have been opened out at the 100ft. level, 170ft., 280ft., 380ft., and 480ft.

“A considerable amount of high-grade ore has been mined from the vein opened up by these workings. At the 380ft. level a cross-cut has been put in 50ft., at the end of this cross-cut the line of reef, it is said, was intersected. It seems that a fair amount of work was done at this level, but not much of importance was developed. It was the cap of this vein that the celebrated ‘Bayley’s Find’ took place.

“*No. 1 South Shaft*.—This shaft has been sunk to prospect a vein which runs parallel and to the South-west of above mentioned. Levels have been opened out at 90 feet, 120 feet, 170 feet and 230 feet. At the 230 feet level a considerable amount of driving has been done to the north and south of shaft. The vein here averaged 9 feet in width.

“*Price Shaft*.—This shaft has been sunk to a depth of 1,020 feet and levels opened out at 100 feet, 170 feet, 250 feet, 380 feet, 480 feet, 600 feet, 800 feet, 900 feet and 1,000 feet. During the last few years the principal work has been carried on from this shaft. From the 1,000 feet level a bore was put down 468 feet, but it seems, owing to bore deflecting, little or no valuable information was gained.

“A great deal of work has been done on the mine during the year by tributers, who have done very well. Norwal and party, who had the mine on tribute for a period of six months treated 457 tons for a return of a little over 3,500ozs.

“The total value of the mine’s output is estimated at about £405,000, and about £300,000 has been paid in wages.

“*Bayley’s Consols G.M.* (22).—The ore bodies that have been opened up in this property closely resemble those opened up in New Bayley’s G.M. A shaft has been sunk to a depth of 320ft., from which the principal amount of work has been done. Levels have been opened out at 120ft., 200ft., and 300ft. Very little has been done on this mine during the last twelve months or so, and water is now standing at about the No. 1 level. A considerable amount of fairly high-grade ore was taken out from below the No. 3 level by means of underhand stoping. It seems to be the general opinion that this mine has not been given a very good trial yet.

“The vein which is said to average about 5ft. in width, trends in a North-Easterly direction, with a slight dip towards the West.

“The total quantity of ore treated, which amounts to 14,042 tons has produced 10,790.97ozs., or an average of a little over 13dwts. per ton.

“*Queen’s Cross G.M.* (4152/3).—During the year, this mine has been worked by a party of tributers, who have been mining and milling ore which averaged about 1½dwts per ton. Notwithstanding this very low-grade, they made an average wage of £4 per week.

“The ore, which is easily mined, was taken out on the open-cut system from a large lode that strikes North-South through the property.

“The material, on being broken, was allowed to go into a pass leading to No. 1 level. From this pass it

was loaded into  $\frac{3}{4}$  ton trucks, and hoisted to surface by means of a small steam hoist, and dumped into a bin at brace, and from this bin it was trammed to battery by means of a horse, where it was put through a 10-head mill.

"The tributers are now opening up another portion of the lode at a point 60 yards North of the battery. A shaft has been sunk to a depth of 80ft., and a drive has been constructed for a considerable distance north, which connected with some old shafts that were sunk on the lode a few years ago, for the purpose of mining the richest portions of it. From these shafts open-cuts will be commenced, and ore will be conveyed to battery in the same manner as above described, with the exception that horse tram will be done away with, a line having been laid from brace of shaft to battery at such a grade as will allow of bracedmen taking loaded truck there, thus effecting a considerable reduction in cost of transport.

"The last parcel of 1,450 tons treated gave a return of just a little over  $1\frac{1}{2}$ dwts. per ton. In dealing with this quantity, £25 was paid for the use of the battery, £19 8s. royalty, £20 for water, £97 for firewood and haulage, and £281 5s. for wages.

"Water for milling purposes was obtained from what is known as Campbell Dam, which is situated a few chains South-West of the mine, for 1s. per 1,000 gallons. This source of supply, however, is now exhausted, and water is being obtained from King's Cross G.M. for the same price.

"Owing to the reduction that will be made in the cost of haulage, and the slightly improved conditions in connection with the breaking of ore, it is estimated that 1dwt. ore will be made pay. Very much better values than this are, however, expected.

"Rose Hill G.M. (226).—There is a large ore body trending through this property in a North-South direction, having a dip towards the East. At the present time the principle work is confined to stoping just above the No. 2 level. This ore body has most unusual characteristics, and the gold occurs in a most extraordinary manner. In driving along the lode at the above-mentioned level, which is 180ft. from surface, a series of small quartz veins, ranging from a few inches up to two feet in thickness occur at distances a few feet apart, which cut through the lode, almost at right angles. These veins have been proved to extend for several feet into the country, both on foot and hanging wall side, and to dip at a sharp angle towards the South. They are estimated to be of slightly better value than the main lode material whilst in contact with it, but immediately they enter the walls of the main lode, they are barren.

"This mine was worked for a time by a party of tributers, who did their drilling by hand, but owing to the hardness of the lode material were unable to make wages, and consequently gave it up.

"Mr. Roberts, who is the owner of the property, being convinced that the ore was of sufficient value to warrant another trial, has within the last twelve months installed a first-class rock-drilling plant, with the result he is now making a good profit.

"At the time of a recent visit to the mine, it was estimated that there were about 8,000 tons of ore in sight, worth 30s. per ton.

"The ore on being raised to surface is passed through a rock-breaker, erected near the brace of shaft. On being dealt with at breaker, it is carted to the King Solomon G.M. (a distance of about 20 chains) for treatment,

"It is intended to sink the main shaft another 100 feet shortly, and should developments at this depth warrant the erection of a 10-head mill on the mine, it will be at once undertaken. It is to be hoped that developments will prove satisfactory at this point, for in all probability it would lead to the development of the lode outside the lease, and to giving an impetus to mining in this locality.

"*Coolgardie Redemption G.M.* (3918).—This property, which consists of 18 acres, is situated a short distance East of Coolgardie townsite.

"A short time ago it was owned and worked by Messrs. Mitchell and Sons, but it seems, owing to their inability to cope with an inflow of water, etc., at the bottom workings, they were unable to continue operations. Water was allowed to rise, and the mine has been flooded since the time operations were discontinued.

"During the time it was owned by the above-mentioned, it is estimated that 4,397 tons of ore were treated at battery for a return of 3,744.88ozs., and that specimens dollied gave a return of 1,257.62 ozs., or a total return of 5,002.5ozs., having a value of a little over £20,000.

"The vein on this property trends North-South, and dips at a sharp angle towards the East. It is reckoned that the principal bulk of the gold obtained came from a series of chutes, that pitch towards the South. Just prior to the mine being flooded, work was confined to below the 300ft. level.

"Of late the mine has been taken over by a company who are now sinking a fine vertical shaft and installing a large pump. Good progress is being made and it is expected that before long the mine will be in a most flourishing condition.

"*Garden Gully G.M.* (4197, 4189).—This property which has been worked in a very spasmodic manner during the last eight years or so, was taken over a few months ago by a company, during which time there has been a considerable amount of activity in erecting machinery and developing the mine. The company at first intended to install a 20-head mill, but in order to commence crushing operations as early as possible, it was decided to erect a 10-head. This work was taken in hand a few weeks ago, and the mill is now in operation.

"Mr. J. W. Turner, the company's mine manager, reports of the property as follows:—"The prospectors of 10 years ago had directed their efforts to the working out of two leaders, one six inches and the other eight inches or nine inches wide (these gave returns of 14dwts. over the plates). I found by carefully sampling that the lode on each side of the leaders gave values from 3dwts. to 4dwts. Cross-cutting this body of ore proves the lode to be 45ft. wide from wall to wall. It is of a sandstone formation intersected with bands of ironstone and quartz, carrying values far and above 3dwts. or 4dwts. already quoted on the bulk of the lode.

"On this immense body of ore we have driven North 80ft. and South 60ft., stoped 15ft. high in the North end, and timbered same, and in the same end put rise up to surface 35ft., ensuring a supply of good air throughout the whole of the workings, and making travelling way other than by the shaft. From this rise and looking North about 100ft., we have sunk a small shaft from the surface 35ft. At the South of the rise at the 50ft. level there is a chamber cut and timbered, bearers put in, and windlass rigged over a winze, which we have sunk to 100ft. This winze has been sunk in valuable ore all the way down,



and the returns of our first crushing from the Eastern lease will be from this winze. I may here state that it will materially increase the profits of the company, and minimise the working costs by less handling and haulage to connect the winze and shaft at the 100ft., and with this object in view I have let the shaft (which is in hard diorite) at 30s. per foot contract for 50ft., and it is now down 75ft. The remaining 25ft. I hope to see down during this month's crushing, and if so, with cross-cut connection in, we shall be in a good position to break ore cheaply when the 20-head mill is handed to us on February 20th, 1908. On the Western lease two shafts have been sunk on the lode 100ft. deep each, making four at that depth for the whole length of the lease. To connect these just now would be too expensive and too slow, but in the very near future these workings will be necessary, and will cheapen the cost of working this great body of ore, which in places is 90ft. wide. On this lode and in one of these shafts (No. 2), at the 50ft., there is a level from which in the past crushings were taken, and the extraction values were as high as 11 dwts. over the plates, and 3dwts 14grs. in the tailings, but with disuse and time these workings had fallen in, and made it dangerous to go into if only to inspect. For 50ft. or 60ft. I have had these workings picked up and securely timbered, and I am now getting ore out of these places for the mill, and I have no hesitation in leading you to expect a 6dwts. or 7dwts. return for the tonnage crushed during this our first month's run. South of the leases 4197 and 4189, and adjoining same, I have been fortunate in obtaining, since the company's formation, an 18-acre prospecting area. It is traversed by our Western lode upon which there are two shafts sunk to a depth of 50ft. each, and we have driven on the lode at that depth a matter of 30ft. North and South, and a cross-cut through lode for a distance of 40ft., in values about 4dwts., which, with a 20-head mill, means a handsome return.

"It will be seen from the foregoing report that no greater than 6dwts to 7dwts. ore per ton is expected and that in dealing with 4dwts. ore per ton profits are expected to be made. The success of this mine will no doubt be the means of inducing others to develop other low-grade shows in the district, and turning them to profitable account.

"*Tindal's Coolgardie G.M. Coy., No-Liability* (20, 33, etc.).—This property, which embraces an area of 50 acres, is situated about two-and-a-half miles in a Southerly direction from Coolgardie.

"The large lode that trends through this property was for a considerable time worked on the open-cut system, but owing, however, to the disadvantages that had to be contended with at depth, it was eventually decided to abandon this system, and develop the mine by means of a vertical shaft. This work was taken in hand some little time ago, and shaft was sunk to a depth of 220ft., and levels opened up at 130ft. and 200ft., which have proved the lode to extend for several hundreds of feet in length, and to be of much better value in the bottom workings than in the upper. The ore treated from the open-cut, which amounted to 50,000 tons, gave an average return of a little over 2½dwts., whilst that taken from the bottom levels ranged from 5dwts. to 10dwts. per ton, the average value being estimated at 8½dwts.

"The following report made on this mine a short time ago will doubtless be of interest:—'The first improvement in the grade of ore really took place at the

130ft. level. From the West cross-cut at this point a North drive was put in, but after proceeding a comparatively short distance the lode faulted; but at 45ft. in again got on her true course. At a point 75ft. in she widened out to 15ft., and was worth over all 7dwts. per ton. A fair amount of stoping has been done here, and the stone taken from the stopes and the level averaged 5dwts. 22grs. per ton. At 102ft. in the drive under notice, the No. 1 North winze is connected with the 200ft. level, values for the depth between the two levels averaging 8dwts on a vertical lode. This drive is in 300ft. from the shaft, and a short distance back a No. 2 winze has been started. This winze is down about 18ft., and values over a width of about 10ft. are about 15dwts or 16dwts. per ton. Ten feet from the face of this drive the lode faulted, but is now coming in again from the Eastern side, and for the 3ft. or 4ft. exposed is worth 6dwts. per ton. The South drive at the 130ft. level is in about 200ft. from the shaft, and the ore at present in the face is worth 6dwts. per ton, the values from the stopes and level for the full distance driven being 5dwts. 22grs. The No. 1 South winze is connected with the 200ft. level, and a No. 2 winze has just been started. A sample of stone taken out from this latter winze assayed 9dwts. 19grs. Thirty feet back from the face of the South drive a West cross-cut has been put in, and the continuation of the big open-cut lode struck. It has been proved for a width of 40ft., and the assay value is 5dwts per ton. For 12ft. past the lode they were in country, but then another lode was met with, which assayed from 2dwts. to 3dwts. per ton. This cross-cut is in 55ft., but no work is being done here at present. The big lode at this level is worth 5dwts. per ton, and nothing has yet been done on it at 200ft.

"The indications at the bottom level are even more promising. From the East cross-cut a North drive was put in, and the East lode proved for a width of 16ft. This drive is now in 200ft., and for the full distance driven, the stone, which averaged 13ft. wide, was worth about 8½dwts. per ton. A material improvement has, however, recently taken place, and in the face at present they have some splendid stone, which is fully 18ft. in width, and assays 17dwts. per ton. South, at this level, at a point 112ft. in, they touched the big lode which turned the East lode. The drive was then turned in a South-Easterly direction, and they are now in some 48ft. The stone had a width of from 8ft. to 10ft., but the best of the gold is in the centre for three feet. The values are from 5dwts. to 6dwts., and are still improving. The face of this drive is now practically under the No. 2 South winze, coming down from the level above. Where the East lode was turned, the big lode is fully 40ft. wide, and worth 3dwts. per ton.

"A 10-head Fraser & Chalmers battery is about to be erected on the mine, and also necessary and up-to-date appliances, which will of course enable the company to deal very much more economically than is being done at present.

"*Griffith's G.M. (73 and 1902, etc.)*.—During the past year this mine has been worked principally by tributers, who have, I understand, done very well. The tributers confined their work almost entirely to stoping above No. 1 level. The small blocks of stone, however, on which they have been working are now almost exhausted. The owners now propose to sink the main shaft another 100ft.

"*Burbank's Main Lode, Limited* (2985, etc.).—Splendid progress has been made on this property.

An additional 10-head of heavy stamps have been installed and several other important and valuable improvements have been made, which have enabled the company to carry on operations in a very thorough and economic manner. This mine is said to be opening up well at the bottom levels, and never looking better than at present.

"From the main shaft, which is now 480ft. in depth, four levels have been opened up, and another is now being constructed from the bottom of a winze sunk from the No. 4 level. It is proposed to cross-cut from this level to a point directly under the main shaft, and then rise and connect to bottom of shaft. After this connection is made the shaft will be squared and timbered down to No. 5 level. The object in deepening the shaft in this manner is to avoid the handling of large quantities of water that would be met with in sinking.

"A hoist has been installed at No. 4 level to raise all material whilst this work is being carried out, and an electric pump placed at No. 5 level to deal with water during the same period. It is estimated that a considerable saving will be effected by the adoption of this method.

"At present the principal work is being carried on between No. 5 and No. 3 levels. At No. 4 level the lode has been proved for a distance of 750ft. in length, and to average nearly 2ft. in width.

"The total output from this mine up to the present is 39,693 tons for a return of 22,867ozs. over the plates, and 36,277 tons tailings treated for a return of 4,925ozs.

"*Burbank's Birthday G.M., Ltd.* (134 and 135, etc.).—During the last twelve months or so the mine has been worked principally by tributaries, who, I am given to understand, have done very well. The tributaries have been let for various parts of the mine, with the result a considerable amount of ore has been mined that would not have been only for the tribute system. On an average about 40 men have been engaged in this work.

"The developments that were carried out at the 800ft. level some time ago did not prove to be very satisfactory, with the result water has been allowed to rise up to No. 4 level. To date, about 153,000 tons of ore have been treated for a return of 138,000 ozs.

"*Lady Robinson G.M. Coy.* (2160).—At present stoping operations are being carried on at the 180ft. and 200ft. levels. At the 200ft. level the lode is reckoned to be 8ft. wide, and to be worth 10dwts. per ton.

"It is the intention of the company to drive South at the 100ft. level at an early date, for the purpose of opening up a large body of ore. A fair amount of stone is treated at this mine for the public. For the period under review 462 tons were treated for a return of 192ozs. 19dwts. To date, about 15,330 tons have been treated for a return of a little over 7,133ozs.

"*Prospecting Area No. 24.*—This property is situated about one mile North of Burbanks. It was worked for some time in the early days, but very little was done then, beyond sinking two vertical shafts to a depth of 100ft. After being idle for a period of about eight years, it was taken up by Carson and party, who are now driving North at the 100ft. level, which is now in a distance of 40ft. The reef here averages about 2ft. in width, and is reckoned to be worth 10dwt. per ton. It is estimated that there are now about 200 tons of ore in sight. A parcel

of 31 tons recently treated at the State battery gave a return of 12½ozs. over the plates. After the above-mentioned block is taken out, it is proposed to sink shaft to 150ft. It is thought that there is a very fair future for this mine.

"*Prospecting Area 172.*—This property consists of 18 acres, and is situated a few chains West of P.A. 24. There is a large lode formation—about 80 feet in width—trending through this area in a North-Easterly direction. Several shafts have been sunk on it from time to time to an average depth of 50ft. on the richest portions of the lode. The last parcel of 20 tons gave a return of 10dwts per ton. The present holders are now driving North at 40ft. from what is known as No. 3 shaft, on ore they estimate to be worth about 12dwts. per ton.

"*Glenloth South G.M.* (4168).—Some very rich stone has been taken from an underhand stope, No. 1 level, within the last 12 months; some of the parcels having returned as much as 2oz. and 3oz. per ton. The last parcel of 20 tons gave a return of 1oz. per ton. This property is situated a few chains South of P.A. 24.

"*Boshter G.M.* (4029).—This property consists of six acres, and is situated about one mile South of Burbanks. The vein that trends through this lease North-South and dips towards the East has been opened up by means of an incline shaft, sunk on the vein, to a depth of 100ft. Drives were driven North and South at the bottom, and 943 tons have been stoped out for a return of 596.07ozs.

"*Shamrock Ale* (3939).—This property is situated a few chains West of the Boshter. Some very good stone is now being raised at this mine. Quite recently a parcel of 30 tons gave a return of 3ozs. per ton. Up to the present a little over 600 tons have been dealt with for a return averaging 1oz. per ton.

"*Lord Bobs G.M.*—This property, which is situated about seven miles from Coolgardie in a South-Westerly direction, was taken up about two years ago by a local syndicate. In the initial stages of the prospecting work, prospects were not very bright, the only thing that was considered of value was a small leader, that averaged about six inches in width, and was worth about 10dwts per ton. To test the value of this leader at a depth, a vertical shaft was sunk on its hanging wall side, and when it attained a depth of 50 feet a large ore body was struck that was found to be worth about 2ozs. per ton. Drives were at once commenced on the ore, and after a considerable amount of driving had been done, each way on the lode, stoping operations were commenced, and the following will show the value of the ore treated up to date:—

"Since May, 1906, 2,272 tons have been treated for a return of 4,595ozs. over the plates, which has enabled the 16 shareholders to divide £12,560, which represents £785 per share.

"*Cheapside G.M.*—This property, which is owned by Marrett Bros., is situated about two miles South of the Lord Bobs G.M. There is a large reef trending East-West through this property. A vertical shaft has been sunk to a depth of 150 feet, and a drive put in East for a distance of 40 feet at this level. From this level a winze has been sunk to a depth of 80 feet, and at present a drive is being put in East on the reef from the bottom of this winze. The reef is estimated to average about 5 feet in width, and to be worth about ½oz. per ton. To date, about 2,200 tons have been treated for a return of close upon 1,300ozs.

"*Grosmont G.M.* (4062).—There is a large lode formation being worked on this property, but the mine is placed at a disadvantage in regard to crushing facilities. It is what may be termed a low-grade show; given better facilities, however, it seems that the ore could be turned to very profitable account.

"*Sunbeam G.M.*—This property is situated about one mile East of the Cheapside G.M. Some little time ago it was let on tribute to Cassin and party, who are now taking out a crushing from above the 50 feet level. The reef here is estimated to average 80 feet wide. There was at the time of my last visit a parcel of stone at grass, which was estimated to be worth 14dwts. per ton.

"*Prospecting Area 18.*—Some little time ago some rich floaters were found on this property, which on being assayed was found to be worth 10ozs. per ton. Encouraged by the results obtained from these floaters a start was made to pick up the reef that shed the stone, and after a month or five weeks' prospecting it was located. A shaft was then sunk to a depth of 40 feet, and a drive put in on the stone, which averaged about 6 inches in width. A parcel of 24 tons obtained from this level gave a return of 1oz. 4dwts. per ton. At the time of my last visit to the mine in the latter part of December there was a parcel at grass, that was estimated to be worth a little over 1oz. per ton. It is proposed to sink another shaft to a depth of 100 feet about 50 feet South of present shaft. It has been found that there is a rich chute pitching towards the South, and the new shaft it is reckoned will cut the south end of the chute, at above-mentioned depth. This show is situated one mile North of the Cheapside G.M."

#### BONNIEVALE.

"*Westralia and East Extension G.M.*—Good progress has been made on this mine considering the nature of the ore body and the manner in which the gold occurs. The reef has now been developed to a depth of 1,300 feet, at which depth it still maintains its width. In November last 2,120 tons were treated for a return of 1,079.01ozs. Sands amounting to 1,680 tons were treated for 87.7ozs. Slimes, 1,164 tons, produced 114.85ozs. From 11.5 tons of concentrates 56.7oz. were obtained.

"Apart from the Westralia and East Extension very little mining is being done. The Vale of Coolgardie and the New Victoria Consols are being worked by tributers."

#### JOURDIE HILLS.

"There has been a fair amount of activity at Jourdie Hills during the last twelve months or so, and some of the mines that are being developed give very good promise.

"*Jourdie Enterprise G.M.*—Two shafts have been sunk on the reef, which averages about 3 feet in width, to a depth of 100 feet. These shafts, which are 50 feet apart have been connected at bottom, and have proved the reef to be worth about 10dwts. per ton.

"*Pride of the Jourdie G.M.*—This mine is now being worked by a party of tributers. At the time of my last visit a winze was being sunk from the No. 2 level on stone estimated to be worth 2ozs. per ton.

"*Pride of the Jourdie North.*—At the time of my last visit to this mine the 180 feet level was being driven North on stone 15 inches wide worth about 10dwts. per ton,

"Graham and party, G.M.L. 789S, have just put through a parcel of 117 tons for a return of 38.95ozs. and 87 tons for 43½ozs. A fair amount of development has been done on the reef, which has been proved to average 6 feet in width.

"*Griffiths and Party, P.A.*—A fine body of ore has been opened up on this area by means of incline shafts which have been sunk on the stone.

"The reef can be traced from one end of area to the other, and is reckoned to be worth 8dwts. per ton, and to average about 4 feet in width."

#### CARBINE.

"*Carbine G.M.*—At present the principal mining operations are being carried on at the No. 4 level, where the lode still continues to maintain its width and values. A rise is now being put through from this level to connect with a prospect shaft, that has been sunk to a depth of 80 feet. This rise is now up about 305 feet, and it is expected that a connection will be made very shortly. This rise has been put up with hand labour. The ventilation (natural) throughout has been fairly good. The last crushing of 180 tons gave a return of 126ozs.

"*Spearment G.M.*—This property is situate a little to the West of the Carbine G.M. At present a main shaft is being sunk to a depth of 225 feet, at which depth it is proposed to drive each way on the ore body, which averages about 2 feet in width. Some very good stone has been treated from this mine, the last parcel of 50 tons gave a return of 32dwts. per ton.

"*Carbine South G.M.*—A vertical shaft has been sunk on this property to a depth of 400 feet, and a cross-cut put in west a little over 285 feet and east 15 feet for the purpose of picking up the Carbine lode. Up to the present, however, the company has not met with success."

#### KUNANALLING.

"Mining at Kunanalling just at present is very quiet. The principal mines working are Star of Fremantle, Bluebell, Shamrock, Premier West, Hopeful, and Inkerman.

"*Star of Fremantle G.M.* (645 S.).—Of late the bottom level is being driven North on very good stone. It is reckoned that a connection will soon be made with a winze that has been sunk from No. 2 level. When this is effected a start will be made to stope the ore from below this level. Quite recently some very good stone was struck which is estimated by the owner to be worth 3ozs. per ton.

"*Blue Bell G.M.* (727S).—At the time of my last visit to this mine the 100 feet level was being driven South on highly payable ore, and stopping operations had just commenced over the back of this level. The reef being worked averages about 18in. in width, and is reckoned to be worth 15dwts. per ton.

"*Shamrock G.M.* (602 S.).—Of late a considerable amount of development work has been done, and ore worth about 94s. per ton has been opened up. To date about 2,500 tons have been treated for an average return of 1oz. per ton.

"*Premier West G.M.*—This property was taken up some little time ago by Cox and party, who installed a hoisting plant for the purpose of cleaning out an old shaft, and to further prospect the mine at a depth of 120 feet. Up to the present results have not been very satisfactory.

"*Hopeful G.M.*—A vertical shaft has just been sunk to a depth of 140 feet, and a drive put in East

on stone at this level has opened up some very rich ore.

*Inkerman G.M.*—Some very good stone has been opened up on this mine within the last twelve months. The last parcel of 113 tons gave a return of 242ozs. over plates.

*The London G.M.*—A parcel of 98 tons just treated gave a return of 37.65ozs."

#### BALGARRIE.

*United Australia G.M.* (622 S.).—There is a very large lode trending through this property, which is estimated to average 100 feet in width, and to be worth about 7dwts. per ton on an average. To date 350 tons have been treated for an average return of 11dwts. per ton.

"The scarcity of water seems to be a great drawback to this locality. It seems to be the general opinion that if provided with a good supply of water and a suitable plant, it would develop into one of the largest mines on the fields."

#### ORA BANDA.

"Since the installation of Freidman and Johnson's 15-head mill in this district rapid progress has been made, which clearly demonstrates the valuable assistance a mill can render when placed within easy reach of low-grade shows.

"The Slippery Gimlet is now under offer to Messrs. G. Price & Co. for £8,000, and from what I can learn developments are proving very satisfactory.

"Generally speaking, mining is fairly brisk, and the outlook of the district very promising, and on my next visit I hope to be able to see my way clear to recommend some provisions being made for a better supply of water for domestic purposes."

#### WIDGIEMOOLTHA.

*Prospecting Area 266.*—This area is being worked by Mathews and party. It consists of 12 acres and is adjoining the Flinders on the North.

"In the early days it was worked by Brookman & Co., who obtained a large quantity of gold from some of the small leaders. The vein on which Mathews is working is supposed to be the continuation of the Flinders. A parcel of 6½ tons just treated gave a return of 12¾ozs.

*Flinders G.M.*—This property is now let on tribute. Some very rich stone has been obtained from this mine from time to time. To date 220 tons have been treated for an average return of about 4ozs. per ton.

*Prospecting Area 260.*—This property adjoins the Flinders on the South, and the vein being worked is supposed to be the continuation of the Flinders. A parcel of seven tons just treated gave a return of 11.50ozs. over plates.

*Yorkshire Lass G.M.* (3906).—A drive is now being put in North at 40 feet level on main reef. At 80 feet level drives have been extended South 50 feet. Reef here averages three feet in width, and is estimated to be worth 14dwts. per ton. The stone being taken from 40ft. level is reckoned to be worth 1oz. per ton. A little to the West of the main reef a little work has been done on what is known as No. 2 lode. It averages five feet in width and is reckoned to be worth 12dwts. per ton.

"Several other reefs have been opened up to depths ranging from 40 to 120 feet which have been proved to be worth from 4dwts. to 1oz. per ton,

*Golden Stream.*—A vertical shaft has been sunk 22 feet on a lode formation which, so far as proved, averages eight feet in width and is said to be worth 1oz. per ton. This is reckoned to be one of the most promising shows here."

#### HIGGINSVILLE.

"Very good developments have taken place at this centre during the year, and the opinion I expressed regarding the possibilities of the auriferous belt a few years ago has been borne out by results. Several promising shows have been opened up. At the Hidden Secret, developments have been so satisfactory as to warrant the installation of a ten-head mill at an early date. On this property a shaft is now being sunk on the reef for the purpose of obtaining a sufficient supply of water for milling purposes, and the latest information received is to the effect that a good supply has been struck, and that the reef is not only widening but is improving in values. When this mill is erected and public crushings undertaken, it will, in my opinion, prove to be of great benefit to some of the claim holders near by.

"A little South of the Hidden Secret, leases 4248 and 4254 are being worked by P. Hannon and O'Conner. The stone that is being broken from one of the reefs is estimated to be worth 4oz. per ton.

"The Little Gladys, which is situated one mile West of Hidden Secret has just been taken up again. To date 47 tons have been treated for a return of 19oz. over plates.

*The Brilliant G.M.* (94255).—There is a reef eight feet in width trending through this property, and it seems to be the general opinion that there are good prospects of it developing into a good mine.

"At the time of my recent visit 126 tons had been treated for a return of 81oz. over plates. Sands were reckoned to be worth 11dwts. 14grs. per ton.

"From McBeaths and party's show 10 tons have been treated for a return of 7ozs.

"Botcher and party have treated 205 tons from their show, Harp of Erin, for a return of 67ozs.

"Martin and party, 20 tons for 14ozs.

"Scott and Conell, 18 tons for 21ozs. 10dwts. in first crushing, and in their second parcel, 13 tons were treated for 18ozs. 9dwts.

*The Cock Bird.*—From a parcel of 14 tons 9ozs. 19dwts. were obtained.

*Rosco and Party, P.A.* 188.—128 tons have been treated from this area for a return of 39ozs.

*O'Reiley and Party, P.A.* 21.—From this area 38 tons have been treated for a return of 65ozs.

"Good progress has been made at the Sons of Erin Mine, and recent developments have been, I have been given to understand, very satisfactory. In one of their leases a large quantity of scheelite was obtained, and has been sent away. It occurred in an East and West reef at a depth of about 20 feet from surface. The principal bulk of it occurred in a lenticular form in the reef, its length being about eight feet, and at its widest part it would be about 18 inches. It is estimated that about 20 tons have been mined, but the principal bulk of this was put through the battery, and it was not until I drew the attention of the tributers, who were then working the reef, to the value of the scheelite, that any notice was given to it.

"The conditions for mining at Higginsville are comparatively speaking very favourable, there being an abundant supply of timber that is suitable for both mining and steaming purposes."

## DUNDAS GOLDFIELD.

"It is now only just a little over 15 years ago since gold was first discovered on this field, and its real history commenced. This discovery was made by Mr. William Moir, on the West side of Lake Dundas. In consequence of this discovery, a prospecting party was organised to further test the locality for gold, it failed, however, to locate anything payable there, It also had the effect of attracting other prospectors to the vicinity of the find, and it was not many months after the first discovery, W. Mawson and R. Kirkpatrick located the first auriferous reef, at the South end of the Dundas Hills.

"A claim was pegged out, and is now known as the Dundas Reward Claim No. 1. Shortly after this many other auriferous reefs were found for many miles North of this mine, along the Dundas Hills, which lie on the Western side of the Northern end of Lake Dundas, and the Eastern side of Lake Cowan."

## THE MINES.

"In common with all other goldfields of the world only a small portion of the claims that have been taken up developed into mines; yet the gross product of bullion from the comparatively few active mines is large, considering the brief period of the field's existence. It is only with the last 11 years that the field began to produce gold in quantities of much importance, and for this period the average per year has been about thirty thousand ounces. Up to the present the total output has amounted to a little over 330,000ozs. fine gold.

"The conditions for mining here, compared with other fields of the State, are fairly favourable. The scarcity of water was a great drawback, but this is in a great measure overcome, and now that the Norseman railway is in course of construction the disadvantages in connection with conveying supplies from Coolgardie by means of horse and camel teams will also be shortly overcome, which will mean a reduction in mining costs. It is also thought that this railway communication will be the means of attracting capital to the field, and the re-opening of a number of many of the old abandoned shows, as well as opening up new properties.

"Seeing that there is a likelihood of a revival in mining taking place I have thought it advisable to embody in this report copious extracts from the pamphlet by Mr. Arthur Catling on some of the mines of the Norseman Gold Belt that have been idle for some considerable time, and which may again be given another trial.

## DUNDAS GROUP.

"*The May Bell G.M.*—This mine is about 14 miles due South of Norseman town. It comprises three leases, known as the May Bell, 24 acres, and May Bell North, 15 acres; and Mawson's Extended, 9 acres; pegged in order from South to North, together with machinery and tailings areas and water right, of five acres each. The property was floated in London in August, 1894, with a capital of £60,000 in 60,000 shares of £1 each, £20,000 being set aside as working capital. Two reefs are traceable on the surface, both coursing North and South through a hill, which runs down in one direction to the North-East side of Lake Dundas."

"Several shafts have been sunk, but as the mine has been mainly opened up by a tunnel, it will be better to describe the work done from that. At a

point half-a-mile from the edge of the lake, 90 feet above its level, and 198 feet from the eastern boundary of the property, the tunnel was started, being now 526 feet in length. The tunnel was commenced in a direction east of North, the intention evidently being to pick up the western vein, upon which most work had been done up to that time. When the tunnel had been carried in 150 feet the reef in question was cut, but the original direction was continued until the second vein was met 33 feet beyond. The lode was followed from this point. Where first picked up it was 18 inches in width, but in the next 50 feet it widened out to 4 feet, averaging that size for the ensuing 350 feet."

"This work would go to show that the reef followed in the tunnel was regarded as the western one, as it can only be presumed that the country was followed east to pick up the second vein. In the same locality a drive was put in west for 14 feet. Nothing was, of course, found in either direction. On the northern side of the crosscourse the reef was much broken, and for 60 feet beyond it was intermixed with country." "A cross-cut was put in west 10 feet from the end of the tunnel, and the second reef picked up 33 feet away. Where the cross-cut holed through there were 5 feet of stone. Drives were then put in 22 feet South, and 204 feet North, the average width of the lode for that distance being a good 4 feet."

"Two shafts connect with the tunnel. No. 1 follows the eastern reef down for 60 feet." "Below the tunnel the shaft continues for 37 feet." "There are 11ft. of stone below the level." "No. 2 shaft is down on the western reef, and the cross-cut from the first section of the tunnel comes into it. From the surface to the level the distance is 87 feet, the shaft continuing below for another 30 feet. In the former portion there are between 5 feet and 6 feet of stone, at the bottom of the shaft there are 3 feet." "On either side of the pit a little stoping has been done on good grade ore."

"Crushing was started on May 3rd, 1897, and stopped on August 25th of the same year. During that time 1,460 tons were put through for 1,119ozs. 13dwts. 2grs., an average of 15dwts. 7grs. per ton."

"*The Magill G.M.*—The Magill was prospected by Percy Rich in October, 1906, and was worked for a short time by the New Coolgardie Exploration Company, Limited." "It was upon a North and South reef that the property was taken up, but the gold-bearing material is not limited to quartz." "For the full length of the present property the reef has been proved to average over 4 feet in width. Two shafts have been sunk, both on the underlie. That to the North is a prospecting shaft and is down 55 feet. The other or main shaft is situated in the centre of the lease, and is 70 feet in depth." "On the hanging wall the reef is richest, about 20 inches assaying particularly well." "The remaining 2 feet 6 inches are composed of a white, glassy quartz, which gives prospects in the disl of payable gold." "From end to end of the ground now held the lode has been prospected on the surface by means of costeens, and most encouraging prospects have been obtained right along. The work done is certainly not sufficient to establish the property as a mine, although the lease as opened up offers exceptional possibilities."

"Three crushings in all have been put through. The first two were treated at the battery on Mawson's Reward. A parcel of 25 tons yielded 26ozs., and

another of 15 tons returned 17ozs. 0dwts. 14grs. The gold on both occasions was valued at upwards of £4 an ounce. More recently, 10 tons were broken from the most southern costeen for a width of 16 feet, an average of 8dwts. per ton was obtained by amalgamation. A further 50 tons were put through for 25ozs. 3dwts. 14grs.

*"The Scotia G.M.*—This property is situated about six and a-half miles south of Mawson's Reward G.M., and is considered to be the same line of reef. It is situated on the top of a hill, rising 280 feet above the lake level, and is traversed by a reef coursing North and South and dipping East. Four shafts are down. Two of these were sunk on the vein either side of the hill by the prospectors at the northern and southern extremities of the lease. That to the North is 45-feet in depth, and to the bottom there is an average of 2 feet 6 inches of stone, which shows gold throughout. The southern shaft is 65 feet in depth on the same width of reef."

"This property was worked in the early days by an Adelaide company who put down two vertical shafts, each about 60 feet, within those sunk by the prospectors. The northern shaft is 90 feet and the other 65 feet in depth. Notwithstanding the fact that the reef underlies East cross-cuts were run in from both shafts west. In the latter direction there is a big lode carrying gold, and it can only be supposed that the object of the company was to reach this." Funds, however, were exhausted before either the reef or formation had been picked up, so that the work done was of no value whatever in prospecting the lease, although later on the workings may be turned to account." "A parcel of 15 tons, made up of stone from the drives, was first crushed for a return of 1oz. 1dwt. 16grs. per ton." Another of 43 tons was taken from the various heaps at grass, and treated for an average of 5½dwts. per ton. A third crushing of 12 tons was treated for an average of 6dwts. 18grs.

*The Albion G.M.*—This property is situated about 11 miles south of Dundas old townsite. An East and West reef has been prospected but the conditions are so confusing that little can be said definitely. The vein apparently rises to the surface in the form of a triangle. From the apex a shaft is down 60 feet to water level. Drives are in there East and West, but at either end the reef makes down abruptly underfoot. In the drives there is an average of three feet of stone. Owing to the occurrence of water at a comparatively shallow depth, the prospectors are unable to sink further to ascertain what form the reef takes below." . . . "What little stone has been opened up is of good value generally, while in places rich patches have been struck." . . . "Samples from the drives assayed 1½ozs. to the ton on an average. The lease in the early days was remarkable for the alluvial found on it."

*"The Empire.*—This property is situated on Mt. Henry, which is situated about one mile north-east of the old townsite of Dundas. The whole of the hill is a vast dyke formation which carries gold. An open cut has been run in for a distance of 85 feet across the lode, the hole being 12 feet in width and 40 feet in depth." . . . "The formation contains mainly ferruginous quartz, micaceous schist, and silicate of iron." . . . "Assays made from all over the property vary from 5dwts. to 2ozs. per ton. The gold is very fine." Forty-six tons have been treated for a return of a little over 4½dwts. per ton.

*"The Buldania Group.*—There is no section of the Norseman gold belt that presents more interesting features and offers such great possibilities, but about which so little is actually known as Buldania. Situated about 21 miles north-east of the town (Norseman) the place is completely isolated. To that, and the fact that the country rock is excessively hard from the very surface, the non-success of the past may be attributed. The existence of gold there was discovered in June, 1896, but, with one exception, the leases have remained in the hands of the prospectors. Under such conditions development work of value has been practically impossible. The country is an intrusive belt of rock which, unlike the main Norseman line, runs East and West. A small chain of hills follows the cross direction of the country. The auriferous area has been proved about 270 feet in width, and samples taken right across it have assayed well. The gold-bearing country comprises a series of parallel reefs separated by bands of hornblende schist. In this respect it bears a striking similarity to Kalgoorlie. Comparatively speaking, there is no decomposed country, and the sulphide zone is come upon at depths varying from 3 feet to 40 feet."

"Above that the gold occurs in a free state, but below the ore is refractory, carrying a large proportion of molybdenite associated with free gold. In one instance only is a shaft down 100 feet, and that shows no alteration in the conditions. Whether the surface indications extend to a depth remains, therefore, to be proved. If they do, Buldania gives every promise of becoming one of the most profitable mining centres on the field, provided of course, operations are properly conducted." The plants that have been erected here have proved utterly incapable of successfully treating the tough ore of the district, and the consequence is that the prospectors have been unable to obtain funds for crushing. For this reason they have dropped out one by one, and the place is now practically deserted. "The little stone that has been put through, however, taken nowhere below a depth of 40 feet, has given high returns, notwithstanding the poorness of the extraction obtained. None of the sulphide ore has been practically tested, but many samples have given sensational assays. Owing to the drawbacks mentioned, the prospectors have been unable to offer a developed property, although the shows, if anything, have improved as they were opened up. The requirements of the latter-day buyers have thus not been satisfied, and Buldania has missed the opportunities enjoyed by other localities." . . . "The assistance of a development company is necessary before a flotation would be desirable. And seeing that a moderate expenditure of capital would prove the country, it is remarkable that the task has not been taken in hand. All that has to be faced of a speculative character is the sinking of a shaft 200 feet, and a little cross-cutting. Such work would prove the lodes at depth, and if the surface indications are permanent the mines are of great value." . . . "The ground takes in one of the chain of hills that characterises the country. Five distinct lodes have been opened up, the crown of the rising ground being in the middle of them. The lodes to the North underlie South and those to the South underlie North. The dip in each case is slight, but the indications encourage the belief that at depth the lodes all merge into one. One shaft would suffice to prove the fact, and, at the same time, it would provide the best means of working the upper levels. As a matter of fact, Buldania will be either a very big thing or nothing

at all, and present appearances point to the former being the case."

*Buldanian Bells.*— . . . "Two leases of 12 acres and six acres respectively constitute the property. The latter is north of the main block, and was taken up to include a subsequently discovered parallel vein. Five separate lodes have received attention, about four chains covering them all, although, as little cross-cutting has been done, the number may not represent all that traverse the ground. All run very nearly East and West. Commencing at the southern side there is the Klondyke lode. On this a shaft has been sunk 30 feet on a vein of quartz 1 foot in width. Either side lode matter fills up the width of the shaft. In the absence of further work the extent of the ore body is not known. Four feet from the surface the sulphide zone comes in here." The next lode has been worked by an open cut for a distance of 290 feet. At the eastern end of the open cut, a shaft is down 12 feet, while about the middle of it is a second shaft 20 feet in depth. Here, as in the previous case, a 12-inch vein of quartz is surrounded by lode matter. The open cut gradually deepens to the western end as the oxidised ore is removed. In the eastern shaft sulphides are met at about 4 feet, but at the other end of the workings the same conditions are not encountered above 19 feet. The next ore body is styled the Big Lode, and is opened up by a shaft to a depth of 50 feet. At that level water was met. Here there is an average of 8 feet of ore, which is oxidised for the first 35 feet. The fourth lode, proceeding north passes through the centre of the hill which the lease contains, and from the brow a shaft has been sunk 60 feet. The lode underlies gently to the North, and was followed down on the foot wall. A cross-cut was run in 12 feet without passing through the ore body." . . . "The most northern lode includes a good 2 feet of solid quartz. Two shafts are down 40 feet on this, and a drive, 20 feet in length, connects them at the bottom. For the first 35 feet of sinking the ore is oxidised, but it then becomes refractory. With the exception of the two last-mentioned lodes the change to sulphide does not make the ore refractory. In the other cases free gold continues to be present, although not so extensively as in the oxidised levels. That the sulphide ore rather improves in value than otherwise is proved by a number of assays that have been made. Not one sample has been tried which returned less than 1oz. to the ton, while many have been equal to from 10ozs. to 70ozs. per ton. Four crushings have been put through by the prospectors at a local battery, only quartz being included. The first comprised 40 tons from the prospectors' reef, and yielded 81ozs. of smelted gold. Even then 1oz. 9dwts. 9grs. was left in the tailings. No. 2 parcel of 15 tons was taken from the prospectors' and Klondyke lodes, and returned 50ozs. Twenty-five tons were next treated from the 2 feet quartz vein forming the northernmost lode. From this only 10ozs. were obtained over plates, although the tailings assayed 2oz. 4dwts. 5grs., and the blanketings 8ozs. 14dwts. 22grs. The fourth crushing consisted of 22 tons from the open cut and yielded 25ozs."

*The Ajax.*—West of the main block of the Buldanian Bells is the Ajax lease, comprising 12 acres." . . . "The lode underlies slightly to the North, and has been followed down for 55 feet. To 35 feet the ore is oxidised, but there it changes to a sulphide, and becomes very highly mineralised. A parcel of 11 tons, made up from the stone removed in sinking to this point, was put through the local battery for

a return of 11ozs. 19dwts. 12grs. of smelted gold. At the 35-foot level the lode carried 2 feet of solid quartz on the footwall. A drive is in 18 feet west on top of the sulphide country, and the ore removed from this is the best yet discovered on the lease, samples of lode matter giving prospects in the dish equal to anything between two and four ounces to the ton. At the bottom of the shaft the solidity of the quartz vein is less pronounced, although the foot-wall itself is well defined. Here also, the hanging wall has not been reached." Other shafts have been sunk, and in each the conditions are identical, and by appearances the lode has been proved for a distance of 660 feet.

*I.X.L. Gold Mine.*—West of the Ajax is an abandoned lease known as the I.X.L., from which the following crushings were put through by the prospector—25 tons for 51ozs. and 6 tons 15cwts. for 15ozs." "In it the country has exactly the same appearance as that in the Eastern blocks."

*Princess May.*—Beyond the I.X.L., proceeding West, there is not another lease for about a mile. There, however, the Princess May forms the known limit of the Buldanian line in this direction. The block of the Buldanian line in this direction. The block consists of 12 acres."—"The ore body here is eight feet in width, and bulk samples taken from one shaft 20 feet deep have assayed 31dwts. to the ton."

*Buldanian Proprietary.*—North of the I.X.L. is the Buldanian Proprietary lease, which comprises 12 acres". "An East and West reef only has been opened up. For a distance of about 100 feet the vein has been exposed in an open cut to a depth of 12 feet. At the East end a second reef seems to effect a junction." . . . "Where the junction takes place there is a large body of stone, which gives payable prospects in the dish. At the Western end of the open cut a shaft is down 70 feet on the reef, an average width of about 3½ feet being maintained. Only one crushing has been put through, and that was taken from the open cut. It consisted of 18 tons which yielded 7oz. 2dwts. 9grs." . . . "With depth in the shaft, however, the reef has improved in value, and at the bottom good prospects can be obtained." . . . "In common with the remainder of the Buldanian Leases, the Proprietary has not been sufficiently developed to establish it as a mine, but what little work has been done is exceedingly promising."

*Birthday Gift.*—This property is situated East of the Buldanian Bells, and comprises 12 acres". "Several quartz reefs course East and West, and between them are bars of schistose rock, carrying a little gold." . . . "So far attention has mainly been directed to prospecting the reefs, as the quartz is of much better value than the lode matter." . . . "Four shafts have been sunk on different reefs. No. 1 is down 38 feet near the Western boundary, on an average of four feet of quartz. The second shaft follows a vein one foot in width to a depth of 70 feet. At 35 feet a drive is in 60 feet West without revealing a greater width of stone. No. 3 shaft has been sunk on an average of two feet of quartz to a depth of 40 feet. From the bottom a crosscut is in South for 60 feet. In this an ore body 12 feet wide, carrying a little gold, was passed through." . . . "Several parcels of ore have been treated. . . . "The first consisted of 40 tons taken from Nos. 2 and 4 shafts. A return of 15dwts. per ton was obtained by amalgamation, but assays made of the tailings showed them to be worth 1oz. 5dwts. No. 2 parcel was taken exclusively from the 50 feet level in the No. 2 shaft,

It comprised 12 tons, from which 37ozs. were produced. Another lot, made up from Nos. 2, 3, and 4 shafts, gave an average of 1½oz. per ton, while just recently 21 tons from Nos. 2 and 3 shafts yielded 16ozs."

"*Pathway G.M.*—Alongside the Birthday Gift are two abandoned leases, which it may be interesting to mention, as on one the deepest shaft in the locality is situated. Unfortunately, the work lies outside the richer run of the country, but still it shows the reef to maintain its surface value and width to a depth of 100 feet." . . . "Near the more remote boundary the deep shaft was sunk on a reef 4½ feet wide. A vertical depth of 100 feet was attained, and at the bottom there was the same width of quartz." . . . "The reef is remarkable among those in the district for its excellent walls, both of which are close diorite." . . . A syndicate who worked the show in the early days, crushed some 200 tons for returns averaging 7dwts. per ton, all the stone treated coming from the upper levels. . . . "This uniformity of one reef to a depth encourages the belief that the richer conditions on other leases will be continuous and, with the assistance of capital, Buldania should yet be a flourishing centre."

#### PRINCESS ROYAL GROUP.

"Quite a number of shows have been worked in this centre from time to time, but just at present mining is a little dull.

*Desirable G.M.* (84).—Two reefs trend through this property in a North-Westerly direction, and both have been developed by means of incline shafts and drives that have been opened up at different points. No. 1 shaft is 230 feet in depth. At 90 feet a drive has been put in 210 feet North, and 70 feet South. The width of reef along this level averaged two feet in width. At 200 feet a drive has been put in South for a distance of 80 feet. No. 2 incline has been sunk to a depth of 125 feet on a reef which averaged two feet in width. Drives were extended from this point 100 feet North and 400 feet South. Up to date a little over 4,000 tons have been treated for an average return of 16dwts. per ton.

"*Three Colonies G.M.* (88).—An underlay shaft was sunk on a reef on this property to a depth of 85 feet, on a reef estimated to two feet in width, and to be worth about 4dwts. per ton.

"*Golden West G.M.* (650).—Mr. W. D. Campbell, Assistant Geologist, reported on this property as follows:—"At the North corner a shaft was sunk near the track, where there were some broken up portions of a quartz reef carrying 30dwt. values, but the large amount of water and the treacherous kaolin has prevented much prospecting being done. This ground may be worth more attention. The most suitable procedure would be by boring to locate the position of the reef that is probably hereabouts. This position is on the line of quartz dykes, and there may be a continuation of the line of reef from the Princess Royal in this direction."

"*Princess Royal G.M.* (106, etc.).—During the last twelve months or so mining operations have been confined principally to the upper workings. In reporting on this property Mr. Campbell states:—"The general underlay of the reef is about 45 degrees Easterly, and general trend North-South. The chute of ore which comprises most of the quartz to over 300 feet in depth bifurcates to South-East from outcrop. No. 7 shaft was used for some time as the working shaft until the main shaft reached 515 feet, after

which the two portions of the mine were connected by the levels driven through the intervening ground. The Eastern reef is of small extent, its outcrop passes about 25 feet West of the main shaft, and has been worked down to the 200 feet level for a length of 120 feet. It is accompanied by a network of cross reefs. These workings are for the most part in a decomposed and a kaolinised greenish felsite rock. There are several dykes of this felsite, all almost perpendicular, traversing the mine in a direction slightly East of North; it is less siliceous than the quartz porphyries, which constitute most of the other dykes in the district, but both varieties are locally called quartzite. The dyke appears to have conduced to the deposition of the gold in the reefs where the latter traverse it. The North and central chutes have been stoped for a length of about 100 feet, the former down to 380 feet level and the latter to the 200 feet level, where it merges into the principal body of quartz termed the South chute. A curiously-shaped spur or lens of ore ranging up to 10 feet thick and 130 feet in length occurs between the 220 feet and 380 feet levels; its middle portion is flat and basin-shaped, and its foot is steep and dome-like. At the 380 feet level the quartz diminishes in quantity and quality. The 500 feet level is clear of the felsite, and is on the lode channel the whole distance. The quartz is met with in patches, excepting at the foot-wall fork of the reef, where it is strong. Boring with the diamond drill to endeavour to test the locality of the reef in the next 200 feet below the 380 feet has been carried out. It does not appear however, that the bores passed through valuable ore."

"*Princess Royal Central G.M.*—A very fine shaft was sunk on this property some little time ago, for the purpose of working the Princess Royal lode, which came into the Central property at depth. This shaft was sunk to a depth of 950 feet, and levels opened up near the bottom on the Royal lode. A large body of ore was opened up at this point, but it seems that values are just a little below payable. Whether the values improve at a greater depth is a matter that remains to be proved. It is, of course, very evident that the future of the mine depends on improved values below present developments.

"*Mararoa G.M.* (60).—Good progress has been made on this property during the time it has been in the hands of the present company. Developments are said to be most satisfactory, and all point to a very prosperous future. The following is contained in the Mine Manager's last half-yearly report:—"The main shaft has been sunk a further depth of 54 feet, making a total of 374 feet. No. 2 level, 150 feet, has been extended 17 feet, total distance from crosscut, 103, reef 7 feet, values 25s. per ton. North rise from stope over this level was put up a distance of 44½ feet, and connected with 80 feet level, reef 108 inches, value 55s. per ton. South rise from stope over this level has been put up 38 feet, five feet of reef was taken, which gave values equal to 25s. per ton. There is no foot-wall showing in the rise. No. 3 level, 240 feet South drive has been advanced a further distance of 113 feet, making a total length of 167 feet, reef averaging about five feet, values varying from 25s. per ton to 55s. per ton. South rise was commenced 56 feet South from crosscut and has been put up a distance of 60 feet, and connected with No. 2 level South, average size of reef 90 inches, values 40s. per ton. South winze was commenced 70 feet South from crosscut, and sunk to a depth 64 feet, for a depth of 50 feet reef will average 96 inches, average value 80s.



per ton. At this point reef split, foot-wall section dipping at an angle of 45 degrees, and the hanging-wall section of reef going very flat into hanging-wall, from 50 to 64 feet the reef on foot-wall averages 42 inches, value 60s. per ton. North Drive North Winze.—At 28 feet North of crosscut a winze was commenced, and sunk to a depth of 21 feet, reef 48 inches, values 64s. per ton. No. 4 level, 350 feet. North drive has been driven 57 feet on a reef varying from 18 inches to 46 inches, values in this level have been poor, average about 12s. per ton. North rise was commenced 18 feet North from cross-cut and has been put up 68 feet and connected with winze sunk below No. 3 level, North drive. The rise showed values for a height of 43 feet to be about 15s. per ton, the reef being about 33 inches wide. At this point values improved to about 60s. per ton, to a height of 68 feet, reef 36 inches wide. East crosscut was driven opposite main shaft for a distance of 62 feet, in good country, no developments of importance being met with. South drive has been driven from crosscut a total distance of 225 feet. The first 48 feet of driving showed a reef fully five feet in width, value being 12s. per ton. At this point values improved. The reef maintained its width and has continued in values for a distance of 177 feet, reef will average fully five feet, and gives an average value of 68s. per ton. The reef in the present level face is 72 inches in width. South rise was commenced at a point South from cross-cut 97 feet, for a height of 48 feet, the angle of reef was about 50 degrees, which showed the width of reef to be 60 inches, values 65s. per ton. The reef then became very flat and until we connected with the hanging-wall section of reef in South winze, No. 3 level. The values in flat portion of reef were 45s. per ton, the reef being five feet with neither foot-wall or hanging-wall being exposed. West crosscut off this level was commenced 85 feet South from crosscut, and was driven 75 feet West; at a distance of 67 feet from level the foot-wall was intersected, which proved to be six feet in width. A rise was put up on the reef a height of 33 feet and connected with winze below No. 3 South level, the reef proved to be West of winze about four feet. There is every reason to believe that this reef is a continuation of the foot-wall reef showing at the 80 feet level. The average assay value from the rise over five feet of reef is 41s. per ton.

**"Battery.**—The ten-head Fraser and Chalmers Battery which was in course of erection at the end of last half-year has been completed, and crushing was resumed on the 20th February.

**"Ore Reserves.**—I have gone carefully into the question of ore reserves, and without going into the question of reserves in the foot-wall reef, my estimate of ore opened up on the Eastern reef is 25,000 tons, estimated value 48s. per ton.

"In concluding this summary of work done during the period under review, it is extremely gratifying for me to bring under the notice of the board the satisfactory nature of developments which have taken place in the mine during the past four months, especially at the bottom level of the mine. The chute of ore passed through is 177 feet in length, and is highly payable. The pay chute is longer in this level than in any of the higher levels, and to my mind looks decidedly encouraging for deeper sinking. We have also in the foot-wall in the West crosscut at the bottom level a development which opens up big possibilities. This reef has not been worked below the 80 feet level, where values are about 6dwts., while the

result of work done at the 350 feet level proved this reef to have improved in values, the assay average of 33 feet of rising over a width of five feet gave 41s. per ton.

"Since the above was written, a 15 drill air compressor has been installed, and a cyanide plant capable of treating 1,000 tons of sands per month.

"It is proposed to regrade No. 2 shaft, and to sink it to a depth of 470 feet to No. 5 level. A connection will be made with No. 5, and all work carried out in connection with this will be done on ore.

**"Cumberland G.M. (597).**—Splendid progress has been made on this property of late, a considerable amount of additional machinery has been installed, and it is reported that the work on the mine is being most energetically and economically carried on. There are several reefs trending through this property, but principal work is being done on what is known as 'Hall's Reef.' This reef has been opened up by means of an incline, which has been sunk to a depth of 557 feet.

"This reef trends in a North-Easterly direction, underlaying at an angle of about 70 degrees towards the South. This reef has an average width of about two feet six inches in the upper levels, the walls being very well defined and regular. The Manager's latest report on the mine is as follows:—

**"The Main Hauling Shaft.**—This has been sunk a distance of 107 feet and a plat and penthouse put in at No. 4 level, and also a permanent roadway laid down from the third to the fourth level.

**"Central Winze.**—The West drive has been continued from the 130 feet to 296 feet in length, from 130 feet to 193 feet the ore body averaged one foot in width and values were poor, from 193 feet to 232 feet a very rich make of stone was met with in the drive, averaging about 12 inches in width and assaying up to 24ozs. per ton. This stone is very highly mineralised, and to all appearance is a fresh make of ore different from any previously met with in the mine. A cut five feet in depth and 10 feet in length was taken out of the bottom of the drive, and the reef improved in size, and values were just as rich as they were in the drive. Driving was continued on from the 232 feet to 296 feet, but the drive was mostly in formation and the quartz leaders of very little value. To work this chute of ore profitably, which is in the drive off the winze 166 feet below the bottom of the main shaft, it was necessary to sink the main shaft down to this level, which work is now being proceeded with.

**"Third Level No. 5 Winze.**—This was sunk to a depth of 60 feet from the bottom of the stope in the West end on to the drive at No. 4 level to be used as an ore pass to facilitate the working of the stope further West.

**"Johnson's Reef.**—A rise was put up a distance of 57 feet to connect this level with the old workings, but in consequence of the bad ventilation it was discontinued, and will be connected later on by a winze from the old workings.

**"Midas Reef.**—A crosscut 116 feet in length was put in at a point 400 feet from the main shaft in the East drive at No. 2 level, to intersect this lode at a point 98 feet in the crosscut the lode was met with, which proved to be a formation three feet in width carrying quartz leaders and about 10 inches of quartz on the foot-wall, the values of which were poor; a drive was put in East on the course of the lode for a distance of 66 feet, but nothing of a payable nature has been met with.

"Main Discovery Shaft.—This has been extended from 75 feet to 120 feet in depth, the shaft is now down 10 feet below the old workings, and seven feet in the hanging-wall, and as the reef is underlying slightly to the North, it will come into the shaft about the 200 feet level.

"Eastern Reef.—This is a new line of reef which has been opened up on the North-East side of the John Bull shaft. The shaft has been sunk on the reef for a depth of 60 feet, the ore-body averaged 14 inches in width, and assay values averaged 10dwts. per ton. This is a promising looking lode, and I believe that, when driving is started on the line of lode, better values will be met with.

"Diamond Drilling.—No. 2 bore in the North crosscut at No. 4 level was continued from 59 feet to 364 feet in depth without intersecting any lode channel.

"The Old Cumberland Reef.—In the Old Cumberland Reef two horizontal bores have been put in at right angles from the line of reef at the 227 level. No. 1 bore was put in North-West for a distance of 100 feet in solid diorite without meeting with any parallel ore-body. No. 2 bore was put in South-East for a distance of 136 feet in diorite or porphyry rock without intersecting any ore channels.

"The Old Cumberland.—This was let on tribute to a party of men who have crushed 105 tons of ore for a yield of 65oz. 7dwts. of bullion.

"Finlayson Reef.—This was also let on tribute. The party of men have done a good deal of development work, and have crushed 17½ tons for a yield of 23ozs. 12dwts. of bullion.

"Plant.—The following additions have been made: Four 30 ton vats have been added to the cyanide plant. One Forward-Downs grinding pan has been erected in the mill-house. One 10-head mill (James Martin & Co.) was erected during the month of September, and is now working satisfactorily.

"Water Supply.—A beautiful supply of both fresh and salt water has been available during the half-year.

"Ore Reserves.—The estimated quantity of ore blocked out is 8,000 tons of 1oz. per ton."

"Lady Miller G.M.—A fine plant has been erected on this property, and it seems to be the general opinion that there is a good future before it.

"The mine has been opened up by means of an incline, sunk on the lode, to a depth of 233 feet. Levels have been opened out at 114 feet and 233 feet, which have practically proved the ore-body to extend for a distance of a little over 600 feet and to range from four feet to 40 feet in width. Prior to present company taking over this property 5,000 tons were treated for an average return of 7½dwts. over plates and 4.7dwts. in tailings. At the time of my last visit it was estimated that there were close upon 30,000 tons of ore in sight, worth about 30s. per ton.

"Iron King G.M. (1008).—This property consists of 18 acres and is situated about half mile from the Lady Miller in a North-Westerly direction. It was taken up in August last, and is now held by a local syndicate, who are vigorously developing the property by means of shafts which are being sunk on the lode.

"What is known as No. 1 shaft has been sunk to a depth of 40 feet. Near the bottom of this shaft a crosscut has been put in West for a distance of 30 feet, at which point hanging-wall was met. About 10 feet in from the shaft a little driving has been done North and South, and the ore obtained from these drives and crosscut 131 gave a return of 37oz.

20grs. over plates, or an average of 5dwts. 15grs. per ton. Sands are estimated to be worth 9dwts. 11grs., and slimes 8dwts. 4grs. per ton.

"The lode which can be traced from one end of the lease to the other trends almost due North-South and dips at an angle of about 70 degrees towards the West. Its width is estimated to average 50 feet.

"In July last a parcel of ore obtained from various points along the outcrop, amounting to 22½ tons, was treated for a return of 8ozs. 8dwts. 8grs. over plates, or an average of 7dwts. 11½grs. per ton. Sands averaged 18dwts. 22grs., and slimes 8dwts. 20grs.—14½ tons sands. It seems to be the general opinion that there is a good future for this property.

"Saint Clare G.M. (1004).—This property, which consists of 18 acres, adjoins the Iron King on the South. There is a large lode trending through this lease in a North-South direction which dips towards the West at a sharp angle. In places it looks to be the continuation of the Iron King lode, but the owners are of opinion that it is a little to the West of the Iron King line of lode, and runs parallel with it.

"Near the Southern boundary a shaft was sunk to a depth of 15ft. nine years ago, and a parcel treated from it then gave a yield of 4½dwts. over plates. From samples taken from this shaft recently, ore was found to be worth 6dwts. per ton, and from samples taken along the outcrop, the average value of lode has been estimated to be 8dwts. per ton. The exact width of lode has not been ascertained in the centre portion of the lease, but from surface indications it is thought to be fully 30 feet.

"Iron Duke G.M.—This property is situated a few chains South-East of the Lady Mary G.M. There is a large ironstone formation trending through the property in a North-Easterly direction, which dips towards the West. An incline has been sunk on lode to a depth of 40 feet, and from the bottom of this incline a crosscut has been put in 40 feet West and 20 feet East, but no walls were cut. The following parcels have been treated from this mine at the State Battery:—November, 1905, 35½ tons for 3oz. 5dwts. 10grs., or an average of 1dwt. 20grs. per ton. Sands assayed 2dwts. 23 grains. per ton; Slimes, 3dwts. 6grs. Sands allowed, 22 tons. December, 1905: 10 tons for 2ozs. 11dwts. 6grs., or an average of 5dwts. 3grs. per ton. Sands assayed 9dwts. 19grs. Slimes, 6dwts. 20 grs. Sands allowed, 6 tons. January, 1906: 9 tons for 3ozs. 8dwts. 8grs., or an average of 7dwts. 14grs. Sands assayed 5dwts. 16grs. per ton. Slimes, 3dwts. 22grs. Sands allowed, 5 tons. December, 1906: 14½ tons for 3oz. 19dwts. 12grs., or an average of 5dwts. 7grs. Sands assayed 5dwts. 6grs. Slimes, 5dwts. 14grs. Sands allowed, 7 tons.

"There is an immense ore body here, and if a plant were on the mine to treat it, there seems to be every reason to believe that it could be turned to profitable account.

"Lady Mary G.M. (49).—Very little underground work has been done on this mine during the past 12 months or so; this it seems, is owing to the vein becoming smaller and of somewhat poor value at depth. Seeing, however, that very little has been done to test the ore-body much below 400 feet, and that the average value of the ore treated has averaged a little over 1oz. per ton, it is only reasonable to think that there is a very fair chance of payable ore being opened up deeper. Mr. W. D. Campbell, Assistant Geologist, reports on this property as follows:—"The reef outcrops along the Western side of the lease; the older

workings for a length of 1,200 feet were worked to a varying depth of about 100 feet during the earlier period of its existence by means of five underlay shafts. These old workings were readily accessible; portions that I did not see near the small adit showed two feet to four feet of quartz in the face of the workings. No. 1 shaft is 273 feet on the underlay, but no values were obtained below the 100 feet. The main incline shaft, No. 7, is the Northmost one on this outcrop; it has an underlay of 49 degrees to the first level, and then about 60 degrees to 470 feet, its present depth. The reef varies from two to five feet in thickness. A horizontal chute of pay-ore occurs in the old workings and extends as far as North shaft, where another chute about 500 feet in length occurs, rather less in width than the other, and dips to the Northward. The 430 feet level was driven along only a slight seam or formation in the country rock for a considerable portion of its length, and the reef was found again making underfoot in the line of the chute. This was followed for 40 feet by means of a winze where the reef becomes four feet wide; the value is  $\frac{1}{2}$ oz. per ton. Adding this 500 feet of chute to the previously-mentioned 1,500 feet, makes a total of 2,000 feet of reef that has been worked in this mine. Water is obtained for the 20-head mill from a well and trench at Lake Dundas.

*"The Lucky Call (856)."*—Some very rich stone has been obtained from the reef which trends through this property in an East-West direction. Pockets of gold ranging from 50 to 400ozs. have been taken out quite near the surface. The quartz is very dark, being mixed with ironstone. A ferruginous casing of six inches thick flanked each side of the reef; the bottom casing also carries gold, about 1oz. per ton. The following shows the tonnage treated and yield since March, 1905:—19 tons, return over plates 65ozs. 15dwts., or an average of 3ozs. 9dwts. 5grs. Sands, 1oz. 11dwts. 8grs. per ton. Slimes, 1oz. 16dwts. 14grs. per ton. Sands allowed, 8 tons. July, 1905: 25 $\frac{1}{2}$ tons, yield 69ozs. 9dwts. over plates, or an average of 2ozs. 14dwts. 11grs. Sands assayed 6dwts. 20grs. Slimes, 3dwts. 22 grs. Sands allowed, 11 tons. February, 1906: 14 $\frac{1}{2}$  tons yielded 220ozs. over plates, or an average of 15ozs. 9dwts. 15grs. per ton. Sands assayed 1oz. 10grs. Slimes, 3dwts. 22grs. Sands allowed, 6 tons. January, 1906: 25 tons yielded 16ozs. 6dwts. 6grs., or an average of 13dwts 1gr. Sands, 5dwts. 14grs. Slimes, 2dwts. 8grs. Sands allowed, 12 $\frac{1}{2}$  tons. The last parcel treated in April last, which consisted of 16 $\frac{1}{2}$  tons, gave a return of 7dwts. 16grs. over plates per ton.

"At the time of my last visit to this mine very little was being done.

*"Valkyrie G.M. (936)."*—A fair amount of development has been done on this property from time to time. The reef, which has a North and South course, dips towards the East. It is very contorted and varies greatly in thickness, ranging from a few inches up to five feet. The gold generally occurs in patches. Several incline shafts have been sunk on the reef, the deepest being 265 feet. A battery was erected on the mine a few years ago, but the mine could not be made to pay. In 1898 the company had to go in liquidation. About 3,200 tons have been treated for an average return of 1oz. per ton.

*"Lord Hopetoun G.M."*—An incline shaft has been sunk on this property to a depth of 180 feet, and levels opened out at 50 feet, 100 feet, and 150 feet. At the 50 feet level a drive has been extended North 189 feet. Crosscuts that have been put into the hang-

ing-wall side of reef at different points have proved it to be over 20 feet wide. At 100 feet level, lode has been driven on North and South 70 and 80 feet respectively, and at the 150 feet level, drives have been put in North and South 30 feet each way. At the time of my last visit the North drive was being driven, and the value of the ore along this drive is estimated to be worth 1 $\frac{1}{2}$ ozs. per ton. There is a large body of ore here, and it seems to be the general opinion that there is a good future for the mine. At present it is in the hands of prospectors. It is the intention of the owners to extend the bottom drives, to prove the lode as far as possible. Up to the present 1,800 tons have been treated, for an average return of 17dwts. per ton.

*"New Moon G.M."*—This property is said to be opening up well. The reef which trends through this claim in a North-Westerly direction averages about 15 inches in width. At the time of my last visit the main incline shaft was being sunk, it was then down 220 feet. Of late a loco. type boiler and a winding engine have been installed to cope with the water and facilitate sinking operations. The last parcel of 75 tons of ore treated gave a return of 2ozs. 4dwts. over plates. Up to the present about 700 tons have been treated for an average of 30dwts. per ton.

#### YILGARN GOLDFIELD.

"During the year very good progress has been made on this goldfield, especially in the vicinity of the Never Never and Marvel Loch, and from present appearances I am inclined to think there is a good future for this locality. The lodes are large, and the conditions for mining are very favourable. This goldfield, in common with the others, has not yet been half prospected, and as more economic methods are being introduced into mining, everything seems to point to a very prosperous future for it.

#### THE MINES.

##### SOUTHERN CROSS.

*"British and Foreign Development Syndicate G.M. (13 & 29, etc.)."*—Several lodes run through this property, but the one on which most work has been done is well defined, and can be traced for a little over a mile in length; its width ranges from five feet to 40 feet, the average, however, is estimated to be about 20 feet. It was one of the first worked in the district, and was originally known as Fraser's G.M. To date about 215,663 tons have been treated for a return of a little over 116,000ozs. The whole of this ore has been obtained from a depth of not more than about 370 feet.

"At the time of my recent visit to this mine stopping operations were being carried on above the No. 3 level. From these stopes ore was being mined and treated at a profit, which a short time ago was considered unpayable. This has been brought about by carefully sorting the ore.

"The upper part of the mine has been worked principally by tributors, who, I am given to understand, have done very well.

"Owing to the low-grade ore at the bottom levels being made payable through careful handling and the likelihood of lode increasing in values deeper, it is to be hoped the Company will be able to see sufficient to warrant them testing the lode to a much greater depth. At present there seem to be very good prospects of the mine developing well at depth.

*"Fraser's South Extended G.M. (256 & 496)."*—Mining operations ceased on this property some little

time ago, and the workings are now flooded. There is a fine lode trending through this property North-South, which dips towards the West at an angle of about 70 degrees. A vertical shaft has been sunk to a depth of 320 feet and a level opened out at 300 feet. Drives have been put in North 220 feet and South 120 feet. The lode here is about 40 feet wide, but has only been worked for a width of 17 feet along the footwall."

"Up to date 43,747 tons have been treated for a yield of 18,433ozs. fine gold. With a suitable plant this mine should be turned to profitable account.

"*Reward G.M.* (529).—The vein that trends through this property in a North-Westerly direction has been developed to a depth of 120 feet. From this shaft 350 feet of driving has been done along the lode, which has averaged about 12 inches in width. In the initial stages of the mine several hundreds of ounces of gold were obtained by means of dollying. To date 2,300 tons have been treated for a return of 1,492 ounces.

"*Haddon G.M.* (552).—This property is situated about one mile West of Southern Cross township. A few years ago a ten-head mill and cyanide plant were erected on this property for the purpose of dealing with a large lode that trends through the property in a North-Westerly direction. After putting through a considerable quantity of ore that was obtained by means of an open cut near the main shaft and other parts of the mine, it was found that the ore was a little too low-grade to pay, with the result very little has been done on the property for some time.

"The lode has been developed to a depth of 200 feet, at which point there has been a fair amount of driving done, but there seems to be very little improvement in values here. It is the opinion of a great many that this mine could be made to pay if properly opened up, and suitable machinery installed to deal with it. To date, 13,779 tons have been treated for a return of 3,294ozs., or an average of about 4.75dwts. per ton.

"*Transvaal G.M.* (536).—This property, which consists of 24 acres, is situated about three miles South of Southern Cross. The large ore-body that trends through this property has been well developed to a depth of 200 feet. A 20-head mill and all necessary machinery for economic work were installed on the mine a short time ago. The lode at No. 1 level has been proved for a length of 1,100 feet, and by means of shafts another 800 feet. At No. 2 level it has been proved for a length of 250 feet, and to average 20 feet in length. At present some little difficulty is being experienced in regard to the dealing with the sulphide ore. To date about 125,825 tons have been treated for a return of about 5,000ozs.

"*Sunbeam G.M.* (550).—This property is situated a few chains South-East of the Transvaal G.M., and consists of eight acres. The vein here, which averages two feet in width, has been proved in length from one end of the lease to the other. Two shafts have been sunk on the dip to a depth of 60 feet, and a level opened up from the bottom for a distance of 250 feet. A five-head mill has been erected on the property, also a cyanide plant. To date about 4,000 tons have been treated for an average return of a little over 4½dwts. per ton.

"*Greenmount Mines, N.L.* (503).—At present stoping operations are being carried on above the No. 1 level in the oxidised ore. The lode, which ranges from a few feet up to 30 feet in width, has been opened up for a length of over 1,000 feet at No. 1

level, which is 100 feet from the surface. Winzes have been sunk from this level, which have proved that sulphides come in at about 50 feet below it. As to whether the sulphide ore can be profitably dealt with is a matter that remains to be proved. It is to be sincerely hoped that it can, as this mine is one of the principal employers of labour in the district. Excellent work has been done in regard to mining and treatment, as the following costs will show:—Mining cost 4s. 8.93d. per ton, milling 2s. 9.98d. per ton, cyanide treatment 2s. 6.33d. per ton. General expenses 1s. 3d. per ton, or a total of 11s. 4.53d. per ton.

"*Great Leviathan G.M.* (570).—At the time of my last visit no work was being done on this property. It seems that the vein got small and rather poor at depth. During the very brief period the mill ran on the mine 3,821 tons were treated for a return of 2,948ozs.

"*Jacoletti G.M.* (490).—Very little has been done on this property during the last twelve months or so. At the time of my last visit a little stoping was being done from what is known as the No. 2 South shaft. A good deal of public crushing has been done, which has proved to be of great assistance to the prospectors in the locality.

"*Marvel Loch G.M.* (714).—Three veins have been opened up on this property, viz., Marvel Loch, Magazine, and Boulder.

"On the Marvel Loch, which is the most Easterly vein, a shaft has been sunk to a depth of 160 feet, and levels have been opened out at 60 feet and 160 feet. At No. 1 level a drive has been put in North 130 feet and South 250 feet. At No. 2 level has been extended North 10 feet and South 30 feet. The average width of vein is estimated to average 2.5 feet.

"Magazine Lode.—A shaft has been sunk to a depth of 50 feet on this lode, and from the bottom a drive has been put in South 100 feet and North 23 feet. The average width is reckoned to be about three feet.

"Boulder Lode.—This is the most Westerly lode. A shaft has been sunk to a depth of 100 feet and levels have been opened out at 50 feet and 100 feet. At the 50 feet level drives have been put in North and South 50 feet from shaft. At 100 feet level drive has been put in South 150 feet and North 70 feet.

"The whole of these veins trend North-South. It seems to be the general opinion that there is a very good future for this mine. At the time of my last visit there were 150 tons at grass, estimated to be worth 10z. per ton.

"*Exhibition G.M.* (753).—This property consists of 18 acres, and is situated about a quarter of a mile North of the Marvel Loch. A vertical shaft has been sunk to a depth of 100 feet, and levels have been opened up at 50 and 100 feet. There is a large lode trending through this property in a North-Easterly direction; its width is estimated to average about 10 feet. It can be traced from one end of the lease to the other. Up to the present very little has been done to prove its value. To date about 500 tons have been treated for a return of about 5dwts. over plates.

"*Donovan's Find Lease.*—This property is situated about two miles South of the Marvel Loch G.M., and consists of 24 acres. The vein which is now being opened up courses North-South and dips towards the East at a fairly sharp angle.

"The following is the progress report for the fortnight ending 31st December, 1907:—

"137 feet level.—No. 1 rise from 46 feet to 63 feet, and broke through to crosscut at 70 feet level; stone

in rise six inches wide, not payable. Crosscuts East and West have been put in from this rise 30 feet above the 137 feet level. The West crosscut put in 6 feet 6 inches has exposed three veins of stone, 5in., 18in., and 3in. wide, respectively, worth 32s. 40s. and 85s. per ton. The East crosscut is in the country rock seven feet. North drive on hanging-wall stone has been started and driven 21 feet, stone six inches wide, not payable. No. 2 rise 13 feet North of crosscut to shaft "A" has been risen 17 feet, stone 12 inches wide, value 40s. Plat timber has been placed in position. The shaft "A" has been sunk from 137 to 143 feet.

"Crushing.—A parcel of 169 tons of stone raised from development work has been crushed at the Jacoletti mill for a return of 267ozs. 11dwts. 21grs. by amalgamation, tailings being worth 6dwts. per ton. Bullion valued at £3 17s. 6d. per oz.

"The want of an adequate water supply for drinking and treatment purposes is severely felt in the district just now, and prospecting operations are much hampered.

"*Never Never G.M.*—Good progress has been made on this mine, an additional 10-head of stamps have been erected, and the owners now reckon that they will be able to make a very substantial reduction in their milling costs. And from what I can learn, mining, milling, and cyaniding will be done for a total cost of about 7s. per ton. There are three large ore bodies running through this property, and from all accounts there seems to be an excellent future for the mine.

"*Golden Cube G.M.* (594).—This property is situated about one mile from the Never Never G.M., in a South-Westerly direction. Several shafts have been sunk on the reef, which trends through the lease East-West. So far as proved, it has been found to be very irregular and broken, and contorted by numerous granite dykes, which cut through the country in all directions. The last parcel of 70 tons treated from this mine gave a return of 65ozs., valued at £3 17s. per ounce. To date 406 tons have been treated for a return of 524ozs. 2dwts.

"*Great Victoria G.M.* (719).—This property, which consists of 12 acres, is situated about two miles South of the Golden Cube. There is a large lode trending North-South through the lease, which has been estimated to average 100 feet in width, and to be worth about 6dwts. per ton. From shafts that have been sunk the width of the lode has been proved to increase from 100 feet at the surface to 105 feet at the 80 feet level. At the time of my last visit there seemed to be a likelihood of a suitable plant being erected on this mine. There seems to be every prospect of this property being developed into a large and profitable mine.

"If this property can be profitably dealt with, and there seems to be no question on this point, it will, in my opinion, be the means of opening others along the same line that now offer prospects of becoming some of the largest producers of the State. Leases were taken up along this line at the time the Great Victoria was discovered, but owing to there being no capital available to prospect them they have been abandoned. It has been stated that this line of lode extends for miles in length, and that fair prospects can be obtained almost anywhere along the outcrop."

#### PARKER'S RANGE.

"Mining here has been a little dull of late; this has been attributed to the absence of crushing facili-

ties near the principal prospects. Seeing, however, that the Spring Hill battery has just commenced to treat public stone, and is very favourably situated, an improvement might be expected.

"*Spring Hill G.M.* (724).—The reef, which trends through the property North-South and dips towards the West, has had a considerable amount of work done on it, the most of it being done in the early days. Of late an incline was sunk on the reef to a depth of 140 feet, the ore obtained averaging about 7dwts. per ton. A five-head mill has been erected, and from all accounts it is thought that the ore, which is reckoned to be a little low in value, will now be turned to profitable account.

"*Piemonti G.M.* (769).—At present this property is being worked by Fornero and party. There is a well-defined reef trending through this property, which has been estimated to average 10 feet in width where it has been developed. It can be seen outcropping from one end of the 12 acre lease to the other. Five shafts have been sunk to an average depth of 50 feet, and the shaft known as No. 3 is now being sunk. It is the intention of the owners to sink it to a depth of 100 feet, at which point it is expected water will be met with. At the time of my recent visit there was a parcel of 200 tons at grass, its value being estimated at about 8dwts. per ton. The last parcel of 45 tons gave a return of 8½dwts. over plates. It seems to be the general opinion that there is a good future for this mine.

"*Gordon Highlander.*—Of late this mine has been worked by tributers. A vertical shaft has been sunk to a depth of 70 feet, and a drive driven on vein for a distance of 60 feet. The vein averages about 2.5ft. in width, and can be traced for some considerable distance along the surface. The last parcel of 18 tons gave a return of 9½ozs. per ton.

"*Dulcie Jean G.M.*—A compound shaft has been recently sunk on this property to a depth of 60 feet, the last 40 feet being in stone. It is now being worked on tribute. The vein, which can be traced for several chains along the surface, averages about 14 inches in width, and is reckoned to be worth a little under ½oz. per ton. The last parcel of 41 tons gave a return of 92ozs. over plates.

#### CHERITON'S FIND.

"This property is situated about 30 miles South of Parker's Range, or 60 miles South of Southern Cross. A start was made some little time ago to further test the value of some of the reefs, which up to the present, have had very little work done on them. A parcel of six tons just treated gave a return of 6½ozs. over plates.

#### KOOLYOONOBING.

"Mining at this centre has been quiet during the year. A little work was done on a small copper-stained quartz reef. The prospectors were of opinion that copper may be obtained at depth, but after sinking a few shallow shafts on it, it proved valueless and has been abandoned.

"It was reported some little time ago that a prospector, Mr. H. Wilson, had discovered a rich reef in the locality, and had applied for a prospecting area, but up to the present I have been unable to learn much of importance about it. The owners of Chadwick's Reward claim propose doing a little more work at the bottom level.

"Water is very scarce in this part, and very little prospecting is being done. There are numerous large

ore bodies throughout this locality, but unless something very rich is discovered, it will take a great deal to attract prospectors there. There are no crushing facilities nearer than Southern Cross.

#### MOUNT JACKSON.

"This centre is situated 110 miles North of Southern Cross. The principal mine worked here was the Mt. Jackson Gold Mine. A ten-head mill was erected here about ten years ago, and to the end of 1906 26,583 tons were treated for a return of 17,062ozs. During the year under review only the sands and slimes have been treated, these were finished a month or so ago, and the locality is now practically deserted.

"A number of shows were worked in the early days, both North and South of the township, and it is the opinion of many of the prospectors who have spent a little time in the district, that there are many promising reefs there that are well worthy of a little development being done on them. The district, however, is at a disadvantage in regard to crushing facilities, and I am very doubtful if anything of value can be done until this disadvantage is overcome.

#### ACCIDENTS.

"During the period under review one fatal accident occurred on each of the goldfields. This is a decrease of two compared with 1906, and compared with 1905 a decrease of four.

"Only one fatal and two serious accidents were caused by falls of ground.

"In the case of the fatal accident I found it was necessary to take proceedings against the manager, for not keeping the workings in a safe condition. It was given in evidence that the place in which the unfortunate miner worked was unsafe, and in support of this it was proved that he met his death in consequence of ground not being properly secured. In the face of this evidence, however, it was thought proper to dismiss the case on the grounds that there was no evidence to show that the ground was unsafe.

"In the other cases where serious accidents occurred, I found it necessary to take proceedings in two cases. Both these actions were taken against engine-drivers. In one case a cage was lowered in a shaft on top of a miner who was in the act of carrying out some repairs in the shaft. The driver lowered cage without first receiving signal to do so. For this he was fined.

"In the other case the engine-driver was fined for not exercising proper care in controlling his engine. Through his neglect a trucker was injured.

#### MINES REGULATION ACT.

The present Mines Regulation Act is working very satisfactorily. It is admitted by both mine managers and miners to be a very good Act, and if it be adhered to it will not only be the means of preventing accidents, but of preserving the health of our miners.

#### COLLIE COALFIELD.

The Annual Report of the Inspector of Mines, Mr. T. D. Briggs, dated 12th January, 1908, says:—

"The total output of coal from the field was 142,373 tons, or 7,421 less than the output for the previous year. Of this total the Government Railways purchased 98,618 tons. This is 12,792 tons less than the quantity purchased by the same department the previous year, but I think this may be accounted for by the decrease in traffic generally on the railways.

"The supply of coal to private consumers was the largest on record, being 43,755 tons as against 38,384 tons during 1906.

"The number of men employed on the mines shows a decrease of 17 per cent., but there was a marked increase in the output per man employed, it having reached 563 tons per man per annum as against 456 tons per man for the previous year, and 327 tons per man for the year 1903, when the maximum price of 13s. per ton was being paid by the Railway Department, and before the introduction of coal cutting machinery at any of the mines.

"Coal-cutting machines are in general use at the Proprietary, Cardiff, and Scottish Collieries, and an electric coal-cutting plant with the "Sullivan" type of machine is now being installed at the Co-operative colliery, and will be in operation within the next few weeks.

"One fatal accident occurred. On the 18th November, a boy named Frederick Herbert Francis, employed at the Cardiff Colliery ostensibly as weighman, was assisting another boy named Flint, who was ventilating furnace attendant, to supply coal for the furnace. A truck of coal from one of the working faces had been emptied at a point in the main tunnel most convenient to the furnace, and was being refilled into a small truck to be taken close to the furnace. Both the boys stated that while Francis was lifting a lump of coal into the truck something in it exploded. They stated that Francis had no light, but was working by the light which Flint had, which was about 12 feet away. The explosion set fire to his clothes. He immediately ran up the tunnel against the intake air current for a distance of 70 yards, fanning his clothes into flames. He was severely burned, and died in the Collie Hospital seven days after. The substance which exploded appears to have been blasting powder, but there was nothing gleaned at the inquest to show exactly where the powder was when it exploded, or how it got alight.

"There were thirteen (13) serious accidents causing injury to the same number of persons. Many of these were cases of 'crushed finger,' 'injury to finger,' etc., but as the sufferers were prevented from following their work for a fortnight they come within the category of 'serious.'

"In addition, there were 11 accidents classed as 'minor ones.'

"There were two (2) prosecutions under the Coal Mines Regulation Act, 1902. In the first a manager was fined 40s. and costs for a breach of Section 52 (3). In the second an overman was fined 20s. and costs for a breach of Section 51, in that he did not to the best of his power enforce the provisions of the Act.

"In addition, a general manager was prosecuted under the Mines Regulation Act, 1906, for a breach of Section 43 (one of the sections of the Act which applies to coal mining), and which prohibits Sunday labour in mines. He was fined 40s. and costs.

"During the last few months a small local syndicate has been prospecting for coal about eight miles East of Collie, and close to the Collie to Narrogin Railway. The prospects are favourable, as it is shown the coal measures undoubtedly exist there.

"A pleasing feature of the latter part of the year's transactions has been the supply of coal to the mail steamers by the Scottish Collieries. It is to be hoped that this new avenue of trade will expand and prove permanent."

NORTHAMPTON MINERAL FIELD, GREENBUSHES MINERAL FIELD, AND PHILLIPS RIVER GOLDFIELD.

Inspection of the mines has been carried out when practicable by the Relieving Inspector of Mines, Mr. S. Cullingworth. His Annual Report dated 24th April, 1908, is as follows:—

NORTHAMPTON.

"During the last six months of the year one visit of inspection was made to the Northampton district, during which the mineral properties then working, numbering six, were inspected, and some 15 mineral properties comprising most of the mines which have contributed at various times to the output of the district were visited, both at or around Northampton, and at Geraldine and Mary Springs, some 45 miles distant.

During the year two (2) fatal accidents occurred.

GREENBUSHES.

"During the last six months of the year one visit of inspection was made to this field, during which some 30 leases and mineral claims were inspected. According to the mining statistics an average of 322 men were engaged above, and 149 below ground in tin mining during the year.

PRODUCTION OF BLACK TIN, GREENBUSHES.

"The following table shows the quantities and value of black tin raised:—

<i>Black Tin.</i>				
	Lode.	Stream.	Total.	Value.
During 1907 (12 months)	tons. 40·40	tons. 729·60	Tons. 770·00	£ 73,045
Total production to date	...	...	6,283·20	434,850

"During the year the price of tin fluctuated considerably, reaching its highest price in July, when the quotations touched £200, then falling gradually during the last six months until the lowest quotation of £122 10s. was reached in December. With the low price ruling towards the latter part of the year, many of the claims temporarily ceased work, hoping for better prices. Whether the price recovers to the high rate reached during the year or not it would seem as though the time would soon be at hand for the old order of things—the small party of miners working in a more or less primitive manner—to give place to larger combinations or corporations working with the aid of machinery, and putting through a larger tonnage for a comparatively smaller cost. This I consider applies as much to the alluvial holdings as to the lode claims. During the year some steps have been taken in this direction, notably in the erection of two hydraulic sluicing plants, and in the sinking of a good main shaft on one lease by a local company assisted by a Government subsidy. This shaft will be sunk 200ft. before opening out, and cross-cutting for the lode if undertaken.

"The table given above will show the importance of this centre as a mining district, and there seems to be every reason to hope in spite of the cessation of work mentioned, the yearly output will be maintained or augmented when the larger plants get fairly to work.

"Accidents.—During the year one fatal, four serious, and two minor accidents took place.

PHILLIPS RIVER DISTRICT.

"Two visits were made to this district during the latter part of the year, during which 20 mining leases were inspected, and a number of smaller holdings visited. Speaking generally, the developments must be regarded as quite satisfactory, although the progress of the district is slow, owing in a great measure to its isolation, to the difficulty experienced in obtaining the necessary mining stores and their cost, and to the large and unexpected quantity of water encountered as the shafts are deepened. The drop in the price of copper has also been severely felt, and there seems to be pressing need for a central dressing plant where the small owners could get their second-class ore dressed to a grade which would make it payable, thus bringing a large quantity of ore into a marketable form which is now regarded as worthless. The railway is also urgently wanted, as it is then confidently expected that the smelting company will be able to reduce its charges. Some of the lodes or veins of ore at the Kundip end of the district are practically free from copper, and are being worked for gold in the ordinary way by crushing and amalgamation, but much of the ore now being treated in this manner contains sufficient copper to render cyaniding out of the question. It is the practice at present to concentrate this ore on Wilfley tables after passing over the battery plates, with the object of sending the concentrates to the smelter at Ravenshorpe. It does not always happen, however, that the resulting product is rich enough in gold and copper contents to pay the carting and smelting charges, and it seems probable that on this class of ore fine grinding and amalgamating in pans would recover a large percentage of the gold now lost.

"Eventually I feel sure the Phillips River district should be a consistent producer, and employ a large number of men.

"Accidents.—During the year one fatal and 11 minor accidents were reported.

*Production of Copper and Gold Ore from the Phillips River District.*

COPPER ORE.

	Tons.	Value.
During 1907 (12 months) ...	10,414·57	£ 57,273
Total production to end of 1907 ...	22,090·22	148,280

GOLD.

	Tons.	Fine ozs. therefrom.	Total with alluvial fine ozs.	Total value.
During 1907 (12 months)	3,690·05	4,290·87	4,313·87	£ 18,324
Total production to end of 1907	32,692·83	27,937·76	28,868·23	122,624

"The average number of men employed in the Phillips River district during the year was—

Copper mining—152 men on surface; 206 underground.

Gold mining—34 men on surface; 46 underground, 3 alluvial."

MINING ACCIDENTS.

I send you herewith tabulated statements of the mining accidents for the year ended December 31st, 1907, for the customary tables Nos. 22, 23, and 24 of your Annual Report, with those of the previous year

for comparison. The fatal accidents are also shown graphically in the diagram herewith, to be used in illustration of the tables.

"Table 22 shows that 45 persons were killed, and 391 injured by mining accidents during 1907, as against 40 killed and 479 injured in 1906. It also shows the distribution of the accidents through the various gold and mineral fields. The diagram shows graphically the totals of fatal accidents year by year since 1894, and that since 1899 there has been little difference in the average mortality from this cause. In table 23 the rate of deaths from accidents per 1,000 persons employed in mines is shown for the different sorts of mines, and for surface and underground working, and the general average rate is seen to be 2.51 for 1907, as against 2.21 for 1906. The rates per 1,000 are, as has been usual heretofore, based upon the figures in your table, No. 18, which gives a grand total for 1907 of 17,934 men employed at mines, above ground and underground. It does not, however, include the alluvial gold workers, who, as shown in table 20, bring up the total number of men engaged in mining to 19,113. There is an inconsistency in this, as account is taken in table 18 of the alluvial tin miners, who are working under quite

similar conditions to those who are searching for alluvial gold. The practice of omitting the alluvial gold miners seems to have originated a good many years ago, when the majority were dry-blowers working in very shallow ground, and were hardly thought to be properly classified as engaged in mining. Later on, however, a great deal of alluvial gold has been won by underground mining in deep ground, on the "leads" at Kalgoorlie, Kanowna, Paddington, Norseman, and elsewhere, and similarly there have been deep workings for alluvial tin ore at Moolyella and Greenbushes. All alluvial workers would, therefore, have best been included, and should be so in the future. The tables have not been amended in the present report on account of not having returns for 1907 of the alluvial workers classified as 'above ground' and 'underground,' as required for completion of your table 18, but if these particulars are obtained for 1908, it will be advisable in next annual report to take the grand total number of men shown in table 17 as the basis of the mortality rates per 1,000. The difference in the annual rates owing to inclusion of alluvial miners instead of exclusion as heretofore is shown for the last seven years as follows:—

	1901.	1902.	1903.	1904.	1905.	1906.	1907.
Total fatal accidents ... ..	45	39	43	42	34	40	45
Death rate per 1,000 men engaged in mining, not including alluvial gold-miners ... ..	2.52	2.10	2.36	2.38	1.91	2.21	2.51
(Men) ... ..	(17,879)	(18,559)	(18,219)	(17,659)	(17,792)	(18,111)	(17,934)
True death rate per 1,000 men engaged, including all miners ... ..	2.15	1.84	1.99	2.14	1.76	2.06	2.35
(Men) ... ..	(20,895)	(21,210)	(21,606)	(19,615)	(19,342)	(19,429)	(19,113)

In comparing the death rate from mining accidents with those of other countries, it is very necessary to take into account the method in which the number of men is estimated upon which the rate is calculated, as some places are much more liberal than others in their definition of men employed in mining. Obviously, the greater the number of men taken, the less is the rate of mortality per 1,000. The soundness of comparisons between the rates of different States and Countries is largely dependent on this consideration.

Table No. 24 gives a summary for 1907 of the fatal accidents above and below ground in gold mines only, with rates per 1,000 men employed, and per 1,000 tons of ore raised, with similar figures of 1906 for comparison. The numbers of men on which these rates are based are given in your table 19.

Hereunder I attach a general table showing the fatal and serious accidents during 1907 classified according to the gold or mineral field in which they happened, and also according to causes. The totals from each cause for 1906 are also given for comparison:—

GOLDFIELD.	Explosions.		Falls of Ground.		In Shafts.		Miscellaneous Underground.		Surface.		Machinery.		Total.	
	Fatal.	Serious.	Fatal.	Serious.	Fatal.	Serious.	Fatal.	Serious.	Fatal.	Serious.	Fatal.	Serious.	Fatal.	Serious.
1. East Coolgardie ... ..	1	5	6	31	1	13	1	133	1	38	2	26	12	246
2. Mt. Margaret ... ..	...	2	4	5	...	...	1	9	1	7	2	6	8	29
3. Murchison ... ..	1	...	5	7	2	5	...	9	...	5	...	2	8	28
4. East Murchison ... ..	...	1	1	10	3	1	...	14	1	1	...	3	5	30
5. Coolgardie ... ..	...	1	...	2	1	1	...	4	...	3	...	1	1	12
6. Yilgarn ... ..	...	1	1	...	...	1	...	2	...	1	...	...	1	5
7. North Coolgardie ... ..	...	1	2	1	...	1	...	1	...	...	...	...	2	4
8. North-East Coolgardie ... ..	...	...	...	2	...	2	...	1	...	...	...	1	...	6
9. Broad Arrow ... ..	...	...	1	1	...	...	1	...	...	1	...	...	2	2
10. Dundas ... ..	...	3	...	...	1	2	...	1	...	1	...	...	1	7
11. Pilbara ... ..	...	...	...	1	...	...	...	...	...	...	...	...	...	1
12. Peak Hill ... ..	...	...	...	1	...	...	...	...	...	1	...	...	...	2
13. Yalgoo ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...
14. Phillips River ... ..	...	...	...	...	...	...	...	...	1	...	...	...	1	...
15. Collie ... ..	1	...	...	2	...	...	...	9	...	1	...	1	1	13
16. Greenbushes ... ..	...	...	1	1	...	1	...	...	...	2	...	...	1	4
17. Northampton ... ..	...	...	1	...	...	...	1	...	...	...	...	...	2	...
18. West Pilbara ... ..	...	...	...	...	...	1	...	...	...	1	...	...	...	2
Total 1907 ... ..	3	14	22	64	8	28	4	183	4	62	4	40	45	391
Total 1906 ... ..	6	13	17	81	3	33	11	227	3	76	...	49	40	479



(The machinery accidents in the above table might properly be included in the 'surface' class. They are such as have been caused by machinery in motion and boilers, and which come under 'The Inspection of Machinery Act, 1904,' as well as under 'The Mines Regulation Act, 1906.' They are usually dealt with by the Inspectors of Machinery, but have to be included as mining accidents under the Mines Regulation Act also. Only such are here recorded as serious accidents as come within the 14 day rule adopted for mining accidents, notwithstanding that the Inspection of Machinery Act defines 'serious bodily injury' as such 'as is likely to incapacitate the sufferer from work for at least 48 hours.')

A large number of slight accidents also, as a measure of precaution in case they might prove serious, have been reported to the Inspectors of Mines, which were found not to prevent the sufferer from returning to his work within 14 days.

*Fatal Accidents.*—The following are brief particulars of the fatal accidents:—

*Explosives.*—Three persons were killed during 1907 by explosions, the exact cause of which is far from clear. In one instance, at the Hainault G.M., Boulder, two men in a leading stope had lighted six charges but heard only five reports. They returned after a very short delay to re-fire the missed hole, when an explosion took place, killing one and very seriously injuring the other. It seems most probable that the explosion took place while the deceased was re-charging the missed hole, but no one knows whether the fuse had hung fire or if the detonator was accidentally struck in re-charging. The fuse and explosives were of the best quality. The men were breaking the General Rules in returning so soon to a missed hole, and if the explosion was due to the fuse hanging fire they had only themselves to blame. If, however, the fuse had failed to ignite at all, or had gone out, and the explosion was due to something done while re-charging, it might have happened at any time when the hole was being re-primed.

In a second case, at the East Fingall Mine, Day Dawn, the man killed and his mate had charged eight holes in a crosscut from the shaft. Deceased was lighting the fuses while his mate stood at the shaft: the latter saw two fuses 'spit' but could not say how many were lighted, and then there was an explosion, followed by several others. The fuse and explosive proved to be of unexceptionable quality. The Coroner's Jury found that faulty fuse caused a premature explosion, but there was no evidence at all that the fuse was faulty beyond the fact of the accident, and it is quite as possible that this was due to some miscalculation or oversight on the part of the men as that it was the fault of the fuse. Special care seems to have been taken at this mine to test the speed of burning of fuses before use.

The third fatal accident with explosives took place at the Cardiff Colliery, Collie, to a boy, who received severe burns, from which he died. It seems doubtful if the whole truth of the occurrence has been obtained. Deceased was lifting a large piece of coal into a skip when there was an explosion of blasting powder which set fire to his clothes. The piece of coal had in it part of a bore-hole, and it is supposed that this had contained unexploded powder, but how the boy came to light this is not explained. There appears to have been some laxity in the practice of the colliery in the way that powder was allowed to be handled by boys and left lying about where anyone could get at it.

*Falls of Ground.*—As is usual, and as is inseparable from the miner's calling on account of its very nature, there was a large number of accidents from falls of rock, 22 men being killed in this way in 1907 in 21 falls. In all these cases careful inquiry was made, both by the Inspectors of Mines and Coroner's inquisition, and in the great majority of them it was found that all reasonable care and skill had been exercised, and that no further precautions could be suggested that would prevent similar accidents recurring. Only five cases appear to require any special comment, viz.:—

1. Ernest Rogers, killed 23rd March, 1907, by a heavy fall of ground in a stope of the Great Boulder Proprietary Mine, Boulder. The stope was about 12 feet in height, and 19 to 20 feet wide. Deceased and his mate had been breaking large rocks with small charges of explosives below where the fall occurred. The roof had been examined by men specially detailed for the work, one of whom was deceased's mate, and was thought by them to be quite safe. Every ordinary precaution appears to have been taken, but the accident suggests doubt whether in these large wide stopes it is good practice to trust so much as is usual to the natural strength of the ground, without some assistance from timber.

2. William Gilbert, killed 18th October, 1907, at the Lancefield G.M., Laverton. This case is somewhat similar to the last; the ground had been carefully examined and was considered safe, but the stope was about 13 feet high where the man was working and over 30 feet wide. Big rocks had been broken up by sand blasting shortly before the fall of rock took place. The Coroner's Jury did not blame anyone, but regretted that the piece of ground which fell had not been tried again after the sand-blast had been fired. This and the preceding accident point to the necessity for examination of the 'back' after any firing in the neighbourhood, to see that ground had not been loosened by the shock of the explosions.

3. S. Caelli, killed 15th March, 1907, in the Greenmount Mine, Southern Cross. In this instance the Inspector of Mines was not satisfied with the precautions that had been taken to maintain the place where the accident occurred in a secure condition, and took proceedings against the underground manager, but the Bench of Justices took the view that he had not proved that the place was insecure on the day of the accident and dismissed the case. There is strong suspicion that this death was due to careless methods of working.

4. G. Zanardini, injured 28th July, 1907, in Gt. Fingall Mine, Day Dawn, died 6th August, 1907. This man's death was due to his own indiscretion in entering a pass which had become jammed for the purpose of freeing it. A large stone fell upon him and broke both his legs, which had to be amputated, causing his death. Owing to this and a very similar non-fatal accident in the same mine to another miner, a new Regulation has been made, dealing with the freeing of passes which have become 'hung up.'

5. M. Curran and G. Bertonelli, killed 19th August, 1907, in the Ingliston Extended Mine, Meekatharra. The ground was very heavy and known to be dangerous, but every reasonable care appears to have been exercised. The Inspector of Mines and Coroner's Jury recommended the use of iron 'timber dogs' as an additional precaution in future in this and similar bad heavy ground.

Of the 22 accidental deaths from falls of ground 12 were in large mines worked on an extensive scale,

six were in smaller mines worked by companies or syndicates, and four were in prospecting work. Two of the last-mentioned were in alluvial claims.

In Shafts.—Six fatal accidents occurred in 1907 in shafts, causing the deaths of eight men. One happened in the shaft of the Burbanks Birthday Gift Mine, near Coolgardie. Two men, who were brothers, got out of the cage at No. 2 level and went different ways. One of them returned after a little time and not being able to find his brother reported the matter, when search was made and the body recovered from the well in the bottom of the shaft. The accident seems to have been due to carelessness on the part of some person in not replacing the bar across the opening into the shaft after it had been raised, but who was at fault is unknown. General Rule 33 of Section 32 of 'The Mines Regulation Act, 1906,' did not come into force till five days after the accident.

Another death was caused at the Gt. Fingall Mine, Day Dawn, by the fall of a stone down the underlay part of the main shaft, and its striking deceased on the head as he stood on the plat at No. 13 level. It could not be discovered where the stone fell from, or how it came to get into the shaft, and the accident therefore remains an unexplainable mishap.

A third fatal accident was in the Morning Star Mine, Mt. Magnet, through a man being crushed between a bailing tank and the end of the shaft, but there is no evidence how he came to be so caught. No fault was found with the equipment or methods of working the shaft, and there is no apparent reason for the man having been caught. Some carelessness or oversight on his own part, or an attack of faintness, seems the only possible explanation of the mishap.

Another fatal accident, in the Cumberland G.M., Norseman, was due to the deceased and others riding in the skip in contravention of instructions. By some means he got his head caught between the skip and the No. 3 plat, and was killed. No fault could be found with the appliances, and the Coroner's Jury found no blame attachable to any person. The accident seems to have been the result of some incautious action of the diseased.

A terrible fatal accident took place in the shaft of the Waroonga Mine, Lawlers, whereby three men lost their lives, one by being jammed between the timbers and cage, and the other two by being thrown out of the cage down the shaft. It seems to have been caused by undue delay on the part of one of the men in getting into the cage after signalling to be hoisted. The cage started while he was leaning out of it putting up the guard rail, and he was caught under the opening set of the plat. This caused his feet to shoot out as he fell, kicking away the feet of two other men on the cage, who were then caught by the framed sets and torn out of the cage. A fourth man in the cage escaped. This was a very uncommon sort of accident and would be very unlikely to occur again. It however strengthens the demand for cages to have gates provided on them which would prevent men from falling or being thrown or knocked out of them.

The remaining death in a shaft occurred at the Golden Horseshoe Mine, Boulder, and also emphasises the necessity for closed gates on cages. Four men were in a cage, when for some reason or other one of them fell, and his head got caught and crushed by one of the framed sets of the shaft. The appliances were all in good order and the motion of the cage steady, so no reason is visible for the man's fall

unless he became faint. He was developing pneumonia at the time, which made him liable to faint. There was no blame attributed to any one by the Coroner's Jury, but they considered that more protection should be afforded to men travelling in cages.

Miscellaneous Underground.—Under this heading there were four fatal accidents in 1907. One was in the Narra Tarra lead mine, at Northampton, and was caused by new workings breaking into old ones full of water. The sudden inrush of water drowned one man, and another had a very narrow escape. There was no suspicion that there were any old workings near where the driving was going on, and no plans of the old workings were available. This accident is one of a sort of which there have been very many instances in all mining countries where old workings are approached, and again draws attention to the absolute necessity for keeping accurate public plans and records of the extent of old workings, which can be referred to years afterwards if required.

Another fatality occurred at the Westralia Mt. Morgans Mine through a man working in a deep open cut at surface, getting mullock, falling down a mullock pass. He seems to have lost his balance while trying to loosen a big stone. No one appears to have considered the place at all dangerous to work in.

A third fatal accident was in the Gt. Boulder Perseverance Mine at Boulder, through a man falling down a pass. There was a good ladderway, and no reason why a man should fall. Either deceased in some way missed his footing or possibly he tried to slide down a rope, as some of the men were in the habit of doing. No one could be blamed but the deceased himself if he took the latter dangerous method of descending.

Another man was killed at Lode Claim 389W, Broad Arrow, through being smothered in mullock through the bursting of an underground ore bin. It seems probable that the dirt had hung up in the pass, and that deceased was trying to free it when the stuff came away with a rush and broke out the front of the bin. The bin was previously considered quite safe. Deceased was one of the owners of the mine.

Surface.—Four fatal accidents have been recorded in connection with surface works of mines, other than those due to machinery in motion. One of these would have been equally well classed among fatalities "in shafts," being the case of a little boy seven years old who was unfortunately killed by falling 520 feet down a sandpass from surface on the South Kalgurli mine. Men were trucking sand to the pass at the time, and had removed the cover, leaving it protected only by a coarse grating of crosspieces. While the men were away with the trucks the boy, playing about with some companions, walked backwards into the shaft, and fell between the cross timbers. The spaces between the timbers were small enough to prevent grown persons from falling through, but a child could pass them easily. The Coroner's jury found that proper precautions were not taken by the company to protect the mouth of the sandpass. On reference to the Crown Law authorities, it was held by them that the boy was a trespasser on the lease without lawful business, and that the mining company were under no legal obligation to keep the top of the pass covered as regarded him, also that the Mines Regulation Act, 1895, did not impose duties as regards the members of the public at large, but only as regards mine employees. The Inspector of Mines was satisfied that proper precautions were taken to pro-

tect the shaft so far as mine employees were concerned, and no action was therefore taken against the company. The accident had to be recorded under the Mines Regulation Act, as it occurred in a mine, but it obviously stands in a somewhat different category from such as occur to employees in mines in the course of their avocation, and it might very fairly have been omitted in making up the figures of mortality through mining accidents per 1,000 men engaged in the industry. It has, however, been included.

A second accident on surface was of a very unusual sort, the manager of the Potosi Consolidated mine being poisoned by some cyanide of potassium fragments getting into his mouth while he was opening a case of the salt. A somewhat similar case was recorded at Kalgoorlie some years ago when a man died from getting a splash of cyanide solution into his mouth while cleaning out a storage tank. These accidents show that great care must be taken to protect the mouth while handling this very poisonous substance.

Another accident at surface was at the Northern mines, Lawlers, where a man lost his life through being smothered by a fall of dry slimes in which he was making an excavation. The Coroner's jury found no blame attachable to anyone, but recommended that in future the dump be worked in two benches.

The fourth accident was due to the man, who lost his life thereby, riding on a truck which he was running out to dump at the Gem mine, Kundip. The truck left the line at a bend, throwing the man on his head and breaking his neck. He had been warned against riding on the truck. The line was in good order, and no one was to blame but the deceased himself.

*Machinery.*—Four men lost their lives while attending to machinery. One was repairing the brakes of a winding engine, and had loosened a pillar, which fell and knocked his head against the masonry or part of the building. No one was to blame but deceased himself. The second accident happened through the deceased attempting to pass one end of a broken belt under a revolving pulley and getting caught. He was the man in charge of the work, and should have used better judgment, and had the engine stopped or run dead slow while he did it.

A third accident was caused by the deceased imprudently wearing a long overcoat while oiling revolving shafting. The coat got caught, and the man was carried round the shafting two or three times, receiving injuries from which he died 20 days afterwards. The accident was due entirely to his own want of ordinary caution.

The fourth death from injuries from machinery was that of a little boy seven years of age, who was drawn between an elevator belt and pulley at the Associated Northern mine, Kalgoorlie. He had no right to be there at all, and was meddling with a running belt which he should not have gone near. His home was close to the mill, and the accident was due to children being allowed to run about mines and mills without supervision. This case is quite similar to the other one above recorded, where a child was killed by falling down a sandpass, and is not properly chargeable to the list of fatalities incidental to the miner's occupation.

A review of the fatal accidents during 1907 shows that they were nearly all mishaps of a character which could not be prevented by greater care on the part of the management of the mines or the Inspectors of

Mines. Many of them were due more or less to imprudence or thoughtlessness on the part of the men killed, but this factor in such accidents seems impossible to be eliminated. In only one instance, that of clearing "hung up" passes, has it been found practicable as yet to prescribe further precautions by regulations which would serve to minimise the recurrence of such accidents, but it seems advisable also to insist on cages and skips being in the future required to be provided with safety gates.

*Serious Accidents.*—To avoid repetition I would refer to the first two paragraphs under this heading in last year's report, which explain to a great extent the large number of accidents recorded as "serious" as compared with former years when a less strict system of record was in vogue. Of 246 accidents in the East Coolgardie field treated as "serious" in 1907, only about 30 were cases of breakage of the larger bones, permanent serious injury to eyes or limbs, or injuries likely to have lasting disabling effects. The remainder, though painful enough, were of much less serious character, being broken and crushed fingers, scalds, jarred hands, poisoned cuts, strains, and wrenches, shocks to system, smaller dislocations, cuts, and bruises. A somewhat similar ratio is found between the more permanently disabling accidents and those of less consequence in the returns of the other fields also.

*Explosions.*—Fourteen persons received injuries recorded as serious during 1907 from explosions. Two were from explosions of detonators while fixing them to fuses, and one from a detonator being carried in a man's pocket. Four were caused by drilling in old holes, one by the man returning to a mis-fire before reasonable time had elapsed, and another from want of proper warning being given when firing, all contrary to the Regulations. In the last case the man responsible for the offence would have been prosecuted had he not left the State. In the others, the injuries received were considered to be sufficient to ensure care in future against repetition of improper practices. Three men were hurt, while cleaning up after firing, by striking unexploded holes with picks. In one instance there was evidently rough and careless work by the man who was injured, as he knew that there was a missed hole under the dirt he was picking at. In the other case two men were hurt apparently by there being a piece of unexploded gelignite among the ore they were clearing away. The Chief Inspector of Explosives, in commenting on this accident, suggests that stronger detonators, No. 7 or 8, should now always be used, to give greater assurance that the whole of the charges in holes should be exploded. A somewhat curious case was that of a man who while about to charge a hole in the bottom of an underlay shaft heard some small stones fall, and on feeling with his tamping stick found that what he took to be one of them had rolled into the hole. He took a drill to bore it out, but on striking it there was an explosion, and it was subsequently ascertained that one of the plugs of gelignite which he had beside him must have fallen down into the hole without his noticing it. Yet another unusual case was that of an accident due to firing a plug of gelignite in a pass to bring down mullock which had become jammed. One man went up the pass and placed and lighted the charge, but while doing so the dirt started to run, and he found on getting down to the bottom that the shoot was choked, and the running dirt soon nearly buried him. In the meantime his

mate and two others were working hard to clear the shoot and get him out before the shot should go off, but while they were doing so there was an explosion at their feet, and one man had his foot blown to pieces. The charge must have fallen down unnoticed among the dirt, and it is wonderful that only one man was hurt.

*Falls of ground.*—Sixty-four men were injured more or less seriously during the year by falls of ground. In 16 instances the men at the time they were hurt were engaged in taking down loose ground, a class of work which is absolutely necessary, but which from its very nature is obviously attended with more than ordinary risk of injury from the falling rock. In one instance two men were injured on successive days in the same stope; after the first accident it appears to have been arranged to put in timber, but this was not done, and next day another accident occurred. The Inspector of Mines considered that there had been negligence, and prosecuted the mate of the second injured man, the shift boss in charge of the work, and the mining manager, for breaches of the Mines Regulation Act. The shift boss was fined £5, but the other two cases were dismissed. In a few other cases, though the Inspectors have not been quite satisfied that all proper care was exercised by those concerned, they have been content with warning the latter, without taking any legal action against them. The great majority of instances, however, were purely accidental mishaps, not preventable by exercise of ordinary skill and care, a class of accidents inseparable from the miner's occupation.

*In Shafts.*—Twenty-eight persons received serious injuries in shafts from various mishaps. Eight were hurt by falls of material down the shafts, such as stones, timber, and drills; five by themselves falling down the shafts from various causes; and 15 by accidents in connection with the working of cages, buckets, kibbles, and skips. Some of these cases are worth mentioning, more particularly as indicating sources of danger against which precautions may be taken in other instances. Two men were hurt by being struck by descending cages while looking or calling into shafts. There were two cases of cages with men in them being lowered suddenly on to the chairs in shafts, whereby three of the men were injured. In one case the accident was due to miscalculation or oversight on the part of the engine-driver; whose attention appears to have been momentarily distracted. After consideration of the circumstances the Board of Examiners under "The Inspection of Machinery Act, 1904," allowed the matter to pass with a record of a warning to the driver. In the other instance, which was in many respects similar, but seemed to involve more carelessness on the part of the driver, proceedings were taken against him by the Inspector of Mines, and he was fined £1 and costs. The Board of Examiners also recorded a warning to the driver. Another nasty accident was due to the engine-driver, through a misunderstanding with the underground foreman as to signals, lowering a cage on to a man working in the shaft. Proceedings were taken against the driver by the Inspector of Mines, and he was fined 10s. and costs. Another was due to a man trying to get out of a cage after he had rung the signal to hoist. In this and two other cases where men were hurt through allowing their elbows to project beyond the sides of the cage while being hoisted, the provision of gates to the cage would probably have prevented the occurrence of the accidents.

Of accidents with skips in inclined shafts, one was due to an engine-driver allowing the skip to get out of control while lowering it with the brake, the runaway skip striking a man who was climbing up the shaft. The Inspector of Mines prosecuted the driver for negligence, and he was fined, including costs, £2 14s. Another, causing injuries to two men, was due to the skip leaving the rails on which it was being hoisted. After inquiry the Inspector of Mines blamed the engine-driver for careless hoisting, but did not think he had a case strong enough to secure a conviction if he took proceedings against him under the Mines Regulation Act. This accident again draws attention to the necessity for providing side guides to skips in inclined shafts in addition to the rails on which they run.

There were three accidents with buckets or kibbles, one from a bucket which was being raised catching the foot of a ladder-way and causing the fall of a man who was upon it; another from a man riding in a bucket, against orders, and being caught between the bucket and the timber of a chute; and a third from a man getting his hand jammed between the kibble-handle and its side, while steadying it. The second of these was a very serious accident, but due entirely to the injured man's own ignorance and foolishness.

One serious accident occurred in an alluvial tin-claim through a windlass barrel becoming loose on its handle through being of defective construction, causing the fall of the owner who was on the rope.

In another case a man fell down an old shaft while illegally removing timber from an abandoned shaft, owing to the ground round the shaft giving way. The injured man's mate was proceeded against for the breach of the Mines Regulation Act in removing the timber, and fined £1 and costs. Another fall down a shaft was occasioned by a man who was lowering timber down a shaft getting his feet caught in a coil of rope he was using and so being dragged into the shaft.

*Miscellaneous Underground.*—One hundred and eighty-three persons were injured by miscellaneous mishaps underground. In 58 cases the injuries were sustained while handling and loading trucks, through fingers or bodies being jammed against shoots or 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, big stones moving in trucks and injuring hands, and so on, the injuries being mostly wrenches, sprains, bruises, and cuts. In 28 cases the injuries were due to falling and rolling loose rocks and stones, such as runs of ore and mullock while shovelling, and stones running down rills and ore shoots; and two men received severe cuts while handling sharp stones. Seventeen men were hurt while handling rock drills, coal cutting machines, and parts of same, and four by the breaking down of the stages erected to work upon. Other falls in the workings, from stages, ladders, or rills, in passes, and so on, caused injuries to 21 men, and 12 were hurt by falling tools and pieces of machinery. Flying splinters of stone and steel injured 15 men, and three men were hurt while handling timber. The remaining cases were due to various accidental causes, jarring of hands, blows from tools, and so on.

*Surface Accidents (including machinery).*—In and about the surface works of mines 102 accidents were recorded for 1907. The causes were very various. Two men were scalded by

hot water, and two burnt. Fourteen persons sustained injuries from falls caused by missing their footing, slipping, and overbalancing. Eight were hurt by trucks, by being jammed or struck by them, by their capsizing, or by the men sustaining strains while working them. Flying splinters injured four men, and one got his hand jarred. Falls of timber and pieces of machinery while being handled accounted for twenty cases of injury. Twenty-eight were caused by machinery in motion, six of these being caused by handling belts in motion. Other causes of accidents were strains from lifting heavy weights, unexpected falls of stamps, a horse bolting and upsetting a dray, kicks from horses, and so on.

The general remarks in my last year's annual report following the particulars given of the serious accidents recorded for 1906 apply also in the case of 1907 and need not therefore be repeated. I would, however, again emphasise the obligation which rests upon mining managers under the Mines Regulation Act to closely supervise all working methods in their mines, and to insist on strict compliance with instructions given to secure greater safety to all employed. It is only by the exercise of strict discipline and determination to put down all dangerous and careless practices that any great improvement can be hoped for in the serious casualty list which forms so ugly a feature of the mining industry, and it is only the mine officials who are every day in the mine and have power to compel compliance with their instructions who can effectively exercise the necessary supervision. The function of Inspectors of Mines is mainly to see that good methods of working are maintained, and to keep the mine officials up to their duties in this respect.

#### PROSECUTIONS.

During 1907 nineteen persons were prosecuted for breaches of the Mines Regulation Acts. A manager in the Coolgardie field was fined £2, costs £2 2s., for failure to provide ladderways and to post up a copy of the General Rules. Two engine-drivers in the Dundas field were fined 10s. each, with costs 22s. and 44s., for negligence in winding whereby persons were injured; and a miner was fined 1s. and costs, 25s., for carelessness in the use of explosives. The charge against a manager in the Yilgarn field of neglecting to maintain his workings in a safe condition was dismissed on a technical point. In the East Coolgardie field there were five prosecutions, involving eight persons. A miner was fined 1s., costs 2s., for carelessness in handling explosives, leniency being shown on account of the man's own candid admission of his fault. An engine-driver was fined £1, and 2s. costs, for negligence in winding whereby two men were injured. A mine manager was fined £1 and costs for failure to efficiently examine and make record of the condition of the mine under his charge, which was being worked by tributers. Two miners were proceeded against for leaving an open winze unprotected by a light, but the case was dismissed for want of evidence other than the men's own admission to the Inspector of Mines. The manager, the shift-boss, and a miner in a large mine were prosecuted for breaches of the Act in connection with a serious accident from a fall of rock, but as noted in a previous paragraph of this report, only the shift-boss was fined £5, the other two cases being dismissed. In the North Coolgardie field a man was fined £1 and 3s. costs for illegally removing timber from an old shaft. In the Mt. Margaret field, a mine manager was fined £1 and

costs for allowing work to be resumed at a place where an accident had occurred before it had been inspected by the Inspector for Mines. In the Murchison field a bracedman was fined £5, with £4 2s. 10d. costs, for omitting to close the shaft-gate after landing a truck, whereby the truck was allowed to fall down the shaft. At Collie an overman was fined 20s. and costs, 18s., for not enforcing the Rules; a general manager was fined £2, with costs £1 11s. 3d., for breach of the provisions of "The Mines Regulation Act, 1906," relating to Sunday labour; and a manager was fined £2 and costs, 2s., for failing to enforce the Rules.

#### SUNDAY LABOUR IN MINES.

Under "The Mines Regulation Act, 1906," the "Sunday Labour in Mines Act, 1899," became incorporated with the former, and enforcement of its requirements became a duty of the Inspectors of Mines. There have been very few complaints during 1907 about work being carried on on Sundays, and the provisions of the Act relating to this matter seem to be very well observed. Permits have in several cases been given to allow Sunday work in cases of especial necessity, but every effort has been made to reduce such work to a minimum. In the case of one large mine I have been assured by the management that the cessation of Sunday work underground not only resulted in no loss but was an absolute advantage to the mine in its working expenses.

#### ACCIDENTS TO WINDING MACHINERY.

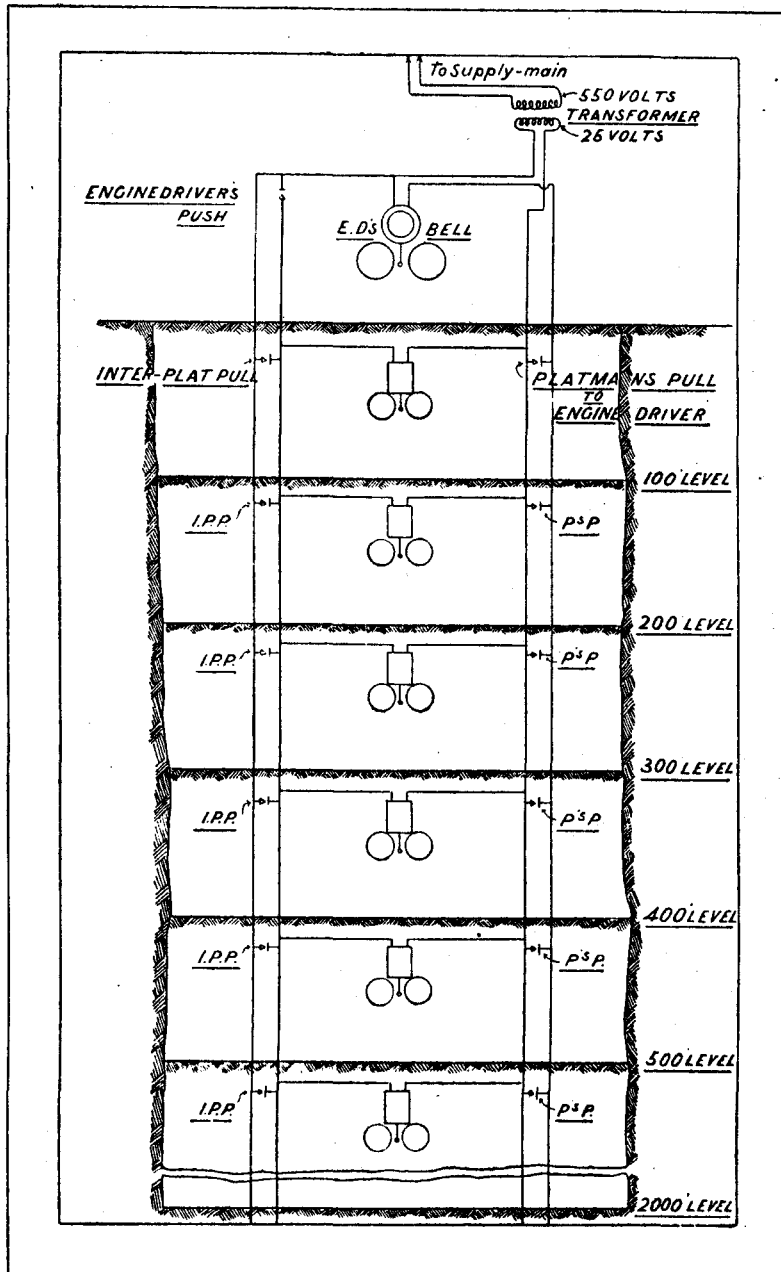
Under Regulation 11 under "The Mines Regulation Act, 1906," it is now necessary for mine owners to report to the Inspector of Mines all accidents to the winding machinery, whether such have caused injury to persons or not. Only two such accidents unattended with injury to persons were reported during 1907 in addition to those in which persons were hurt, both in mines in the East Coolgardie Goldfield. Both were cases of overwinding. In one the rope was pulled out of its shoe, and the pulley wheel broken, but the cage remained hung up. In the other case the side catches on the skip acted as soon as the detaching hook had let the rope go, and the skip hung up by the former, leaving the bridle chains slack. In the case where the rope was pulled out of its shoe the accident draws attention to the need for great care in making these attachments to ensure that the joint is not greatly weaker than the rope itself. In this instance it must have been considerably easier to pull the rope out of the shoe than to break the rope, and doubt is cast on the effectiveness of the method of shoeing.

#### NEW REGULATIONS.

The Regulations under "The Mines Act, 1906," which came into force during 1907 have been on the whole favourably received by the mining community, very little objection having been made to any of the more important provisions. The experience of their working has, however, suggested some slight amendments, which will be brought forward in due course. In consequence of several accidents from the practice of sending men into ore-shoots and mullock-passes that had become jammed or "hung up," it has been found necessary to make an additional Regulation dealing with this matter as follows:—

"No person shall enter any shoot or pass underground in which ore, rock, mullock, or sand has become jammed or hung up for the purpose of examin-

— GREAT BOULDER PROPRIETARY MINE —  
ELECTRIC SIGNALLING ARRANGEMENT



ing or freeing the said pass or shoot, unless all other practicable means have been previously taken of causing the ore, rock, mullock, or sand to run or become free. Before any person enters such shoot or pass, the fact of its being necessary to do so shall be reported to the manager or to the person for the time being in charge of the underground mining work, and the work of freeing the said shoot or pass shall be done under his instructions. Every case of any person having to enter such shoot or pass shall be reported to the manager and entered in the Record Book." This Regulation, however, was not gazetted till 7th February, 1908, and therefore was not in force during 1907.

#### SUNDRY MATTERS RELATING TO REGULATION OF MINES.

The following notes relative to matters connected with the Regulation of Mines which have been under consideration during 1907 may be of interest:—

*Gates to Cages in Shafts.*—In last year's report reference was made to this matter, and as shown in the foregoing part of this report there were, during 1907, no less than four men in our mines who lost their lives and three who were seriously injured by accidents in shafts which would probably not have happened if gates had been provided on the cages. In previous years there were several similar accidents, many of them fatal, and taking this experience with that of other countries as referred to in last year's report, it seems clear that an effort is required to secure greater safety in this respect.

*Signalling in Mines.*—One of the provisions of "The Mines Regulation Act, 1906," to which great exception has been taken since it has come into force, is General Rule 11 of Section 32, notwithstanding that it is somewhat less stringent than the almost identical General Rule 10 of Section 23 of the older Mines Regulation Act of 1895, which has been in operation for over ten years. Objection is taken to return signals being made compulsory. The history of Mines Regulation Acts everywhere, however, bears out the contention that it is necessary to insist by legislative processes upon safeguards being introduced into mines before there is any very general disposition to supply them. The inertia of conservatism has usually to be overcome by an external stimulus. Return signals are now insisted upon in many mining countries, and have proved a great additional safeguard to the workman wherever they have been installed. The experience with them in this State has been highly satisfactory wherever a really good return signal installation has been introduced. After much investigation and discussion of the subject I am fully convinced that the requirement of such signals is a proper one and one which ought to be insisted upon in all large mines. In the smaller ones there is not so much liability to confusion of signals, and the same necessity does not therefore exist for repetition of them before the cage is moved, but in these also it is of much advantage. In the small mines it is a simple matter to arrange return signals by means of knocker lines, similar to those used for signalling from underground to the engine room. In the big mines various systems of electric signalling are being very generally introduced, which render signalling both more easy and more rapid and permit good return signals to be readily made. Several of the large mines at Boulder are now equipped with electric signal systems, the latest installation being that at the Great Boulder Proprietary mine, where

what is known as Grayson & McGlew's patent has been put in. This is described as follows by Mr. Deeble, Inspector of Mines:—

"Recently on the Great Boulder mine at the main shaft, has been installed an electric bell system of signalling for the underground works to the depth of 2,230 feet embracing 27 levels. This system of signalling is claimed by the inventors to have every advantage over any system hitherto in use.

"The following is a brief description of the system, the object of which is to provide by means of electric bells a simple and efficient system of signalling for the cage and underground work. Alternating current is used instead of continuous current and the system is composed as follows:—

"(a.) For localities with supply current a transformer, four insulated wire cable, watertight polarised bells, junction boxes, pulls or pushes, namely platman's pull, and interplat pulls, for platman to communicate with engine-driver, and miners stationed at the various levels to communicate with platman.

"(b.) For localities without supply current, the same as the above with the exception that, instead of a transformer, a generator must be used. The working of the circuit wired to illustrate the actual procedure is as follows:—Assuming a platman hauling at the 400ft. level and shift boss at the 1,400ft. level require the cage, the shift boss simply rings the platman his number of rings by using the interplat pull corresponding to the level he rings from, by so doing the bells are ringing at every level, excepting of course the engine-driver's bell; the platman replies to the shift boss by using the interplat pull with the same number of rings, and calls engine-driver by using the platman's pull for the level at which the cage is required; engine-driver by using his pull, replies to platman's signal, and lowers the cage to the level asked for, so by this system perfect communication and understanding between levels will be obtained, and also the engine-driver can secure the highest degree of safety.

"By the use of polarised bells, you do away with the interruptor in the circuit, which often causes much trouble with the continuous current bells.

"By means of the transformer, the high voltage current from the main supply is reduced to 25 volts, and therefore no danger to life.

"A great saving of time, by which an increase of tonnage is the result, maintenance and working expenses much lower than any other bell system, and possibilities of breakdown practically nil.

"It will be seen by the foregoing description it is in advance of any other system yet tried in this State. The installation on the Boulder mine is of the very best material and workmanship; the main one made up as follows, from the outside jute, then steel armour bonded, jute, prepared paper, lead cable taken down the shaft is a submarine armoured sheathing, tape, vulcanized rubber, insulation eight No. 16 gauge wires. Watertight cast-iron junction boxes (made on the mine) 14in. by 11in. by 5in. are used, one being placed at every level over the centre leg of the shaft. There are two watertight "Mix &

Genest" pulls, and one "Siemen's and Halske's" polarised bell placed in every level, a pull being placed on each of the legs about 7 feet above the plat, and bell on the cap piece of the plat.

"A two-core No. 16 wire armoured cable (similar to the main cable) is used for wiring the plats from the pulls and bells to the junction boxes. The engine-driver's bell and pull is fixed on a board on the right-hand side where the engine-driver is standing. The main conductors are tapped off from the supply main of 550 volts, and are taken to a transformer (placed in the engine-house) which reduces the voltage down to 25 volts, and this voltage is quite sufficient to work these bells at any practical working depth.

"A separate circuit connected from the same transformer has been installed from bracedman to engine-driver, and *vice versa*, thus making the whole signalling complete.

"When going through the mine I found the system worked very satisfactorily, and on enquiry of the platmen they spoke very highly of it. The engine-driver also stated he thought it was a considerable advance in the right direction. Now he stated he received knocks which he had to act upon in place of what was often before a confusion of signals, some of which were intended for the platman only."

After making the connections in the junction boxes, the box is run full of melted paraffin, which, on solidifying forms a watertight covering. The doors have india rubber cord luting besides. The bells are specially constructed to resist entrance of moisture whether as water or in the air.

In the *Australian Mining Standard* of 1st January, 1908, page 17, there is a description, taken from *The Engineering and Mining Journal*, of an electrical installation which has been introduced in some of the deep mines of the Lake Superior Copper district, which is somewhat similar to that above described, but uses red and green lights in addition to the bells. It seems doubtful if the advantage of visible signals is equal to that of having a low-tension current as in the Great Boulder installation.

Some exception has been taken to the preference expressed in the description by Inspector Hudson of the Kalgurli installation in Appendix C to my last annual report, for bells of the single stroke type as compared with trembling bells, in a paper by Mr. R. B. Lugg to the Goldfields Electricians' Association. Mr. Lugg there brings forward evidence from six engine-drivers and the underground manager of the South Kalgurli Mine that "in their case there is never any confusion caused by the trembling sound of the bells, the 'rings' being as distinct as possible, and louder and clearer than the single stroke bells, which have been tried on several occasions." Mr. Lugg also pertinently objects to the comparatively high voltage of the Kalgurli installation, on account of the greater risk of break downs and accidents.

Much objection has been made to General Rule (11) (b) of Section 32 of "The Mines Regulation Act, 1906," on the ground that it requires the return signal system to be extended to the bottom of the shaft while sinking is in progress. This is usually not "reasonably practicable," and therefore is not required, the introductory clause of Section 32 covering the case. A return signal which is reasonably practical in such cases is, however, provided by Regulation 8, in the special sinking signals, the driver returning the principal safety signal, that of the firing warning, by raising and lowering the bucket.

*Transvaal Royal Commission on the use of Winding Ropes and Safety Catches and Appliances in Mine Shafts.*—The issue of the Report of this Commission has been one of the most important landmarks of mining progress during the year 1907. In order to make it known among mining people in this State a large number of copies of the Report have been distributed gratis by the Department. It is full of most valuable information on numerous matters relating to safety appliances for winding, and to testing and care of winding ropes.

*Testing Winding Ropes.*—Regulation 10 under "The Mines Regulation Act, 1906," having come into force during 1907, a start has been made with making systematic records of the condition of winding ropes and tests of their strength. Most of this has hitherto been done at the mines, by means of tests of individual wires. Unfortunately the testing machine at the Midland Junction workshops is not quite large enough to test the heaviest ropes in use, and a considerable expenditure would have to be incurred to make it suitable to test them to breaking point. It is very advisable that the machine should be improved so as to be able to make such tests on the largest ropes in use.

A question in connection with winding ropes which is of much importance, and which can only be decided by a series of tests to breaking point, is that of the strength of splices in wire ropes. In discussion of the draft of the Regulations with the Chamber of Mines at Kalgoorlie it was held by many members of the Chamber that well-made splices were equal in strength to the main rope, and that no restriction should be placed on their use. It is impossible, however, to guarantee that a splice is always well made, and there is much reason to fear that its strength may prove to be anything from very little up to equal to the rest of the rope. The Transvaal regulations do not allow the use of spliced ropes for winding men, and I am strongly of opinion that we should follow their precedent in this matter. If the improvements that have been suggested were made to the Midland Junction testing machine it would be possible readily to decide this matter, by testing a number of spliced ropes to breaking point, and so ascertaining the relative strengths of the splice and main ropes. The Transvaal Commission's report shows by tests that the short splices used in fixing thimbles on to the ends of ropes are often far below the average strength of the ropes, and supports the contention that the longer splices used to unite ropes are also liable to be of doubtful strength.

These experiments in the Transvaal Commission's report on the strength of the attachment of shackles to ropes are of great interest and value, and quite bear out previous experiments in England, which show that the attachment of the shackles or thimbles is often much below the general strength of the rope, and that great care and skill have to be exercised to get an attachment which is equally strong as the rope. In one of the overwinding accidents here last year, above mentioned, it will be noted that the rope was pulled out of the shackle, showing the attachment to have been weaker than the rope. This also is a matter which requires experimental investigation with a testing machine on numerous carefully made examples of different sorts of attachments.

The Inspectors of Mines at Kalgoorlie have been giving much consideration to the matter of testing the winding ropes, and the following extracts from a



report by Mr. Inspector Decble are of much interest:—

"The strength of a rope can be given very closely when first put in use, but owing to different sizes of pit head pulleys and engine drums—and strains caused by taking loads away suddenly, sometimes when there is a little slack chain on the cage—and other conditions under which they are sometimes worked, it is not possible to estimate the strength of a rope with any degree of certainty after it has been in use for some months, and this can only be done by actual tests.

"I must give credit to the mine managers of the deep mines in this district that they have the ropes examined very carefully, and at the slightest sign of defect, the rope is taken off, but a rope may become defective and not show signs.

"What is required is a test which will show when a rope is so reduced in strength that the margin of safety is not sufficient, or when it does not comply with the Regulations. The life of a rope is not of such consideration when taken in comparison with the tonnage hauled that it need be considered, and would not affect the economic side of mining. The fact of a rope breaking in a shaft very seldom proves anything in particular: it might be caused by a defective rope or a careless engine-driver. A rope may be nearly broken through by taking away a load with several feet of slack rope on the cage and finally part altogether when further up the shaft. The Mines Regulation Act, General Rule 42 (b) reads:—"The working load shall not exceed one-eighth of the certified breaking strain of the rope when new, and whenever, after testing, as provided by Regulations, it is found that the breaking strain of any rope is not six times at least greater than the working load such rope shall be condemned by the Inspector."

"The Regulations provide for a test by a straight pull, which, I am of opinion, does not go far enough. In making any test it should be carried out as near the working conditions as possible. The same diameter rope is often used on different size pulleys and drums, which must make a difference in the strain the rope will stand and the length of its safe working life.

"It is not practicable for a mining company to carry out tests to prove, in each case, what would be the breaking strain over the pulley in use, but I think it is a matter deserving serious consideration, when so many lives are involved, whether the Government should not have a testing station, and every six months, when the ropes are re-shod, sufficient should be cut off to test around a pulley whose diameter would be the same as the one in use. Part of it could be tested with a straight pull, which would soon give us some reliable results, and the difference between a straight pull and around various size wheels and drums. A certificate from such a testing station would be a guarantee that the rope would be in good order, and suitable for the work where it is intended to use it.

"A very powerful brake often gives a false sense of security, by the engine-driver knowing that he can bring the engine up by its aid quickly when it is under a full head of steam, but a large number do not seem to be aware that to do so would probably put too much strain on the rope. It is quite an easy matter to calculate the weight of a falling body travelling at a given speed and brought to a state of rest in a given distance, but a brake may possibly take most of the strain within a foot and not have a gradual retarding

effect. For this reason it is necessary to have the brake so arranged that it cannot be put on suddenly. Brakes made for this purpose are in use on some of the large mines in Kalgoorlie. They are made in two ways—one, in which the steam takes the brake off by lifting a weight which is on the end of a lever. When steam is turned off, or should a steam-pipe burst or steam be turned off by any other means, the weight falls and puts the brakes on. The other is worked by the steam forcing the brake on and is therefore not so good as the first.

"With a view of getting, approximately, the strain on a winding rope in the ordinary way of winding ore, I got an ordinary tested spring balance and soldered a holder on to the pointer to hold a lead pencil. I then fixed a paper dial on the face of the balance, and by putting a weight on the hook the pencil would register it and any extra weight such as would be caused by the starting and stopping of a cage or skip. I tried several and found that the increase showed more than I thought reasonable. Inspector Cullingworth kindly offered to go with me to the various plats being hauled from, to take off the paper each trip and see that the cages did not bump on the bearers and so give a false reading.

"The following are the results obtained from three different mines:—

#### Hauling from 600ft. Level.

Travelling.	Per min.	Ratio of Increase.	Load on Rope.	Total Strain on Rope.
			T. cwt. qrs.	T. cwt. qrs.
1. Up ...	1565	2½	2 1 0	5 2 2
2. Down ...	1565	2	2 1 0	4 2 0
3. Up ...	1636	2	2 1 0	4 2 0
4. Down ...	No time taken	3½	2 1 0	7 13 3
5. Up ...	1500	1½	2 1 0	3 1 2
6. Down ...	1500	1½	2 1 0	3 11 3
7. Up ...	1440	3	2 1 0	6 3 0
8. Down ...	1800	2½	2 1 0	5 2 2
9. Up ...	1384	3½	2 1 0	7 3 2

#### Hauling from 1,300ft. deep with cage.

1. Down ...	2437	2½	5 0 0	12 10 0
2. Up ...	2363	3	5 0 0	15 0 0
3. Down ...	Unsatisfactory.			
4. Up ...	2294	2½	5 0 0	12 0 0
5. Down ...	2437	2	5 0 0	10 0 0

#### Hauling 1,400ft. level.

6. Up ...	2470	...	5 0 0	12 10 0
7. Down ...	2545	2½	5 0 0	12 10 0

#### With Skip from 1,547ft. Level.

1. ...	2578	3½	6 0 0	21 0 0
2. ...	2184	2½	6 0 0	15 0 0
3. ...	2308	3½	6 0 0	21 0 0
4. ...	2442	3	6 0 0	18 0 0

"To show how these compare with tests made in other places, I will quote from contributed evidence by the Caledonian Wire Rope Co., Ltd., to the Transvaal Winding Rope and Safety Catch Commission.

"Dynamometer tests made at a colliery in the North of England:—

#### 2,240lbs. per ton.

Cage and loaded tubs ...	...	5 tons 1 cwt
" " " lifted gently ...	...	5 " 3 "
" " " with 3in. slack ...	...	8 " 10 "
" " " " 6in. " ...	...	10 " 10 "
" " " " 9in. " ...	...	12 " 10 "

"In page 323 of the report by the Winding Rope and Safety Catch Commission, the following is given in the evidence by Mr. G. S. Whyte as results by dynamometer tests:—

Cage and load weighed by machine	...	6,375 lbs.
" " lifted gently	... ..	6,725 "
" " with 3in. slack chain	... ..	11,200 "
" " " 6in. "	... ..	12,250 "
" " " 12in. "	... ..	15,675 "

"In the tests I made the strain was not as much due to the speed driven as to the starting and stopping of the load. The slowest time for the whole trip when hauling from the 600ft. level registered, with only one exception, the most increased strain. The increased strain, I am quite satisfied, is due to the retarding force being put in quickly."

Mr. Deeble goes on to quote from page 175 of the Transvaal Commission's report on the question of whether a rope should be required to have a fixed ratio between its ultimate strength and its maximum load, or a specified reserve of strength at any point over and above the maximum load. He points out that by lifting the load too suddenly or by clapping on the brakes too abruptly the condition is brought about which is shown in the experiments above quoted and a 20-ton load might be momentarily in-

creased to equal say, 60 tons. In this argument it appears to the present writer doubtful if proper allowance has been made for the elasticity of the rope which greatly modifies the suddenness of the shocks in the case of long ropes. The question is one of great practical interest and deserves very close consideration from all concerned with the use of winding ropes.

*Speed of Winding in Shafts.*—General Rule 20 of Section 32 of "The Mines Regulation Act, 1906" prescribes a maximum speed of 500 feet per minute when winding men, but on the large and deep mines of the Boulder district it has for years past been customary greatly to exceed this speed, apparently with perfect safety. A request has therefore been made by the Chamber of Mines to have an amendment made in the General Rule. In the experiments quoted in the last paragraph above made by Inspectors Deeble and Cullingworth, it will be seen that the cages and skips were travelling at average rates of from 1,384 to 2,578 feet per minute, in the course of ordinary work. To get further information on this point the following records have since been taken by the Inspectors on three of the large mines while changing shifts:—

## IVANHOE G.M.

No. of Cage.	Level.	Time of Travelling.	Distance.	Average Speed per min.	Stoppage Levels.	Time of Trip if taken at Regulation Speed (500ft. per min.)
		secs.	feet.		secs.	secs.
1	13	65	1,670	1,541	60	200
2	13	55	1,670	1,821	35	200
	13 to 12	18	151	503	30	18
3	12	50	1,519	1,822	35	182
	12 to 11	12	148	740	20	17
4	11	45	1,371	1,828	30	164
	11 to 10	15	193	772	20	23
5	10	35	1,203	2,062	45	144
6	10	42	"	1,718	35	144
7	10	35	"	2,062	55	144
8	10	40	"	1,804	20	144
	10 to 9	12	193	965	30	23
9	9	35	1,010	1,731	45	121
10	9	35	"	1,731	40	121
11	9	37	"	1,637	20	121
	9 to 8	12	145	725	35	17
12	8	31	865	1,674	40	103
13	8	30	"	1,730	35	103
14	8	35	"	1,483	20	103
	8 to 7	19	148	467	35	17
15	7	25	717	1,720	35	86
	7 to 6	10	111	666	30	13
16	6	25	606	1,454	35	72
17	6	28	"	1,298	40	72
18	6	27	"	1,346	25	72
	6 to 13	55	1,064	1,160	55	127
19	8	37	865	1,402	15	103
	8 to 9	12	145	725	6	17
	9 to 10	10	193	1,158	15	23
	10 to 12	12	316	1,580	14	37
	12 to 13	11	151	823	20	18
	13 to 12	10	151	906	25	18
20	13	57	1,519	1,598	30	182
21	5	25	500	1,200	30	60
	5 to 8	35	365	625	18	43
	8 to 9	13	145	669	10	17
	9 to 10	15	193	772	15	23
22	10	35	1,203	2,062	45	144
23	6	23	606	1,580	12	72
	6 to 9	20	404	1,212	15	48
	9 to 12	25	509	1,221	40	61
		1,168 sec.			1,210 sec.	3,477 sec.
		19 min. 28 sec.			20 min. 10 sec.	57 min. 57 sec.

Regulation time ... 3,477 sec., or 57 min. 57 sec.

Actual time ... 1,168 sec., or 19 min. 28 sec.

Time saved ... 2,309 sec., or 36 min. 29 sec.

## GOLDEN HORSESHOE ESTATES CO., LTD.

No. of Cage from surface.	Level.	Time travelling, in seconds.	Distance.	Average speed per minute.	Stoppage.	Regulation speed.
					seconds.	seconds.
1	15 ...	115	1,500	782	59	180
	15 to 10 ...	42	500	714	40	60
2	10 ...	65	1,000	923	58	120
3	10 ...	47	1,000	1,255	48	120
	10 to 9 ...	10	100	600	30	12
4	9 ...	62	900	870	50	108
5	9 ...	60	900	900	49	108
6	9 ...	58	900	931	30	108
	9 to 8 ...	20	100	300	30	12
7	8 ...	50	800	960	61	96
8	8 ...	48	800	1,000	35	96
	8 to 7 ...	12	100	500	38	12
9	7 ...	40	700	1,050	56	84
10	7 ...	41	700	1,024	43	84
	7 to 6 ...	10	100	600	43	12
11	6 ...	37	600	973	44	72
12	6 ...	37	600	973	35	72
13	6 ...	35	600	1,028	26	72
13	6 to 5 ...	12	100	500	41	12
14	5 ...	34	500	882	31	60
		835	...	...	847	1,500

Regulation speed, 1,500 secs. or 25 mins.

Actual time 835 " " 13 " 55 secs.

Time saved 665 " " 11 " 5 "

## GREAT BOULDER PERSEVERANCE G.M. CO.

No. of Cage from Surface.	Level.	Time travelling, in seconds.	Distance.	Average speed per minute.	Stoppage.	Regulation Speed.
					seconds.	seconds.
1	9 ...	67	900	805	20	108
	9 to 16 ...	45	700	933	37	84
	16 to 7 ...	55	900	981	13	108
	7 Surface ...	44	700	954	...	84
	4 ...	39	400	615	18	48
	4 to 9 ...	36	500	833	25	60
	9 to 13 ...	38	400	631	58	48
	13 Surface ...	65	1,300	1,200	...	156
		389	...	...	171	696

Regulation time ... 696 secs., or 11 mins. 36 secs.

Actual time ... 389 " " 6 " 29 "

Time saved ... 307 " " 5 " 7 "

It will be noted that the *average* speed actually attained is compared with the maximum speed allowed by the Regulations without allowance in the latter case for drop in velocity in coming to rest and at starting and without taking into account the provision that the speed within 100 feet of the surface must not exceed 200 feet per minute, which would mean a lower average velocity than that taken for comparison. The tables show how greatly it is customary to exceed the prescribed speeds, the velocity being sometimes over four times the latter. Such speeds are not considered excessive in other mining countries where there are deep mines with large outputs of ore, and the fact that they have been maintained for years in the Boulder mines with great freedom from accidents also shows of itself that they cannot be considered unsafe. The Ivanhoe example above quoted shows how serious would be the loss of time if the regulation speed were strictly insisted upon.

The fact is that it is not reasonable to prescribe the same maximum of speed for all winding engines

irrespective of their construction and of the condition of the shaft. A speed reasonable as a maximum for a geared winding engine would be ridiculously low for one of the fine large first motion engines commonly employed in deep winding, and that allowable in a twisted, poorly timbered shaft, or one in swelling ground liable to cause cages to become jammed in the guides and timbers to be sprung out, must necessarily be much lower than in one in thoroughly good condition. It follows that the maximum speed allowed should not be one figure for all engines but a speed determined by the condition of each case, and would be best fixed by the Inspector of Mines from time to time for each winding installation.

In order that rapid winding may be permitted it will be necessary to insist on several precautions. There must be perfect indicators showing the engine-driver the position of each cage at any moment. The engines must be under very thorough control at all stages of the winding and be provided with speed indicators to show the driver at any time the rate at which he is travelling. Automatically recording

speed indicators, which would register on cards the variations in speed of winding, would be very desirable, and would furnish a great check upon careless driving and especially on abrupt changes of speed by jerking loads away from a state of rest or by too suddenly applying the brakes. There should also be an automatic device to shut off steam as the cage approaches surface to prevent overwinding. The brakes should be sufficiently powerful to hold the maximum load suspended in the shaft at any point, and should be such that they are applied with thorough control of their pressure and not too abruptly. The shaft must be in thoroughly good order, with large and strong guides. Cages should be fitted with gates, and their safety catches must be suitable for rapid winding. No keeps should be permitted at plats except such as are carried on the cages themselves, and these must be such that there is no possibility of their projecting and catching the shaft timbers while the cage is travelling. There have been several accidents in shafts in our mines through safety catches coming into action while the cage is travelling at high speed, due usually to bad application of the brakes causing jerking of the load, and from cages striking keeps and bearers inadvertently left out in the shafts at plats. With high speed winding the shocks so caused would be disastrous to men on the cage.

*Speed of Winding with Skips in inclined shafts.*—Since last report I have not heard of any further trials being made to provide safety catches on skips used in inclined shafts, and the speed of running has consequently been kept at a low limit. In some of the deeper mines this has come to mean considerable loss of time in changing shifts, and it is desirable that improvements should be made in the winding equipment to allow of faster hoisting with safety. In a recent paper in the proceedings of the Canadian Mining Institute a statement is made that the skips in the deep inclined shafts of some of the mines in the Lake Superior Copper region run at a velocity of 3,000 feet a minute. The wheels of the skips run on rails on 12in. by 12in. longitudinal sleepers, and are placed fairly high on the sides of the skip body so that the latter runs between these sleepers. This construction brings the centre of gravity of the skip much nearer to the plane of the rails on which it runs, and so is probably better adapted for rapid winding than those commonly used in this State which have the body well above the axles of the wheels. The heavy timber required for the sleepers might however possibly be found to be equally well and cheaply used as side guides as in Taylor's and Bell's safety devices figured in my annual reports for 1905 and 1906, which would admit of the use of safety catches as well.

*High Temperature of Winding Rooms.*—Mr. Deeble, Inspector of Mines at Kalgoorlie, has drawn attention to the high temperatures prevalent in many engine rooms during the hot summer of our goldfields, owing to the heat from the steam pipes, etc., and quotes the following figures showing the temperatures at the engine-drivers' positions compared with the ordinary shade temperature elsewhere at the same time.

<i>First Mine.</i>			
Shade temperature	...	...	99 deg.
Driver's position at Engine	...	...	113 "

<i>Second Mine.</i>			
(Winding from three shafts, four winding engines.)			
1. Shade temperature	...	...	100 deg.
2. At driver's position	...	...	110 "
3. At driver's position	...	...	112 "
4. At driver's position	...	...	116 "

<i>Third Mine.</i>			
Shade temperature	...	...	102 deg.
At driver's position at engine	...	...	118 "

<i>Fourth Mine.</i>			
Shade temperature	...	...	101 deg.
At driver's position at engine	...	...	106 "
(With table fan going beside driver.)			
At driver's position at engine	...	...	108 "
(With fan stopped for five minutes.)			

<i>Fifth Mine.</i>			
Shade temperature	...	...	105 deg.
At driver's position at engine	...	...	119 "

<i>Sixth Mine.</i>			
Shade temperature	...	...	106 deg.
At driver's position at engine	...	...	114 "

This is a matter which deserves attention from managers, and steps should be taken to minimise the escape of heat into the engine rooms. Fortunately when the high temperatures occur the humidity of the atmosphere is usually low and the engine rooms are well ventilated. So far as I have been able to learn the engine-drivers have not suffered in health or efficiency from the high temperatures, and some who have had fans provided to dispel the warm air have preferred not to have them, but it is obvious that if a driver happened to be in bad health the increase in the normal temperature might easily prove too much for him and lead to accidents with the machine in his charge.

*Size of Pulleys.*—Mr. Deeble has also drawn attention to another point which should get more consideration than has generally been accorded to it, namely the size of the pulleys over which winding ropes are made to travel. He remarks, "One cannot but be struck with the want of system in this particular part of mining. If we take the Great Boulder Proprietary-G.M., for example, where they are hauling with four engines, the ropes in each case are 1 $\frac{1}{8}$  in. diameter with a breaking strain of 52 tons. Diameters of poppet head pulleys are given as 8ft., 3ft., 4ft., and 8ft. Diameters of drums on engines are given as 9ft., 7ft. 6in., 6ft. 6in., and 10ft. In no case are the drums and pulley wheels the same diameter, and to my mind it does not seem reasonable that a 1 $\frac{1}{8}$ in. diameter rope should be worked over a 4ft. diameter wheel." Various rules are given for the relative sizes of drums and sheaves and the ropes running upon them, but there is obviously considerable variation to be made in them according to the construction of the rope and the quality and properties of the steel of which it is composed. Messrs. Haggie Bros., Ltd., rope manufacturers, gave the following recommendation to the Transvaal Commission (page 297):—

"12 outside wires per strand where the diameter of drum and pulley is about 50 times the diameter of the rope.

"11 outside wires per strand where the diameter of drum and pulley is about 55 times the diameter of the rope.

"10 outside wires per strand where the diameter of drum and pulley is about 60 times the diameter of the rope.

"9 outside wires per strand where the diameter of drum and pulley is about 65 times the diameter of the rope.

"8 outside wires per strand where the diameter of drum and pulley is about 70 times the diameter of the rope.

"7 outside wires per strand where the diameter of drum and pulley is about 75 times the diameter of the rope.

"6 outside wires per strand where the diameter of drum and pulley is about 80 times the diameter of the rope:—

"E.g., 1in. diameter rope, 12 outside wires for drum and pulley about 4ft. diameter.

1in. diameter rope, 9 outside wires for drum and pulley about 5ft. 6in. diameter.

1in. diameter rope, 7 outside wires for drum and pulley about 6ft. 3in. diameter.

1in. diameter rope, 6 outside wires for drum and pulley about 6ft. 9in. diameter.

"In the case of crab or emergency ropes, where the drums are very small, we recommend the ropes being constructed of wires of a diameter not more than one three-hundredth part of the diameter of the drum, e.g., 1 inch diameter rope to work on a 15in. diameter drum should be composed of wires not more than .050in. diameter, i.e., about No. 18 S.W.G."

It should be noted that Messrs. Haggie's recommendations appear to relate to specially flexible ropes.

The Caledonian Wire Rope Coy., Ltd., in their evidence to the same Commission, say:—"For winding ropes working under normal conditions, the ratio between the diameter of the largest wires in the rope and the diameter of the drum or sheave should be taken at 1200. This ratio, however, has its limit, as we reach a point where the size of wire is sufficiently large to cover the requirements as regards abrasion, and consequently larger provision can be made for the bending by increasing the ratio." This rule would require for a rope with wires  $\frac{1}{8}$ in. diameter (as in, say, 1in. and  $1\frac{1}{8}$ in. diameter winding ropes of six strands each composed of six wires round a core of one soft wire) a pulley diameter of  $12\frac{1}{2}$ ft. and for a more flexible rope of 12 wires (9 over 3) in each strand with diameter of wire .104in., one of  $10\frac{1}{2}$ ft. A simple way of remembering the Caledonian Coy's. rule is that the diameter of the pulley, in feet, is 100 times the diameter of the largest wires, in inches. It will be seen by comparison of the rules given by Messrs. Haggie and the Caledonian Coy. that the sizes of pulleys may be very different according to the construction of the ropes, stiff ones requiring pulleys two or three times as large as specially flexible sorts.

"Ventilation.—Inspector Cullingworth has forwarded the following description of a rather interesting experiment recently tried in mine ventilation in the Boulder Déep Levels mine:—

"The 1,100 feet level of this mine is badly ventilated, there being no winzes down below 500 feet. The conditions are further aggravated by the fact of the shaft not being centred for the last 30 or 40 feet, and being a wet shaft and the water kept down by bailing, there is a continuous shower of water which spreads all over the uncentred portion of the shaft, and further serves to deaden the air.

"The experiment consisted of affixing to the compressed air column on the surface a locomotive vacuum air brake and connecting with a steam pipe from the boiler. The compressor was stopped and the hose taken off the air pipe in the level below. Steam was then turned on, passed through the air brake, and exhausted into the air. We then descended to the level, taking a thermometer, on the plat when we landed the temperature was 82deg. F. At the face, some 600 feet from the plat, there was a good current of air rushing up the air pipe, sufficient to put out the light of a candle at two feet. In about 10 minutes' time the temperature all along the level to the plat had been reduced to 74deg. F. So far as I

am aware, this is the first time a Westinghouse Vacuum Air Brake has been tried for this purpose. The experiment was merely preliminary, and the question of costs cannot yet be arrived at. It seems as though it would be well worth continuing these experiments in a smoky face after firing, where at present even with a jet of air on it takes some hours to clear the smoke."

*Fumes of Explosives.*—During 1907 there were four cases reported to the Inspectors of Mines of men being overcome by fumes of explosives, but in all of them the sufferers very quickly recovered. The treatment with emetic doses of sulphate of zinc described in the Chief Inspector of Explosives' Bulletin No. 2 on 'Gassing,' published in 1906, is well spoken of by those who have tried it, and seems to afford rapid relief from the effects of fumes of explosives.

*Cyanide Fumes.*—There have been few complaints on this head during 1907. In some cases where residues from cyanide treatment have been used for filling stopes some trouble has been experienced owing to the ventilation becoming blocked, but it is becoming more generally appreciated that while this sort of work is in progress there is necessity for maintaining a good current of air as prescribed in the Regulations.

*Lead Poisoning.*—There were some slight cases of lead poisoning in the oxidised portions of one of the lead mines at Northampton towards the end of 1906, which were investigated during 1907. The mine was a prospecting concern, and the poisoning was mainly due to carelessness and ignorance of their danger on the part of the men working it. Should mining in this district again become important it will be necessary to give close attention to precautions against lead poisoning.

"Coal Mines Regulation Act, 1902"; *Check Inspectors.*—During the year under review a case of considerable interest cropped up at Collie wherein entrance to a colliery was refused by the manager to a check inspector appointed by the workmen, on the ground that he was not a 'practical working miner' within the meaning of the Act, as he was not actually making his living as a miner at the time of his appointment as check inspector. English precedents were quoted in support of the manager's reading of the words of the Act, which is also borne out by evidence given before the Royal Commission on Mines in England in 1907, wherein it appears that the view has been taken by the Courts that persons appointed as check inspectors must be working miners at the time of their appointment, though not necessarily workmen in the particular mine to be inspected. The same question has been raised in New South Wales, and in consequence their Act was amended by omitting the word 'working' in the expression 'practical working miners.' An amendment of our Act in the same way has been asked for by the Collie Miners' Union.

*Engine-Drivers' Duties.*—There has been a good deal of discussion during 1907 on the question whether a winding engine-driver should be allowed to have charge of any other machinery while he is on duty. Cases have been cited where the winding engine-driver had to attend to other engines as well and wherein such practice was obviously more or less objectionable. It has been held by some of those taking part in the discussion that a winding engine-driver should be forbidden by the Regulations from doing anything more than attend to his winding engine. The question seems to me entirely one of degree: in

large mines with much winding and constant calls on the engine-driver's attention, it would be most reprehensible and dangerous to distract his mind by requiring him to attend to other work or supervise assistants doing such work. In smaller mines it might often be quite practicable and reasonable for him to do a good deal of other work than simply attending to the engine. In my opinion there is no need for a special regulation on the matter, as it comes under the existing General Rule 19. If the Inspector finds that in the special circumstances of the case the driver is able to have 'effective supervision' over more machines than one, the latter may be allowed to do so, but if his time is fully taken up with one engine it is clear that he cannot exercise 'effective supervision' over others. The case is one for the exercise of much discretion by all concerned and subject to the arrangements made being satisfactory to the Inspectors of Mines.

*"Rescue of Miner from Flooded Workings.*—One of the most notable incidents in mining during 1907 was the rescue by divers of a miner imprisoned by flood waters in a rise underground. The case caused a great sensation at the time, and was the occasion of a display of conspicuous bravery and endurance by the divers engaged in the rescue work, whose gallant behaviour won them universal commendation and has been recognised by the award to them of numerous medals and certificates. A fuller account of this occurrence is given in Appendix I. hereto.

#### THE MINING DEVELOPMENT ACT, 1902.

"Appended hereto (Appendix No. II.) are particulars of the advances under 'The Mining Development Act, 1902' which have been made or operated upon during 1907. I regret to have to say that the working of this Act is not by any means satisfactory. There are many complaints—in my opinion well-founded—as to the delays experienced in making preliminary arrangements for the giving of advances, and in making progress payments available. Most of the delays are due to the neglect of the applicants themselves to forward the information that is required, a great many showing a strong disposition to ignore requirements of the Act which do not commend themselves to them, but there can be no question besides that the procedure laid down in the Act is much more cumbrous than is desirable. If assistance is to be of any use in most cases it is of the first necessity that it should be available quickly. But though the delays in arranging the advances have doubtless been very troublesome and irritating to borrowers, they are after all very little responsible for what has most generally proved the rock on which these ventures have come to grief, namely the much greater difficulty and cost of the work undertaken than was

anticipated by the borrowers. Over and over again it has proved that they were not able to carry out their own share of the work they had undertaken, their estimates of cost having been far too sanguine, and it has not been carried to completion. In many other cases the hopes of developing good ore deposits have proved illusory, and there has been much disappointment at not opening up payable stone where it was confidently expected. This experience is unfortunately one which is in the nature of mining, the deposition of ore being always more or less fortuitous and subject to no absolute rules. From one cause and another very few of these State-aided ventures have proved remunerative, and most of the money advanced has been dead loss. I would therefore strongly urge reconsideration of the Mining Development Act, and particularly revision and elucidation of the principles which are to be taken to govern State loans for mining purposes. These should be more clearly defined, on a broad basis of general national advantage, and kept as free as possible from considerations of more or less sentimental nature, engendered by sympathy with struggling ventures, which simply obscure the main issues.

#### VISITS TO MINING CENTRES.

"During the year 1907 93 days were spent by myself in travelling to and from and visiting various centres. The most important visit was to the Pilbara and West Pilbara Goldfields, with the Hon. the Minister for Mines. My report on these fields and on the question of a railway from the coast to Marble Bar has been published in Bulletin form, dated 8th August, 1907. In January a short visit was made to Wagin, to inspect the alleged auriferous reefs there. My report was published soon after my return in the daily newspapers, and is now appended to this report (Appendix III.). In February a short report was made on the Silver Lead Lode at Mundijong, and this is also appended (Appendix IV.). In March a visit was made to Coolgardie, Kalgoorlie, and the Jourdie Hills, but no report was prepared, matters arising from the visit being all dealt with departmentally. In September a visit was made to the Black Range and Meekatharra districts in connection with the proposed railways to them, and reports on these are appended hereto (Appendices V. and VI.). Towards the end of November I went to the Phillips River field, and made a report on its progress, which is also appended hereto (Appendix VII.). A report on the Blackboy Hill Goldfield, by Mr. Cullingworth, Inspector of Mines, is also appended (Appendix VIII.)."

I have, etc.,

A MONTGOMERY, M.A., F.G.S.,

State Mining Engineer.

Pt. 5673

4012

GML 4376

## APPENDIX No. I.

*Rescue of Modesto Varischetti, an Italian miner, from flooded workings of "The Westralia and East Extension Mines" at Bonnievale, W.A., by divers Hughes and Hearne.*

On 19th March, 1907, an extraordinarily heavy and sudden downpour of rain in the Bonnievale district caused a flood, which broke into old workings connected with the "Westralia and East Extension" mine and inundated its lower levels, filling them from the bottom (1,354 feet) up to the No. 9 (900 feet) level. The workmen effected their escape, all but an Italian miner named Modesto Varischetti, who was working by himself in a rise 28 feet above the No. 10 (1,000 feet) level, and who was cut off by the flood waters and imprisoned in the rise, as in a diving bell, the air in it not being able to escape and consequently preventing the rising of the water to the top of it. In the main shaft and in the stopes above the No. 10 level, however, the water rose to No. 9 level, its surface being about 50 feet vertically above the point where the man was imprisoned. The workings of this mine are on a reef having an inclination to the horizon somewhat less than 45deg., and the distances between the levels are measured "on the underlay," there being thus 100 feet between Nos. 9 and 10 levels, though the vertical distance is only about 65 feet.

It was at first thought that Varischetti must have lost his life in the flood, but as it was recognised that there was a possibility of his still being alive in the rise, efforts were made to communicate with him by knocking on the rock, and his signals in return after a time proved that he had escaped the immediate peril of drowning. Using all the available means of draining the mine it was seen that the water could not be lowered to the No. 10 level for quite ten days, and it was found that appliances for quicker pumping could not be procured and installed in time to give any better result. There being great fear that the imprisoned man would not be able to live for such a length of time without fresh air, food, and light, it was decided that an attempt should be made to carry succour to him by divers. Diving dresses were telegraphed for to Perth, and, through the energetic assistance of the Chief Harbourmaster at Fremantle, were obtained without delay, so that in less than eight hours from the time of the despatch of the telegram for them a special train was on its way to the Goldfields with two divers, Messrs. Curtis and Hearne, with their assistants and diving outfits. Meantime two other divers, Messrs. F. Hughes and Fox of Kalgoorlie, who had lately followed the occupation of miners, and were familiar with the local mining practice, had volunteered their services and gone to the flooded mine. The first-mentioned divers arrived early on the morning of the 22nd March, and it was considered advisable that Hughes and Fox, on account of their mining experience, should make the first attempt at rescue. They would have to descend through open stopes below the No. 9 level to an ore-

pass to the No. 10 level, a distance of 100 feet, then turn at right angles along the latter level and go along it 250 feet to reach the foot of the rise where the man was imprisoned. Both divers would have to go down to the ore-pass, and one would then remain at the bottom of it to pass his comrade's air-pipe and lines round the angle so as to prevent them from fouling. The work was of a difficult and dangerous nature, having to be done in total darkness, without knowledge of the shape of the cavities to be passed through, often in very cramped space, and subject to the continual danger that the flooding might have displaced timbers or so loosened the "filling" in the worked out ground as to make it liable to run into the pass or the level and overwhelm the rescuers. Hughes led the way and after some difficulty reached the bottom of the pass, where he found the shoot into the level choked with about half a ton of ore; he cleared this out, took the door off the shoot, and got down into the level, but then had to return twice to No. 9 as the other diver did not come down to him. It proved that Fox had been unable to get down, and on making his second attempt he sustained an injury to his leg which caused him to retire from further participation in the work. Diver Hearne then took his place, and Hughes and he went down to the No. 10 level, but both had to return to arrange certain matters about which there was a misunderstanding. They then descended again, and Hughes struggled along the level, kneedeep in sludge, to the rise, where he was able to find the air-hose pipe leading to Varischetti's rock-drill, and after shaking it several times obtained a signal in reply from the imprisoned man. Hughes was then so exhausted that he had to return after fixing a guide-line for future use. After a rest of 3½ hours Hughes and Hearne again descended, the descent being the fifth that the former had made that day, and Hughes succeeded in reaching Varischetti, shook hands with him, and supplied him with an electric lamp, food, and other necessaries. Next day he again made a visit, Hearne as before staying at the angle at the foot of the ore-pass, and daily visits were repeated until 28th March, when the water had been lowered by baling enough to make it just possible for a man to wade along the No. 10 level from the ore-pass with his head out of the water. Diver Hughes then went in twice without his diving dress and talked to Varischetti, and then made a third trip and brought him out, carrying him portion of the way, as the entombed man's strength failed him.

Hughes had all the most difficult and dangerous pioneer work to do and carried it out most pluckily. He was ably seconded by Diver Hearne, to whom also great credit is due. It was not found necessary for Diver Curtis to descend, though he was ready to do

so at any time, and he took a valuable part in the work by superintending the surface arrangements for the diving. It might be thought that the other divers should have taken turns with Hughes, but those in charge of the work very properly made the relief of the imprisoned man paramount over all other considerations, and sent again and again the man who had experienced and surmounted the difficulties and learned the shape of the passages through which he had to travel, as being the one most likely to meet with success. For the same reason it was better for Hearne to make repeated journeys with Hughes than to send down another man. It is no discredit to the other divers that their opportunities

for distinguishing themselves were not as good as those which fell to Hughes by virtue of his being the pioneer in the work. All did their duty well, and doubtless would have done more than they did had it been required of them.

Thanks to his obtaining food, light, and hope on the third day of his imprisonment the rescued man was in fairly good health, and soon recovered from the effects of his adventure.

A. MONTGOMERY, M.A., F.G.S.,  
State Mining Engineer.  
State Mining Engineer's Office,  
Perth, 13th April, 1907.

## APPENDIX No. II.

### ADVANCES UNDER "THE MINING DEVELOPMENT ACT, 1902."

#### PIONEER MINING AND PROSPECTING.

1. *Oversight G.M.L. 957Y, Bulong.*—Particulars of this advance were given in last year's report. The syndicate was not able to resume work during 1907, but a little work was done by tributers in the upper levels, and the royalties received from these, amounting to £29 13s., were paid to the Department by the syndicate towards the accrued interest on their loan. At the end of the year the outstanding loan, with interest, amounted to £848 15s. 7d.

2. *The Ninety-Eight, G.M.L. 951Y, Bulong.*—Since last year's report the lease and chattels thereon held as security for the loan were offered for sale, but only realised £1. This was a case where repayment of the loan was not expected unless the mine turned out well. The amount of the loan, with accrued interest, £262 2s. 11d., has been written off.

3. *The Monkland, G.M.L. 1127X, Gindalbie.*—Since last year's report operations on this mine have proved a failure and been discontinued. The loan, with interest to end of 1907, amounted £548 9s. 5d.

4. *The Sunbeam G.M.L. 1121X, Kanowna.*—Since the last annual report of a sum of £54 16s. 6d. has been paid on account of the work in this mine, making a total advanced of £957 17s. The mine has been working throughout 1907, but without very much success, the reef being small. At the end of the year the amount of the loan, with accrued interest, stood at £981 19s. 6d.

5. *The Eclipse, G.M.L. 1047X, Gindalbie.*—During 1907 further payments were made on this mine's account of £150, being a total of £254 7s. 2d. to end of 1907. The agreement was modified to allow the sum of £154 7s. 2d. to be advanced against purchase and erection of machinery, in addition to the £200 originally authorised, the balance of the loan of £450 being then available for assistance in sinking. Up to the end of 1907 no sinking had been done, and the amount advanced for plant and machinery, with interest accrued, was £260 15s. 10d.

6. *The Kalgurli Syndicate, G.M.L. 1223W, Paddington.*—Since last year's report further advances have been made of £65 5s. 2d., making a total of £308 9s. 7d. The operations of the Syndicate proving unsuccessful they let the mine on tribute, and received royalty from tributers amounting to £124 3s. 9d. The Syndicate then went into liquidation and the mortgage on their property was foreclosed, but sale of effects had not been quite completed at the end of 1907. During the present year the account has been closed by writing off the sum of £239 19s. 11d. as a bad debt.

7. *The Coolgardie Opal, M.L. 53, Coolgardie.*—Further advances of £21 were made during 1907 to assist the prospectors for opal in developing their mine, making a total advance of £99. Little work was done more than described in last year's report, and the venture was abandoned. The advance which, with



accrued interest, amounted to £102 4s. 6d., has been written off as irrecoverable.

8. *The Menzies Prospecting and Development Co., N.L., Menzies.*—Advances amounting to £324 7s. 6d. were made during 1907, bringing the total advanced to this Company to £589 12s. 2d. The ground became very hard, and developments being unfavourable, the Company decided to wind up. A sum of £11 9s. was repaid. The chattels realised £7 0s. 6d. net.

9. *Rollo's Reward Gold Mining Co., Kanowna.*—Since last year's report £246 0s. 2d. were advanced to this Company, making a total to end of 1907 of £285 9s. 2d. The shaft was sunk to a depth of 150 feet, and a crosscut driven North-East at the 126 feet level to No. 2 bore. Gold-bearing dirt was obtained, some 17 loads being crushed for rather under 4dwts. of gold per ton, but it was found that the crosscut was at too shallow a depth. The company then went into liquidation, and the lease reverted to Mr. Rollo, who took over the Company's liability to the Government of £288 12s. 9d.

10. *The Malcolm Prospecting Co., N.L., Mt. Malcolm.*—During 1907 further advances were made to this Company of £630 2s. 8d., making a total advance of £15 5s., the original advance of £1,050 having been increased by a further one of £500 towards erection of a battery which was to be available for public crushing. This was erected and commenced crushing in August, 1907. The mine has been working regularly with a fair amount of success throughout 1907.

11. *The Spring Hill, G.M.L. 721, Parker's Range, Yilgarn.*—Since last report the battery has commenced work, and a further sum of £200 has been advanced to Mr. W. A. Patterson to assist him in erection of a cyanide plant. All profits were to be paid to the Department until the loan was cleared off, but up to the end of the year only £18 2s. had been received. The battery has been of considerable service to the district.

12. *The Orabanda, G.M.L. 1288W, Waverley.*—Messrs. Friedman & Johnson's battery referred to in last year's report has done a good deal of crushing during 1907, and repaid the sum of £603 3s. 11d. of the moneys advanced.

13. *P.A. 158R, Yarri.*—Mr. F. Cross obtained assistance up to £100 in sinking a shaft in new country to the South of Yarri. He sank 50 feet and obtained advances of £50, but the ground became so hard that he then abandoned the venture. The loan has been written off as irrecoverable.

14. *Mt. Chester, M.L. 250, Ravensthorpe.*—An advance of £250 was approved at the rate of £1 for £1 for tunnelling under a large outcrop of black oxide of manganese on the Ravensthorpe Range. The work is described in my report on the Phillips River district of 16th December, 1907. Up to the end of the year a sum of £185 8s. 10d. had been advanced, and there was interest due, £6 11s. 11d.

15. *M.L. 482 (formerly P.A. 8), Greenbushes.*—Mr. Thomas Elias obtained an advance of £150, which has subsequently been increased to £300, in aid of his prospecting tunnel, which at the end of the year had been driven a distance of about 1,000 feet. Work is still in progress. Advances paid to end of 1907, £192 3s. 11d.

16. *Whale, G.M.L. 469G, Niagara.*—In November, 1906, application was made by Mr. John McGillen, owner of the "Whale" mine at Niagara, who had been working it for several years, for a loan of £160 to assist him in repairing and retimbering the old main underlay shaft, and in driving at the 360 feet level.

The application was favourably reported upon by the Inspector of Mines, and a loan of £160 was approved by the Minister at the rate of £1 for £1 on expenditure by the borrower, the advances for repairing the shaft being limited to a total of £20, and the balance to be expended in driving, payments not to exceed 10s. per foot. Security was taken by a mortgage over the mine and machinery. The work was proceeded with and carried out satisfactorily, and some good stone was found, but the reef soon became very poor. The whole of the loan of £160 was expended during 1907.

17. *Pride, G.M.L. 312P, Peak Hill.*—An advance of £100 was made to Mr. George Reid to enable him to continue work in his mine, but after receiving £25 17s. 6d. his health broke down and he abandoned the venture.

18. *Bayley's Sulphide Lode, G.M.L. 4230, Coolgardie.*—A party of prospectors working this ground were allowed an advance of £230 on crosscutting at a depth of 180 feet, but some shallow work was ultimately allowed to be included. Considerable work was done and a lode was cut, but after £111 had been advanced the Inspector of Mines reported that it was useless to continue advances, and the party signified their intention of doing no more work on the lease. The amount advanced was then written off. The party, however, after a time recommenced work, and further payments were made to them of £42 10s., making a total of £153 10s. advanced, or with accrued interest to the end of the year, £158 18s.

19. *Seddon Syndicate, P.A. 292Z, Mt. Ida.*—An advance of £200 was made to this syndicate, owning the late "Lady Doris" mine, to assist them in erecting machinery and getting a water supply, at the rate of £1 for £1 on the amount expended by them, in return for which the party were bound to crush for the public when required. The machinery had been obtained by the syndicate under a hire-purchase agreement from Messrs. Silverthorne & Adair; trouble arose among members of the syndicate, and eventually Messrs. Silverthorne & Adair took possession of the plant. It was arranged that the latter firm should pay the Government £70 for goods at the battery over which security was held by the Minister for Mines. This amount had not been received up to the end of 1907.

20. *Westralia Tasmania, G.M.L. 1665T, and Mt. Mounzel, G.M.L. 1745T, Erlistown.*—A loan of £300 was approved to Messrs. Dwyer & Party, owners of these leases, to assist them in sinking a new main shaft for working purposes and to secure a battery water supply. Before any portion of the loan was paid the party had sunk a prospecting shaft 140 feet deep, and obtained fresh water in it. The work of sinking the main shaft was satisfactorily carried out to 150 feet, as agreed, and subsequently deeper, to 170 feet. A new reef was cut at 166 feet, and the party then decided to move their 5-head battery at Baneygo to this mine. The work of the party has been favourably reported upon by the Inspectors of Mines, and they seem to be making a very strenuous effort to develop their mine. At the end of 1907 advances made amounted to £299 4s. 9d., and there was unpaid accrued interest, £7 11s. 9d.

21. *Carbine South Syndicate, Ltd., G.M.L. 758S, Kumanalling.*—A loan of £500 was approved for sinking the "Carbine South" main shaft from the 200 feet level downwards, and for crosscutting or driving at a depth not less than 380 feet, on the basis

of £1 for £2 spent by the syndicate. Work was gone on with and at the end of the year the shaft had been sunk to a depth of 421½ feet, and a crosscut driven West at the 400 feet level 319 feet, and East 43 feet. The amount of advances made during 1907 was £371 10s., and interest to 31st December amounted to £5 12s. 3d.

22. *Trenton G.M. Co., N.L., G.M.Ls. 388D, 399D, and 400D, Day Dawn.*—This Company obtained a loan of £1,000 at the rate of £1 for £1 expended by them, for the purpose of sinking their main shaft from 408 feet to 608 feet, and for crosscutting, driving, and other development work at the 350 feet level. After doing 42 feet of crosscutting, 297 feet of driving, 37 feet of winzing, and 14 feet of rising, and receiving the sum of £1,000, the Company applied for exemption, and later on went into liquidation.

23. *The Just-in-Time G.M. Co., N.L., G.M.L. 1783T, Mt. Morgans.*—This Company having expended considerable money on its mine, applied for a loan from the Government to assist in procuring further machinery equipment, and after reports had been obtained upon the property from the Inspector of Mines, a loan was approved of £1,000, being £200 on development work, £500 towards purchase of machinery, and £300 towards its cartage and erection, on the basis of £1 for £1 expended by the Company. The machinery of the "Midas" mine at Goongarrie was thereupon purchased by the Company, and erected. After work had been carried on for a short time the Company fell into financial difficulties, and eventually went into liquidation. The whole of the advance of £1,000 was paid over during 1907, and at the end of the year liquidation arrangements were in progress. The sum of £35 16s. 8d. was also owing as accrued interest.

24. *All Nations, G.M.L. 166L, Nullagine.*—Advances up to £300 were authorised to assist Mr. J. Corrin to sink a new shaft 200ft. deep for the purpose of testing at greater depth a reef which had been successfully worked in the shallower levels, at the rate of £1 for £1, but not to exceed 20s. per foot to 150ft. and 45s. thereafter to 200ft. depth. After sinking to 150ft. water was encountered, and Mr. Corrin found himself unable to go deeper, so began to crosscut; samples of the reef sent for assay proved very poor in gold and work was abandoned. The advances made amounted to £187 10s.

25. *Providence, G.M.L. 13Z, Goongarrie.*—The Providence Copper Mining Co., Ltd., applied for assistance in sinking their main shaft, and advances up to £300 were authorised at not more than £2 10s. a foot in sinking from 70ft. to the 150ft. level. After sinking 57ft. and receiving advances of £142 10s. the ground became very hard and sinking was discontinued. The Company then did some crosscutting and driving, but did not locate payable ore and went into liquidation. Realisation of the assets had not been completed at the end of the year.

26. *Condor United G.M. Syndicate, G.M.L. 339, Mt. Sir Samuel.*—Messrs. Maund and party, owners of this mine, having applied for assistance in getting a water supply for their battery, a sum of £150 was advanced in aid of their purchase of a windmill and piping. The operations of the party proved unsuccessful and towards the end of the year they intimated their inability to repay the loan and suggested that the Government take over their battery for public crushing.

27. *Garibaldi, G.M.L. 736, Yilgarn.*—The owners of this lease were granted a loan of £150 towards

sinking their shaft and providing a boiler and pump. A sum of £137 was advanced in part payment of the loan, but the water in the mine proved too much for the party and they abandoned the lease. At the end of the year the security had not been realised upon.

28. *The Coolgardie Prospecting, Development, and Mining Coy., N.L., Coolgardie.*—This local Company was formed in response to an offer by the Minister to assist such in opening up local mines. They fixed their choice upon the "Undaunted" and "Undaunted Extended" leases, G.M.Ls. 4093 and 4117, and purchased them. The Minister agreed to advance £1,500 by way of recoup of three-fifths of the Company's total expenditure, £150 being to be devoted to cost of purchase of machinery, and £650 for specified development work, the remaining £700 being for further mine development thereafter as might be agreed to by the Minister should the first work prove the mine to warrant being gone on with. At the end of the year £390 6s. 7d. had been advanced.

29. *Emily, G.M.L. 1510, Day Dawn.*—This mine is worked by a co-operative syndicate, who found themselves unable to carry on operations without deeper sinking. The prospects of the mine were considered good by the Inspector of Mines, and a loan of £400 was approved, £325 to go towards sinking the main shaft from 70ft. level to 200ft., and £75 towards purchase of machinery and other requisites, on the basis of £1 for £1 expended by the applicants. Up to the end of December £370 7s. 3d. had been advanced, and there was interest due, £5 5s. 7d.

30. *The Greenbushes Prospecting and Mining Co., Ltd., Greenbushes, "South Cornwall," M.L. 300.*—This local development Company made application towards the end of 1906 for assistance in sinking a new shaft to a depth of 200ft., on the South Cornwall mine and crosscutting at the bottom thereof. The Minister approved a loan of £1,000 at the rate of £2 for £1 expended by the Company, in hire or purchase of machinery, sinking the shaft to 200ft., and driving or crosscutting below the depth of 180ft. Work was carried on steadily during 1907, mostly on contract. At the end of the year it was still in progress, and advances had been made amounting to £586 14s. 8d.

31. *The North End Mines, Ltd., Kalgoorlie.*—During 1906 the Government Geologist reported on various applications that had been brought forward for assistance in developing the North End of the Kalgoorlie Field, and selected that of the North End Mines Co., as the most eligible. The Minister thereupon approved a loan in aid of sinking to 400ft. in August, 1906, but it was not till August, 1907, that the matter was finally arranged, when the Minister consented to advances being made up to £1,000 on the work of sinking the new main shaft from 150ft. to 400ft., or such depth as might be approved by the State Mining Engineer, and in crosscutting or driving from the bottom of the shaft, at the rate of £1 for £1, but limited to not more than £4 10s. a foot for sinking and £1 10s. a foot for driving or crosscutting. At the end of the year the shaft had been sunk to about 225ft. and sinking was in progress. The advances made during 1907 amounted to £248 10s.

32. *Kingdom Come, M.L. 112, Northampton.*—The owners of this lease are endeavouring to reopen the old "Mary Springs" lead mine, and obtained assistance to the extent of £200 in doing so, for purchase, transport, and erection of machinery. The

whole of the advance was paid over during 1907. Work on the mine is still in progress, with promising results.

Three parties have been assisted with grants for boring during 1907, the advances amounting to £350 3s. 10d.

## BORING.

Further boring plant and repairs, new parts, etc., have cost £2,490 16s. 2d. This work is in the charge of the Engineer of Mines Water Supply.

## SUBSIDIES TO CRUSHING PLANTS.

The following table gives particulars of the subsidies paid to various owners of treatment plants to induce them to crush for the public at prescribed rates:—

*Subsidies to Batteries, twelve months ended 31st December, 1907.*

Name.	Place.	Tonnage.	Rate.	Amount.
Carter, F. T. ... ..	Paddington ...	1,483½	1s.	£ 74 3 3
Reidel & Norton ... ..	Kanowna ...	453	1s.	22 13 0
Wendell & Hallahan ... ..	Do. ...	267½	1s.	13 7 6
Martin, J. ... ..	Do. ...	630½	1s.	31 10 6
Phillips, F. P. ... ..	Paddington ...	175	1s.	8 15 0
Poole, H. ... ..	Lawlers ...	1,249	2s.	124 18 0
Smith & Langsford ... ..	Do. ...	1,996	2s.	199 12 0
Allsop & Co. ... ..	Paddington ...	972	1s.	48 12 0
Hill, W. C. ... ..	Australia United ...	65½	2s.	6 11 0
Do. ... ..	Mt. Morgans ...	99½	1s.	4 19 3
Bow, F. W. ... ..	Kunanalling ...	143½	1s. 6d.	10 15 7
Spencer & Thompson ... ..	Berrigrin ...	1,344½	2s.	134 9 8
Friedman & Johnson ... ..	Waverley ...	8,257½	1s. 6d.	619 6 3
State Battery ... ..	Leonora ...	100	2s. 6d.	12 10 0
Malcolm Mines, Ltd. ... ..	Murrin ...	340	1s. 6d.	25 10 0
Do. ... ..	Do. ...	131½	1s.	6 11 6
Donnan, John ... ..	Kanowna ...	123	1s.	6 3 0
Bryant, J. J. ... ..	Black Range ...	332½	2s.	33 5 6
State Battery ... ..	Menzies ...	225	2s.	22 10 0
Sons of Erin ... ..	Higginsville ...	304	1s. 6d.	22 16 0
Nicholson, Mahoney, & O'Donohue ... ..	Gum Creek ...	60½	2s.	6 1 0
Pauley & McCoy ... ..	Ejudina ...	318	2s.	31 16 0
Davies, R. ... ..	Mt. Morgans ...	411	2s.	41 2 0
State Battery ... ..	Norseman ...	55	2s.	5 10 0
Spicer, J. ... ..	Tampa ...	885	1s. 6d.	66 7 6
Dodman, J. ... ..	Bulong ...	981	1s. 6d.	73 11 6
Styles & Brown ... ..	Jaccoletti ...	49½	2s.	4 18 6
Red Hill Westralia ... ..	Kalgoorlie ...	403	1s. 6d.	30 4 6
Summers, D. ... ..	Jourdie Hills ...	958	1s. 6d.	71 17 0
State Battery ... ..	Black Range ...	123	4s.	24 12 0
Trickett, W. H. ... ..	Paddington ...	246½	1s.	12 6 6
State Battery ... ..	Yarri ...	9	5s.	2 5 0
Russell, J. ... ..	Do. ...	10½	5s.	2 12 6
Houghton, A. B. ... ..	Kunanalling ...	806½	1s. 6d.	60 9 9
Patterson, W. A. ... ..	Yilgarn ...	694	1s.	34 14 0
Potosi Consolidated, Ltd. ... ..	Yundamindera ...	499	1s. to 5s.	88 2 0
Do. do. ... ..	Do. ...	53½	2s.	5 6 6
Messenger, W. K. ... ..	Meekatharra ...	51	4s.	10 4 0
Hammond, M. J. ... ..	Do. ...	125	6d.	3 2 6
Do. ... ..	Do. ...	125	2s. 6d.	15 12 6
Webb, C. B. ... ..	Yerilla ...	15	5s.	3 15 0
Stelph, A. ... ..	Yundamindera ...	220	per cent.	11 11 0
Spencer, A. A. ... ..	Mindoolah ...	1,015	2s.	101 10 0
Jaccoletti G.M. Ltd. ... ..	Southern Cross ...	645	1s. 6d.	73 9 0
State Battery ... ..	Lennonville ...	45	11s.	24 15 0
Taylor and party ... ..	Jourdie Hills ...	46½	1s. 6d.	3 9 9
Dallison Bros. ... ..	Kundip ...	954	2s.	95 8 0
Total ... ..	...	28,332½	...	2,333 13 0
Less refund (being overcharge) ... ..	...	8	...	0 8 0
		28,324½	...	£2,333 5 0

## PROVIDING TRANSPORT FOR PROSPECTORS.

A sum of £1,052 9s. 11d. has been expended during 1907 on the maintenance of the Government camels and on assisting prospectors with horses and drays to explore new country.

## SUMMARY OF EXPENDITURE ON MINING DEVELOPMENT.

(A)—Loans made under Mining Development Act, 1902, from 1st January, to 31st December, 1907.

<i>Advances in aid of Mining Work.</i>		Amount.	Total.
		£ s. d.	£ s. d.
Oakley & Thomas ... ..	Kanowna ...	54 16 6	
Kingsmill, W. J., and party ... ..	Ravensthorpe ...	185 8 10	
Malcolm Prospecting Co., Ltd. ... ..	Malcolm ...	630 2 8	
Cross, Frederick ... ..	Yarri ...	50 0 0	
Kalgurli G.M. Syndicate ... ..	Paddington ...	65 5 2	
Perry, Bingie, & Harrop ... ..	Gindalbie ...	150 0 0	
Freeman, Simpson, and party ... ..	Coolgardie ...	21 0 0	
Rollos Reward G.M. Co. ... ..	Kanowna ...	246 0 2	
Menzies Prospecting and Development Co. ... ..	Menzies ...	324 7 6	
Elias, Thomas ... ..	Greenbushes ...	192 3 11	
McGillen, John ... ..	Niagara ...	160 0 0	
Reid, George ... ..	Ravelstone ...	25 17 6	
Tierney, Aldridge, & Gordon ... ..	Coolgardie ...	153 10 0	
Robinson, Wishart, and party ... ..	Mt. Ida ...	200 0 0	
Doyle, Dwyer, Clark, and party ... ..	Erlistoun ...	299 4 9	
Carbine South Syndicate, Ltd. ... ..	Coolgardie ...	371 10 0	
Trenton G.M. Co., N.L. ... ..	Cue ...	1,000 0 0	
Just-in-time G.M. Co., N.L. ... ..	Mt. Morgans ...	200 0 0	
Corrin, Joseph ... ..	Nullagine ...	187 10 0	
Providence Copper Co. ... ..	Goongarrie ...	142 10 0	
Maud, Brown, and party ... ..	Murchison ...	150 0 0	
Dellavedora and party ... ..	Parker's Range ...	137 0 0	
Hodder, Edward (advertising) ... ..	... ..	3 2 6	
Bevan, Smith, and party (advertising) ... ..	... ..	3 12 0	
Coolgardie Prospecting and Development Co. ... ..	Coolgardie ...	390 6 7	
Emily Syndicate ... ..	Day Dawn ...	370 7 3	
Greenbushes Mining and Prospecting Co. ... ..	Greenbushes ...	586 14 8	
North End Mines ... ..	Kalgoorlie ...	248 10 0	
Spear, R. C. ... ..	Northampton ...	200 0 0	
			6,749 0 0
<i>Advances towards erection of Batteries and Treatment Plants.</i>			
Patterson, W. A. ... ..	Parker's Range ...	200 0 0	
Just-in-Time G.M. Co. ... ..	Mt. Morgans ...	800 0 0	
			1,000 0 0
<i>Boring.</i>			
Purchase of Boring Plants and Parts ... ..	... ..	...	2,490 16 2
Chesson & Heydon ... ..	... ..	302 7 9	
Mulga Queen ... ..	... ..	20 16 1	
De Baun, John ... ..	... ..	27 0 0	
			350 3 10
<i>Subsidies to Batteries</i> ... ..	... ..	...	2,300 11 0
<i>Providing Miners' Means of Transport</i> ... ..	... ..	...	1,052 19 11
			13,943 10 11
<i>(B.)—Miscellaneous, Under Mining Development Vote.</i>			
<i>Water Supply.</i>			
Friedman & Johnson ... ..	... ..	382 14 9	
Mulga Queen G.M. ... ..	... ..	182 19 8	
			565 14 5
<i>Miscellaneous.</i>			
Subsidy Carting Ore long distances ... ..	... ..	350 2 5	
Draining North Lead, Kanowna ... ..	... ..	53 0 0	
Development Work in Mines ... ..	... ..	547 6 3	
Cablegram re Collie Coal ... ..	... ..	0 14 9	
Kalgoorlie Boulder Firewood Tram Co. ... ..	... ..	6,028 9 6	
Derby Roads Road ... ..	... ..	100 0 0	
Preliminary Investigations re Water Supply ... ..	... ..	100 2 5	
Assays ... ..	... ..	7 1 7	
Ravensthorpe Metallurgical Institute ... ..	... ..	80 0 0	
			7,266 16 11
Grand Total ... ..	...	...	£21,776 2 3

## REFUNDS.

The following are the refunds made during 1907 to the Treasury on account of loans for Mining Development:—

	£	s.	d.
Messrs. Friedman & Johnson ..	603	3	11
Messrs. Nicholson, Mahoney, & O'Donohue .. .. .	2	17	0
Mr. W. A. Patterson .. .. .	18	2	0
Messrs. Bevan, Smith, & Connolly	188	9	4
Menzies Prospecting & Development Co. .. .. .	11	9	0
	£824	1	3

## AMOUNTS WRITTEN OFF.

The list hereunder shows all the advances under "The Mining Development Act, 1902" which have been written off up to the end of 1907:—

Year authorised.	Name of Borrower.	Mine.	Amount of Loan and Interest written off.	Date written off.
			£ s. d.	
1902	Manners & Gore ... .. .	Gabanintha... .. .	285 0 4	29-5-05
1903	Cheyne, C. C. ... .. .	M.L. 12, Yandanooka ... .. .	70 17 10	31-12-04
1903	South Fingall G.M. Co., Ltd. ... .. .	Volunteer Blocks ... .. .	1,030 18 0	18-1-04
1903	Irwin River Coal and Prospecting Synd.	Irwin River... .. .	925 6 0	23-3-05
1903	Foran and Party ... .. .	E. Coolgardie ... .. .	150 0 0	14-2-06
1903	Waite and Party ... .. .	Claim 209, Kalgoorlie ... .. .	100 0 0	18-4-05
1903	Hannan's Reward and Mt. Charlotte G.M. Co., Ltd.	Boring at Kalgoorlie ... .. .	383 11 9	31-12-04
1903	Jameson, C. A. ... .. .	P.A. 275W, Broad Arrow... .. .	50 0 0	30-6-04
1904	Netherwood, Lamont and Valkenburg	White Flag Consols ... .. .	48 10 5	3-10-06
1904	Bertaux, R. ... .. .	President Loubet... .. .	255 18 3	12-6-07
1904	Comerford, E. ... .. .	The Ninety-eight ... .. .	262 2 11	13-3-07
1904	Stuart, Rollo and McIver ... .. .	On Boring Reserve, Kanowna ... .. .	262 11 6	22-5-07
1904	Bell, Wm. ... .. .	Mosquito Creek Battery ... .. .	520 12 6	31-12-05
1904	Tierney and Party ... .. .	G.M.L. 3993, Coolgardie ... .. .	150 0 0	22-10-04
1904	Blake, McKinnon and Muir ... .. .	Claim 320X... .. .	50 0 0	23-9-04
1904	Westralia Mining and Oil Corporation, Ltd.	Boring ... .. .	618 14 7	20-3-06
1904	Marshall, Geo. ... .. .	Lady Mary ... .. .	152 17 2	15-2-06
1904	Erwin and Francisco ... .. .	The Admiral ... .. .	719 1 1	30-3-06
1905	Milling and Dolan ... .. .	Mt. Ida Battery Lease ... .. .	313 6 2	29-5-07
1905	McIntyre, A. ... .. .	For Water, Southern Cross ... .. .	71 8 4	22-11-06
1905	Johnson, Wm. ... .. .	Battler's Hope, Greenbushes ... .. .	118 18 4	6-6-07
1905	Ifla, C. H. ... .. .	Water Supply ... .. .	25 0 0	29-6-05
1906	W.A. Sluicing Syndicate ... .. .	Pig and Horgan's Gullies ... .. .	309 1 3	21-2-07
1906	Freeman, Simpson, Herbert & Simpson	G.M.L. 53, Coolgardie ... .. .	102 4 6	10-10-07
1907	Cross, Fredk. ... .. .	P.A. 158 R, Edjudina ... .. .	50 0 0	28-4-07
			£7,026 0 11	

State Mining Engineer's Office, Perth,  
31st March, 1908.

A. MONTGOMERY, M.A., F.G.S.,  
State Mining Engineer.

## APPENDIX No. III.

## REPORT ON THE QUARTZ REEFS AT WAGIN.

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

Office of the State Mining Engineer,  
Perth, W.A., 31st January, 1907.

Sir,—

In accordance with instructions I went to the Wagin district on 10th inst., to examine the quartz reefs there which are being prospected for gold, returning to Perth on 14th inst.

The general features of the country round Wagin have been described in a report by the Assistant Government Geologist, Mr. H. P. Woodward, which has

been published in the Annual Progress Report of the Geological Survey for 1905 (page 132 of Annual Report of the Department of Mines, 1905). The alleged gold discoveries were also reported on by Mr. Woodward on 9th April, 1906, and later on by the Assistant Government Geologist, Mr. W. D. Campbell, on the 16th August, 1906. Mr. Campbell's re-

port is accompanied by a map, on which the position and direction of the principal reefs are very clearly shown.

The map herewith, kindly prepared for me by the Government Land Agent at Wagin, shows the positions of the various areas of land taken up for mining purposes which were in existence as mining tenements at the time of my visit.

The country round Wagin is of granite formation wherever the bedrock is visible, and where it is not visible the soil indicates a granitic origin. In parts of the district there appears to be a considerable depth of superficial soil and alluvial deposits. Occasional stones of greenstone (diorite, etc.) testify to the presence of dykes penetrating the granite, which are probably not at all uncommon, though I only saw two actually clearly visible—on the bare granite rocks to the North-East of Mr. H. W. Spragge's house. These greenstone dykes are quite similar to those so commonly seen penetrating the granite of the Darling Ranges on the railways running East from Perth. Their occurrence and character are not quite the same as those of the diorites and other greenstones so well known on the goldfields. In geological structure, therefore, the Wagin district is quite similar to the granitic country along the Darling Ranges, which has not yet proved payably auriferous, and not to any of our well-known goldfields, in all of which the greenstone formation is dominant.

Large outcrops of reef quartz are common in the Darling Range granites, and also in the Eastern and Central Goldfields in the large areas of granite country often found separating the auriferous greenstone belts, but though a great deal of prospecting has been done on such quartz reefs, I am not aware of any of them having yet been found payably auriferous, except when, as at Cue and Kookynie, they are in close proximity to the greenstone formation. There is no convincing reason known to me why, *a priori*, payable auriferous reefs should not be developed in the granite country, but the fact remains that the experience of the goldfields of this State is that hitherto this has not been a formation favourable for the discovery of much gold when distant from greenstones.

The reefs at Wagin outcrop often very strongly as large bodies of quartz, frequently of great width, traceable on surface for considerable distances. The quartz, however, has not a very attractive appearance to an eye accustomed to the auriferous quartz of the goldfields, though it is very difficult to define any essential points of distinction. So far as can be seen from the small amount of work that has been done on them the reefs are fairly well defined, with distinct "walls" separating the quartz from the country, and therefore seem to be true lodes, but in one case where the quartz occurred in hard granite the reef was not at all clearly defined, but had more the character of a segregation vein in the granite. Most of the quartz bodies, however, are in my opinion of lode type.

The following occurrences of quartz reefs were visited and examined:—

*Wainui, G.M.L. 84.*—On this lease Messrs. Spragge and Murray have done a good deal of work on a large outcrop of quartz, traceable on surface for several chains on a line of strike approximately North-East by South-West, and apparently up to about 90 feet in width, though this width would probably be found to include much broken "country" in depth. The outcrops and shafts show very large bodies of somewhat rubbly quartz, a little stained with brown oxide of iron, and iron-stained kaolin and other clayey mat-

ter much mixed with quartz and veins of oxide of iron. Three small shafts have been sunk, two about 90 feet apart on about the middle of the outcrop, and the third or main shaft some 70 feet or so West of the line connecting the first two, on what is regarded as the hanging-wall of the lode. All these shafts were unfortunately full of water at the time of my visit, despite strenuous efforts by the owners of the mine to have them unwatered for inspection. A new pump which they had obtained was however not yet fixed. It is to be worked by an oil engine, and should soon clear the mine of water when set going. All efforts to unwater the shaft by bailing with windlass and buckets were quite unavailing. The owners informed me that No. 1 shaft was 25 feet deep, and that there was a crosscut from it 35 feet to the North-West in lode matter, and a drive 35 feet to the North-East. The dump was nearly all quartz: a sample taken by me all round it (No. 14) returned only a trace of gold on assay. The No. 2 shaft was stated to be 45 feet deep, with a crosscut North-West 20 feet, from which a winze was sunk a short distance on a vein of iron oxide and quartz said to be from four to 16 inches wide and to give good prospects of gold. A small piece of ore supposed to be from this vein picked from the dump by Mr. Murray gave me a fair prospect of gold by crushing and panning, and I was shown a small piece of gold two or three grains in weight, stated to have come from the vein, and another little bit of ironstone showing gold. A crushing of ten tons was sent to the Coolgardie State battery which came mostly from the workings from this shaft; it is stated to have returned 5ozs. 14dwts. of gold, or at the rate of 11½dwts. to the ton. A pan of the rubbly quartz on the part of the dump from which the crushing is said to have been taken on being washed off only gave me a few very fine "colours" of gold—quite an unpayable prospect—and a sample of the same on assay (No. 15) returned only a minute trace of gold.

The main shaft is said to be sunk 54 feet, at first in somewhat soft kaolinised granite, then at 20 feet entering the hanging-wall side of the lode, composed of quartz and kaolin, and a crosscut has been driven some 14 feet towards the winze from No. 2 shaft, with the expectation of cutting the auriferous vein. A sample taken by me (No. 16) all round the dump at the main shaft, nearly all quartz, returned no gold at all on assay.

Taking my tests in conjunction with those previously obtained by Messrs. Woodward and Campbell, it is quite clear that the great mass of the lode matter is quite unpayable, and unfit for crushing in bulk. Owing to the water I did not personally see the auriferous vein alleged to exist, but the owners of the mine seemed very well satisfied about it, and we'll content to spend their own money in persevering with development, so I see no reason to doubt its existence. I am quite satisfied that there is a little gold about the reef, and in such a large lode it is probable that it would be chiefly in smaller veins traversing the main bulk. From what I have seen, however, I have very great doubt of the existence, even in small rich veins, of enough gold to make the mine a payable concern. When the water has been mastered and the crosscut from the main shaft connected with the workings from No. 2 shaft it will be possible to form an opinion on much better grounds than are at present available.

*"Terror," G.M.L. 134.*—Almost due north of Messrs. Spragge & Murray's workings, there is an-

other large outcrop of quartz running more nearly N. & S. than the last described reef, and apparently several chains to the N.W. of its course. A shaft has been sunk 36 feet deep on the east side of the outcrop; at the top of the shaft the quartz is seen to dip flatly westward, and below it the shaft is in weathered granite with occasional veins of quartz. At the bottom of the shaft the owners had crosscut 12 feet to W.N.W. at the time of my visit without yet striking the quartz body.

P.A. 34.—The same party as hold the "Terror" lease are also working on this P.A. to pick up Spragge's reef, and have started a shaft, but at the time of my visit no reef had been found.

P.As. 8 and 9.—"Sinclair's Reef".—A strong outcrop of quartz running N.N. Easterly passes through these holdings, and is seen again further north in P.A. 16. Several shallow costéans have been made on the outcrop, showing it to be up to 40 feet wide, and a shaft has been sunk some 30 feet. The quartz is very similar in appearance to that of Spragge's Reef, and from their position it is quite possible that Sinclair's and Spragge's reefs are identical. No one was at work on these areas at the time of my visit. I took two samples, one from the costéans to the south of the shaft (No. 17) and one from the dump at the shaft (No. 18), but on assay neither returned any gold.

P.As. 17 and 18, "Green's Reef".—Very much on the same line as Sinclair's reef, but apparently somewhat further westward a very large and strong outcrop of quartz is seen in these holdings, traceable for a long distance, and often up to 40 or 50 feet at least in width—course N.N.E. by S.S.W. A good deal of trenching has been done across the outcrop, revealing large solid masses of quartz. Sample No. 12, taken along one of the trenches in P.A. 18, and No. 13 from the trenches further south following the outcrop, failed on assay to give any return of gold. No one was working on the ground and I did not hear if any part of the lode had been proved auriferous.

P.A. 19.—Following about the same line still further to the north-north-east we come to Bailey and Samways' reef near the railway line, which again shows a big wide outcrop of quartz running about N. 30deg. E. for a distance of several chains, and up to 30 feet or more in width. A shaft had been sunk on this about 20 feet deep, which the owners kindly had baled out for my inspection. The bottom of the shaft is all in solid quartz, the reef not having been cut through. I took three samples, No. 9 from the dump round the shaft, No. 10 from along the outcrop where it had been cut into, and No. 11 from round the shaft near the bottom, but none of the three on assay returned any gold. The men baling the shaft could not tell me if any gold had been found when the reef was being worked.

The reefs running from Spragge's mine to Bailey and Samways' find seem to be a succession of lodes more or less *en échelon* rather than one continuous lode. It is clear, however, that there has been extensive fracture of the country along this general line, leading to the formation of this group of lodes.

P.As. 23, 5, 10, and 11.—These holdings are taken up along the line of another large quartz reef which is best seen in P.A. 5, known as The Lady of the Lake. Very little work has been done on any of the other areas. The outcrop runs about N.N.E. and S.S.W. and is over 50 feet in width at the Lady of the Lake No. 1 shaft. Some costeaning has been done

and two shafts have been sunk. The Southern or No. 1 shaft is 57 feet deep on an underlay of about 67deg. from the horizontal, but the wall followed down is not the main wall of the lode, there being quartz under it. It is a fairly well-defined "wall." At the bottom of the shaft there is a short drive of about 3 feet in length to the north and then a crosscut east, all in quartz, of 17 feet. About 3 feet of this crosscut was stated to be ore expected to be payable, and I took a sample from it, No. 1, but on assay no gold could be got in it. I took another sample, No. 2, up the face of the crosscut in the east end, but this also failed to give any gold on assay, and a third sample, No. 3, taken along the south wall of the crosscut only gave a minute trace. A large sample taken all round the dump at the top of the shaft, No. 4, was also assayed, without yielding even a trace of gold.

The No. 2 shaft is about 130 feet N. of the No. 1, and is sunk vertically to a depth of 52 feet. It is mostly in soft granite, being just on the west side of the lode. At the bottom a crosscut has been made for about 18 feet eastward, mostly in silicified country with quartz veins, but not yet in solid quartz as in No. 1 shaft. The country here seems to be dioritic, probably due to a local dyke of greenstone, as granite is evidently the main rock all round. The last 6 feet of the crosscut being mostly in quartz, I took a sample, No. 5, from this portion, which gave an assay return of a minute trace of gold, and a special sample, No. 6, from one small vein thought by the man in charge of the work to be likely to yield gold, also returned only a minute trace of gold. By panning off a dish of the rubble from the dump at No. 1 shaft a few small colours of gold were obtained, but the prospect was entirely unpayable. Some rich stone is said to have been obtained from a trench on surface near No. 2 shaft, but there was no sign of any such material at the time of my visit.

Tarry's P.A.—Mr. T. Tarry has been prospecting to the north of P.A. 11 on the Wagin townsite, but had only made two small surface trenches at the time of my visit. One of these shows iron-stained weathered granitic matter with veins of quartz and oxide of iron, which may possibly be part of a lode "formation," but is by no means clearly so. Mr. Tarry has picked up stones of quartz and iron oxide in this vicinity, lying on the surface, and I was shown a piece of iron oxide with gold visible in it, which was said to have been picked up by him. I took two samples of the stones collected by Mr. Tarry No. 7 being quartz, and No. 8 ironstone, but it is obvious that no guarantee can be given that such loose stones are really native to the place where they were said to be found. Sample No. 7 returned on assay 6dwts. 13grs. of gold per ton, and No. 8 a minute trace of gold. The former return will have to be confirmed by others of stone undoubtedly derived from the ground prospected before any importance can be attached to it.

P.A. 20, Hanson's Reef.—On a high bluff of granite on the west side of Lake Parkeyerring there is an outcrop of quartz in hard granite, on which a little work has been done by trenching. The outcrop is traceable some 5 chains or so on surface, on a line running about N. 50 deg. E. I noticed some loose stones of dense fine-grained greenstone lying about the surface, pointing to dykes of this rock. The quartz reef is not well defined, looking more like a segregation vein than a true lode. A sample (No.

19) taken for assay however returned no gold, and another stone containing much hornblende given to me by Mr. Murray as from this place (No. 20) also was found to contain no gold or metal of value.

For convenience of collation I subjoin a summary of the assays that have been made by the Government Mineralogist and Assayer, Mr. Simpson, from samples taken by me.

Geological Survey No.	No. of Sample.	From	Result.
2817	1	"Lady of the Lake," No. 1 shaft, North wall of crosscut ...	Gold— <i>nil.</i>
2818	2	Do. do. do. East face of crosscut ...	" "
2819	3	Do. do. do. South side of crosscut ...	" minute trace.
2820	4	Do. do. Ore dump of No. 1 shaft ...	" <i>nil.</i>
2821	5	Do. do. No. 2 shaft, 6 feet of end of crosscut ...	" minute trace.
2822	6	Do. do. do. small vein in crosscut ...	" "
2823	7	Tarry's P.A., stones of quartz collected by Mr. Tarry—origin of stones not guaranteed	" 6dwt. 13grs. per ton.
2824	8	Tarry's P.A., loose pieces of ironstone collected by Mr. Tarry	" minute trace.
2825	9	Bailey & Samways' P.A., sample from dump at shaft ...	" <i>nil.</i>
2826	10	Do. do. sample from cuts on outcrop ...	" "
2827	11	Do. do. sample from near bottom of shaft ...	" "
2828	12	Green's P.A., sample from Northern trenches ...	" "
2829	13	Do. sample along cuts on outcrop ...	" "
2830	14	Wainui Reward Lease, Spragge and Murray's reef, sample round ore dump at No. 1 shaft	" trace.
2831	15	Wainui Reward Lease, Spragge and Murray's reef, sample from ore dump at No. 2 shaft	" minute trace.
2832	16	Wainui Reward Lease, Spragge and Murray's reef, sample from ore dump at main shaft	" <i>nil.</i>
2833	17	Sinclair's reef, sample from trenches on outcrop ...	" "
2834	18	Do. do. sample from ore dump at shaft ...	" "
2835	19	Hanson's reef, sample from cut on outcrop ...	" "
2836	20	Do. do. stone containing much hornblende ...	" "

The analyst notes that by panning tests No. 2823 (or 7) gave a little fairly coarse gold in the dish, and that No. 2830 (or 14) gave a single small speck of gold on washing off; none of the other samples showed any gold in the pan by washing test.

My tests of the quartz quite confirm those previously obtained by Messrs. Woodward and Campbell, and it is clear that the main masses of these large

quartz reefs are hopelessly unpayable. There is, however, a little gold in the district, which seems to be in small veins traversing the large reefs. These veins have not been followed enough to show if there is any possibility of their being payable, but I have next to no hope of their being industrially valuable.

A. MONTGOMERY, M.A., F.G.S.,  
State Mining Engineer.

#### APPENDIX No. IV.

#### REPORT ON THE SILVER-LEAD LEAD AT MUNDIJONG.

*The Secretary for Mines.*

19th February, 1907.

On the 1st instant I made a very short visit in company with the Honourable the Minister for Mines to the Silver and Lead Mine near Mundijong, on which some work has recently been done by a local company.

The leases, 6H and 7H, are part of lot 407, and are situated about two miles East-South-East from the Mundijong Railway Station, and are bounded to the South by the Jarrah Timber Company's Railway, which runs to the coast at Rockingham. The mine is therefore very easily accessible, and in the event of its becoming a producer of ore it is most favourably situated for sending the ore either to Fremantle or to Rockingham for shipment or smelting. The situation is good also as regards plentiful supplies of sawn and round timber from the well-timbered country in its vicinity, and water for ore-dressing purposes can be

obtained without much difficulty. The working facilities are therefore exceptionally favourable.

In my short visit it was not possible to see much of the structure of the district, especially as much of the surface is covered with brown ironstone ("laterite") deposits, but round the mine it appears to be composed of highly inclined metamorphic sandstones and slate, forming foot-hills to the Darling Range, and probably of great geological age. The lode on which work has been done is a strong body of quartz running about North 35deg. West, and traced on surface for a considerable distance. The first discoveries of lead ore in it are said to have been made many years ago, but I have not been able to ascertain how much ore was sent away or what became of it. A shaft was sunk about 40 feet soon after the discovery, and this



has been deepened by the present owners to 86 feet, and furnished with a small boiler and steam pump. There is a small amount of work done on the lode at a depth of 30 feet in the shaft, and a small excavation at 52 feet, but the principal work is at the 70 feet level. Here a crosscut has been made 23 feet North-East through the lode, and a winze sunk nearly 30 feet. The lode-matter is about 16 feet wide in the crosscut, and is mostly quartz, with strings and dabs of galena and blende. Near the bottom of the winze there is some pretty pure dense blende and a little galena. The lode underlays a little to the North-East, going out of the shaft between the 50 and 70 feet levels. The winze seems mainly in the hanging-wall portion of the lode, but in the crosscut at 70 feet the most defined lode-matter is on the foot-wall side and corresponds with the veins of ore seen in the bottom of the winze. The lode-stuff exposed in the workings contains, so far as could be seen, very little pure galena or blende that could be hand-picked for sale, though some very large lumps of pure ore are said to have been got from time to time in the workings, but would require dressing and concentrating to obtain a marketable product. Without extended and careful sampling I could not say with any certainty whether there is enough ore in sight to be payable if the stuff were concentrated, but I hardly think there is at present. Still the finding of a few bunches of good ore such as are commonly met with in lead lodes would make a great difference in the average production of ore, and it seems to me well worth while to open up the lode by driving along it so as to ascertain its bulk value with some certainty. As the shaft is already down 86 feet it would be best to sink it to the 100 feet level, and drive then along the lode, crosscutting it at intervals. This work would soon show if the average contents in lead and zinc ores were sufficient to render mining and dressing profitable.

My visit was too short to attempt sampling the lode, which would require two or three days. The dump shows mostly poor material, and apparently more blende than galena, and I much doubt if it would pay for concentration even with a mill on the ground. No doubt, however, much of the best ore

has been picked out. There were some bags of ore stacked near the shaft, stated to have been picked from the dump: I took a rough sample from several of these, mainly to see if the ore contained gold in any appreciable quantity, and to ascertain the value of the galena in silver, and on assay by the Government Mineralogist and Assayer it returned:—

Lead—8.30 per cent. (wet assay).

Zinc—5.31 per cent.

Copper—slight trace.

Silver—14dwts. 8grs. per ton.

Gold—trace.

Silica—77.71 per cent.

This assay shows ore requiring crushing and concentration to obtain a marketable product, and which should not go direct to smelting works. The galena does not appear to be richly argentiferous, and there is very little gold. I should, however, advise the owners to have tests made frequently for gold, as the lode matter is highly quartzose and of likely appearance for occurrence of gold.

The lode has been opened for about 60 feet along the outcrop a short distance North-West from the shaft, and shows a good deal of galena through the quartz.

The whole occurrence is an interesting one, being in a rock formation different, to the best of my knowledge, from that of any other mineral field yet opened in the State. The lode is a strong one, and doubtless will prove persistent both in length and depth, and there is enough galena in it to give great hopes of payable shoots being discovered. Besides driving on the lode at the 100ft. level I would recommend the owners to test the outcrop well by numerous costeans at short distances apart, as these would be likely to prove the existence of shoots of ore more rapidly than underground driving. A mine of this sort has generally at first to depend for returns on its first class, hand-picked, clean ore, the erection of dressing machinery for the concentration of the second-class ore being left until the lode has been sufficiently opened out to guarantee large supplies of ore for the mill.

A. MONTGOMERY, M.A., F.G.S.,  
State Mining Engineer.

#### APPENDIX No. V.

#### REPORT ON THE PROGRESS OF THE BLACK RANGE DISTRICT, WITH SPECIAL REFERENCE TO THE PROJECTED MOUNT MAGNET TO BLACK RANGE RAILWAY.

##### *The Secretary for Mines.*

Office of the State Mining Engineer,  
Perth, W.A., 14th October, 1907.

In accordance with instructions from the Hon. the Minister for Mines, I visited the Black Range district on 8th to 12th ulto., to inquire into the progress of the Field, and more especially into the question of whether recent developments were such as would justify proceeding with the construction of the proposed railway from Mt. Magnet to Black Range. My last report on this field and on the railway question, dated 12th July, 1906, has been published as an Appendix, K, to my annual report for 1906 in the last annual report of the Department of Mines, and I

have not a very great deal to say in addition to what was contained therein. Notes on the various mines examined are appended to this report, which will serve to show the progress in individual cases. Speaking generally, the district has developed very satisfactorily, and though it has not realised the extravagant expectations that were frequently entertained by many persons a year or so ago, neither has it given justification for the pessimistic opinions which one often hears expressed now. A few mines which appeared promising at first have not stood the test

of development, but, to make up for these, several others have been found which bid fair to become considerable producers of gold. New discoveries are being continually made throughout the field, extending the area of known auriferous ground. This auriferous belt may now be said to stretch, somewhat discontinuously, from Mt. Townsend on the north to Coorang (or the Youanne Well) on the south, a distance of over 100 miles. On this occasion I did not visit the Montague Range portion of the field, being most concerned with the developments in the larger mines more immediately to be served by the proposed railway, but according to the information obtained at Black Range from residents of Birrigrin and Montague Range there was little difference in the general position of affairs there from that described in my previous report. At Sandstone the Oroya-Black Range Coy. have done a large amount of work on the Sandstone reef, and have put up a very fine 20-head battery, cyanide plant, rock-drilling outfit, and winding plant, and have become regular producers of gold. The Black Range Coy. have also greatly improved their plant both for mining and milling, and are doing good work underground. Both of these mines have been rumoured to have become greatly impoverished in the lowest levels, but this is not the case at all, there being large bodies of payable ore in both instances opened up in these levels. I could see nothing to justify any fear that the ore in these reefs would not "live" downwards as well as in any mines of the State; on the contrary, it is of a sort from which one expects great persistency, being dense, granular, bluish-coloured quartz, carrying a good deal of iron pyrites embedded and enclosed in its substance and associated with gold. The Sandstone Development Coy. have equipped their mine with light machinery, and are pursuing prospecting operations with promising results while also sinking a deep shaft to cut the underlay of the Sandstone reef. The Wanderie reef also has some machinery upon it, but has not been fortunate in its developments, the shoots of ore proving to be rather short and unreliable; there is, however, not a great deal done upon it, and it does not seem to me by any means yet a hopeless venture.

At the part of the field known locally as "Hancock's" there is very considerable activity and improvement, though all the mines are still in the prospecting stage. Several promising new reefs have been found during the year and the longer known ones have opened up fairly satisfactorily. There are very numerous reefs in this part of the district, mostly somewhat small, but many of fair working size. The Kohinoor, Bull-Oak, and Worker mines are those most extensively opened, and the first-

named, with several neighbouring "shows," has now been taken over by a company.

Round Nunngarra mining has been very stagnant. The Wirraminna has been equipped with winding plant and pumps, and the shaft has been sunk below the water level, but developments at the bottom level have been very unfavourable. A recent crushing having given a very poor return it seems rather unlikely that the owners of this mine will do much towards its development for some time to come, if at all. In the Nunngarra lease at the Two Mile Hill prospecting has been very perseveringly carried on, but though a gold-bearing reef has been struck it is rather poor so far as yet seen, and there does not seem at present much prospect of its turning out successfully.

At Maninga Marley the Maninga Marley mine has winding machinery and a battery, but the mine has been very disappointing. The auriferous quartz has proved patchy in its occurrence, and its place is often taken by mullock. This in my opinion is mainly due to a faulting movement of the country having taken place along the plane of the reef, dislocating and rupturing the quartz, and there is accordingly much hope that the good ore may be recovered at greater depth. The Maninga Marley North and Havilah mines have both turned out a considerable amount of payable ore, and seem likely to maintain their output. The Havilah has steam winding machinery and a battery. There are a number of smaller prospecting mines round the Maninga Marley centre, some of which are promising. A local company has lately been formed to work the "Eclipse" lease, from which some fair ore has been raised.

Messrs. Prendergast and party's recent discovery of gold in one of the big jasper reefs so common in this district is of much interest, though not yet enough developed to show whether it is going to be an important find or not. There seem reasonable grounds for thinking it may prove to be workable on a fairly large scale.

The Range View centre, to the south-west from Nunngarra, has not developed much on account of its long distance from a battery. There have, however, been some very fine crushings from the reefs here, and some of these are very large "formations," which have been proved to extend and carry gold for long distances. This piece of country seems to me to deserve much more attention than has yet been given to it.

The following table shows the returns from the Black Range district to June 30th, 1907, as recorded by the Statist of this Department:—

Taking the production of gold year by year the progress made lately becomes more evident.

	Alluvial.	Dolled and Specimens.	Ore Treated.	Gold therefrom.
	Fine ozs.	Fine ozs.	Tons (2,240lbs.).	Fine ozs.
Previous to 1904 ... ..	16·03	277·54	407·37	792·77
1904 ... ..	135·70	61·61	7,183·16	10,989·08
1905 ... ..	238·80	689·65	10,975·90	15,765·31
1906 ... ..	477·78	639·81	20,581·58	34,302·70
1907 (6 months) ... ..	173·32	27·81	16,241·00	20,362·73
Total ... ..	1,041·63	1,696·42	55,389·01	82,212·59

Total Gold Production, 84,950.64 fine ozs. of value £360,844 16s. 8d.

The crushings show the excellent average return from the whole district of 1.48 fine ozs. per ton.

The summarised returns from the Black Range

State Battery are also quoted hereunder, as they show in somewhat greater detail the numerous sources from which ore has been drawn to make up the above total, but they do not include ore crushed at the Companies' batteries or at private crushing plants.



*Ore Crushed and Sands Treated by Cyanide at the Black Range State Battery since inception to 31st August, 1907—continued.*

Lease.		Milling.			Cyaniding.			Total
No.	Name.	Tons crushed.	—		Tons treated.	—		Gold Obtained.
			ozs.	dwt.	grs.	ozs.	dwt.	grs.
142B	P.A.	20.0	7	3	0	..	..	7 3 0
171B	P.A.	15.0	4	19	0	..	..	4 19 0
103B	..	15.0	9	12	0	..	..	9 12 0
205B	Nungarra	123.0	41	0	0	51	7 6 6	48 6 6
157B	P.A.	13.0	7	3	0	..	..	7 3 0
285B	..	7.00	14	10	0	..	..	14 10 0
285B	Bell Chambers	92.0	139	1	0	48	34 17 0	173 18 0
146B	P.A.	7.0	9	6	0	4	1 7 16	10 13 16
330B	Koh-i-noor North	78.0	15	16	0	..	..	15 16 0
182B	P.A.	8.0	8	9	0	..	..	8 9 0
177B	P.A.	6.0	6	7	0	..	..	6 7 0
383B	Maid Marion	150.0	187	4	0	74	32 1 20	219 5 20
397B	Poseidon	10.5	76	16	0	..	..	76 16 0
174B	Sandstone Development Co	246.0	134	6	0	15	5 2 4	139 8 4
91B	P.A.	15.0	6	3	12	..	..	6 3 12
	Battery Refuse	18.0	28	1	0	..	..	28 1 0
390B	Welcome	31.0	7	7	0	..	..	7 7 0
341B	Agnes	13.0	12	5	0	..	..	12 5 0
149B	P.A.	20.0	17	11	0	..	..	17 11 0
216B	P.A.	11.0	11	0	0	..	..	11 0 0
432B	The Diver	30.0	25	8	0	19	4 18 2	30 6 2
201B	P.A.	10.0	9	14	0	..	..	9 14 0
173B	P.A.	15.0	2	11	0	..	..	2 11 0
47B	P.A.	9.0	21	6	0	..	..	21 6 0
108B	P.A.	13.0	23	11	0	..	..	23 11 0
325B	Eileen	41.0	15	8	0	..	..	15 8 0
214B	P.A.	10.0	4	9	0	..	..	4 9 0
	Various parcels	..	..	..	..	324	197 12 0	197 12 0
	Totals	21,646.15	26,143	6	2	11,398	4,264 12 10	30,407 18 12

The number of small "shows" in the above table which have crushed a few tons of ore for testing purposes is worthy of notice. Many of these would doubtless be opened up more vigorously if the conditions of working them were improved.

#### TRANSPORT OF GOODS TO THE FIELD.

At present most supplies of all sorts required for the Black Range district are carted from Mt. Magnet, though a good deal of machinery and building material has been brought *via* Leonora and Lawlers from the Eastern Goldfields. The cost of carriage from Mt. Magnet to Nungarra or Sandstone is from £5 to £7 a ton, averaging about £6. By express wagon it is about £7 a ton. Heavy machinery requires special rates to be arranged. There are 51 heavy teams regularly on the road, together with several lighter conveyances. A list kindly prepared for me by Mr. Gladden, Town Clerk of Mt. Magnet, showed 30 owners of horse teams with 33 teams, 5 of camel teams with 6 teams, 8 of donkey teams with 10 teams, and 2 of mule teams with 2 teams, being 45 owners and 51 teams altogether. The usual load for a team was given to me as averaging seven tons per trip, and at present the teams are stated to be doing on an average about one trip in 21 days, which would give a monthly tonnage sent to Black Range of about 510 tons. Until lately, while building was proceeding vigorously at Sandstone, and much machinery was being erected on the Oroya Black Range and Black Range Company's mines, the teams are said to have averaged a trip in 14 days, equal to about 765 tons a month. In consequence of the heavy traffic the road has been cut up a good deal, and during wet weather transport becomes very difficult.

When going up to Black Range from Mt. Magnet, I passed on the road 29 large teams, two light teams, and the mail coach, and there were six heavy teams

in Sandstone and Nungarra, while I ascertained there were between 15 and 20 at Mt. Magnet loading and waiting for loading. On the return journey I passed 40 large teams, two coaches, two vans, one three-horse team, one two-horse dray, one sulky, and five or six cyclists, and saw a number of other heavy wagons in Mt. Magnet, these figures fully bearing out the above statement given to me.

The Manager of the Oroya-Black Range Mine informed me that the carting of his new plant from Mt. Magnet to Sandstone cost in round figures £8,000, and was effected at an average rate of about £6 a ton. The cost of this plant erected is about £32,000, showing that cartage alone amounted to no less than 25 per cent. of the total. In addition to this the railway freight from Geraldton to Mt. Magnet comes to about £2 5s. a ton. The same mine estimates its probable expenditure for road transport for some time to come at about £500 per month.

The Manager of the Black Range G.M. Company has advised in reply to my inquiries that his present expenditure on railways and cartage combined averages £100 per month. This would be about £73 per month for cartage alone. The figures of these two mines serve to show the importance to them of this item of expense, and give some indication of the probable transport requirements of other mines as they become more advanced. They give, however, no guide as to the very serious cost to the mines of the loss of time frequently imposed upon them by unavoidable delays in getting supplies, and this is often far more serious than the actual cost of the goods.

#### FIREWOOD AND MINING TIMBER.

The country round the Black Range mines carries a fair amount of light mulga scrub, suitable for prospecting purposes, and affording an easily obtained supply of firewood for small boilers. It is not, how-

ever, sufficiently dense to give the supplies of firewood required for large mines, nor large enough to yield much good mining timber. Consequently the more advanced mines at Sandstone are already finding their supplies of firewood running short and becoming more expensive, and heavy mining timber has to be brought from the country along the Midland Railway line. The Oroya Black Range Company estimate the cost of the supplies of firewood which they will require at £260 to £300 per month. They are getting it just now, under contract, at 17s. 6d. and 18s. 6d. a cord, but may very likely have to pay 19s. before long. The Black Range Company are paying 17s. 9d. a cord for firewood, and their expenditure for fuel from 1st January to 30th June, 1907, is given in their published accounts as £823 3s. 6d. The wood carts have now to go out several miles from Sandstone before they can get bush heavy enough to be profitable to cut at the prices quoted, and it is expected that they will soon have to go much further. For mulga mining timber the carts are already going out 12 to 15 miles, and for gum as much as 30 miles, and the supplies in sight are not very satisfactory. Along the line of the railway there is a good belt of mulga timber on the North side between Mt. Magnet and East Mt. Magnet, and if it is brought round by Range View another very fair area of forest would be made accessible about 15 to 20 miles from Sandstone. Mine managers in the district already regard the threatening scarcity of firewood with some apprehension, and are looking forward to the coming of the railway as the only good solution of this difficulty.

In working the larger reefs a good deal of long and heavy timber is required, and this has now mostly to be brought from the Midland Railway line. While ordinary mulga mining timber is costing the Black Range G.M. Co. 5½d. to 6d. per lineal foot, long gum timber costs them 2s. 9d. per foot. The Oroya Black Range mine in six weeks just previous to my visit used heavy timber to the value of £693, costing over 2s. a foot. The Black Range G.M. Co.'s mining timber expenditure for the first six months of the present year is put down in their published accounts as £357 3s. 5d.

On account of the great weight of hardwood sawn timber making it much more expensive at Black Range than imported Oregon pine, the latter is almost entirely used for structural purposes. It costs about £2 10s. per 100 super. feet. With a railway the local hardwood timber could be brought on to the field at no greater cost than the imported, and its great superiority in strength and durability makes it far better for mining purposes. The construction of railways to mining districts of the badly-timbered parts of the goldfields therefore is a considerable advantage to the timber industry of the South-Western portion of the State.

#### ROUTE OF RAILWAY.

The line as already surveyed goes from Mt. Magnet to East Mt. Magnet, and thence to Sandstone, bearing a little to the North of a straight line from Mt. Magnet to Sandstone. When at Nunngarra it was represented to me by a deputation that if possible the line should come a little to the South from East Mt. Magnet and approach Range View so as to pass through a fine belt of mulga timber to the West of that locality and then turn to the North to reach Sandstone, passing fairly close to Nunngarra. The deputation appeared to think that this route would

be no longer than the one surveyed, but as far as one can judge from the maps of the district it would necessarily be some five or six miles longer. It would, however, have several advantages, firstly in improving the supplies of firewood and mining timber available for the mines, and secondly, in bringing the railway nearer to the South-Western and Western parts of the field. The Range View district has as yet had very little work done in it, but it promises very well, and, in my opinion, a detour to serve this part of the field would be entirely justifiable and advisable. Unless there turn out to be unexpected engineering difficulties in the way of this route I would therefore recommend it in preference to the one already surveyed.

#### TRAFFIC FOR RAILWAY.

In my previous report the question of traffic to be expected on the proposed railway was gone into as fully as the figures at my disposal permitted, and I have very little to add to what was then said. Since that report was written the traffic by road has been very much greater than was then estimated, and there would doubtless be a still further large increase if the railway were made. The field has every prospect of soon being able to maintain a population of 4,000 to 5,000 people at least. I would again direct attention to the very significant figures in Table VIII. of my former report, as showing the large amount of railway transport required by mines of any considerable size, and the heavy expenditure which is entailed by their being at a distance from a railway. Also to the great saving to the country as a whole that was there claimed to result from substituting cheap railway carriage for the expensive cartage now in vogue. The host of teamsters and animals now engaged in the carrying trade can be much more usefully employed in productive work.

An aspect of the traffic question that deserves some consideration is that of the benefit this railway would be to the country lying East and North-East of Black Range. The distance by rail from Geraldton to Black Range will be about 310 miles, while from Fremantle to Leonora it is 548 miles. Lawlers is about equally distant from Leonora and Black Range, so it is probable that the advantage of the latter in shorter railway traction from the Coast will enable it to become the distributing centre for Lawlers, Mt. Sir Samuel, and Wiluna, instead of Leonora as hitherto. Though the transfer of carrying trade from one portion of the railways to another is of no benefit to the State, the improvement of transport facilities to outlying districts is decidedly beneficial. There is therefore considerable likelihood that there may be a good deal of inland carrying trade from Black Range in addition to that due to the goldfields of the immediate vicinity.

The construction of a railway from Mt. Magnet to Black Range is without doubt an undertaking about the immediate commercial success of which there may be very reasonable question, depending as it does on the successful development of a mining district which has been as yet but little proved. What has been done, however, in the field has been attended with highly favourable results, and gives every promise of further success, and so far as the writer is able to form an opinion he has every confidence that it will become an important mining field.

I have, etc.,

A. MONTGOMERY, M.A., F.G.S.

State Mining Engineer,

## NOTES ON THE MINES OF THE BLACK RANGE DISTRICT.

## SANDSTONE CENTRE.

There has been great progress made in this part of the Field. A townsite has been laid out and a large number of business and other buildings erected, many of them of very creditable type of construction. The amount of building that has been done shows great faith in the future of the Field on the part of those who have put their money in this class of investment. Considerable expense has been gone to in clearing the streets in the town, and also in straightening, widening, and clearing the main roads throughout the whole Black Range District.

*Oroya-Black Range Mine.*—A large amount of work has been done in this mine on the Sandstone reef, payable values being proved along it for a length of about 1,700 feet. A main inclined shaft, known as the Doolette shaft, has been sunk 421 feet on the underlay, equal to a vertical depth of about 250 feet, and three levels have been opened from it at vertical depths of 110 feet, 175 feet, and 236 feet. A large amount of driving has been done on these levels, the bottom one showing good values for about 450 feet in length. At the time of my visit the north drive was showing an improvement in the face, after passing through a pinched and broken portion of the reef. The lowest workings in the mine were in a winze 72 feet below the No. 3 level, in the bottom of which the reef was reported as 6 feet wide of an average assay value of 75s. per ton. The reef throughout the mine is generally of fair size, being commonly 5 or 6 feet thick, and sometimes up to 10 feet. There are two branches of it in some parts of the mine. The walls are well smoothed, the reef being very distinctly of the fissure-lode type. In the bottom level the country rock is still much weathered, but may be expected to become hard undecomposed diorite when the mine gets a little deeper. Below the water level the weathered rock is somewhat treacherous in working, on account of numerous greasy "heads" or joints, requiring plentiful timbering.

It has been claimed that the shoots of gold in this mine are pitching very rapidly to the southward, but neither in the mine nor in examination of the assay plans did I see any strong evidence that this is a fact. The values have proved to be irregular in their distribution, and definite shoots are not very distinctly traceable. There seemed to me no more reason to say that the gold was pitching to the south than in any other direction. The values have varied considerably while the levels were being driven, and until more stoping has been done, and several of the good patches in one level have been unmistakably connected by stoping with corresponding ones on the next one below it there will be no certainty that there is any decided direction of pitch of the shoots. The extension of the No. 3 level northward will give very valuable information on this point, which is of particular importance to the neighbouring mine of the Sandstone Development Company.

The developments in the Oroya-Black Range mine have been very satisfactory on the whole, and there is at present no reason to suppose that they will not continue so as the mine gets deeper. There is every appearance of this being a good permanent mine.

There are said to be fully 80,000 tons of payable ore at present "in sight."

The mine has an excellent equipment of machinery on surface, comprising winding plant, air-compressing plant, 20-head stamp mill, cyanide leaching plant, and engineer's and blacksmith's shops. The cyanide plant is on the double-treatment system, the tailings from the stamps being pumped to receiving vats on carriages travelling over the top of the leaching vats. No slimes treatment plant has yet been erected, but I understand that a vacuum filtration plant is soon to be obtained. The battery has stamps of 1,250lbs. weight, and crushes about 3,000 tons a month, which could probably be increased without much trouble to 4,000 tons if pressed. The machinery on the mine has cost about £35,000. Just before my visit there had been a clean up of the battery after a run of six weeks, the return from 4,350 tons crushed being 2,956.3ozs. of bullion, valued at £10,856.

*Sandstone Development G.M. Coy's. Mines.*—This Company's ground is adjacent to the Oroya-Black Range Company's on the north and west. The outcrop of the Sandstone reef has been traced in the north blocks for about 800 feet, carrying more or less gold. The western blocks are expected to contain the Sandstone reef in depth, as its underlay must before long carry it into them if it continues dipping as seen in the existing workings of the Oroya-Black Range mine. To cut it, a main shaft has been begun on the Juno Lease, 196B, and is now down about 300 feet. The ground was fully weathered down to 70 feet, then less so and with numerous greasy heads down to 185 feet. From 185 to 220 feet a reef "formation" was passed through, probably a small reef parallel to the Sandstone reef which is also seen in a prospecting shaft near the Juno Eastern boundary. The quartz is of favourable appearance, but rather poor, but may be worth driving upon later on. This reef brought in a considerable amount of water, the shaft now making about 20,000 gallons a day. Below 220 feet the country became greyish blocky diorite. This shaft is equipped with steam winding plant and a steam pump.

No. 2 shaft on the Sandridge lease, 187B, also has a light winding and pumping plant erected upon it, the latter actuated by oil engines and rope drive. It is sunk 200 feet and a level has been opened at 180 feet on a very flat-lying reef of quartz. This gave a large influx of water, about 40,000 gallons per day. The quartz carries gold but is not of very good value, though possibly worth raising when there is a battery on the mine. It is unlikely that this is the Sandstone reef, and more probably it is a hanging wall branch or spur from it. The latter reef is being worked in a prospecting shaft 300 feet further east, and there has all its usual characteristics, and is payable ore. This prospecting shaft is down 120 feet and a winze below it is 60 feet deep or about 150 feet vertically below the surface. The crosscut east from the No. 2 shaft should have some distance to go yet before cutting this reef.

Another shaft on the Juno lease, almost on the boundary between it and the Oroya-Black Range

ground, is 110 feet deep, and has the parallel reef above referred to at 92 feet. The manager proposed to bore here to cut the Sandstone reef, and I have since heard that he has done so and obtained gold in the borings, but was unable to penetrate the hard quartz of the reef with the boring bits.

There seems to me to be every reason to be very hopeful about the future of this company, but owing to its being on the underlay of the Oroya-Black Range reef it cannot expect to get this in the Juno lease except at some depth, and probably it will not be much use opening out from the Juno shaft shallower than 500 feet. In the Sandridge and Wonoka leases the reef is much nearer surface and the work from the Sandridge shaft should now soon communicate with the tributers' winze in the Wonoka prospecting shaft above referred to and be in a position to raise ore for crushing. The prospects of success are very promising.

*Wanderie Mine.*—This mine has a small steam winding outfit and the main shaft has been sunk to a depth of 212 feet. At 200 feet a crosscut goes 12 feet north to the reef which has then been driven along 40 feet to the west and 70 feet to the east. The mine was full of water up to the 120ft. level when I visited it, so I could not see the bottom level. I was informed by one of the owners that there were two short shoots of payable ore, 30 feet and 25 feet long, in it. What little work was going on was being done above the 120 feet level, which has been driven along for about 500 feet. The reef has been much broken and much of the stone too poor to pay.

At the 70 feet level work is proceeding on a shoot of ore 18 inches to 2 feet thick further east than any of the lowest workings.

The owners of this mine have had great trouble with their pumping, there being said to be over 5,000 gallons of water per hour to be raised. This should not be serious if good pumps were available, but the plant provided does not appear to have given satisfaction.

*Wanderie West Mine.*—This has no machinery upon it. There is a big reef which is being worked at about the 70 feet level, but the stone is somewhat poor as a rule. The Wanderie reef so far as opened appears to be on the whole of rather low grade, but there are patches of good ore in it, and with its own battery on the ground there seems a reasonable chance of success.

*Wanderie North Mine.*—This reef has been pretty well worked out down to water level, and the owners are stated to have made a fair profit out of it. The reef in the bottom is of pretty good value, but not large. The owners do not seem inclined to risk the profits already made in putting up machinery to go below water level.

*The Black Range Mining Company, No-Liability.*—This mine has been a very profitable property to the owners, and bids fair to continue a prosperous career. The main shaft is now down to 316 feet in vertical depth, and a level has been opened at 300 feet. The bottom of the shaft is in hard diorite country. The reef in the north end of the 300 feet level is small and poor, but going south it has been followed for over 200 feet in good ore 5 to 7 feet thick, said to be worth 10dwt. to 1oz. to the ton. The reef has well smoothed walls, and penetrates the hard country in a manner that assures persistency in depth. The stone is of good appearance and carries a fair amount of included pyrites. In the upper levels, at 250, 200, 120, and 63 feet vertically below surface, a large

amount of work has been done, especially in the south ends of the 200 and 120 feet levels. The latter is much further south than any other in the mine and shows lenses of ore not seen in these. Throughout the mine the quartz has been in lenses, often 8 or 10 feet thick but as frequently thinning down until the walls come together. The reef is a strong and well defined fissure lode.

The last half-yearly report of the Company, to June 30th, 1907, gives the following figures:—

"The total stone taken out of the mine up to the present has been approximately 25,000 tons, yielding 47,800ozs. of gold from the battery and cyanide plant, value £180,000, while there is about 8,000 tons of battery sand and slimes untreated, containing about 5,000ozs. of recoverable gold, showing an average value approximately of 2ozs. 2dwts. per ton of stone treated to date. The total wages paid have been £54,000; the expenditure on plant, etc., £23,000; on stores, fuel, etc., £33,000; while shareholders have received in dividends the sum of £47,062. There has also been paid out of profits from the mine the sum of £8,800 for the purchase of the Kohinoor mine, and your directors anticipate receiving the whole of that amount out of gold obtained from that mine during the next twelve months.

"It is estimated by your Mining Superintendent from levels opened up in the Kohinoor mine, that there is not less than £10,000 worth of gold in sight."

This Company have lately installed a new 20-head battery (1,050lbs. stamps) and double treatment cyanide leaching plant. The old 10-head battery has been sold to the Kohinoor Co.

#### NUNGARRA CENTRE.

*Nungarra Leases (205B, 264B).*—A great deal of prospecting work has been done on these leases, there being said to be upwards of 3,000 feet of driving and sinking. The principal shaft is now 150 feet deep, or 4 feet below water level. A reef 5½ to 6 feet wide of dark jaspery quartz has been cut, carrying gold estimated at about 12dwt. per ton by the prospector, Mr. Kelly, but not yet tested by crushing. About 28 feet below surface, a quantity of loose quartz from this reef was obtained, 120 tons of which are stated to have returned 42ozs. of gold with tailings sands, assaying 4dwts. per ton and slimes 3dwt. 6grs. per ton. The water struck at the bottom of the shaft is said to be a fairly heavy flow, preventing further sinking without machinery.

The prospectors have lately been working on surface on the cemented brown ironstone of the Two-mile hill. Mr. Kelly considers from his trials that a large portion of this material would pay for mining and crushing if there were a battery on the spot.

*Wirraminna Mine.*—This mine is being worked by the Sandstone Development Company, who have put a small winding and pumping plant upon it. The shaft has been sunk to 157 feet, and a bottom level opened at 150 feet. A crosscut at this level has been driven west 80 feet through soft much decomposed diorite country, but the reef "formation" where cut through was a small vein of mullock very poor in gold. It has been followed south about 20 feet and has become larger, but is still very mullocky and poor. A strong flow of water, about 30,000 gallons per day, comes from the face of the crosscut.

At the 100ft. level, which is about 30 feet below the prospector's old workings, the formation is rubbly quartz much mixed with clay, but which rests

upon a large "horse" of mullock filling the lode channel. No good walls are seen and the whole ore occurrence is ill-defined. A crushing of about 300 tons of ore was being tried at the time of my visit, but it gave a very poor return. I understand that the mine is now given over to tributers who are working above the water level.

This lode is an interesting ore occurrence and is possibly explainable by faulting movements having gone on along the lode fissure after this had been filled with auriferous quartz. The mining prospects however are at present very unsatisfactory, and there seems little likelihood of much more being done below water level until shallow developments have proved some more valuable and better defined ore bodies than are yet discovered.

*Solomon's Glory (444B) formerly Lady Jackson (G.M.L. 51B) and Eureka (G.M.L. 36B).*—This mine, described in my report of 1906 under its then name, has had a crushing taken from it since of 45 tons, which yielded about 8dwts. per ton, but there is practically no change visible in the workings. This and some adjoining leases have lately been taken up again and are to be worked soon.

#### "HANCOCK'S" CENTRE.

The group of leases at this locality lies about  $3\frac{1}{2}$  miles South-Easterly from the Sandstone townsite and about  $2\frac{1}{2}$  miles East-North-East from the State Battery. There has been much activity in this centre since my previous visit to it in 1906, several new reefs having been found. Over 80 men were working on reefs in this part of the field.

*Worker Mine (378B).*—The underlay shaft of this mine is now down 250 feet, and connects with the bottom level from a vertical shaft 108 feet deep, which is just upon water level. The underlay shaft is all in granite country, part of a considerable dyke of granite which runs through this lease and some adjoining ones, but the vertical shaft is in diorite. At the bottom of the latter shaft the diorite became pretty hard. There is a crosscut from it 29 feet to the reef, which struck the granite country at 15 feet. The granite underlays a little towards the shaft, about one in eight or 10. The reef where cut is larger than in the shallower workings and is dipping much more steeply. A short distance above the level it branches going upwards, the main hanging-wall branch going up into as yet unproved ground. The foot-wall branch is flatter, and a short distance below the next level it also branches, sending up a steeper hanging-wall branch and a flatter foot-wall one. The latter is the reef on which the original workings were located. The two hanging-wall branches both contain fair gold and are yet to be worked. The reef appears now likely as it goes down to become a contact vein between the granite and the diorite. The mine now looks a much more permanent concern than when the workings were confined to the small reef seen in the branch in the underlay shaft. The ore so far as this mine has been opened has given very fair average returns, as shown by the tabulated results above given from the State Battery. At the bottom level the reef has been driven along for 260 feet to the South and about 50 feet North of the vertical shaft.

*New Sensation (365B) and New Sensation East (366B).*—This is one of the most Easterly mines of this group on which any considerable amount of work has yet been done. A shaft has been sunk on the

boundary between the two leases to a depth of 130 feet, and is connected at 66 feet by a short crosscut with an underlay shaft sunk on the reef. At the bottom level the reef has been driven along for about 50 feet and is seen to be a strong fissure lode, with well-smoothed distinct walls about four feet apart. There are about 18 inches of quartz and iron-stained material carrying good gold. At the bottom of the underlay shaft a hanging-wall branch is seen to go upwards from the flatter one followed down in the shaft, similarly as just described in the Worker Mine. This branch has not yet been followed up. Below the junction the lode has the steeper underlay of the hanging-wall branch. The returns from this mine have been very good, and for a little developed "show" it looks very promising. The country is diorite. Course of reef North 60deg. East—underlay to North-West about one in two and a-half. As in several other reefs in this district there are indications of faulting movements of the country on the reef fissure subsequent to the formation of the quartz, rupturing the latter and mixing it with a good deal of mullock, and also bringing a lot of mullock into the lode channel.

*Golden Ball Extended (364B).*—Two men were working on this lease on a very small leader of quartz getting out a crushing. Their shaft was down 70 feet in weathered diorite country.

*Freedom (337B).*—Here there is a North and South reef with underlay of rather more than one in one to the East, with good smooth hanging-wall. There is a whip shaft 110 feet deep with crosscut 75 feet to the reef, which is there somewhat broken up. Another vertical shaft 43 feet deep has cut the reef and in the workings therefrom it has shown as much as five feet in width of quartz, but is often small. In the North end the reef cuts off against an East and West laminated jasperoid reef, numbers of which are seen very plentifully about this part of the field. This mine is a somewhat elevated ridge of country, and the water level should therefore lie deeper than usual. The size of the reef is not distinctly seen, and there is some likelihood that the vein worked is only portion of a much larger "formation." Values are said to be obtainable from borings in the present foot-wall. Cartage to the State Battery,  $3\frac{1}{2}$  miles distant, costs five shillings per ton. The crushings as yet made have given good returns.

*Lady Ellen (139B).*—There has not been very much progress in this mine since my previous report. A new vertical shaft is being sunk. The reef is rather small, but has given some very nice returns.

*Bull Oak (382B), also Comrades (369B), and Comrades Extended (379B).*—A good deal of work has been done in this mine, which is a comparatively recent discovery. The country appears to be much weathered granite, as in the Worker. The reef runs North-West and South-East and underlays rather flatter than one and a-half in one to the North-East. A vertical shaft has been sunk 110 feet to cut the reef at a point 189 feet North-East from its outcrop. In the bottom level there is a fine strong reef from 18 inches up to four or five feet wide carrying good values. In the upper parts of the mine the quartz is a good deal broken and sometimes crushed to a mass of coarse grit similar to the crushed quartz from which the Sandstone reef obtained its name, doubtless due to movements of the walls after the quartz had been formed. The reef has good smooth hanging-wall, but the foot-wall is less defined. There is a large amount of good stone in sight in this mine,



which seems likely to become one of considerable importance. There are about 600 tons at grass, estimated to be of good payable value. The crushings at the State Battery are tabulated in the foregoing part of this report.

*Kohinoor North (330B).*—This lease was being worked by the Kohinoor Company under an option of purchase at the time I visited it. A shaft has been sunk 106 feet vertically, and a crosscut driven therefrom 47 feet, cutting a reef running North-West and South-East with underlay about one in one to North-East. This has been driven along for 65 feet South and 125 feet North. In the South drive the reef is badly defined and seems to be veins of quartz in weathered granite. In the North drive it is much better defined, showing about a foot of quartz and occasionally a smooth hanging-wall. The owners of the lease worked this reef at about the 60 feet level and got some fairly good stone, up to three or four feet wide. This reef, like the Worker, is close to the contact between the granite dykes and the diorite country, and may be a more important concern than it at present appears. Its true size is not clearly seen in the workings as yet.

The shaft is in decomposed granite country, but the crosscut after cutting the reef goes into weathered diorite. A small granite vein three inches wide is seen penetrating the diorite.

*Kohinoor (22B).*—This lease and several adjacent ones have been taken over by the Kohinoor G.M. Company, and a good deal of work has been done. This mine rather closely resembles the Havilah mine, to be described hereunder, in having a very flat reef running off from a steeply inclined one. The latter reef runs more or less North and South with underlay to the Eastward, while the flat lode dips towards the North-West. The Company has sunk a new vertical shaft 160 feet deep in hard blue diorite at the bottom, and crosscut 30 feet East, but had not reached the lode at the time of my visit, though expecting to cut it any day. The country so far has carried very little water. The present working shaft is 85 feet deep, and at the bottom a crosscut 70 feet in length struck the flat reef. On this a winze has been sunk 100ft., on an underlay of about three feet in one. The shaft passed through the flat reef at about 34 feet, and above this point there has been a good deal of stoping done. The lode is two feet to seven feet thick, averaging about three and a-half feet; it is somewhat clayey and ferruginous material mostly but carries very good gold values. In the lowest parts of the winze below the bottom level the walls are well defined. There is also gold in the other reef, but this has not been followed very much, the principal work being on the flat reef. The half-yearly report of the Black Range G.M. Company, No-Liability, to the 30th June, 1907, states that the estimated value of stone in sight in the Kohinoor mine is £10,000. The returns recorded officially from trial crushings are shown in the foregoing tables.

*Abundance (49B).*—This reef has continued to be worked on a small scale above water level with fair success. A new shaft has been sunk 90 feet, and the reef is now 2½ to 3 feet thick of good solid stone of fair value.

There are several other small "shows" working in this locality which were not thought of sufficient importance to be visited.

*Prendergast's New Reef—The Indomitable.*—To the east of Miner's Homestead Lease 4B and 5½ to 6 miles south-east from the State battery, Messrs.

Prendergast Bros. and McIlheny have lately taken up a lease on a large reef of laminated red jasper running N.W. and S.E., which is as much as 100 feet wide in places. This is one of the large jasper "bars" so common in the Black Range district, and is traceable for a long distance. A very similar reef is seen near Mt. Breen on the road to Maninga Marley. The jasper has evidently been shattered to some extent by some earth movement after its first formation and the fractures in it have been filled with white quartz. It appears to be in the portions so veined that the gold has been mostly found, though some has been seen in pieces of the jasper itself. Very little work has yet been done besides cutting a costean across part of the reef and starting a shaft. The values for 20 to 30 feet in width across the costean are estimated by the prospectors at 7 to 10 dwts. per ton. Gold is visible in some of the quartz veins, especially in vesicular iron-stained stuff which doubtless once contained pyrites. Gold has been found at intervals for a considerable length along the outcrop.

It has been known for a long time that many of the jasper reefs contain a little gold, but this is the first in this district that appears to have it in anything approaching payable quantity. The St. George reef at Mt. Magnet, which has lately been proved to be a large body of auriferous stone, is however a very similar ore occurrence, and its example should direct much more careful attention to this class of reefs. It is by no means unprecedented for them to be auriferous, for the Westralia, Mount Morgan, Craiggiemore, and Lancefield reefs are of this type or closely allied to it, also the Lady Miller mine at Norseman which is now proved to contain a large amount of ore. Prendergast's reef will require a good deal of actual testing before it will be seen if it can be considered seriously as a probable gold producer, but the prospects fully justify it having a good trial.

*Black Range Main Reef (3B).*—Next to nothing has been done on this mine since my report of 1906, and the machinery has been removed to the Eclipse. Two men have lately been working again in the shallow ground. This reef deserves more energetic development.

*Eclipse (211B).*—This mine was shut down at the time of my visit pending flotation of the Eclipse Gold Mining Company, No-Liability. There are two vertical shafts, one 170 feet, the other 95 feet deep. According to the prospectus of the proposed company "there have been treated at the State battery, Black Range, 440 tons for a yield of 335ozs. 3dwt. by amalgamation, and 74ozs. 3dwt. recovered from the sands by cyaniding, making a total of 440 tons for 409ozs. 6dwts. smelted gold, of a gross value of £1,563 8s. 3d., exclusive of 30 per cent. slimes not accounted for. Average value of gold, £3 16s. 5d. per ounce."

#### MANINGA MARLEY CENTRE.

There has been very considerable progress made in this locality. Two of the mines have steam winding machinery and batteries, and a hotel and several stores and dwellings have been erected. There are now several known reefs instead of only one or two, and there seems a good deal of probability that the known area of auriferous ground will soon be still more extended.

*Maninga Marley (53B, 100B, and 77B).*—This mine has a shaft down to the 200ft. level, at which the reef has been driven along to the eastward a dis-

tance of about 285 feet. At the 150ft. level drives have been made 60 feet east and 70 feet west of the shaft, and at the 100ft. level 66 feet west and 266 feet east. There is also a good deal of work done at the 50 feet level.

At the time of my visit things were not looking well, and the battery was stopped for want of supplies of ore. The body of stone from which the principal supplies of stone came has been nearly all worked out and the quartz gave place to broken mullocky material carrying but little gold. The "formation" remains a large one, its full width being quite doubtful, with smooth hard footwall and undefined broken hanging wall. A crosscut in the hanging wall of the principal vein has shown broken lode material to exist for fifteen or more feet and has shown a small vein of quartz parallel to the main lode. On the footwall there is a layer of schist parallel with the lode, but where this has been shot away it is noticeable that the lamination of the diorite schist country is not parallel with the lode but strikes it at an angle. The layer of schist on the wall is quite thin and seems to me to be due to pressure and sliding movements of the walls on the lode fissure. A good deal of angular quartz in lumps and finer rubble is distributed through the mullocky portions of the lode filling, and several larger lenses of fair ore have been found. It is noticeable that these lenses have mostly been in flat depressions in the walls, particularly in the hanging wall, and they gave me the impression that they were only portions of an older quartz body which had been disrupted by a faulting movement along the lode fissure after it had received its first filling of auriferous quartz. It is easily conceivable that if such faulting movements did take place on an already formed lode, parts of it would be shorn off and carried upwards or downwards in the fissure, and that those pieces would remain unaffected which were protected from rubbing motion by being in depressions in the walls. Some of the small quartz lenses bear out this theory, being much broken at the edges into fine grit and rubble and then being less and less broken towards the centre, but still much fractured as if by strong lateral pressure of the walls. The trouble latterly has been to find quartz at all, the reef channel being much filled with mullock instead of quartz, and when bunches of the latter stone have been got they are said to have been generally of very fair value. If the above theory is correct—and it seems to me very feasible—there is strong probability that by sinking deeper the stone will be recovered. The extensive shattering of the hanging wall and extreme smoothness and regularity of the footwall support the explanation given. If sinking is continued it will be necessary to do a good deal of cross-cutting into the hanging wall from time to time until the disturbed rock is cut through, as it is always possible for the older quartz lode to have gone into what is now the hanging wall of the fault.

The mine has a fairly good workable equipment of machinery and ore treatment plant and it is to be hoped that the company will be able to persevere with its development. The manager gave me the latest returns from crushings as totalling 4,787ozs. 2dwts. 18grs. of gold from the crushing of 4,157 tons of quartz and 1,176ozs. from the cyaniding of 1,134 tons of tailings. The gold is stated to be worth about £3 5s. an ounce. The officially recorded returns in fine gold are quoted earlier in this report in the general table.

*Doyle & Paton's P.A.*—About half a mile east from the Maninga Marley a small rich leader has been found and is being opened up by a shaft. Course, N. 35deg. E., dip 1 in 1 to N.W. Another leader is seen about two chains further west. These quartz veins are in hard diorite country and carry a little galena and pyrites with the gold.

*Kurrajong (335B).*—Here there is a shaft down 40 feet on a small vein running N. and S. and dipping west about 45deg. The "formation" is up to 18 inches wide, in hard splintery diorite. The owners gave me their returns from crushings as follows:—

Six tons gave 3ozs. 4dwts. per ton on the plates, and tailings sands assayed 2ozs. 1dwt. per ton. 7 tons gave 2ozs. 19dwt. 13grs. inclusive of the value estimated by assay in the tailings. 19½ tons of seconds gave 1oz. 18dwts. per ton on the plates, and tailings assayed 9dwt. 19grs. per ton.

The reef is small and broken, but of fairly good value. A vein seen about 4 chains south from the shaft in a costean may be the same as that in the shaft, but probably there are several veins in the hard diorite.

*Poseidon (133B).*—This mine has a vertical shaft down about 75 feet on a reef running about N. and S. and dipping 1 in 1 to the east, which has also been followed down by two underlay shafts, one about 30 feet deep the other connecting with the vertical shaft. The surface soil is deep and had to be sunk through for about 14 feet before the reef was cut. The reef is 18 inches to 3 feet wide and gives fair prospects of gold. The walls are smooth and distinct; the country is weathered diorite schist. This is a very promising little prospecting show, and should be opened up more thoroughly. It is about 1¾ miles from the Maninga Marley battery, where crushing may be had at 20s. per ton, and cyaniding at 10s. per ton of sands, 70 per cent. of sands being allowed and an extraction of 75 per cent. of the gold values guaranteed.

*Manninga Marley North (788B).*—The flat reef seen in the adjacent Havilah mine has also been worked in this one. Its course here is about N. 75 deg. W. and it dips flatly to the south in the principal workings. It is however somewhat saddle-shaped and one part dips to the north. A small shaft 16 feet deep strikes it on the ridge of the saddle, and from this an underlay shaft has been made to the south, a distance of 200ft., connecting near the bottom with a vertical shaft 58 feet deep. There is fairly hard blue diorite in the bottom of this shaft. At the 58 feet level there is good stone for about 150 feet in length from the Havilah boundary eastwards. It is from 18in. to 5 feet thick in various parts of the workings, and would average about 2 feet 6 inches. The manager estimates he has fully 1,000 tons of ore in sight. What has been crushed (see table) has given a very good average return. Going eastward the stone seems to die out, but at the lowest levels it extends further eastward than higher up.

On the north dip of the saddle a shaft has been sunk 30 feet to cut the reef, which is 2 to 3 feet thick but more broken than on the south side. Some good ore has been got but the values on this side have been much more irregular than in the south workings. In two winzes which have been sunk the reef is dipping north fairly steeply. Towards the east the reef appears to die out.

*Maninga Marley Deep* (123B).—A vertical shaft has been sunk to 100 feet and a crosscut made therefrom 10 or 15 feet to the westward which cut a mineralised reef about 4 feet wide said to assay about 5dwt. of gold per ton. The crosscut was then continued to the southern boundary of the lease but did not cut the Havilah reef. No work was going on at the time of my visit.

*Havilah* (203B & 243B).—This mine is equipped with steam winding plant, a ten-head battery, and a cyanide leaching plant, and has been working very energetically since being purchased by its present owners. There are two reefs in the mine, as described in my 1906 report, and it now seems to me most probable that the somewhat steeply dipping North reef is younger than the flat saddle reef and faults this. Their relationship is not altogether clear, and it may be that the flat reef is simply a branch from the other one, but everything seemed to me to point more to the North reef being the younger. The point is one of much importance to the mine, as if my belief is correct there would be another portion of the saddle reef on the North side of the North reef. The North reef runs a little North of West and dips Northward fairly steeply. The saddle reef has much the same course, but the ridge of the saddle seems to pitch to the Westward, getting deeper below surface in that direction, and its course is a little more to the North than that of the North reef. Consequently while in the East end of the mine the Northern dip of part of the saddle reef is quite perceptible, the ridge gets nearer and nearer the Northern reef as it goes Westward, while at the same time getting lower beneath the level surface. The main vertical shaft is down to the 160 feet level and sinking to the 220 feet level is in progress. The North reef is cut through just below the 160 feet level. It is a strong reef of quartz, but somewhat poor. Driving along the level the flat reef is encountered, and is a fine body of quartz up to six and eight feet thick, containing very fair values. The stone is different in appearance from that in the Northern reef, strengthening the conclusion that the two reefs are of different ages. There is a good deal of water at this level, affording a good supply for the battery. In the shallower workings the Northern reef remains poorer than the flat reef, and the bulk of the stoping has been done on the latter. On the Southerly dipping portion of this work has been carried down close to the boundary of the Maninga Marley North mine to a level at a vertical depth of 60 feet, below which there is a winze, this mine being a little deeper on the reef than its neighbours. In the lower part of these workings the stone became small, and even pinched out altogether towards the West, giving rise to an opinion that the shoot of stone was pitching Eastward into the Maninga Marley North, but there does not seem much reason for this belief, it being more probable that the pinch is only a local one such as must frequently be expected in a flat reef. At the time of my visit there were indications of improvement in the size of the quartz vein going Westward in the lowest workings, and in the upper workings there does not seem any regular dying out of the stone in that end as would be expected if the shoot were terminating in that direction.

To September 7th, 1907, this mine had crushed 5,101 tons for 6,627ozs of gold worth £3 15s. an ounce. There are considerable bodies of stone still in sight. The 220 feet level will soon be opened and

should give valuable information as to the permanency of the mine.

Though the principal reef has a decided saddle shape it should not be concluded that it is necessarily a "saddle-reef" similar to the typical Bendigo occurrences. These are in stratified country and have an explicable reason for their shape in that they are formed in fissures between the strata at the crown of anticlinal folds. The Havilah reef is in diorite country, without perceptible stratification and with a certain amount of schistose lamination which does not conform with the shape of the reef at all. Its mode of origin is quite problematical, and no dependence can be placed on theories of its future behaviour based on that of saddle-reefs elsewhere.

*Agnes* (311B).—This is a recent discovery about five miles to the South-West from Maninga Marley on the Eastern slope of a small hill composed of laminated ferruginous quartzite, one of the large "jasper bars" of the district. It is not far from the contact of the diorite country with the granite, the latter being seen in some "breakaways" about a mile to the South. There is a strong outcrop of quartz over six feet thick, the reef striking North and South and underlying to the Eastward fairly steeply. A shaft has been sunk about 15 feet and a small amount of stoping done. The quartz reminded me very much of that in the Wallaby reef at Yarri. There have been two test crushings, the first, of 13 tons, returning 12ozs. 5dwts. at the State Battery; and the second, of 33 tons, 25ozs. 6dwts. at the Maninga Marley Battery. These results fully justify opening up the reef more extensively.

There appears to be a belt of schist country along the Eastern side of the quartzite hill about three to five chains in width in this locality containing numerous quartz veins, and "floaters" containing gold have been frequently picked up. The place seems well worth prospecting more thoroughly. The owners of this mine have done a large amount of track-cutting to get their ore to the two batteries at which it has been crushed.

*McMahon & McCullough's P.A.*—These prospectors have sunk a shaft 40 feet deep on a prospecting area to the South of the Agnes lease, and have cut some quartz leaders running North and South carrying a little gold.

A well is much required in this part of the district to enable prospectors to live in it and open it up.

#### RANGE VIEW CENTRE.

This locality is better known locally as Bellechambers, from Mr. W. Bellechambers having taken a leading part in opening it up. It lies about eight miles in a direct line South-West from Nunngarra, but is a good deal further by road. Cartage to the State Battery costs 20s. per ton. The auriferous reefs are in a belt of diorite schist country not far from the contact of the main Black Range diorite area with the granite country lying West of it. The reefs run mostly in a general North-Easterly direction, and stand in close connection with a large reef of the laminated quartzite or "jasper bar" type, which is traceable across country for a long distance.

*Royal Flush* (329B).—A shaft has been sunk on this lease to a depth of 70 feet, but the men were working at about 30 feet when I visited it. They had about 50 tons of ore at grass, the better portion of which was estimated by them at 30dwts. per ton, and the second-class stuff at 8dwts. The quartz is of bluish tinge and contains a good deal of pyrites. The

reef runs about North and South with underlay about one in one to the East, and seems part of a larger "formation." The best stone has been on the hanging-wall, but there is a bigger and poorer quartz body also on the foot-wall. The crushings are returned as having yielded over 2½ozs. per ton by amalgamation, and the tailings sands are stated to have still contained 15dwts. to 16dwts. of gold per ton. There was not much to be seen of the reef in the workings I saw, but the returns would indicate that this "show" is worth active development.

There is another parallel line of reef about 200 feet to the Eastward, estimated to yield about 10dwts. per ton, according to the prospectors, but too poor at this rate to cart to the Black Range State Battery.

*Try Again (333B).*—Very little has been done on this lease, which lies to the South-East from the Royal Flush. The workings are on the East side of the large "jasper bar" above mentioned, while those of the Royal Flush are West of it. They consist of a number of shallow pits and trenches for some distance along the outcrop of a whitish schist "formation" of Easterly underlay with veins of quartz through it. This traverses a laminated slaty diorite schist. The ore that has been raised is estimated by the prospectors as worth about an ounce of gold to the ton.

*Lady Augusta (334B).*—Some quartz veins are seen in this lease which seem to cut across the "jasper bar." No work has been done beyond a little trenching. Many pieces of quartz carrying gold are said to have been picked up on this ground.

*Missing Link West (297B).*—A crushing of 13 tons from this lease is stated to have returned about 32dwts. per ton from a shaft about 5 chains N.N.W. from the south eastern angle of the lease. This lode lies west of the Missing Link "formation."

*Missing Link (285B).*—The workings on this lease are on the "jasper bar" which here takes the form of a wide "formation" of laminated quartzite and blackish jasper, soft clayey whitish schist, rubbly white quartz, ferruginous quartz and bluish quartz veins. The most southerly shaft is 85 feet deep and down a little below water level, and the water came in so freely that the prospectors were not able to bail it out to continue sinking. The "formation" is 32 feet 6 inches wide in the crosscut from the bottom of the shaft and carries gold, the average value according to the prospectors' estimates being 12dwts. per ton. There are two other shafts a short distance further north along the lode down to 80 feet and connected with one another. A crosscut has been put out to the N.W. a considerable distance, passing through soft schistose lode stuff and striking into hard jasperoid banded quartz. The "formation" is evidently a very large one at this point, its full size not being visible. The auriferous portion is soft schistose material full of veins of rubbly quartz and much stained with brown oxide of iron. A party of tributers are sinking a winze on the best part of the lode, and sending a parcel of 150 tons to the State battery at Black Range which they expect to return fully an ounce to the ton. Previous returns are shown in the foregoing tables. There is said to be more or less gold all through the workings, the average value being stated to me as 9dwt. per ton. It would take several days careful sampling and testing to verify this estimate, which I had not time to do. The opinion formed from such evidence as I could obtain on a brief visit was that this is a mine of large possibilities, and which might be important, but which would have to be very carefully tested by sampling

and trial crushings before one could pronounce upon its value with any confidence. If the above stated average estimate of 9dwt. of gold per ton proves reliable the mine should be workable on a large scale very profitably as a low-grade concern. The lode is traceable for a long distance on surface, about 3 miles according to the prospectors. In places the outcrop shows large masses of brown iron ore, and in others there is much white quartz.

*Range View (265B).*—On this lease two shafts are down 60 feet on the same big lode as seen in the Missing Link. The course of the lode is N.N.E. and here it appears to underlay to the east about 1 in 1. The shafts are connected by a drive 150 feet in length on the footwall of the lode and there is a crosscut into the hanging wall side 45 feet long. Along the footwall there is from 3 to 8 feet of laminated clayey and iron-stained material containing much rubbly banded quartz, the whole of which stuff is estimated by the prospector as worth about 15dwt. of gold per ton. The crosscut is in decomposed dioritic matter, full of quartz veins and is probably not through the main "formation."

*Harley.*—This holding is some distance further N.N.E. along the line of the lode, and a shaft has been sunk 60 feet on it. The outcrop shows big masses of white quartz, said to prospect about 10dwt. of gold per ton. At the bottom of the shaft the reef has been crosscut for 14 feet and there is a drive 50 feet south in the footwall and then another crosscut 14 feet through the reef. The underlay is to the east rather steeper than 1 in 1. If the prospector's estimate of the values is correct this mine should be well worth opening up. The quartz contains a little pyrites and looks rather promising. The country is softish weathered diorite.

There is said to be gold still obtainable along the outcrop of the lode for about a mile and a half further to the north-north-east. The line of lode from the Missing Link northwards is evidently well worth prospecting, and would be able to supply a large amount of crushing material to a local battery. Much of the stuff will no doubt be of low-grade and unable to pay expenses of cartage fifteen miles to the State battery at Black Range. In order to test this district adequately a local battery is much required.

*Copper Lode.*—About a mile and a half east of the Range View Hotel a strongly outcropping lode of quartz 4 to 5 feet wide has been found running N.N.E. and S.S.W. in diorite and diorite schist country. Some of the quartz is strongly stained with green carbonate of copper and some small cuts into the lode have enabled some very fair copper ore to be extracted, mostly ferruginous red oxide (tile ore) and green carbonate. The ore is very silicious. An assay is said to have returned 4dwt. of gold per ton as well as a fair amount of copper. Copper pyrites will doubtless be found at no great depth. The prospector has attacked this lode at the points where the showy outcrops of stained quartz attract the eye, and it is probable that there may be better copper ore where the lode is more ferruginous and softer. The discovery is hardly of importance for copper under existing conditions of transport, but might be worth following up if the railway were made. This line of lode is well to the west of the Missing Link line and is not very far from the contact between the diorite and granite country.

A. MONTGOMERY, M.A., F.G.S.

State Mining Engineer.

Perth 25th October, 1907.

## APPENDIX No. VI.

## REPORT ON THE PROGRESS OF MINING IN THE MEEKATHARRA DISTRICT WITH REFERENCE TO THE PROPOSAL TO EXTEND THE NORTHERN RAILWAY FROM NANNINE TO MEEKATHARRA.

*The Secretary for Mines.*

In accordance with your telegram of the 13th September last, received at Black Range, to "proceed to Meekatharra to obtain information on the proposition of constructing a railway from Nannine with the view of reporting whether the railway is warranted," I went to Meekatharra on the 19th to the 22nd September, and now have the honour to submit a report on the state of the mining industry at that centre, with special reference to the railway question.

The Meekatharra district has already been described, as seen in the latter part of 1903, by the Assistant Government Geologist, Mr. C. G. Gibson, in Bulletin No. 14 of the Geological Survey of Western Australia, in which maps are given showing the geological structure of the field and the positions of most of the principal reefs. Further notes on the district by the present writer, dated the 12th July, 1906, have been published as Appendix M. to my annual report in the annual report of the Mines Department for 1906, page 104. The present report does not unnecessarily repeat the information afforded by these previously published reports, but adds to them to bring the information therein contained more up to date.

The principal developments on the field since my previously published report have been on the Marmont and Ingliston Extended lines of reef. The Marmont mine has been opened to a depth of 190 feet, and is now seen to be a large "formation," containing very considerable bodies of payable auriferous quartz. The owners estimate they have fully 50,000 tons of highly payable ore in sight, with every prospect of large additional reserves being developed at lower levels. The mine has been furnished with winding machinery and a ten-head battery, but was not yet equipped at the time of my visit with a cyanide plant. The Marmont Extended mine has a shaft down 144 feet and has purchased and is about to erect winding machinery to sink below water level. The Fenian mine is down to the 250 feet level, and has a steam winding plant but has not yet got its own battery. The same lode as is in the Marmont passes through this lease, and though work has hitherto been mainly confined to one richer vein, it is now seen that the "formation" is much more extensive than this, and there is every prospect of supplies of ore still being obtained from the upper levels. Good values were cut in the bottom level very shortly before my visit. The next mine going northwards on this line of reef is the Ingliston Consols, which as yet has no machinery. A new main shaft has however been sunk to 143 feet, and is very shortly to be equipped with steam winding plant to enable the mine to be opened at the 250 feet level.

There is a large "formation" and considerable reserves of ore of lower grade than the richer veins hitherto worked.

It is not quite clear if the above line of reef is the same as that worked in the Ingliston Extended mine. In this mine work is proceeding vigorously at the 110 and 210 feet levels on a large soft clayey "formation." Eighty men on an average are employed, and 19,393 tons of ore have been crushed for gold valued at £35,417, or at the rate of 37s. 6d. per ton. The mine has a good steam-driven winding plant and

its own 10-head battery with cyanide leaching plant for treatment of the coarser tailings and a filter-press plant for treatment of the slimes.

To the north of the Ingliston Extended a lot of work has been done on the Commodore South, Commodore, Macquarie, Halcyon, and Halcyon Extended mines, on lodes which may be extensions of those seen in the Ingliston Extended or perhaps parallel ones on very much the same general line of fracture. These mines are all in the prospecting stage but all have very considerable quantities of ore and some of them will no doubt become more important mines.

On the Pioneer line of reef the Pioneer mine has a good outfit of winding and pumping machinery but has done very little underground work of late. Since my visit more active mining has been resumed and it is reported that good ore has been struck in the mine. The St. George lease to the south from the Pioneer, on a parallel group of reefs, and the Ninety-Three, on what appears to be the Pioneer group, are both being worked on a small scale with encouraging results, but are not yet equipped with machinery. Both have very large reefs of quartz.

Another reef very similar in appearance to the Pioneer quartz has lately been opened up close to the Meekatharra townsite, gold having been found in the Lady Lorna mine in a big reef which has long been passed over as being of no value. Very little work has yet been done to demonstrate the importance of this discovery, but it is valuable as showing the occurrence of payable gold in a reef till lately considered of no account.

To the north of the Meekatharra townsite the Haveluck and Haveluck Proprietary mines continue working on a small scale, and have now been proved to contain large quantities of low-grade ore, and have been sampled by more than one possible purchaser on account of firms looking for likely properties for company operations.

The "8-Mile District" to the south of Meekatharra about 8 miles, has several lines of promising reefs, some of which are of large size. This locality seems likely to be of very considerable importance. The Revenue mine has been remarkable for the richness of a very short shoot of ore which occurs in it, and has a shaft 200 feet deep with a steam winding plant upon it. The Gibraltar, Karangahaki and Batavia reefs seem likely to become of more permanent importance, having considerable bodies of quartz, but require more testing by actual crushing than has yet been given to them. This district would be passed through by a railway to Meekatharra.

In an appendix to this report fuller notes are given upon the various mines of the district, but the above general account will serve, in conjunction with the previously published description, to give a fair knowledge of the present state of mining at Meekatharra.

*Gold Production.*—The following table, made up by the Statist of this Department, shows the output of gold from the various mines of the district to the 30th June, 1907, giving a total output of 50,356.29 fine ounces of gold of the value of £213,898. The average value of the stone crushed has been 1.07 fine ounces per ton.

## MURCHISON GOLDFIELD.

### NANNINE DISTRICT.

*Production of Gold and Silver from all sources, as reported to the Mines Department, showing in Fine Ounces the Output from Mines yielding Gold and Silver during 1907 and previous years, and the Total Production to date.*

Mining Centre.	No. of Lease.	Name of Company and Lease.	Total up to 31st December, 1906.					Total for Six Months of 1907.					Total to 30th June, 1907.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	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.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
<b>MEEKATHARRA MINING CENTRE.</b>																	
Meekatharra ..	578N	Batavia ..			57.00	82.90			51.00	40.56				108.00	123.46		
Do.	535N	(Beverley)			144.25	100.45								144.25	100.45		
Do.	535N, 648N	Beverley leases						8.50	3.04					8.50	3.04		
Do.	579N	Commodore			199.00	516.19			117.00	303.42				316.00	819.61		
Do.	555N	Commodore Block			239.00	934.11			15.00	44.35				254.00	978.46		
Do.	641N	Commodore Brown Hill			136.00	29.85								136.00	29.85		
Do.	660N	Commodore Extended							32.00	3.99				32.00	3.99		
Do.	596N	Easter Eve Gift		2.01									2.01				
Do.	477N	Fenian			1,419.75	5,671.64			806.00	1,975.90				2,225.75	7,647.54		
Do.	313N	Halcyon		2.11	2,011.25	1,130.00			613.50	108.02			2.11	2,624.75	1,238.02		
Do.	635N	Halcyon Extended			78.00	22.70			77.00	152.26				155.00	174.96		
Do.	236N	Haveluck			2,073.75	1,636.06			249.50	127.07				2,323.25	1,763.13		
Do.	592N	Haveluck Proprietary			1,472.00	392.80			582.00	127.87				2,054.00	520.67		
Do.	677N	Haveluck South			36.00	15.87			19.50	11.87				55.50	27.74		
Do.	475N	Ingliston Consols Extended			1,536.25	4,248.25	.30							1,536.25	4,248.25	.30	
Do.	475N	Ingliston Consols Extended leases							592.50	1,406.83				592.50	1,406.83		
Do.	398N	(Ingliston Extended)			1,320.25	1,106.46								1,320.25	1,106.46		
Do.	398N, 437N, 462N	Ingliston Extended G.Ms., Ltd.			7,773.00	4,547.46			7,268.00	2,824.08				15,041.00	7,371.54		
Do.	514N	Ingliston No. 2			30.50	21.52			21.50	17.25				52.00	38.77		
Do.	507N	Ingliston United			108.25	88.79			176.00	48.96				284.25	137.75		
Do.	666N	Karangahaki			283.00	558.00			44.50	38.19				327.50	596.19		
Do.	728N	Macquarrie							89.00	39.29				89.00	39.29		
Do.	533N	Marmont			1,079.00	3,680.56			951.00	1,226.34				2,030.00	4,906.90		
Do.	580N	Marmont Extended							43.00	38.03				43.00	38.03		
Do.	610N	Multum in Parvo			7.00	82.33			.11	1,035.62				7.11	1,117.95		
Do.	624N	New Orleans			27.00	12.82			38.00	10.72				65.00	23.54		
Do.	93N	N 93			3,103.00	1,629.17			435.00	156.60				3,538.00	1,785.77		
Do.	372N	Pioneer			3,342.75	3,570.31								3,342.75	3,570.31		
Do.	531N	Revenue			9.75	3,076.93								9.75	3,076.93		
Do.	541N	Revenue North			71.00	44.55			125.00	52.54				196.00	97.09		
Do.	709N	Rocklee							26.50	25.23				26.50	25.23		
Do.	710N	St. George							32.00	16.73				32.00	16.73		
Do.	675N	Two Bells			24.00	42.00								24.00	42.00		
Do.		Voided leases		59.69	7,122.73	6,672.69							59.69	7,122.73	6,672.69		
Do.		Sundry claims			312.75	254.26			196.00	111.37				508.75	365.63		
Total			177.68	63.81	34,016.23	40,168.67	.30		12,609.11	9,946.13			177.68	63.81	46,625.34	50,114.80	.30

The increase in production of gold year by year is better shown by the following summarised table, which is made up to a month later than the above:—

Year.	Alluvial. Fine ozs.	Dolled and Specimens. Fine ozs.	Ore treated. Tons (2,240lbs.)	Gold therefrom. Fine ozs.	Total Gold. Fine ozs.
Previous to 1900 ... ..	...	12·71	383·50	647·20	659·91
1900 ... ..	...	39·32	516·00	817·81	857·13
1901 ... ..	...	4·90	3,140·75	2,875·27	2,880·17
1902 ... ..	...	...	3,666·58	3,241·27	3,241·27
1903 ... ..	...	...	6,199·50	4,434·78	4,434·78
1904 ... ..	...	...	3,813·65	5,737·07	5,737·07
1905 ... ..	...	4·87	4,238·87	7,250·61	7,255·48
1906 ... ..	177·68	2·01	12,057·38	15,164·66	15,344·35
First seven months of 1907 ... ..	64·45	...	14,770·64	11,180·77	11,245·22
Total to 31st July, 1907 ... ..	242·13	63·81	48,786·87	51,349·44	51,655·38

Until the Ingliston Extended and Marmont batteries started, nearly all the crushing for the field was done by the Meekatharra State battery, the total returns from which are shown year by year hereunder:—

Year.	Tons crushed (2,240lbs.).	Gold therefrom, plates and cyanide (unrefined gold).
1901 ... ..	3,063·50	3,028·4
1902 ... ..	3,611·35	3,485·75
1903 ... ..	5,668·50	4,848·6
1904 ... ..	3,830·50	7,091·55
1905 ... ..	4,301·75	8,794·9
1906 ... ..	4,500·00	11,006·53
To 31st August, 1907 ... ..	5,605·5	8,709·48
Total ... ..	30,581·1	46,965·21

Value of Gold = £172,736.

There is still a large heap of tailings lying at this battery awaiting treatment. This field is one for the development of which great credit may fairly be claimed for the State battery policy.

*Necessity for railway.*—The Meekatharra Field is about 24 miles North of the present terminus of the Northern Railway at Nannine, and is connected with it by a road which is usually a very good one, but which becomes very soft and boggy in wet weather. It is by no means unfavourably situated as regards facilities of transport compared with some of the more outlying goldfields of the State, such as Norseman, Black Range, and Wiluna, and the advocates of a railway to it have therefore to make out a specially good case to show why its claims should be preferred to those of other fields which are less favourably situated and therefore stand in greater need of the assistance afforded by a railway. If it could be shown that the line would be a directly profitable commercial undertaking on the part of the State, there could be no objection to its immediate construction. Failing directly profitable returns, it seems necessary to prove that the district is suffering from exceptional disabilities which are retarding its development to such an extent as to make railway connection imperative for their removal.

So far as direct profit is concerned, it is to be remembered that most of the goods sent over the railway to the Meekatharra field go right through from the coast and are already carried by the railways to Nannine. The additional freights at long-distance rates on the extra 24 miles traction to Meekatharra would not give a large increase on the present railway revenue, and so long as the traffic is limited to the

at present existing actual requirements of the field there is very little prospect of the railway extension being a paying proposition. The district, however, is a rapidly growing one, and bids fair to open up several fairly large mines, and it is to the prospective traffic that we should have to look for profit. Forecasts of the future progress of the district are necessarily speculative and cannot be reduced to demonstrable figures; as a matter of opinion, however, it appears to me that there are good prospects of the mines and population of Meekatharra increasing—if railway connection is granted—to such an extent as to make the line a profitable one.

The main argument for the extension of the railway rests upon the economies that would result from it in the working of the mines, and the consequent stimulus that would be given to their development, especially to such as are of low-grade. The district is remarkable for the size and number of its lodes, and many of these have been proved to contain large bodies of gold-bearing ore too poor to be profitably worked under present conditions. Many of these low-grade ore-bodies are composed of clayey soft material, and cheap supplies of mining timber are a necessity for their safe working. They are also very dependent for success in development on cheap fuel, in order that the mechanical and metallurgical handling of the large quantities of ore that must be treated to make low-grade stuff profitable can be carried on at a sufficiently low cost. The richer mines also are greatly concerned in the question of cheap supplies of mining timber and fuel, for though they may be able to carry on work in spite of all disabilities, it is at a heavy cost for transport of their supplies, greatly lessening their profits and preventing them from working their reserves of low-grade ore.

*Mining Timber and Fuel.*—Supplies of mining timber and fuel are by no means good at Meekatharra, and it is on their account more than anything else that the railway is required. The mulga scrub in the vicinity of the mines is somewhat sparse and contains but little good heavy firewood or sound timber fit for underground support. Firewood carts have to go out seven or eight miles to get wood worth cutting, and will soon have to go much further. The nearest considerable area of heavy mulga scrub is said to be 15 to 20 miles out from Meekatharra, and this will soon have to be resorted to. If the railway were made, firewood could be cheaply brought in from the wood-line now being constructed North of Cue. Coal would also become obtainable in the event of firewood supplies running short, as has been done by the Great Fingall Mine at Day Dawn. Collie coal for use in gas-producers, as at the State Battery

at Nannine, would also be available at rates compatible with economical generation of power.

A good idea of the average consumption of firewood, mining timber, and general goods, by mines in full work, may be obtained from the following figures, which show the totals used by eight large mines in the Northern portion of the Central and Eastern Goldfields over a period of two years (1904-1905) and the average consumption per ton of ore:—

Tonnage of ore crushed, 1,088,473 tons.

Tonnage of fuel used, 213,737 tons equal 0.2 tons per ton of ore.

Tonnage of mining timber used, 4,917 tons equal 0.0045 tons per ton of ore.

Tonnage of other goods used (including machinery), 11,426 tons equal 0.01 tons per ton of ore.

The tonnage of ore crushed in the Meekatharra district for the present year, 1907, bids fair to be about 25,000 tons. At the above average rates this would require 5,000 tons of firewood, 112½ tons of mining timber, and 250 tons of general goods, but the probability is that these figures will be very much exceeded, the consumption of firewood being much greater in the small mines per ton of ore crushed than in the large and well-equipped ones, that of mining timber being unusually large in this district on account of the mullocky nature of much of the ore, and there being an unusual amount of machinery and supplies required owing to the erection of new plant on several mines. It is clear, however, that a demand for not less than 5,000 tons of firewood annually, rapidly increasing as the mines extend their output of ore, must be provided for at Meekatharra, and that before long fuel will become very expensive unless it is brought in by railway.

Really good mining timber is not obtainable at Meekatharra, the local mulga being only suitable for small sets and props and for light work. The large strong timbers required in the big mullocky "formations" have to be brought from the Midland Railway at very heavy cost. There has been one warning already in the district as to the absolute necessity of using plenty of good timber, there having been a large subsidence of the surface ground over the upper stopes of the Ingliston Extended mine, owing to the light timber at first used in these collapsing. The manager kindly gave me figures from his books to show that during 12 months ended 30th June, 1907, he had to import over 100 tons of timber, and quoted the following as instances of the cost of getting it:—

	£	s.	d.
74 sets Morrel gum from Three Springs cost .. .. .	44	4	0
Railage to Nannine cost .. .. .	72	0	0
Cartage from Nannine and agency charges .. .. .	136	0	0
	<hr/>		
	£252	4	0
	<hr/>		
37 sets Morrel gum 12in. diameter small end, cost at Three Springs (Weight, 27 tons 1 cwt. 1 qr.)	22	7	0
Railage Three Springs to Nannine at 25s. 7d. per ton .. .. .	35	0	5
Cartage Nannine to Meekatharra at £2 per ton .. .. .	54	2	3
Agency and commission Nannine to mine at 10s. 9d. per ton .. .. .	15	14	3
	<hr/>		
	£127	3	11
	<hr/>		

On these two lots of timber the charges from the railway terminus to the mine were £205 16s. 6d., while the cost at the end of the railway was only £173 11s. 5d. Were the railway extended to Meekatharra the cost of timber would therefore be only about one-half what it is at present: The 111 sets cost, it may be here noted, £379 7s. 11d. altogether, or at the average rate of £3 8s. 4d. per set. In the Marmont mine I was shown several sets which had cost over £5 apiece, and one large one was estimated by the manager at £12. Another good example of the cost of mining timber was quoted to me by the manager of the Marmont mine. He got a 5-ton truck of timber containing 30 pieces of timber costing £5 5s. on the trucks, but the total cost was £20 12s. 6d. by the time the timber reached his mine.

For shaft timbers and all surface construction work where sawn timber is required, imported Oregon pine is largely used on this field. The cost of Oregon timber is:—

	Per 100ft. super.		
	£	s.	d.
Railage from Geraldton to Nannine	0	7	9
Cartage from Nannine to Meekatharra .. .. .	0	5	1
Agency from Nannine to Meekatharra .. .. .	0	1	5
	<hr/>		
Cost of Carriage .. .. .	0	14	3
Invoice price at Geraldton .. .. .	1	0	0
	<hr/>		
Total .. .. .	£1	14	3
	<hr/>		

Jarrah timber from Geraldton costs for freight, agency, and cartage 19s. per 100 feet super., the principal cost being on account of the great weight to be carted. It is cheaper than Oregon at Nannine but dearer at Meekatharra, and further inland still the advantage in cost is increasingly in favour of the lighter Oregon timber. For strength and durability the jarrah is a far superior timber for mining and structural purposes, and if the railway were extended to Meekatharra it would become cheaper than Oregon and be much more used, with some consequent small benefit to the timber industry of the South-Western portion of this State.

*General Goods Traffic.*—I have not been able to obtain any very reliable figures as to the extent of the traffic in general goods between Nannine and Meekatharra. The population of the district is a little over 700 persons, which would give a probable minimum requirement of carriage of about 1,500 tons of stores annually. One leading business man in Meekatharra gave his own loading for the months of July and August at 83 tons, and estimated that fully 100 tons a month of stores were imported. The three hotels are estimated to get 80 tons a month of various stores. Another leading merchant had carted 40 tons, and had at least 25 more to come up from Nannine during September. Another had imported 164 tons of building material during the year ending August 31st, 1907. The population has increased during the last year from about 400 to over 700, so presumably the traffic in stores is also on the increase. Taking the various figures into account it does not seem too high an estimate to calculate the present traffic in merchants' stores at about 2,000 tons per annum.

A reference to Table VIII. in my published report on the proposed railway to Black Range in the annual report of the Mines Department for 1906,



page 101, will serve to show the very large amount of railway traffic that is caused by mines of some magnitude for their own direct necessities, and the importance to them of the item of transport in their costs. In considering the case of Meekatharra it is reasonable to keep in mind the figures of the requirements of some of these larger mines, as showing what smaller ones may rapidly grow to, rather than those of present actual traffic.

*Benefit to Outlying Districts.*—The extension of the railway to Meekatharra would be of quite appreciable benefit to the Peak Hill and Abbotts districts, the road to which from Nannine passes through Meekatharra, as it would save them 24 miles of road carriage. These districts are very dull at present and making a hard struggle for existence, and every improvement, however slight, in their transport facilities is of considerable consequence. The Peak Hill Goldfield up to the end of 1906 has crushed 289,603 tons of ore and produced 206,368 fine ounces of gold.

Abbotts centre is credited to the same date with 33,726 tons crushed for 35,886 fine ounces of gold.

*Conclusion.*—The Meekatharra Field is rapidly becoming more and more important and gives every promise of supporting a group of mines of very fair magnitude. Extension of the railway to it would be a very great assistance in rapidly bringing it into full productiveness and is almost an absolute necessity in order to provide the requisite supplies of mining timber and fuel. In my opinion the prospects of this field justify the construction of a railway to it as soon as possible, and there is every promise of its soon becoming a profitable line. The construction should not be costly, the route of the line being through flat easy country.

A. MONTGOMERY, M.A., F.G.S.,  
State Mining Engineer.

Perth, October 25th, 1907.

#### APPENDIX.

#### NOTES ON MINES AT MEEKATHARRA.

*Ingliston Extended Gold Mines, Ltd.* (398N, 437N, 462N, 529N, and 539N).—The main shaft has levels at 210 feet and 110 feet; at the former the lode has been driven upon for 181 feet to the north from the crosscut, and in the latter for 330 feet south and 150 feet north. The ore body is up to 40 feet wide, of very clayey material, and appears to be pitching somewhat flatly to the north. In the stopes it has smooth, well defined walls. There seems a possibility that it is formed on the intersection of two lodes dipping slightly towards one another and diverging somewhat in strike as they go northwards. A large tonnage of what is stated to be good ore is in sight, and the mine should easily maintain its present average output for some time to come. There is also another lode cut in the 210 feet crosscut further west.

The returns from this mine are given in the foregoing report. The mill treatment has lately been greatly improved by substituting settlement of the slimes in vats for the previous settlement in ground dams. This now permits continuous treatment of the whole of the ore. The stamps crush with a weak solution of cyanide instead of water, and the tailings from the plates are lifted at once to leaching tanks, where the slimes are separated, and the sands caught and treated by percolation leaching. The overflowing slimes go into settling tanks, the delivery into which is submerged, and the overflow from these tanks is nearly clear, and is returned to the stamps. When a settler is nearly full of slime the flow of sludge into it is diverted into a second one, and the slime soon settles enough to allow a clear supernatant solution to be siphoned off. When thoroughly settled the thickened sludge is allowed to run out through a sluice-gate and passes to the pumps feeding the filter press, by which it is pumped into the latter. The press has narrow frames on account of the very clayey nature of the ore, but is able to treat 45 tons in 24 hours. The extraction is very satisfactory, and the treatment is complete, the residues from the leaching vats and filter press being now able to be finally rejected and stacked on surface until fit to be used for filling the stopes.

*Marmont* (533N).—The main shaft is being sunk deeper and is now down to 190 feet. Levels have been opened at 144 feet and 90 feet. The lode "formation" is often 30 or more feet wide, and consists of broken country with very numerous ramifying quartz veins and large bodies of quartz. About 400 feet of driving have been done on payable quartz. The manager estimates not less than 50,000 tons of ore, worth an ounce of gold per ton, to be in sight, and the estimate of quantity does not seem at all unreasonable. The returns from crushings have been highly payable, as shown by the tabulated figures in the foregoing report. There is every promise of this becoming a very important mine. The owners have given it a very fair equipment of machinery, costing about £4,000, and having now their own 10-head battery should be able to make rapid progress. Negotiations for the sale of this mine and the adjoining "Fenian" one to an English company have lately fallen through, the representatives of the company declining to pay the price of £100,000 put upon them by the owners.

*Fenian* (477N).—The main shaft has been sunk to the 250 feet level, and levels are opened at 150 feet and 250 feet, besides higher ones from the older prospecting shafts. At the 250 feet level several crosscuts have been driven into the "formation," which is a large broken channel of country, but at this point containing much less quartz than in the Marmont. The rock at this level has become hard undecomposed diorite. A vein of quartz over 2 feet wide had been cut just before my visit, carrying good values, corresponding with the principal rich vein worked in the higher levels. There are several other gold-bearing veins at this level in the "formation," and probably driving along the course of the latter will result in the discovery of occasional larger bodies of quartz. At the 150 feet level the lode has been followed right through the Fenian lease, from the Marmont boundary on the south to the Ingliston Consols on the north. Part of the drive north of the shaft is off the reef, but crosscuts show it as a big iron-stained rubbly "formation." Near the north boundary there is some very good ore, 70 tons crushed having re-

turned 7ozs. of gold per ton. The prospects of this mine have much improved since I saw it in May, 1906, there being now much more ore in sight, and it is being recognised that the lode is a large "formation" like those in the Marmont and Ingliston Consols, and not merely the narrow rich vein of quartz which was worked at first. Doubtless a large amount of low-grade ore will still be won from the upper levels.

*Ingliston Consols Extended* (475N).—The new shaft, which is to go to 250 feet before opening out, has been sunk to 143 feet, and is now waiting the erection of machinery before being sunk deeper. The lowest workings in the mine at present are in the 150 feet level, which has been driven along the lode for about 300 feet with numerous crosscuts and drives from them on veins in the large "formation." A lot of the soft clayey material is estimated to be profitable to mine if there were a battery close at hand, as well as the richer quartz veins going through it. The principal vein of quartz is about 2 feet wide in this level, and of good value. When this mine is equipped with machinery it should soon greatly increase in importance. (For returns see table in foregoing report.)

*Marmont Extended* (580N).—A shaft has been sunk to water-level (144 feet) and machinery has been purchased to enable sinking to be continued, but was not yet on the ground at the time of my visit. In this mine the "formation" has been poor, but at 140 feet better ore was got, and 40 tons crushed gave 43ozs. 7dwts. of gold by amalgamation alone. The shaft is being sunk in the belief that the Marmont ore shoot pitches south into this property. The mine was under exemption at the time of my visit, pending arrival of the machinery.

*Madge* (589N).—To the south of the Marmont Extended a lot of work has been done without much success so far to try to find the Marmont lode. In the "Madge" lease there is a wide "formation" containing siliceous schistose matter with much brown iron ore and full of small cavities which have been crystals of pyrites. Its relation to the Marmont lode is not yet clear.

*Gwalia* (663N).—In the Gwalia lease also a great deal of prospecting has been done by sinking shafts and crosscutting between them, and there is a wide "formation" carrying a little gold. In one of the shafts there is much white kaolin, and this contains veins of quartz with bunches of black tourmaline in radiating acicular bundles. This leads me to think that the kaolin represents a felsite intrusion, and it may be that the Marmont lode extends northward from a granitic dyke which comes near surface in the Gwalia. The kaolin also contains bunches of very green mineral, which have been determined by the Government Mineralogist as a chromiferous chlorite. This gives a decided green tinge also to the kaolin in Savage's Ninety-Three lease.

*Commodore* (597N).—Several shafts have been sunk to water-level, about 145 feet, and one water-shaft to 160 feet. They are on a large "formation" or shattered zone lode running about N. 30deg. E., which may be a northern continuation of the Marmont or Ingliston Extended lodes. This line is traced north to the Halcyon Extended (635N). The quartz is up to 3 feet in width, but very bunched, ramifying through the "formation." Some good ore has been obtained at various times along this lode, which appears to require working as a large low-grade proposition.

*Macquarie* (728N).—This mine is on a line of reef lying east of the Commodore line, but striking nearly north and south, and underlaying a little to the west. A vertical main shaft has been sunk in the lode 115 feet, in low grade clayey ore which the owner estimates at 9dwt. gold per ton. At the bottom of the shaft a short crosscut east cuts the footwall which is very smooth. On this wall there is a body of ore on the north side of the shaft 3 to 6 feet wide which has been risen upon to connect with older workings from a 60ft. shaft. A good deal of work has been done from the 60ft. shaft, but it was all on another portion of the lode, the footwall "splice" having been overlooked. The whole lode appears to be 15 to 16 feet wide, composed of clayey material mixed with rubbly quartz and much stained with oxide of iron. A recent crushing of 90 tons from the footwall branch is stated by the owners to have returned nearly £5 per ton by amalgamation and cyanide, not including gold still in slimes containing 7dwts. per ton. There are about 400 tons of ore at grass estimated by the owners to be worth about £4 a ton. This lode has not had a great deal done upon it yet, but seems decidedly promising, and if the stuff raised yields in the mill in accordance with the owner's estimates, there is every reason to expect that this mine will become one of much importance.

*Halcyon* (313N).—A considerable amount of work has been done in this mine on a low-grade ore body which has given an average return of a little under half an ounce of fine gold to the ton (see table of returns in foregoing report). A large open-cut has been taken out, about 100 feet long, 12 to 20 feet wide and 40 feet deep, the lode matter being weathered dioritic matter and kaolin with quartz leaders and oxide of iron veins through it. A vertical shaft has been sunk 105 feet, and stopping on the lode has been carried on down to this level. The lode is a big mass of dioritic matter full of quartz veins and gritty quartz, and is estimated by the owners to be worth about 9dwt. gold to the ton in bulk. A good deal of work has been done on several flattish quartz leaders, the relation of which to the lode is not clearly visible.

This ore is very slimy in the battery, a recent crushing of 412 tons giving only 93 tons of sands for cyanide leaching treatment, the rest being slimes. Both sands and slimes were about the same assay value, about 4dwt. per ton.

*Halcyon Extended* (635N).—On this lease there is a water shaft down 160 feet, in which water was struck at 126 feet, and a working shaft 80 feet deep. From the bottom of the latter a drive has been made north along the lode to the water shaft, about 360 feet, and a lot of crosscutting has been done. The workings are in much weathered dioritic matter and kaolin, full of small veins of quartz, often running about east and west. No defined lode is seen, but the workings along a N. and S. line show more or less gold, and the owners think the stuff might be profitably treated in bulk. Some good ore has been obtained, a recent crushing of 78 tons having yielded 2oz. 2dwt. per ton by amalgamation, 29½ tons of tailings sands assaying 23½dwts. gold per ton, and slimes of the same assay value. The gold values make it likely that this is an extension of the lodes seen further south, but inspection does not show any such recognisable "formation" as in these, and the country does not seem to be broken to anything like the same extent. If the values are as stated by the

owners, however, there must clearly be here a very large amount of low-grade ore.

*Pioneer* (372N).—Very little progress has been made in this mine since my report of 1906. The main shaft is down to 180 feet, and a good deal of driving has been done on a reef at that depth. It runs about N.N.E. and S.S.W., some flat reefs were cut in the shaft and crosscut from it. There is said to have been one good shoot of gold in this level but very short, but it is lately reported in the newspapers that good gold has been again obtained. There is very little water, and the large pump with which the mine is furnished has not been required. The reefs of the Pioneer group are quite unlike those above described, being strong reefs of bluish quartz with a little pyrites in it, of the fissure-reef type. The mine has a fair record of gold production (see table in foregoing report).

*St. George* (710N).—There is a strongly outcropping bluish quartz reef running more or less N.E. and S.W. through this lease parallel to the Pioneer group of reefs, and branching going northwards into three branches. It has been worked a little from time to time, and has lately been tried again. One of the old shafts is down 112 feet, but the latest workings are shallow and carried down on the underlay about 70 feet from the outcrop. Here the reef is 4 to 8 feet wide, underlays to the eastward about 1 in 1, and shows distinct walls. There have been several crushings, returning 8 to 14dwts. of gold per ton. The reef is a large strong body of stone, but appears to be of rather low grade on the whole; should other test crushings continue to give as good results as have been hitherto obtained it would seem that there are hopes of its being good enough to be worked. These large reefs offer great possibilities of the occurrence of more valuable ore in depth.

*Ninety-Three* (93N).—There is very little visible difference in this mine from the state of affairs described in my report of 1906, though the owner, Mr. Savage, has been steadily working his big reef, and has taken out a good deal of ore (see table of returns). There is a huge body of low-grade quartz, with occasional occurrences of good ore, but without very extensive and prolonged sampling it is quite impossible to form an opinion of any value as to the prospects of the mine. The amount of gold already obtained is very encouraging, and there seems great likelihood that with a battery on the spot a large amount of low-grade ore could be profitably handled.

*Lady Lorna* (748N).—This is a quite recent discovery on a large outcrop of quartz, running about N. 10deg. E., like that of the Pioneer and St. George reefs which protrudes itself alongside the road from Nannine a little south of where this enters the Meekatharra townsite. The reef was thought to be barren, but has lately been found to contain some good ore. The portion carrying gold is about 3ft. 6in. wide and some of the stone is fairly rich. A crushing of 5 tons yielded a return of 16dwt. gold per ton by amalgamation, and the tailings assayed 10dwt. per ton. The shoot so far as yet known is short, but the reef is now being prospected more carefully, and may be found to contain other shoots as well.

*New Orleans* (624N).—Two shafts have been sunk on this lease to a depth of 100 feet, and will soon be connected with one another by a drive on the reef. This is a quartz vein running between N. and S. and N.W. and S.E. with westerly underlay about 1 in 1, and from 10 inches to 30 inches thick. The walls

are well smoothed, and the reef quartz is sometimes striated where it rests on the wall. The country is weathered diorite. There have been three crushings, returning 10dwt., 7dwt., and 8dwt. 18grs. of gold per ton respectively. To the east of the shafts a short distance there is a surface trench on weathered diorite schist "formation," carrying a little gold. From its position this may be an extension of the Marmont-Halcyon zone of auriferous soft "formations." The quartz in the vein which has been worked is quite similar in appearance to that in the Ingleston Consols Extended and Marmont mines.

*Victor and Dawley's P.A.* (235N).—Quite a mile further north than the New Orleans lease a small quartz reef has been found running N.N.E. and S.S.W. with steep underlay eastward, which has been traced on surface for about 15 chains in length in laminated diorite schist country with the same strike as the reef. The vein is small, usually less than 12 inches in thickness. A shaft has been sunk 45 feet on it. A crushing of 25 tons is reported to have returned 14oz. 1dwt. of gold. This is rather a small vein to be of much importance, but it shows that there is auriferous ground for some considerable distance to the north of the principal mines at Meekatharra.

*Haveluck* (236N).—There are somewhat extensive workings in this mine over 600 feet of driving having been done at the 70 and 100 feet levels. The deepest shaft is down 175 feet to water and about 100 feet of driving has been done at that level. There is a large soft lode over 30 feet in width of white kaolin and quartz veins. Sometimes there are three or more distinct parallel veins, averaging each about 2 feet in thickness of laminated kaolin and rubbly quartz. The lode matter is often very white, and may very likely be originally a felsitic dyke. The country is dioritic schist. Gold is said to occur more or less all through the "formation" and the owners think that a great deal of it would yield 8dwts. of gold per ton in bulk. The mine has been sampled more than once by prospective buyers, but they do not seem to have been satisfied to take it. The crushings (see table) show a payable average of about 15dwt. of fine gold per ton which would have been higher had the slimes been treated also. The lode-stuff is very slimy in the battery, and requires special attention to slime treatment. The mine is a large low-grade proposition, and seems likely to be of importance.

*Haveluck Proprietary* (592N).—This mine was described pretty fully under the name of the "Haveluck Consols" in my 1906 report, and there is very little to add to what was then said. The workings are now mostly from the 140 feet level. The gold values in the ore are stated to show improvement lately.

*Multum in Parvo* (610N).—This lease is about three-quarters of a mile to the north-east from the Haveluck group, and has been remarkable for the richness of two small veins which have been worked. The foregoing table shows a return of 1,117.95ozs. of fine gold from 7.11 tons of ore, or at the rate of 157.2ozs. per ton. In a shaft about 20ft. deep the rich vein is seen to be about two inches wide, running N. and S. and underlaying about 1 in 1 to the east. There is also a deeper shaft, about 60 feet deep a short distance to the north of this, in which there is a leader running N.E. and S.W. The country is weathered diorite, and the surface is covered 3 to 6 feet deep with detrital material cemented with

brown iron oxide to a hard crust, which interferes a good deal with prospecting. On this crust there has been a patch of alluvial workings, from which some 270ozs. of gold are said to have been got. It seems likely that there are other rich leaders under this alluvial patch, and it is quite possible that it caps one of the large clayey "formations" such as are seen further south in this field.

There are also considerable alluvial workings to the south of the Multum in Parvo lease, which strengthens the probability of there being an underlying auriferous "formation."

"*Eight-Mile*" District, or "*Yellowgindat*."—The principal workings of this group of mines lie about one to two miles west from the 16-mile post on the road from Nannine to Meekatharra. There are several more or less parallel lines of reef running north-north-easterly. On the west side of the field there is a hard highly laminated dioritic hill, running about N. 30deg. E., parallel with the reefs and the planes of lamination of the diorite itself. I noticed some small quartz veins in the diorite, running conformably with its foliation. To the east of this hard outcropping ridge the country is still diorite, but is generally much softer, and weathered to some considerable depth.

*Sirdar* (246N).—The most northerly workings are those of the Sirdar group, about two miles N.N.E. from the Revenue mine which may be taken as about the centre of the principal auriferous area as at present known. The old Sirdar lease is forfeited and the ground is now worked by Messrs. Dixon and O'Connell as a prospecting area. There are several shafts, one of them 75 feet deep, and two reefs. The principal reef has quartz up to 6 or 7 feet thick, often in lenticular masses something like the "Kidney" quartz of Edjudina. The country is diorite schist, much weathered. The reefs are said to have been worked upon from time to time for ten years past. The Sirdar lease is credited in the official returns to end of 1906 with 190.25 tons crushed for 143.37ozs. of fine gold, and 54.82 fine ozs. from dollied stuff and specimens. I was informed on the ground that the present prospectors have had an average of 25dwt. of gold (unrefined) from their crushings and that the last one gave 35dwt. Messrs. Ferguson and Drake working to the north of Dixon and O'Connell on the same reef are said to have had, some years ago, returns of 20, 17, and 12 dwts. per ton, the stone being crushed at Nannine and Garden Gully batteries. There are evidently strong bodies of quartz in these reefs, and the reported returns are sufficiently good to show that they are well worth prospecting thoroughly and are of considerable promise.

*Batavia* (578N).—This lease lies on the eastern side and at the foot of the hard diorite hill above mentioned, and is the most westerly of the lines of reef in this district. Two shafts have been sunk, the No. 2 or south one being about 500 feet south of the No. 1.

No. 2 is down 60 feet on the lode, which here strikes N. 10deg. E. with slight underlay to the east. In the bottom of the shaft the lode is 14 feet wide from wall to wall, and composed of quartz inter-laminated with bands of hardish blue diorite schist. The owners judge the value in bulk across the reef at 10dwt. per ton. They have crushed 51 tons for a return of 17 dwt. per ton not inclusive of gold left in the tailings, which assay 3dwt. 22grs. of gold per ton. The north shaft is down 100 feet, to water level, and the

lode has been driven on to the north for 46 feet from the bottom of the shaft. Here it is smaller, being 15 to 18 inches wide, and strikes about N.N.E. Forty-one tons from this shaft returned 35dwt. of gold per ton, and the tailings assayed 7dwt. 22grs. The country is hardish blue diorite schist. This seems a very promising lode, well worth opening up more extensively. Cartage to the State battery at Meekatharra costs 12s. 6d. per ton.

*Batavia North*.—In this holding, which adjoins the Batavia lease on the north, the reef has been cut some 500 to 600 feet further north in a shaft 30 feet deep, but at the time of my visit very little more had been done than merely touch the reef, and the prospects were still poor.

*South Batavia*.—Prospecting is also in progress at the south end of the Batavia lease, where a shaft has been sunk 52 feet deep in laminated blue diorite. A leader has been cut but probably not the Batavia reef, for which the prospectors are now crosscutting.

*Kelby South* (formerly lease 579N, now P.A. 198N).—A shaft has been sunk 42 feet on a reef running N. 20deg. E. with underlay about 1 in 10 to the east. The reef is small, about 15 inches thick, and the stone often in lenticular "kidneys." The country is dioritic schist, much weathered. A recent crushing of 12 tons returned 22dwt. 8grs. of gold per ton by amalgamation, and the tailings sands were expected to contain 7dwts. per ton. The official record to end of 1906 shows 10.50 tons crushed for 13.22ozs. of fine gold.

*Rocklee* (709N).—On this lease there is a shaft down 70 feet on a strong quartz reef running N.N.E. and S.S.W. from which there was a large parcel of stone at grass when I visited the mine—26½ tons crushed this year have returned 25.23ozs. of fine gold.

On the same line of reef further south Miles and Party recently had a crushing which returned 19dwts. of gold per ton.

*North Revenue Extended* (706N).—A shaft has been sunk about 100 feet on what is taken to be the Revenue leader, and has cut a vein 1½ to 3 inches wide carrying some rich ore. The quartz is somewhat lenticular and is enclosed in schist country. A small patch of about 7ozs. of gold is stated to have been got about a week before my visit. Between this mine and the Rocklee shaft the surface of the ground shows much loose quartz and brown iron oxide.

*Revenue North* (541N).—Here a shaft is being sunk to water level, 135ft. and was down 123 feet at the time of my visit. The owners expect at 135 feet to crosscut to what is known as Brand's reef, which lies about 200 feet west of the Revenue leader. The last crushing of 125 tons is said to have yielded 9dwt. per ton by amalgamation, with tailings assaying 4dwt. 17grs. per ton. The reef was 1½ to 2 feet wide, and has been driven along for 100 feet at the 80 feet level.

*Revenue* (531N).—This has been a remarkable mine, having returned over 3,000ozs. of fine gold from a little less than ten tons crushed. The main shaft has been sunk to 200ft., and is equipped with steam winding plant. The water raised is about 5,000 gallons per day. Levels have been driven on the leader at 200 feet and 126 feet (water level). It has very smooth, straight walls with sometimes as much as two feet of crushed lode-slate between them. The auriferous portion is 3 to 10 inches wide, but the shoot is very short, and is nearly vertical. I saw some very rich ore in it. Outside the shoot the leader has hitherto been of no value. The country is laminated slaty schist.

There are also workings in this lease on Brand's reef and on the Rooklee reef, and these are probably of more permanent importance to the mine than the rich leader.

*Two Bells (675N).*—On this lease there are 5 shafts, testing a small reef for a distance of about 400 feet. The reef runs N. 30deg. E., and contains quartz which is often in lenticular "kidneys." It lies between two "jasper bars" or reefs of laminated dark ferruginous quartz which run parallel to it, about 200 feet apart. The reef has been worked to a depth of about 80 feet, and is said to have given several good crushings, but the official record to 30th June, 1907, only shows 24 tons crushed for 42ozs. of fine gold.

*Two Bells North (695N).*—Here there was seen a nice heap of quartz from the same reef as in the last mentioned mine carrying visible gold. The reefs seem somewhat larger at this point.

The Two Bells reef seems from its position to be a member of the Revenue series. This group of parallel reefs probably runs for about three miles across country, from the Two Bells on the south to the Sirdar on the north, though it is improbable that any one of the reefs extends continuously the whole distance.

*McColl and Party's P.A. (214).*—East of the Revenue group of reefs about three-quarters of a mile there is another roughly parallel line of auriferous lodes, known on the field as the Phantom line, from the old name of the lease now called Karangahaki. Towards the southern end of this the above party have been prospecting a number of bodies and leaders of quartz interspersed through a wide and undefined clayey "formation" over an acre in extent. There is a little gold obtainable all over this area, and a small crushing of 8 tons yielded 35dwts. of gold per ton. This "formation" requires a lot of prospecting before much can be known about it.

*Gibraltar (708N) and Great Oversight (731N).*—A large "formation" of rubbly quartz traverses these leases on a line running about N. 10deg. E. Three shafts have been sunk, one in the Great Oversight 82 feet deep, one on the south boundary of the Gibraltar 50 feet deep, and another further north 41 feet. From the south shaft there is a drive 30 feet

and winze 10ft., and the "formation" is crosscut 14 feet. In the north shaft there is a crosscut 50 feet, all more or less in "formation," and 16 feet of this are estimated by the prospectors to yield 9dwt. of gold per ton. There is evidently a very big body of quartz in this mine, though of low grade, and with a local battery there might be some hope of profitable mining. Thirteen tons have been crushed for a return of 7ozs. 17dwts. 12grs. of gold. This reef seems worth taking some trouble to test thoroughly by actual crushings and extensive sampling.

*Karangahaki (666N, formerly Phantom, 416N).*—Here there are six or more shafts on a line of reef running about N. 10deg. E., two of them being whip shafts. These are down on the underlay of the reef to water at 125 feet, and a level has been driven at 120 feet. At this depth the reef is seen to be a succession of lenses and bodies of quartz, often much crushed, and with a good deal of interstitial rubbly quartz in a lode formation with smooth, well defined walls, 4 to 10 feet apart. The underlay is to the east about 1 in 1. A lot of driving on the lode has been done to test it and there is a very considerable amount of ore in sight, which I am given to understand is of fair value. The mine is at present being worked under an option of purchase. According to the official returns to 30th June, 1907, this mine has crushed 570.5 tons for 814.35 ounces of fine gold, a record which gives much promise of future success. The country is schist, much weathered above the water level.

There are probably at least three reefs in this lease, and if the mine is worked energetically it should have a very considerable output of ore. A local battery is much required to test the stone without the expense of carting it to Meekatharra.

The Yallowgindat centre at present gives employment to between 60 and 70 men, and bids fair to become of very considerable importance, but requires local crushing plant to enable it to be properly proved. If the railway were extended from Nanine to Meekatharra it could be brought right through this locality.

A. MONTGOMERY, M.A., F.G.S.,  
State Mining Engineer.

Perth, 25th October, 1907.

#### APPENDIX No. VII.

#### REPORT ON THE PROGRESS OF THE PHILLIPS RIVER GOLDFIELD.

##### *The Secretary for Mines, Perth.*

Sir,—I have to report having again visited the Phillips River district, in pursuance of the instructions of the Hon. the Minister for Mines. Leaving Perth on 19th ult., Ravensthorpe was reached on the evening of the 21st, and I remained on the field, examining most of the mines now at work and making inquiry into the state of the mining industry, until 30th November, leaving Hopetoun on the morning of 1st inst., on the return journey.

My first report on this field (published in Bulletin form) was dated 28th February, 1903, and was supplemented by a later one, dated 28th June, 1905, published in the annual report of the Department of Mines for the year 1904. Notes on the progress of the State smelting works on the field are contained in my annual reports for the years 1905 and 1906. The Inspector of Mines, Mr. Cullingworth, has also lately reported on the state of mining progress in the

district, in reports dated 25th September, 1907, and 24th October, 1907, which have been published in the newspapers. The present report is supplementary to those preceding it and does not attempt to give a complete account of the field independently of these.

The Geological Survey Department has made a good start with its examination of the field, the Government Geologist's Field Assistant, Mr. Talbot, having been for some months past engaged in making the preliminary topographical surveys. The area covered by his work comprises over 80 square miles and may have to be considerably extended in order to include all the ground on which mineral discoveries have been worked. It would require to be very greatly extended to take in all the likely mineral country in this vicinity. It is somewhat usual to regard the Phillips River Goldfield as containing only a small and relatively unimportant mineral area, but it is by no means a small one, and its increasing importance is best shown by the figures of mineral production given later on. As the more complete examination of the country by the Geological Survey is in progress there is no necessity for me to now add to the rough sketch of its structure given in my former reports. It may, however, be of economic value to draw attention to the fact that the most of the copper bearing lodes hitherto worked are situated close to the contact between the granite country and the greenstones, and seem likely to have some genetic connection therewith. The belt of country along the contact is therefore of especial interest to prospectors and should receive great attention from them. The Geological maps, when issued, will be of very great service in the development of the field.

#### MINES VISITED.

*Sunset* (M.L. 115).—This mine has lately been under exemption from working. The deepest shaft is down about 120 feet, on the underlay of the reef, which in the upper part of the shaft is to the south, but below the 100 feet level turns to the north. Good ore was obtained in the shaft, and at 100 feet level the lode is seen to be 8 to 10 feet wide. The ore at 100 feet is stated to have averaged about 12 per cent. copper, and is chalcopyrite in a hard quartzitic matrix. At this depth granite comes in and forms the hanging wall, and it seems pretty clear that the lode is on the contact between the granite and greenstone country, much of the lode material being silicified and transmuted greenstone. The rock in the bottom of the shaft has become very hard, and would best be worked with machine drills. At about the 60 feet level there is a drive on the lode to connect with another shaft a short distance to the eastward, and some stoping has been done which shows the main ore shoot to be about 35 feet long. There is another smaller shoot of oxidised ore at the eastern shaft, which has mostly been worked out. The prospectors have principally confined their work to the shallower ground, where the lode and country are softened by weathering. The lode is larger and better in the deepest workings, but is too hard for prospectors. There is not much ground open on which to form a judgment of the lode, but so far as it has been opened it is extremely promising, and well warrants further work being done upon it. The ore-body in the bottom of the principal shaft would yield a good deal of rich ore by handpicking, but unless smelting can be arranged for at a much lower tariff than at present a great deal of it would be too poor to go to

the furnace, and would best be concentrated. Probably before long it will be possible to smelt profitably a much lower grade of ore than at present, and then only the still lower grades of ore would require concentration. This mine deserves vigorous working. From the tables hereunder it will be seen that it has produced 507.44 tons of ore, containing copper valued at £3,317.

*Surprise* (M.L. 114).—This mine lies due west of the "Sunset," and appears to be likewise on the contact of the granite and greenstone country, the former being clearly intrusive through the latter and sending off veins into it. The greenstone is often very like a metamorphic rock, and may prove to be such, and not a truly igneous one.

The main shaft has been sunk to the 81 feet level on the underlay of the lode, and a winze has been sunk 39 feet deeper. In this winze the lode-matter and country have become hard and no longer affected by weathering. In the shallower workings they are much softer through kaolinisation. In the bottom of the winze the lode is fully 8 feet wide and contains a fair amount of chalcopyrite, but is rather poor in copper if taken in bulk. The hanging wall is hard granite. The prospectors have worked out nearly all the ore in the softer shallow ground, and in the west end of the bottom level have struck a hard diabase dyke which cuts off their lode. At surface this dyke is seen to be of no great width, and ore has been found on the other side of it, so it seems to be quite similar to that passed through in the Last Chance mine, which cut through the lode without heaving it, or apparently altering it in any way. These diabase dykes are rather common in the district, and appear to be of much later date of origin than the copper lodes.

In the oxidised zone the lode is somewhat small, but has yielded a good deal of fair ore, the recorded output of the lease being 466.46 tons containing copper valued at £3,553. The owners have a considerable heap of second-class ore on surface, too poor to go to the smelter under present conditions. The lode is probably a contact one, between the intrusive granite and the greenstone or metamorphic country, and in the bottom of the mine seems to be of considerable thickness. Like the "Sunset" lode it is getting too hard for prospectors and hand boring, and requires working on a more extensive scale with aid of machine drills. Just at present there is not much ore in sight, but the record of the mine is fairly good, and its prospects seem to me to fully justify working on a larger scale.

*Marion Martin* (M.L. 16).—This lease lies north of the "Sunset," and the country rock appears to be mostly greenstone, or metamorphic rock resembling greenstone, though the granite is close at hand. Very little new ground has been broken since my previous report of 1905. The lease now belongs to the Phillips River Gold and Copper Co., who are only doing prospecting work upon it, driving at shallow levels on the lodes to locate further ore shoots. The lodes are rather small in size at present for a large company's operations, though they have produced a good deal of ore of good quality. For the period ended June 30th, 1907, the Company's annual report shows 168 feet of driving and crosscutting done, and 26 feet of shaft sinking, and states that 297 tons of ore were sent to the smelter containing 20 tons of copper (equal to 7 per cent.), 52ozs. of gold, and 133ozs. of silver, and estimates the ore-dumps still on the

mine at 355 tons of assay value 5.87 per cent. of copper. The total production recorded by the Statist of the Mines Department from this lease to 31st October is 1,432.30 tons of ore containing copper to the value of £9,612 and 55.89 ozs. of fine gold.

The difficulty in working this holding is that the known ore shoots in the various lodes are so far apart that they cannot conveniently be worked from one shaft, and no one of them so far as yet seen is quite good enough to justify erection of much machinery. It seems quite necessary to do a good deal more prospecting before attempting systematic mining. The deepest workings have shown very good chalcopryite ore, and there seems no reason to fear for the permanency of the ore-shoots. Their small size in length and thickness and their scattered disposition in the lease are the worst drawbacks. From the recorded output of ore from the really small amount of development work done I am very hopeful nevertheless that this lease will yet prove itself valuable.

*Mt. Cattlin West* (formerly Puzzler and Zealandia) M.L. 219.—On this lease a shaft has been sunk to a depth of 100ft. on the underlay of an ore vein running nearly east and west and dipping to the north. In the shallower workings some good ore was obtained, but is said to have been buncy and erratic. The present owners have driven at the 100ft. level to the S.W., across a large ore body about 30ft. wide, a vein on one wall of which or a leader therefrom seems to have been the lode on which the shaft was sunk. The walls of this ore body run from N. 80deg. W. to W.N.W. with underlay to N.N.E. A parcel of 2½ tons sent to the Smelter from 10ft. of lode matter on the footwall side was tested there by the Company's metallurgist and gave the following very promising analysis:—

Silica	SiO <sub>2</sub>	43.80%	
Ferrous oxide	FeO	19.37%	
Alumina	Al <sub>2</sub> O	9.06%	
Sulphur	S	12.15%	
Copper	Cu	8.38%	
Gold	Au		166ozs. per ton.
Silver	Ag		5 " "

The ore is hornblendic material and quartz with iron and copper pyrites disseminated through it, and as shown by the analysis requires no large addition of fluxes to be easily smelted. No driving has yet been done to prove this large lode, which on the present showing seems likely to be of much importance.

About 60 feet west from the principal shaft there is another vertical one, 82ft. deep, sunk in quartzitic material, and which strikes granite country. In this shaft there is about three feet of vein matter, dipping westerly from which some pyrite and chalcopryite ore has been obtained containing 10 to 11 per cent. of copper. Here again the lode matter appears to make on the contact with the granite country. This lease gives every inducement for energetic prospecting. It has produced 94.08 tons of ore containing copper valued at £848.

*Mount Cattlin South* (M.L. 263).—A shaft has been sunk about 110 feet on the underlay of a lode running about E. and W. and dipping south about 70deg. The lode has good walls, but there are still sulphides in the hanging wall and the width of ore-bearing material may be greater than the three to four feet now seen. At the 70 feet level there is a short drive to the west and a crosscut about 22ft. to the south, all through much mineralised and altered greenstone country, carrying a great deal of garnet,

and a large amount of pyrites. Veins of granite are seen penetrating the greenstone, and the lode is evidently at or near the contact with the main mass of granite seen on surface a short distance south of the shaft.

When the shaft was first sunk over two years ago the lode matter was almost all marcasite (white iron pyrites) with only occasional kernels of copper pyrites, and the dump took fire spontaneously and burned for some months. The recent work has produced ore containing a somewhat larger amount of copper and some of it has been sold to the Smelting Works as sulphur-bearing flux.

One of the owners of the lease told me that the parcel sold contained 45 per cent. iron, 37 per cent. sulphur, and 2 per cent. copper, and realised 11s. per ton net as fluxing material. The high sulphur contents make it very useful in treatment of oxidised copper ores, and the iron is available partly as flux for silica, and for increasing the matte fall in the furnace. There seems to be a decided increase in the quantity of chalcopryite in the ore in the deepest workings, and there is much hope that further exploration will discover ore of better value in copper. The lode well warrants development.

*Mt. Cattlin* (M.L. 15).—This mine is now the property of The Mount Cattlin Copper Mining Company, Limited, and has been very well opened up by its owners in the comparatively short time since they took it over. A main shaft has been sunk to a depth of over 300 feet, and furnished in first-class style with winding plant, rock-drilling machinery, poppet heads, and other necessary surface equipment. The development work done to end of October since the Company took over the mine is close on 4,500 feet. Levels have been driven at 100, 200, and 300 feet, in which four shoots of ore are recognised. The main shoot near the main shaft has been followed from surface to below the 300ft. level, where a winze has been sunk on it, which was down 81 feet at the time of my visit, and which is intended to be continued to 400 feet. In this winze there is a very fine body of good chalcopryite ore, about 3 to 4 feet wide showing that the shoot is living downwards very satisfactorily. In the east drive at the 300 feet level a good shoot of chalcopryite was struck during the last week in November, nearly 6 feet wide and of very good average value. This seems to be the downward continuation of a small shoot which in the upper levels did not seem to be of much account, and is a very important new development. The work at the 300ft. level has all through been very successful, the shoots of ore appearing to be longer, larger, and of better quality than nearer the surface. There seems every reason for being sanguine as to the future of the mine, which now has a very considerable amount of payable ore in sight. The net tonnage sold to the Smelting Works by the Company to 30th September last was given to me as 7,523.9112 tons of gross value £40,759 5s. 5d. The total output from the lease to 31st October, as recorded by the Mines Department, is 8,204.49 tons, of value £37,529 for copper, and £2,335 for gold. Until lately the Company was employing about 90 men, but have now only about 39 at work, pending resumption of active smelting work by the Phillips River Gold and Copper Company.

The Mt. Cattlin lode is a large one, up to 30ft. wide in places, and its full value as an ore-producer will not be entirely apparent until a good deal of

stopping has been done. Though the recognised ore-shoots appear to be very fairly persistent as a whole, the distribution of the copper ore is, as usual in copper mines, somewhat bunchy and irregular, and during development work it is very easy to miss ore-bodies of considerable magnitude which would be discovered in stopping. There is a large amount of low grade ore obtainable, not included at present in the Company's estimates of ore reserves, the value of which will depend very greatly on the success of concentration treatment, and if this ore can be made to pay for breaking out and concentrating there is little doubt that large quantities of better grade ore will be extracted while doing so which would not be known about if the ground were not turned over, and which will add a good deal to the output of the mine.

The Company's total expenditure to 30th September, 1907, was given to me by the general manager as:—

	£.	s.	d.
Capital Expenditure ..	21,176	18	9
Revenue Expenditure ..	35,079	0	5
Total ..	£56,255	19	2

a figure which demonstrates unmistakably the extensive character of the Company's operations and the value of the mine to the district and to the State.

*Andante* (M.L. 207).—I did not visit this lease, which was not being worked. The Mt. Cattlin lode is stated to have been cut 8ft. wide. Seventeen tons of ore crushed this year at the Gilbert G.Ms. battery are recorded as having returned 6.60ozs. of fine gold. The ore contained a little copper. My informant could not tell me the value of the tailings from the crushing or the percentage of copper. In the bottom of the workings, which are about 30ft. deep, the ore becomes full of sulphides and unfit for battery treatment. The future of this property seems to depend on cheap smelting treatment, which would enable the local owners to develop it themselves, or on being taken over by a company with enough capital to do considerable opening up before returns are expected.

*Mt. Benson* (M.L. 175).—This mine is one of those acquired by The Phillips River Gold and Copper Co., Ltd. A main shaft has been sunk 170 feet in depth, and considerable driving done at the 157 feet level, below which are two winzes down to 190 feet. The shaft is well equipped with substantial poppet-heads, a good winding engine, and an air compressing plant, fit for permanent mining work. At the time of my visit work underground was suspended, and the water, of which there is a very considerable influx, had been allowed to rise, pending the result of diamond drilling operations in progress. The work in the eastern end of the mine according to the Company's plans and assays seems to be in a large mineralised "formation" of which the character is yet very uncertain. A lot of driving and crosscutting has been done without obtaining any very definite information as to the nature of the ore deposit. So far as I could learn it seems as if in this part of the mine there is a large area of more or less mineralised country partly transformed into lode matter, and carrying small values in copper and gold erratically disseminated, with frequent irregular veins of better ore. To see what this is at greater depth a diamond drill bore is being put down at an angle of 60deg. from the horizontal, from a point on surface about 400 feet north of the outcrop. The bore starts in

fine grained granite, often carrying a little chalcopryrite and soon passes into very dense hard quartzitic rock which seems to be greenstone transmuted into quartzite on the contact with the intrusive granite. The bore was only down about 160ft. when my visit was made, but was already getting into much less silicified greenstone schist. The cores show very frequent spots and veins of chalcopryrite, the whole of the rock along the contact with the granite being evidently impregnated with a small amount of this mineral. The country rock on the mine dumps is of dioritic character, showing as a schist near surface but more massive from the lower levels.

The Company's report for year ended June 30th, 1907, gives the amount of development work done in this mine as 1,499 feet of driving and crosscutting, 170 feet of shaft sinking, 199 feet of passes, rises, and winzes, and 58 feet of chamber-cutting, total 1,926 feet, and gives the ore sent to the Smelting Works as 322 tons containing 23 tons of copper, 132ozs. of gold, and 339ozs. of silver. The ore on the dumps is estimated at 727 tons of assay value 5.16 per cent. of copper. The total output of the lease recorded by the Mines Department is 1,322.99 tons of ore containing copper to the value of £7,296, and 503.52ozs. of fine gold.

On the whole this mine, though producing some ore very rich both in copper and gold, appears to be rather a low-grade proposition, and it seems likely that its success will depend very greatly upon developments at greater depth and on the success of concentration treatment. The ore-bearing material appears to be a large schistose "formation," much larger than the quartz veins appearing at the outcrop would lead one to expect, and in places the values are very promising.

*Mary* (M.L. 7).—This lease is also now held by the Phillips River Gold and Copper Coy., but only a little prospecting work has been done by them upon it. Its output of ore to 31st October as recorded by the Mines Department is 795.74 tons returning copper to the value of £5,627 and 9.47 ozs. of fine gold. When I saw this mine on a previous visit there was a very nice shoot of chalcopryrite ore going strongly downwards in the bottom of the workings, and I have little doubt that when again worked it will be a considerable producer of ore.

*Ballarat* (M.L. 205) and *Emily Hale* (M.L. 124).—The shaft on the Emily Hale lease at the time of my previous visits was down to water level at about 70 feet and the prospectors were not able to sink it deeper on account of the water. Since the Mt. Benson mine started pumping however, the water disappeared and the shaft has been carried down to 140 feet on the underlay of the lode. This runs about N. and S. and underlays to the west, but the first 65 feet from surface are nearly vertical. At the 140ft. level there is a shoot of very fair yellow copper ore for 35ft. north and 15ft. south of the shaft, 12 to 30 inches wide. Good ore was got all the way down the shaft, averaging 10 to 12 per cent. copper. The lode is in greenstone country, and is composed of silicious and hornblende lode stuff with chalcopryrite. A good deal of stopping has been done above the 65ft. level, and there is a fairly large dump at surface of second grade ore from this work from which the best ore has been picked. The shoot at this level is about 100ft. long; at the 140ft. level it had not been driven through in the north end when I saw it. The mine is recorded as having produced 252.58 tons of ore,



containing copper valued at £2,576. Like other prospecting properties in the district this mine is suffering from want of means of treatment of its poorer ore, the handpicked first-class ore hardly sufficing to enable the owners to make a living.

*New Moon* (M.L. 204), formerly *Kilmore* (M.L. 119).—Some work was going on in this mine but I was unable to visit it on this occasion. Its returns are recorded as 70.96 tons of ore treated for copper valued at £729.

*Last Chance Proprietary* (M.L. 200).—On this lease there is a shaft down 125ft., and from the level at the bottom of it a winze has been sunk about 90ft. deeper on an ore shoot pitching southward. In this winze the lode carried about 3ft. in width of ore composed of quartz, chalcopyrite, and marcasite, with frequent coatings of black sulphide of copper and bornite on the chalcopyrite. The lode in the stopes at about the 65ft. level is seen to be about 3ft. wide, with smooth walls. The country is greenstone schist. The recorded output from the mine has been 238.07 tons of ore containing copper valued at £2,257. There is a good deal of second-class ore on the dumps, awaiting cheaper smelting treatment, or concentration.

*Last Chance* (M.L. 116).—Here the main shaft is now down to 120ft. or about 40ft. below the water level, but only a little driving has yet been done. In the west end at the bottom level the lode consists of about 8 feet of mineralised schist containing some nice bunches and streaks of chalcopyrite, and yields enough handpicked ore to be payable, but requires concentration of the poorer ore to make the most of the values. The ground becomes fairly hard under the water level. At the 55ft. level the lode has been driven along for about 400ft. in length and several shoots of ore have been cut, from which a good deal of ore has been raised. The official returns show 868.83 tons of ore raised containing copper to the value of £3,403. This mine has a good record of production, and now requires machinery to enable sinking to be carried deeper and for dressing the lower grade ore.

*Last Chance North Extended* (M.L. 224).—This lease lies on the flank of Mount McMahon, and has much iron oxide outcropping upon it. A shaft has been sunk 70ft. on one of the brown iron ore outcrops and a crosscut driven north-easterly from it about 100ft. in length. This passed through 50ft. of ironstained lode matter containing some very promising looking gossan, but no appreciable values in gold or copper were obtained, though there are traces of gold and silver. The lodestuff was very thoroughly oxidised down to the greatest depth at which it was cut, and the shaft being on the hillside it is possible that the water level lies considerably deeper. I have in previous reports called attention to the great possibilities of the iron oxide lodes on the main range, and have little doubt that many of them if followed down will prove to be merely oxidised portions of pyritic lodes, in which there is much likelihood of finding copper.

In another shaft about 4 chains further S.W. a little copper ore has been got in an ironstone vein, pointing to the probable presence of this metal in the vein below the leached-out oxidised outcrops.

*Iron Nob Extended* (M.L. 283).—The ironstone quarry on Reserve 10021 on the main range, which was opened for the Smelting Works when they were in the hands of the Government, has been lately aban-

doned by the present owners of the works in favour of a new quarry on M.L. 283, which is a larger deposit and of better quality of iron ore, besides being nearer the works. This quarry is in a huge outcrop of brown iron ore—in my opinion without question a lode gossan—which stands out prominently on the slope of the Range. Its width is not yet ascertained but probably it is at least 50ft. wide. The brown iron ore is cellular, and of sintery appearance, and that which is mined for flux contains only about 8 per cent. of silica and other constituents insoluble in acids. A little copper is said to have been got from time to time at the Smelting Works in analyses of this flux, and lately a large lump of fairly good copper ore was brought in as having been got in the quarry, but I understand that no more could be found when looked for. A shaft has been sunk on the western side of the ironstone outcrop to a depth of about 70 feet, passing through clayey, much-weathered country all the way. It would be well worth while sinking this still deeper, to water level, and crosscutting through the ironstone lode. The lode in depth may prove to be only iron pyrites, but there is a very good chance that there may also be a good deal of copper, and in similar circumstances there have been numerous occurrences of rich secondary copper ores between the gossan outcrop and the underlying sulphides. I understand that there is some probability of this being tested by diamond drilling.

*Mt. Garrity* (M.L. 271), formerly *Tattersall's*.—On this lease a good deal of work has been done prospecting veins of oxidised copper ores which seem to run irregularly through a large mineralised belt of schist. One of the shafts is down about 60ft. The ore is quartz with ferruginous oxides and carbonates of copper, and has given some very good returns for gold. The workings are now getting down to the zone of sulphides. There seems every reason for persevering prospecting on this mine, but as yet it does not seem that the veins discovered are of very much importance. The lease lies on the flank of the portion of the main range running N.W. from Mt. Desmond.

*Mt. Chester* (M.L. 250).—In my first report, of February 28th, 1903, I drew attention to a large outcrop of black oxide of manganese on the top of the range north of Mt. Desmond, near the peak known locally as Mt. Decker. A local syndicate have since driven a long tunnel under this outcrop, but it cuts the hill so high above the water level that everything passed through is still thoroughly weathered and oxidised. Several veins of oxide of manganese are cut in the tunnel, the largest being about 9 feet wide, while two others are also of fair thickness. So far as I can learn there was no gold, silver, copper, or lead found in the ore, which is more pulverulent underground than at surface. The tunnel has proved that the manganese lodes go down, and they have every appearance of being lode gossans. They are well worth testing by sinking a winze upon them, or by boring with a diamond drill to intersect them below the water level. As a little galena has been found in the Elverdton mine, not very far away, as well as copper ores, there is a possibility that in the sulphide zone these lodes may contain either lead or copper or both. They are certainly worth testing in depth.

The tunnel shows very regularly laminated country striking north-westerly and dipping 70deg. to 75deg.

to the S.W. In the mouth of the tunnel the strata appear to be fine-grained argillaceous sandstones and a little further west there are large beds of quartzite. In the tunnel the beds are very clayey in their composition, but very distinctly laminated, with variously coloured laminae. Three rather thick massive beds of weathered felspathic rock are seen in the tunnel apparently interbedded with the laminated strata, but whether they are dykes or not of igneous rock is not yet clear. They seem to stand in close connection with the manganese veins.

I am not at all certain that the apparently stratified rocks may not prove to be felspathic schists greatly altered by the action of hydrothermal and pneumatolytic agencies, as the whole range shows most strongly that such action has been very prevalent along it. If they are sedimentary rocks, then they most probably belong to the same formation as the Kundip quartzites and conglomerates and overlie the older rocks of the Ravensthorpe metalliferous series. As they dip steeply to the S.W. it would then be probable that they are thrown into their present position by a powerful fault somewhere on the west side of the Range. The Geological survey will doubtless throw light on this matter.

*Ironclad* (M.L. 275).—To the south-west from the Mt. Chester tunnel in the low ground at foot of the hill the greenstone schists are seen again in some recent workings on a lode which appears to be running about N.E. and S.W. and underlying to the N.W. crossing the schists, which here strike N.N. Westerly No one was working, and very little ore was visible on the dumps. It seemed to be mostly quartz and schist with copper pyrites and oxidised copper ores.

*P.L.P.* (M.L. 199).—This lease adjoins the N.W. angle of the Mt. Desmond lease, and has two lines of lode opened up. The eastern one is the same as that worked in the north shaft of the Mt. Desmond mine, and has two shafts sunk upon it, close to the boundary between the two properties, to a depth of about 60ft. It runs a little to the west of north, and consists of schist and quartz. For from 8 to 12 feet in width it contains chalcopyrite ore in veins up to three feet wide, and should yield a good deal of good hand-picked ore and a large amount of material fit for concentrating. The granite country is seen both to the east and the west of the lode, and a short distance north of the shaft a diabase dyke is seen crossing on a more or less east and west course, cutting through both granite country and lode. This dyke is also seen in the workings on the western lode, but does not seem to cause any serious dislocation.

The western line of lode is about 240ft. further west and has had a good deal of work done upon it, most of the ore recorded from this lease having come from it. The lode here, as in the case of the eastern one, is found along a dyke of greenstone penetrating the granite country. It is possible that this dyke may be the one in which the Elverdton lode occurs further south, but the relations of these lodges are not yet definitely established.

The P.L.P. lease has yielded 179.54 tons of ore to 31st October, 1907, containing copper valued at £2,013, and 10.91ozs. of fine gold.

*Mt. Desmond* (M.L. 109).—A long line of lode has been traced through this and the adjoining "*Desmond*" (M.L. 208) leases into the British Flag (M.L. 203) lease, and may be the same as the Elverdton lode in M.L. 95. The Mt. Desmond lode, however, seems to line out somewhat to the eastward of the Elverdton line, and there is no certainty by any means

as yet that they are identical. Possibly it may prove that the Mt. Desmond line joins the Elverdton to the south of the latter mine's main shaft, and that the northern portion of the Elverdton lode is on a separate line, perhaps that seen in the western shaft of the P.L.P. The north shaft of the Mt. Desmond and the eastern shaft of the P.L.P. are presumed to be on the main Mt. Desmond lode, but they also are a good deal off its general line of strike. Between the north shaft and the main shaft however there is one, and probably more than one, diabase dyke cutting across the line of lode, which may have disturbed its continuity. The Mt. Desmond mine is now the property of the Phillips River Gold and Copper Co., who have enlarged the main shaft and provided it with winding engine, air-compressor, poppet heads, and other necessary permanent plant. At the time of my visit, however, work had been concentrated upon the adjoining Elverdton mine.

The north shaft above referred to is a prospecting shaft sunk 100ft. from which a crosscut has been driven 20 feet east to cut the lode, which has then been followed south for about 100ft. The lode matter is schist and quartz with a fair amount of copper pyrites, the ore-dump being estimated to contain about 6 per cent. of copper. The main shaft is sunk to a depth of about 270ft. and has levels driven from it at 96ft. and 196ft. A good deal of crosscutting has been done, and it is now seen that the lode, which at surface appeared to be one of no great size, is a very large one, up to as much as 60 feet wide. It is a dyke of dark greenstone penetrating the granite country, and often converted into schist, especially along the walls, by pressure and movement of the walls. The whole of the rock contains a little copper pyrites dispersed throughout its mass, and a great deal of it has enough ore to be worth seriously considering as a concentrating proposition, while there are numerous veins and bunches of better ore besides, fit for immediate smelting. The principal ore-shoot is the one worked downwards from No. 3 shaft, about 250 feet south of the main shaft. This has been followed from the 96 to the 196 feet level by a winze, in which there is a splendid show of excellent yellow ore the full width of the winze. This shoot seems to be pitching northwards towards the main shaft.

The Mt. Desmond mine could probably be worked with considerable profit for a time by confining attention to the richer veins and working out these only. There seems however a much better prospect of success in working it on a large scale as a low-grade mine, concentrating the poorest stuff which cannot be smelted directly, and treating a large amount of material that would otherwise be left untouched. I understand that this is the policy advocated by the management, and from inspection of the workings and of the assay plans there seems every reason for their confidence that it will result successfully. Much depends on the adoption of a cheap and efficient system of concentration, and if anticipations as to this are realised a great bulk of low grade ore would be available above the levels already opened.

The Company's report for period ended June 30th, 1907, states that 1,246 tons of ore have been sent to the Smelting Works, containing 152.5 tons of copper, 189ozs. of gold and 795ozs. of silver. The official returns from the lease recorded by the Mines Department show 1,484.78 tons of ore, of value in copper £15,415, and containing also 162.35ozs. of fine gold.

On the *Desmond* (M.L. 208) and *British Flag* (M.L. 203) leases little has been done except prospecting, tracing the lode to the southward. Some good oxidised copper ore has been obtained from these leases.

*Elverdton* (M.L. 95) and *Elverdton South* (M.L. 168).—These leases also are now held by the Phillips River Gold and Copper Co., Ltd., who are now working them as one mine. A new main shaft has been sunk, and levels opened from it at 130ft. and 250ft. The shaft has been well equipped with poppet-heads, winding engine, and rock-drilling outfit. At the 250 feet level the bottom of the shaft and the chamber east from it are in granite country, but the greenstone dyke rock was met with in the eastern side of the chamber, and on the contact was, for a width of about 4 feet, schistose and much transmuted into lode matter, carrying a fair amount of yellow copper ore. This was followed to the north for about 60 feet, the lode carrying some good ore, but being mostly of somewhat low grade. As the vein seemed to be turning more to the east than was expected, the drive was then diverted to follow a smooth wall in the granite. After driving 100 feet on this a crosscut was made to the N.E., which at 17 feet cut the lode again, showing rich chalcopyrite ore in hard quartz matrix. The lode, as before, is on the western contact between the greenstone dyke and the granite. It has been driven along both north and south from the crosscut, a total distance of about 90 feet when last seen by me, carrying good ore all the way. The south face had about 3 feet in width of very fair ore, and the north one 5 feet of first-class chalcopyrite when last visited. This is a splendid shoot of ore and its length is not yet known. The last 20 feet going north were in ore carrying much less silica than where the shoot was first cut. It seems probable that the poorer ore cut at the main shaft is the north end of this ore-shoot, which would then be about 200 feet in length and still continuing strongly to the northward. It is probably the ore-shoot worked from the old Elverdton main shaft described in my former reports from which the principal output of the mine has been obtained. At the 250 feet level the shoot is certainly larger and better than in the higher workings. The prospects of this end of the mine are exceedingly good.

Driving south from the main shaft there appears to be a heave of some sort throwing the reef over to the east, and a good deal of exploratory work has had to be done. The drives are mostly in dense dark greenstone dyke rock, but the granite is seen in two crosscuts to the west; one of these shows a "horse" of granite in the dyke, or else there is a second dyke west of the main one.

A crosscut to the east passes through hard greenstone, containing frequent impregnations of chalcopyrite. Following the western contact of the dyke and the granite as before the lode became more defined again about 150 feet south of the main shaft, and at the time of my last visit to the mine there was about 5 feet of lode-matter in the face, consisting of schist and quartz with a good deal of pyrites and some fair chalcopyrite ore. Boring in the eastern wall having shown ore there, a subsequent breaking down revealed that the lode was 12½ feet wide, and contained a band 2½ feet wide of pretty good ore, quartz and chalcopyrite with some iron pyrites. This is probably the north end of the shoot of ore worked by the former owners in their south shafts

on the Elverdton lease. This is an important development.

The work done at the 250 feet level of this mine is very satisfactory as showing that the lode lives downwards strongly and contains good ore in the hard unweathered country. The chalcopyrite has every appearance of being a primary mineral in the lode and not a secondary enrichment.

The lode often shows characteristics of a fissure vein, so it is probable that its formation is due to there having been faulting movements of the country along the line of weakness constituted by the contact between the intrusive greenstone dyke and the granite. The dyke is evidently much larger at the lowest level than in any of the upper workings. It seems a good deal less schistose than the Mt. Desmond one, but is otherwise very similar. There seems a chance that ore might make also on its eastern edge, and some prospecting to test this might be done with advantage.

For the year ended June 30th, 1907, the Company's annual report states that 573 tons of ore were sent to the Smelting Works, containing 34.36 tons of copper, 54ozs. of gold, and 257ozs. of silver. The statistics of ore production of the Mines Department show 3,539.42 tons of ore treated from this mine (including the Elverdton South) for copper valued at £25,524 and 18.86ozs. of fine gold.

*Thistle and Shamrock* (M.L. 257, formerly "Welcome Stranger").—On this lease there is a shaft about 100ft. deep, from which a drive has been carried over 100 feet in length along a lode running N. and S., and standing nearly vertically. The lode is on the edge of a small greenstone dyke penetrating the granite country, and which seems to lie a good deal to the east of the probable course southward of the Elverdton dyke. The lode is up to two or three feet wide in parts, but is mostly rather small. It contains some very fair oxidised copper ores, and in the lowest workings a little pyrites is beginning to appear. The hardness of the country is much against the prospectors.

About 100 and 120 feet east there are two other similar small lodes, running parallel to the first, but underlaying towards it, which also seem to be formed on small dykes of schistose greenstone running through the granite. Small parcels of good copper ore have been raised and sold from all these lodes.

*Addie* (M.L. 32).—No one was working on this lease. There appears to be a north and south lode following a dyke of schist (greenstone) traversing the granite country. A small parcel of good ore was raised here, but the water became too much for the prospectors.

*Fairlie* (M.L. 266).—There are two lodes on this lease on which some work has been done, the workings being formerly known as the "Grand Slam" and "Mountain View" mines. Like the Thistle and Shamrock and Addie lodes, these are in small belts of greenstone schist running N. and S. through the granite. Shafts have been sunk some 80 or 90 feet, but no one was working, and I did not go down them. Small parcels of oxidised copper ores have been raised from them.

The series of small greenstone dykes on which these lodes are formed may perhaps represent the southward termination of the Mt. Desmond and Elverdton dykes, which would then have split up and become small. Further south the country seems to be all granite, and no important mineral discoveries have been made for about two miles. The dykes are

plainly most intimately related to the copper lodes of the Mt. Desmond and Elverdton group of mines, and it will be of much service to have them traced and mapped.

*P.A. 46.*—Messrs. Stennett and party are working a small quartz vein two to 12 inches wide on a prospecting area in the granite country about a mile south of the last described leases. The vein runs east and west, and dips about 45 degrees to the south. The prospectors have worked it down for about 30 feet in depth, and recently had a crushing of 10½ tons, which returned about three ounces of gold to the ton.

*Mt. Stennett (M.L. 108).*—No one was working on this lease when I visited it, and there was little to be seen in the workings from two of the shafts which I went down. The lode is traceable a fairly long distance, and is in a belt of greenstone schist close to its contact with the granite country. The shafts are down about 120 feet, on the underlay of the lode, which is easterly. The lode is a well defined strong body, but has not been very rich, most of the ore being of a grade which would require either very cheap smelting or concentration. The lease has yielded 298.97 tons of ore containing copper valued at £2,672, and also 24.68 ounces of fine gold. It seems well worth more energetic handling.

*Ardpatrick (G.M. 107).*—A good deal of work has been done above water level, about 40 feet deep, on a quartz lode running N.E. and S.W., and underlaying about 45 degrees to S.E. The owners were away at the Harbour View Battery putting through a crushing when I visited the ground. To October 31st, 10 tons had been crushed for 14.48 ounces of fine gold. The country is granite, as in the case of the similar gold-bearing vein in Stennett's P.A. 46.

*Gladys (M.L. 159).*—On this abandoned lease two prospectors had recently been trying the old workings, and had raised a small parcel of good-looking oxidised copper ore. The lode runs about N. and S., and is three or four feet wide. The workings are about 30 feet deep, and are quite small. The ore contained carbonates of copper, and some good-looking copper glance.

*Alice Mary (G.L. 99).*—On this there is a shaft sunk on a large lode of quartz and oxide of iron. The lease being fairly high up on the range, the water level is probably deep, and there is considerable probability of concentrated secondary copper ores being found below the gossany portions. The lode is being worked for gold.

*Christmas Gift (M.L. 184).*—Here there is a large lode six to eight feet wide running a little to the east of north. The lode matter is quartz and brown oxide of iron, with some very good oxidised copper ore and a fair amount of gold. The gossan outcrops carry gold, but are poor in copper, which comes in lower down. The principal shaft is sunk to 100 feet, but little work has been done at that level. The workings now in progress are at 45 feet, where some very good ore was being got when I visited the mine. The picked ore sent to the smelting works is stated to have yielded about 20 per cent. of copper and one ounce of gold per ton. The owners showed some nice specimens of green carbonate of copper with

gold freely visible in it. To 31st October, 1907, the statistical returns from this lease show 69 tons of ore treated at smelting works for copper valued at £683, and 279 tons crushed by battery treatment, the gold return from both sources being 217.43 fine ounces.

This lode seems to me to be one of very considerable promise, and likely to prove of importance. There is a good deal of low-grade ore in it as well as the richer stuff which has been treated. The country is much weathered greenstone schist. It is worth noting that at surface this lode seems very little different from other gossan outcrops on the Ravensthorpe Range, but has proved to contain copper ore down below. The Hillsborough mine shows the same feature, giving great encouragement to the prospecting of the iron oxide lodes by sinking upon them.

*Hillsborough (G.L. 98).*—A fine large lode containing good copper ore and gold has been opened on this lease by a shaft 120 feet deep. The course is N. 75 degrees to 80 degrees E., and underlay to S.S.E. 50 feet in the depth of the shaft.

In the bottom of the shaft, which is sunk in weathered greenstone schist country, the lode shows a smooth hard hanging wall, dividing the lode material very clearly from the country. A crosscut has been made 18 feet across the lode without finding the footwall, so it is apparent that it is a large ore body. The lode matter is mostly iron oxide and some clayey lode matter, without very much quartz, and shows some excellent oxidised copper ore. The shaft is down just to the water level, and in the bottom a little chalcopryite begins to come in. Stuff showing gold freely has been found at several points in the workings. The lode has been followed from surface to the bottom level by an underlay shaft, but in this the hanging wall has been followed, and the footwall of the lode is not certainly seen. There was no copper in the first 80 feet of sinking, the stuff being mined only for the gold contained in the gossan. As has been already pointed out this is a very common feature in copper lodes, the metal having been leached out from the shallower parts of the lode. There is a considerable amount of rather low-grade gold ore in the workings, estimated by the owners as likely to return five or six dwts. per ton by battery treatment. The battery does not, however, give a good extraction on this ferruginous material, as assay of the tailings shows them to contain about as much gold as is recovered, and as the oxide of iron is wanted for smelting purposes, it would be very desirable if special arrangements could be made for treatment of even the low-grade stuff by smelting.

To 31st October, 1907, the Hillsborough lease is recorded to have crushed 134.09 tons of ore, and sent to the smelting works 70.57 tons for 328.96ozs. of fine gold and copper to the value of £270.

The owners of this mine have supplied me with the following statement of their returns:—

Treated at Battery.	Tons.	Gold (unrefined) therefrom.
February, 1906	20	16oz. 14dwt. 0grs.
December, 1906	41	94oz. 15dwt. 8grs.
November, 1907	151	152oz. 11dwt. 18grs.
<b>Total</b>	<b>212</b>	<b>264oz. 1dwt. 2grs.</b>

Sold to Smelting Works.		Tons, dry net weight.	Copper. %	Gold per ton.	Silver per ton.
Jan. 24th, 1907	—Concentrates from December crushing	2-1219	1-75	2-62ozs.	0-39ozs.
Jan. 22nd, 1907	—Second-class ore	5-8494	4-13	3-03ozs.	0-99ozs.
" "	—First-class ore	8-5966	14-26	3-10ozs.	0-89ozs.
June 7th	—Second-class ore	20-0880	1-95	2-30ozs.	0-44ozs.
June 20th	—First-class ore	16-1543	12-29	2-45ozs.	1-00ozs.
July 8th	—Second-class ore	32-0688	2-47	2-42ozs.	0-30ozs.
Sept. 24th	—First-class ore	5-7762	11-79	2-19ozs.	1-20ozs.

From the crushing of 151 tons treated in November, there were saved about 7 tons of concentrates, assaying  $2\frac{1}{2}$  to 3 ounces of gold per ton, and the tailings assayed 17dwt. of gold per ton.

Very little work has been done on the lease except the sinking of the underlay and vertical shafts, and development by driving is required to show the extent of the ore shoots. The returns quoted are very good for the small amount of ground broken, and there is every reason to think that this lode will be one of great importance to the Field. It is certainly a most promising prospect.

On the West boundary of the lease there is another shaft 100 feet deep, from which a crushing was taken returning 14dwts. of gold per ton. The lode is from two to four feet wide, and composed of iron oxide and quartz mostly. A little copper came in in the bottom of the workings, showing that this also is a copper lode in depth. It is not clear yet if this is the main Hillsborough lode or a parallel one lying south of it.

*Lilly* (G.L. 104).—Close to the last mentioned shaft there is another one 100 feet deep on the same lode in the Lilly lease. The lode in this is about eight feet wide. From this 50 tons have been crushed for 31.96ozs. fine gold. The lode evidently deserves serious attention.

*Queen of the Earth* (G.L. 129).—On this lease most of the work done has been for the purpose of cutting the Hillsborough lode, but though several leaders have been found, and also a lode of ironstone and clayey lodestuff carrying some gold, no great success has yet attended the operations. A good deal of alluvial gold has lately been found on surface on this lease, and it seems to have quite a number of more or less auriferous veins traversing it.

*Stowaway* (G.L. 106).—On this lease also there are several costeans showing ironstone veins and lodes in which a little gold has been got, and the owner has been pretty successful in getting alluvial gold in the surface soil. Much of this is evidently reef gold, which has travelled but a short way from its original matrix. One piece weighed  $6\frac{1}{2}$ ozs., but contained a little quartz. This seems a very likely piece of ground for discovery of a good reef. It is worth noting that on this lease there is in parts an occurrence of a rounded pebble conglomerate, evidently a relic of a denuded superincumbent sedimentary formation much younger than the bedrock. It is also seen on the other side of the Kundip Creek to the south of this.

*Western Gem* (G.L. 80).—A vertical shaft has been sunk 180 feet to water level passing through weathered greenstone country, which is becoming harder at the bottom of the shaft. It was put down in search of the reef worked further west in the Two Boys lease (G.M. 74), but did not strike it, and cross-cutting will be required. There are also workings on a flat reef, which seems to run to the south of the Two Boys' workings, but not parallel to them. The bearings I obtained gave its course as from N. 10 degrees W. to N.N.W., while the Two Boys lodes run nearly east and west. The dip is at a low angle to the westward, but gets steeper in the deeper workings. The lodestuff is brown iron oxide and clayey matter, 15 to 18 inches wide, with some quartz, and contains fair values in gold, having given up to 25dwts. per ton in the battery. The recorded returns to 31st October, are 70 tons crushed for 58.33ozs. of fine gold.

Towards the western side of this lease there is a shallow cut on a lode of clayey iron oxide striking towards the Hillsborough, from which prospects can be obtained estimated equal to 5dwt. of gold per ton. This seems worth prospecting further.

The line of country between the Lilly lease and the Two Boys and Gem holdings seems to contain a large number of auriferous ironstone veins, some of them of fair size, and offers strong inducement for active prospecting. There appear to be several distinct lines of lode, which require laying down on a map in order that their relations to each other should be visible.

*Two Boys* (G.L. 74).—In this lease the principal work is on a flat lode, two to six feet thick, running about East and West, and dipping southerly, except to the north of the shaft where it seems to dip towards the north, thus having somewhat of a saddle shape. This dip may, however, be only a local bend. The workings are of some extent, and go to about 10½ feet beneath the surface. The lodestuff is clayey, quartzose, and ferruginous material, often resembling furnace clinkers in appearance. Much of it is fairly pure dark brown oxide of iron. From its appearance I feel fairly certain that it is the result of decomposition of pyrites, which would lead to the expectation that sulphides will be obtained in depth, and though there is no sign of copper as yet, it is not unlikely that the lode is one of auriferous copper below the water level. The country is a white kaolinised rock, probably a fine grained granite or quartz porphyry in depth.

The returns from this lode are very good, 388.12 tons crushed having yielded 1,008.23ozs. of fine gold. There is a large amount of crushing dirt in sight ready to crush, and as the owners have put up a 10-head battery of their own they should be able to treat it at low cost, and take out a lot of the lower grade ore that will not pay for carting to a battery at a distance. They were waiting for their oil engine to drive the mill, which had not yet come to hand. Water is brought from the "Medic" shaft, about a mile away. A cyanide plant is also proposed.

*Gem* (G.L. 65).—The lode seen in the Two Boys is also worked in this lease, and is quite similar. There is also another E. & W. lode, dipping southerly more steeply, about 40 degrees to the north of the first line. This has been sunk upon for about 140 feet on the underlay. Down to 60 feet the reef was poor, but it then improved in size and value. At the bottom level the reef is about six feet wide, but contains a good deal of clayey lodestuff. It has a smooth hanging wall, and lies in kaolin country. 1,138.35 tons crushed to 31st October last have returned 827.85 ounces of fine gold.

This mine was crushing again at the time of my visit. It has its own 5-head battery, driven by an oil engine. The owner estimates the cost of fuel at about one-half of that of the steam-driven batteries in the district.

On the top of the range, east of the Gem lease there is a large outcrop of laminated and brecciated ferruginous quartzite, and close to this some prospectors have lately got a small quartz vein carrying gold. The possibilities of the piece of country in and around the gold leases at Kundip are very great, both for gold and copper, and there is every likelihood that energetic prospecting will be well rewarded.

*Medic* (G.L. 66).—A main shaft is being sunk on this lease, and is down 180 feet, at which depth the in-

flux of water became so heavy (about 5,000 gallons a day) as to require a pump, which is being obtained. The water level is at 80ft. The water having been allowed to rise I did not see the underground workings. The country is greenstone. The reef is said to be three or four feet wide at water level, but the good shoots of ore are somewhat short. The reef runs about E. and W., but is rather crooked, with southerly underlay. 377.90 tons have been crushed to 31st October, 1907, for 331.34ozs. of fine gold, and there are estimated to be about 300 tons of stone at grass ready for crushing. The workings are down to 120 feet on the eastern ore-shoot, and to about 90 feet on the western one.

*Harbour View* (M.L. 52).—The main shaft, which is on the underlay of the reef, has been sunk about 150 feet, the bottom level being 140 feet below the surface. The Phillips River Gold and Copper Coy., Limited, had, till lately, an option over this property, and drove about 320 feet along the lode at the 140 feet level, also 200 feet at the 104 feet level from the north shaft, near the north boundary of the lease, but failed to agree with the owners as to the price to be paid for the mine, and gave up their option. The owners are now working it themselves.

The course of the lode in the southern portion of the lease is about N. 22 degrees E., and it underlays about 1 in 3 to the westward; in the northern workings it runs about N.E. All through the mine there is a very well-defined smooth hard footwall, the footwall country being somewhat coarsely crystalline granular greenstone, which is becoming fairly hard in the bottom level. The hanging wall is not so clearly defined, and is often not seen at all, the lode being wide, and the workings have generally followed the footwall. Where best seen the hanging wall is a somewhat fine-grained, much-jointed greenstone, not similar to the footwall, the lode being apparently formed along a line of fault. The lode matter is greenstone schist, mostly much weathered in the present shallow workings, with quartz and much iron oxide, and contains several very good shoots of copper ore. Throughout the present workings the ore is very thoroughly oxidised, though sulphides are beginning to come in at the lowest level. The ore bodies are often four feet and sometimes eight to ten feet in thickness, and appear to be of considerable length. Some excellent oxidised ore was being raised at the time of my visit from the shoot at the main shaft from a slope about eight feet wide. This was very fine smelting ore, containing a large amount of oxide of iron and little silica. The mine should be able to turn out a large quantity of good smelting ore from the southern workings, and a much larger amount of poorer ore for milling at its own battery. Even the second-class ore would be much preferably smelted than milled, as the battery treatment does not obtain a good extraction of gold from it, but under existing circumstances nothing better can be done than crushing it. It is treated in a 10-head battery, and the tailings are passed over Wilfley tables. The saving of the oxidised copper ores by concentration is, however, very poor.

Another good shoot of copper ore has been opened in a shaft some hundreds of feet north of the main southern workings, yielding good smelting ore and some milling material.

In the north shaft the drive at the 104 feet level passes mostly through ore composed largely of brown oxide of iron, and is often six to 10 feet wide, with the hanging wall frequently not visible. A little

copper ore is found in it, but the workings are probably not deep enough to be below the zone of impoverishment in copper by leaching. There seems to be a very good chance of secondary enrichments at the water level. The lode matter all carries more or less gold. The present owners crushed 340 tons from the dump at the shaft, representing a bulk sample of the ground excavated, for a return of four dwts. per ton by amalgamation treatment only. The ore is easy smelting material, and its best treatment would be by smelting with sulphide ores.

From the course of the lode in the north workings it seems possible that there is a junction of two lodes in that end of the lease. A lode of brown iron oxide and quartz, carrying a little gold, and running N.E. and S.W. has been cut in some costeans to the north of the battery, and should join the main lode near the north shaft. Its underlay appears to be westward, or towards the main lode.

To 31st October, 1907, the Harbour View mine is recorded as having sent to smelters 736.92 tons of ore containing copper to the value of £5,906, and crushed 5,083.25 tons for a return of 2,417.74ozs. of fine gold, and 226.39ozs. of fine silver from the total tonnage treated.

This mine is a very promising proposition, and if opened up extensively bids fair to become one of great importance. It carries gold values more or less for the whole length it has been tested, a distance of over 1,400 feet, contains several shoots of good smelting copper ore, and the lode is a large and strong one. It has maintained a struggling existence for several years past out of its own produce under very adverse circumstances, but now requires equipment with machinery, and development in depth. There is as yet but little water met with in the mine, but judging from the experience of the other mines in the Phillips River Field, it is probable that a good supply for battery and dressing purposes will be obtained when the workings are carried deeper. The ground is getting hard in the bottom workings, and rock drills will doubtless be required at lower levels for efficient development. It can no doubt be worked on a small scale in the shallow weathered ground for many years to come, but what is required to make an important mine of it is capital, to enable it to be opened up on a fairly large scale and properly provided with plant for raising and effectively reducing the ore.

*The Flag Gold and Copper Mining Co., Ltd.* (M.L. 60)—*Red, White, and Blue.*—On this mine a new main shaft has been sunk 212 feet, and crosscutting carried in 40 feet at the 200 feet level. A heavy flow of water has been met with, estimated at about 60,000 gallons per day, and at the time of my visit work underground from the main shaft was at a standstill, pending the installation of a pump. The water is salt, but not excessively so, containing about 1½ per cent. of salt. The shaft is equipped with angle steel poppet-heads, and a steam-driven winding winch, but rock-drilling plant has not yet been provided though it is likely to be required when the shaft is carried deeper as the country gets much harder in depth. The mine also has a 5-head battery.

The main lode in this lease has a general E. and W. course, but repeatedly breaks away from it and returns to it in somewhat zigzag fashion. The underlay is to the south about 1 in 2. The deepest workings are from an underlay shaft which goes down to the 100 feet level, at which depth there has been a good deal of driving. A winze is sunk 40 feet below this, showing the lode going down strongly. The

whole of the lode stuff in these workings is very thoroughly oxidised, but from surface downwards there have been veins and bunches of copper ores, some of which in the deeper parts of the mine are sulphides (bornite and copper glance). The lode material is mostly clayey iron oxide with not very much quartz, and some parts are nearly pure dark-coloured oxide of iron.

Seven shoots of copper ore are distinguished in the mine, but most of these have not yet been followed to any considerable depth. The main shoot at the underlay shaft is about 50 feet in length and is from 3ft. to 8ft. wide. It has yielded some very good copper ore rich in gold. The other shoots are all well worth development, and when the lode is opened at the 200 feet level should yield a lot of good ore. The shallow workings give a very good average value in gold, the assays frequently exceeding 1oz. per ton.

In a shaft on the lode to the east of the main shoot of ore some very rich gold prospects have lately been obtained in friable white quartz and white quartz grit and sand forming part of the lode-filling.

On another lode, known as No. 2, very little work has yet been done, though it contains fair gold. It may join the main lode towards the west side of the lease.

The Company's report to 30th September, 1907, states that since it began operations 206½ tons of ore have been treated by smelting containing 195.9 oz. of gold and 21.05 tons of copper, and yielding a return, after deduction of smelting charges, of £1,115 14s. 1d. The total recorded production from the lease is 449.44 tons of ore treated by smelting, yielding copper to the value of £3,032, and 1005.60 tons crushed, for a return from both sources of 1,122.15 ozs. of fine gold and 107.29ozs. of silver.

At the time of my visit the mine was employing 31 men, not including those engaged at the battery and the office staff.

The Flag Coy. is a local venture, with its office in Ravensthorpe and most of its shareholders in the Commonwealth, and was floated with considerable difficulty, a large number of shares being unissued. It now seems in a fair way to attain a good position, and if developments continue to be as favourable as present appearances entitle one to expect it should have a very good prospect of becoming a strong and successful concern. There is, however, a great deal to be done to enable work to be carried out to the best advantage, and it would be very desirable to have some more working capital.

The battery treatment of the oxidised ore is not as successful as could be wished, the extraction of gold by amalgamation being only about 45 to 50 per cent. of the total value. Cyanide treatment of the tailings is debarred on account of the presence of copper, and concentration is not successful in effecting any considerable saving of gold from the tailings. The ore is excellent material for smelting treatment, but the lower-grade stuff will not pay to send to the Phillips River Smelting Works at present rates of freight and smelting charges.

The Flag is therefore in the same case with the Harbour View, Hillsborough, and other Kundip

mines, and the erection of a local smelting works has already been under consideration. As yet there is a lack of sulphide ores to treat with the oxidised material, but this will most probably be remedied as the mines get deeper. The exploration of these lodes in depth is therefore highly advisable, not only to prove the mines, but also to provide means for the effective treatment of the large amounts of oxidised ores now in sight.

*West River District.*—Time did not permit of a visit to this locality, which is about 22 miles from Ravensthorpe and 20 miles from Hopetoun. One of the prospectors of the district informed me that there were six parties of men working in the district, comprising nine men. The likely mineral country is said to be about two miles in length. Some small parcels of very good ore have been sent out, the total recorded being 107.27 tons sent to smelters containing copper valued at £1,678 and 50 tons treated for gold, of which 11.58 fine ounces were obtained from the total tonnage. Cartage of ore to Hopetoun costs £2 10s. a ton, and shipment to Wallaroo about 25s. per ton. One of the lodes is said to be 10ft. wide, but most of the others are small. The ore shipped has returned 25 to 37 per cent. of copper. This district seems worth some attention.

*Scheelite Lode.*—Some 10 miles or so west of Kundip Mr. H. Dallison has been working a small lode carrying gold and scheelite. A parcel crushed at the Gilbert battery was concentrated after extraction of the gold and 17 bags of scheelite obtained. From the account sales which Mr. Dallison was good enough to show me I have extracted the following interesting particulars:—

17 bags Scheelite—Gross weight ...	979	kilogrammes.
Net weight ...	950.7	"
Net dry weight	943.38	"
Agreed Assay: 75% WO <sub>3</sub> (tungstic oxide)	943.38	kilos. @
75% =	707.535	kilos.
@ 45.50 marks per unit per 1,000 kilos =	M 3,219.30	
Less charges ...	59.50	
	<u>M 3,159.80</u>	
	£ s. d.	
@ 20.45 M. to £1 =	154 10 4	
Less stamps, commission, and interest	4 7 1	
	<u>150 3 3</u>	
Less charges of transport, etc.	11 2 1	
Net proceeds	<u>£139 1 2</u>	

The parcel seems to have been fortunate in getting an unusually high market value for tungstic oxide, but it is well worth noting that the scheelite proved very profitable to ship, the net return from less than a ton being £139 1s. 2d.

#### PRODUCTION OF GOLD AND COPPER FROM THE PHILLIPS RIVER FIELD.

The following tables have been prepared by the Statist showing the production of the Goldfield to 31st October, 1907, and the sources thereof:—

G.M.L. 115





Do.	M.L. 158	Rio Tinto											.32								
Do.	M.L. 257	Thistle and Shamrock				.69							.69								
Do.		Voided leases										9.00	.70								
Do.		Sundry claims				.56							.56								
Mt. Purchas	37	Agnes Reward			90.00	40.74				4.38		90.00	40.74								
Do.	121	Elsonor Frances										.05	18.56								
Do.	89	Mt. Agnes Reward										84.00	88.02								
Do.	92	Mt. Mary										17.00	11.89								
Do.		Voided leases																			
Do.		Sundry claims										4.75	4.68								
Ravensthorpe	M.L. 207	Andante			17.00	6.60						17.00	6.60								
Do.	M.L. 215	Birthday											3.12								
Do.	M.L. 259	Birthday				.31							.31								
Do.	M.L. 176	Blue Ribbon											4.22								
Do.	115	Bobby Dazzler			9.00	12.60						18.00	38.59								
Do.	M.L. 196	Contest				.21							.21								
Do.	M.L. 26	Ellendale										70.00	36.80								
Do.	93	Ellen Tommy										34.00	14.26								
Do.	64	Eureka: — Gilbert G.M., Ltd.										29.00	33.38								
Do.	29, etc.	Floater: Gilbert G.M., Ltd.										12,584.00	10,661.48								
Do.	82	Gilbert G.M., Ltd.			140.00	59.60						236.00	148.47								
Do.	63	Golden Link										22.00	15.27								
Do.	17	Grafter										227.50	356.46								
Do.	M.L. 202	Grafter				12.67							14.43								
Do.	26	James Henry										406.00	514.67								
Do.	75	Jubilee										64.00	32.66								
Do.	M.L. 116	Last Chance											5.31								
Do.	21	Lucy										269.00	174.78								
Do.	M.L. 16	(Marion Martin)											20.09								
Do.	M.L. 7	Mary											9.47								
Do.	M.L. 175	(Mt. Benson)											287.88								
Do.	M.L. 175	Mt. Benson: Phillips River Gold and Copper Co., Ltd.				174.74	36.48						215.64	36.48							
Do.	M.L. 195	Mt. Benson Extended				10.60							11.88								
Do.	M.L. 15	(Mt. Cattlin)								49		200.00	85.50								
Do.	88 (52)	Mt. Eliza				1,483.37	12.15						1,483.37	12.15							
Do.	M.L. 15	(Mt. Cattlin: Phillips River Gold and Copper Co., Ltd.)											387.33								
Do.	M.L. 15	Mount Cattlin Copper Mining Co.			21.50	8.61						101.50	76.28								
Do.	119	New Maori Queen			2.44	51.59						2.44	51.59								
Do.	M.L. 204	New Moon				.70							.70								
Do.	1	(Phillips River G.M. Co., N.L.)										5,070.00	4,048.94								
Do.	M.L. 16	Phillips River Gold and Copper Co., Ltd.				35.80							35.80								
Do.	76	Planet											13.46								
Do.	50	(Plantagenet)								4.85		87.00	151.81								
Do.	59	Plantagenet G.Ms., N.L.										442.00	151.81								
Do.	52	Princess Royal										27.00	9.07								
Do.	M.L. 219	Puzzler				.59						59.00	29.79								
Do.		Voided leases								109.50		623.00	332.02								
Do.		Sundry claims			20.00	5.35					134.79	73.00	71.10	4.15							
West River	M.L. 252	Pick and Shovel				.21							.21								
Do.		Sundry claims				1.69	3.44					50.00	11.37	3.44							
<i>From Goldfield generally:—</i>																					
Sundry parcels treated at:—																					
Government Smelter														4.76							
Phillips River Smelter														9.01							
Reported by Banks and Gold Dealers																					
													111.90								
Totals													5.21	1,383.78	2,867.13	66.17	291.09	621.59	30,386.56	26,514.02	1,931.24

TABLE II.  
PHILLIPS RIVER GOLDFIELD.  
*Production of Copper.*

No. of Lease.	Name of Mine.	* 1907.		Previous to 1907.		Total to 31st October, 1907.	
		Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	<b>KUNDIP MINING CENTRE.</b>	tons.	£	tons.	£	tons.	£
G.M.L. 99	Alice Mary	..	..	8.02	85	8.02	85
184	Christmas Gift	..	..	29.40	226	69.00	683
52, 94	(Harbour View leases)	..	..	604.36	4,524	604.36	4,524
G.M.L. 81	Harbour View North	..	..	1.44	28	1.44	28
(206)	(Hecla)	..	..	18.86	246	24.94	278
G.M.L. 98	Hillsborough	..	..	70.57	270	70.57	270
(242)	(Lone Star)	..	..	9.02	66	12.92	98
(237)	(Mosaic)	..	..	..	..	1.67	19
108	Mt. Stennett	..	..	54.29	614	298.97	2,672
52, 94	Ravensthorpe G.M. Syndicate, N.L.	..	..	4.88	51	132.56	1,382
60	Red, White, and Blue	..	..	216.42	1,372	449.44	3,032
	Voided leases	..	..	..	..	79.90	547
	Sundry claims	..	..	18.34	343	18.34	343
	<b>MT. DESMOND MINING CENTRE.</b>						
(232)	(Addie)	..	..	5.13	95	5.13	95
(238)	(Blue Spec)	..	..	11.83	97	11.83	97
(255)	(Desmond Central)	..	..	3.01	39	3.01	39
168	(Elverdton South)	..	..	18.48	119	18.48	119
266	Fairlie	..	..	7.97	90	8.81	103
109	(Mt. Desmond)	..	..	..	..	198.87	1,640
109	Mt. Desmond—Phillips River G. and C. Co., Ltd.	..	..	801.19	7,855	484.72	5,920
95	Elverdton—Phillips River Options Syndicate, N.L.	..	..	..	..	2,946.02	22,657
95	Elverdton	..	..	130.00	570	130.00	570
95	Elverdton—Phillips River G. and C. Co., Ltd.	..	..	444.92	2,178	444.92	2,178
199	P.L.P.	..	..	68.69	741	179.54	2,013
257	Thistle and Shamrock	..	..	26.16	345	26.16	345
	Voided leases	..	..	..	..	182.90	1,906
	Sundry claims	..	..	4.42	64	34.10	433
	<b>RAVENSTHORPE MINING CENTRE.</b>						
205	Ballarat	..	..	65.50	640	54.81	744
259	Birthday	..	..	1.69	17	1.69	17
196	Contest	..	..	10.57	100	5.12	29
244	Copper Horseshoe	..	..	1.43	4	1.43	4
124	Emily Hale	..	..	..	..	132.27	1,192
202	Grafter	..	..	59.56	138	8.79	44
210	Great Oversight	..	..	30.94	203	42.34	321
116	Last Chance	..	..	96.43	1,173	772.40	7,230
(227)	(Last Chance Extended)	..	..	..	..	2.55	27
200	Last Chance Proprietary	..	..	136.26	1,315	101.81	942
16	(Marion Martin)	..	..	..	..	865.69	6,650
16	Marion Martin—Phillips River G. and C. Co., Ltd.	..	..	566.61	2,962	..	..
7	Mary	..	..	27.32	135	768.42	5,492
175	(Mt. Benson)	..	..	..	..	605.19	3,702
175	Mt. Benson—Phillips River G. and C. Co., Ltd.	..	..	633.30	2,718	84.50	876
195	Mt. Benson Extended	..	..	20.22	109	2.55	21
15	(Mt. Cattlin)	..	..	..	..	281.56	1,716
15	(Mt. Cattlin—Phillips River G. and C. Co., Ltd.)	..	..	..	..	1,263.76	7,646
15	Mt. Cattlin—Mt. Cattlin Copper M. Co., Ltd.	..	..	6,357.67	28,167	..	..
(G.M.L. 119)	(New Maori Queen)	..	..	13.73	14	..	..
204	New Moon	..	..	15.33	229	23.71	231
276	Our Selection	..	..	10.89	80	..	..
219	Mt. Cattlin West (late Puzzler)	..	..	22.78	216	12.44	94
115	Sunset	..	..	29.68	208	477.76	3,109
114	Surprise	..	..	70.39	606	396.07	2,947
221	Who Can Tell	..	..	..	..	1.45	15
	Voided leases	..	..	..	..	359.19	2,573
	Sundry claims	..	..	1.20	4	56.52	373
	<b>WEST RIVER MINING CENTRE.</b>						
252	Pick and Shovel	..	..	4.47	68	..	..
	Sundry claims	..	..	88.30	1,421	14.50	189
	From Goldfields generally	..	..	..	228	..	..
	Totals	..	..	10,169.83	55,842	11,675.65	91,007
		..	..			21,845.48	146,849

\* To 31st October, 1907.

## YEARLY TOTALS.

Year.	Quantity.	Value.
	tons.	£
1900	34.00	725
1901	1,089.14	12,918
1902	308.25	1,238
1903	1,561.33	10,984
1904	3,468.89	24,280
1905	2,329.04	15,592
1906	2,885.00	25,270
1907 (10 months)	10,169.83	55,842
Total	21,845.48	146,849

Table I. shows the fine gold produced from 30,386.56 tons of ore treated as 27,135.61 fine oz. and silver 1,931.24ozs. but these figures include the gold and silver from the tonnage of ore shown in Table II. as well. The total gold production of the field, including alluvial gold, has been 27,426.70 fine ozs., equal to a value at £4.2477 per oz. of £116,500. Of this amount 2,872.34 fine ozs. of value £12,201 have been won during 10 months of 1907. The total value of the fine silver produced, taken at 2s. 4d. per oz. fine, is £225 of which £8 belongs to 1907. The total copper value is £146,849, of which £55,842 have been obtained during 10 months of 1907. The grand total value of the metal production of the field is therefore £263,574, of which £68,051 have been obtained during 10 months of 1907. The present year's operations show a great increase in total value of metal produced over any previous year, the increase being due to the copper, the yield of which is more than double that of any previous year. This increase is further seen from the table to be principally due to the operations of the mines worked by the Phillips River Gold and Copper Co., Ltd., and Mt. Cattlin Copper Mining Co., Ltd.

#### SMELTING WORKS.

The Phillips River Gold and Copper Co., Ltd., have considerably added to and improved the smelting works, which were unfinished when purchased by them from the Government. The purchase price of the works, stocks of ore, stores, etc., as shown in my annual report for 1906, was £18,233 1s. 2d. Sampling machinery has been added and a reverberatory furnace, with 65ft. stack, of 9 square feet flue area, also slag granulating troughs, fitting shop, and other accessories. Another reverberatory furnace is now about to be erected, and a blowing engine has arrived at Hopetoun and will shortly be put in place. The excavations and foundations for a converter are also under way, and the converter itself is expected to arrive from England very shortly. This extra plant will enable blister copper to be produced and will greatly reduce the present costs of realisation of the furnace products. The general manager, Mr. G. C. Klug, calculates that he will be able to produce and market copper at about £51 per ton, inclusive of mining and realisation charges. The gold and silver values constitute a profit additional to any margin on the copper over cost of production.

According to the Company's report for period ended June 30th, 1907, they purchased from the Government 1,098.5 tons of ore, containing 160 tons of copper, 391ozs. of gold, and 1,351ozs. of silver. They subsequently received 9,203 tons of ore, containing 705 tons of copper, 2,716ozs. of gold, and 5,746ozs. of silver, making a total stock of 10,301.5 tons of ore containing 865 tons of copper, 3,107ozs. gold, and 7,097ozs. of silver. There were smelted 6,106 tons of ore and 2,575 tons of old slag for a return of matte containing 501 tons of copper, 1,805ozs. of gold, and 4,846ozs. of silver.

When the recent heavy fall took place in the price of copper from the abnormal figure which it had reached of over £100 a ton to below £60 a ton, the management of the Works, who had very naturally been anxious to put matte on the market while the price was high, considered it advisable under the altered circumstances to stop smelting until the projected additions to the plant should be completed and costs could be lowered by means of them and through the

coming in of the Hopetoun to Ravensthorpe Railway, for making which a contract was let in August last. In following this course, for which there are excellent reasons, it does not seem to me that anyone can blame them, though it has indubitably caused considerable depression in the district, and led to restriction of mining operations. The Company are carrying out their agreement to buy ore from mine-owners in the district on the tariff used by the State Smelting Works, and outside their own mines no one is affected by their ceasing to smelt. They have an undoubted right to manage their business in the way that seems best to themselves. A great deal of unnecessary alarm has been occasioned by their action, but after looking into matters on the spot I see no reason for ascribing motives for it other than the obvious good business ones which the Company openly put forward.

The new reverberatory furnace will serve for smelting ore fines, concentrates, and flue dust, which are not suitable for blast furnace treatment, together with silicious gold ores and rich oxidised copper ores, and will produce matte for the converter and slags for retreatment in the blast furnace. The blast furnace will take the lumpy ores and smelt them for a somewhat low-grade matte and clean slag. The mattes will go to the storage reverberatory furnace and thence to the converter, where they will be blown up to blister copper, using silicious gold and copper ores as flux for the iron in the matte. The converter slags will return to the blast furnace. The scheme of operations is complete, and will deal with all classes of ores likely to be brought in to the Works.

In the smelting practice hitherto followed it has been thought best by the management to run the blast furnace so as to make a somewhat low-grade matte, the average value produced for the period ended 30th June, 1907, being given to me as

40.446 per cent. copper.  
1.457oz. gold.  
3.91oz. silver.

The average composition of the slag for the last month's running was—

Silica SiO <sub>2</sub>	41.6%	
Ferrous oxide FeO	38.46%	
Lime CaO	5.17%	
Magnesia MgO	5.12%	
Alumina Al <sub>2</sub> O <sub>3</sub>	8.57%	
Copper Cu	.47%	
Gold Au		.035oz. per ton.
Silver Ag		.010 " " "

The total amount of matte exported to 30th June, 1907, was 2,154.8658 tons.

The following figures relating to the two latest shipments of matte will serve to show how it is valued for export purposes. The copper is taken at the ruling price for the week of shipment of standard copper, the gold at £4 per oz., and the silver at 2s. per ounce:—

2,990 bags matte shipped per s.s. "Flinders," 24th October, 1907, for transhipment to s.s. "Charon," October 29th, 1907, contained a net weight of 152 tons 12cwts. 0qrs. 7lbs. The assay value in copper was 37.72 per cent., gold 2.37oz. per ton, and silver 3.81oz. per ton, the amount of metals shipped being 57.5619 tons of copper, 361.669ozs. of gold, and 581.418ozs. of silver.

57.5619 tons copper @ £58 18s. 0d.	=	£3,390 7 11
361.669ozs. gold @ £4	=	1,446 13 6
581.418ozs. silver @ 2s.	=	58 2 10
Value of shipment	=	£4,895 4 3

1,194 bags shipped per s.s. "Flinders," November 21st, 1907, for transshipment into s.s. "Paroo," November 28th, 1907, contained a net weight of 59 tons 1cwt. 3qrs. 14lbs. of matte of assay value 46.9 per cent. copper, 3.5oz. gold per ton, and 5oz. silver per ton, or containing 27.7149 tons of copper, 206.828oz. of gold, and 295.468oz. of silver.

27.7149 tons of copper	@ £58 18 0	=	£1,632 8 2
206.828ozs. of gold	@ £4	=	827 6 3
295.468ozs. of silver	@ 2s.	=	29 10 11
			<u>£2,489 5 4</u>

It has been already noted that the Company expect to be able to produce copper at a cost of not more than £51 per ton of metal. I was not able to procure full figures of the actual cost of the work hitherto, though informed that the costs of smelting had worked out at 43s. to 45s. per ton of ore, on account of full returns not having been yet received from Europe. The figures for the shipments made by the Government while the Works were under State control were given in my Annual Reports for 1904 and 1905. From the latter it is seen that the total copper bearing material sold was 1,329.5282 tons net, containing, according to the assays, 899.1519 tons of copper, of which 869.6902 tons were actually realised on sale. The total shipping and realisation expenses from Albany were £10,513 17s. 1d., and from the Smelting Works to Albany costs were £4,101 10s. 6d., making total costs after leaving the Works £14,615 7s. 7d. This is at the rate of £16 5s. 1d. per ton of copper in the matte as shown by assays, or £16 16s. 1d. per ton of fine copper actually sold. In the 1904 Report it is shown that for the portion of the shipments to June 30th, 1905, the total costs per ton of fine copper produced were £47 10s. 7d., irrespective of the price paid for purchase of the ore. This was with a small furnace and with all the difficulties incidental to starting new works under very unfavourable conditions. The Company now have a much larger furnace, and with their projected improvements in smelting and the economies that will result from the construction of the Hopetoun to Ravensthorpe railway, their estimate of covering all costs of production including mining on £51 per ton of copper seems to me entirely feasible and reasonable.

The Smelting Works are employing 54 men at present, and when the blast furnace was working the number of men employed was about 160.

The construction of the railway will enable the Company to obtain limestone as flux from Hopetoun at a much cheaper rate than is now paid for the local limestone. The latter is of poor quality, and the deposits are much scattered. The limestone flux will constitute an important item in the railway freights. Good deposits have been opened in the sandhills near Hopetoun.

A good deal of magnesite has been found in the Ravensthorpe district with the travertine limestone and has been used for flux. It will be very useful also as a refractory material.

The Company have been fortunate also in obtaining a useful refractory material in a deposit of clayey sandstone of granitic origin (Arkose) not very far to the west of the works. This contains silica 67.8 per cent., alumina 25.6 per cent., and only traces of magnesia, lime, and iron, and has been made use of as fireclay, though bricks made of it are rather friable. The deposit is a sedimentary one, overlying the older rocks.

## PHILLIPS RIVER GOLD AND COPPER COY., LTD.

In view of the recent Press criticisms on the operations of this Company the following figures supplied to me by the general manager will be of much interest and value as showing the large amount of work done by the Company and the very considerable expenditure to which they have gone in opening up their properties.

Development work done since commencement of operations to 31st October, 1907:—

	Feet.
Mount Benson mine .. .. .	2,086
Mount Benson mine (diamond drilling)	88
Marion Martin mine .. .. .	424
Elverdton mine .. .. .	1,027
British Flag mine .. .. .	234
Mount Desmond mine .. .. .	1,750
Mary mine .. .. .	87
Harbour View mine .. .. .	784
	<u>6,480</u>

The expenditure to 30th September, 1907, was:—

	£	s.	d.
Mount Desmond mine .. .. .	14,445	2	9
Elverdton mine .. .. .	9,759	1	3
Mount Benson mine .. .. .	16,910	3	10
Marion Martin mine .. .. .	1,740	12	6
Harbour View mine .. .. .	4,168	9	9
Mary mine .. .. .	346	1	7
Desmond mine .. .. .	2	18	0
British Flag mine .. .. .	217	14	3
Elverdton South mine .. .. .	10	10	0
Smelting Works .. .. .	57,596	1	8
General accounts, stores, etc. ..	19,953	12	8
	<u>£125,150</u>	<u>8</u>	<u>3</u>

During the same period to 30th September, 1907, the ore produced by the Company's mines was:—

	£	s.	d.
Mt. Desmond 1,265.0804 tons of value	12,734	19	7
Elverdton 574.9160 " "	2,668	8	0
Mt. Benson 717.7957 " "	4,279	4	10
Marion Martin 566.6011 " "	3,082	18	4
Total 3,124.3932 " "	<u>£22,715</u>	<u>10</u>	<u>9</u>

The allied Mt. Cattlin Copper Mining Co., Ltd., to the same date expended £56,255 19s. 2d. and raised 7,523.9112 tons of ore of value £40,759 5s. 5d. The two companies have therefore already expended the large sum of £181,406 7s. 5d., and have produced 10,648.3044 tons of ore of value £63,474 16s. 2d.

## CONCENTRATION OF LOW-GRADE ORES.

In my former reports reference was made to the necessity for dressing the low-grade ores before smelting, which was sure to arise as the field progressed. This is now more than ever apparent, and though the improvements at the Smelting Works will enable ores of down to 4 per cent. of copper, or even less, being treated by direct smelting, there will always be a large amount of poorer ore that will be best concentrated. This will necessitate erection of machinery for crushing and dressing at the mines themselves, as the very low-grade ores cannot pay for any considerable cost of transport to dressing-plant at a distance. While this will not prove a serious matter

for the larger mines, it is one of much difficulty in the case of the smaller ones operated by working parties. Until they are in a position to buy dressing plants for themselves the only courses open to these appear to be to sell their low-grade ore-heaps to the nearest larger concern which possesses a dressing-mill, or to co-operate in putting up small mills to serve several mines adjacent to one another.

The large supplies of water that have been struck in the deeper mines have got over the difficulty as to scarcity of water that at one time stood in the way of the general adoption of concentration treatment, and recent advances in flotation methods of dealing with sulphide slimes give much hope that means will soon be forthcoming of greatly reducing the excessive losses of mineral that have been the great drawback to concentration. The management of the Phillips River Gold and Copper Company are giving this matter much attention, and will probably before long erect ore-dressing plant.

#### RAILWAY.

A contract for the construction of the railway from Hopetoun to Ravensthorpe was let in August last, and the first twenty miles of formation are nearly finished, but no rails had been laid down at the time of my visit. The formation of the road-bed for these twenty miles is very light work, and more rapid progress would reasonably have been expected. The remaining 13 miles of formation comprise a good deal of earth and rock cutting and filling, and will require to be vigorously proceeded with in order that the line may be finished within the contract period of one year.

#### HARBOUR WORKS.

An extension of the jetty at Hopetoun is under construction to enable somewhat deeper water to be reached and to provide more room for lighters alongside the jetty. A flat-bottomed scow has lately been used very successfully in transferring railway rails from the steamers to the jetty, and it would appear that this class of craft is specially well suited for the conditions prevailing at Hopetoun.

#### IMPORTS INTO HOPETOUN.

The following table was kindly supplied by the wharfinger at Hopetoun, Mr. Vernon, showing the tonnage of goods landed at Hopetoun Jetty for twelve months ending 31st October, 1907:—

	Coke.	General Cargo.	Total.
	tons.	tons.	tons.
1906.			
November ... ..	...	452	452
December ... ..	5½	1,005	1,010½
1907.			
January ... ..	...	675	675
February ... ..	...	920	920
March ... ..	57	942	999
April ... ..	344	923	1,267
May ... ..	302	1,318	1,620
June ... ..	150	805	955
July ... ..	195	784	979
August ... ..	448	1,007	1,455
September ... ..	249	787	1,036
October ... ..	342	703	1,045
	2,092½	10,321	12,413½

#### SUMMARY.

It will be seen from the foregoing that the larger mines of the Phillips River district which have been opened up by companies have made very substantial progress. The lodes have generally proved to be much larger than was anticipated from their appearance in the shallow levels, and good shoots of ore have been found in them to the greatest depth they have been worked, viz., 381 feet in the Mount Cattlin mine. In the earlier days of the field it seemed likely to be a district of small lodes, but now it is seen that this is by no means the case, several of them having proved to be of large size, fit for mining on an extensive scale. Among the smaller mines round Ravensthorpe there has not been so much active progress as could be wished, but such work as has been done has proved the lodes to be continuing strongly downwards into the hard country below the water level, with good values in them. Round Kundip better progress has been made, largely owing to much of the ore being able to be treated for gold by battery process, and several very promising lodes have been opened up.

The absence of general activity in the smaller mines which has of late characterised the district is very commonly ascribed to the recent heavy fall in the price of copper, but this alone cannot be the true reason as there was very little done in most of them even when the metal was at the abnormal price of over £100 a ton. It must be remembered also that the present price, of about £60 a ton, is a very fair average one for copper for the last five years, and above the average price for the last twenty years, and is rather above than below the price ruling in 1902 to 1904, when there was the greatest amount of activity in prospecting for copper and the State Smelting Works were started. A better reason is the high cost of realising the ore, which is so great that ore of from 10 per cent. to 12 per cent. copper by assay barely pays expenses in the case of most of the small mines. Only the best hand-picked ore is profitable and the small owners are driven therefore to "pick the eyes out" of their mines. This state of affairs should be greatly altered for the better when the improvements to the Smelting Works are completed, and the railway has been made. Much will depend upon the action of the Phillips River Gold and Copper Company in reducing their smelting tariff so as to deal liberally with the prospectors, and upon the costs at which ore can be exported to competing smelters in the event of their not doing so. The establishment of ore-dressing plant will also be an important factor in improving the prospects of small owners. It is obvious, however, that for serious mining in this district some capital is required in nearly all cases to equip the mines with machinery, and to develop them so that they may become permanent producers of wealth, and the introduction of companies to handle them in place of small working parties is therefore highly desirable in the best interests of the field.

The construction of the Hopetoun to Ravensthorpe railway will greatly better all working conditions on the mines, and it is highly necessary that this work should be urged to earliest possible completion.

I have, etc.,

A. MONTGOMERY, M.A., F.G.S.,  
State Mining Engineer.

Department of Mines, Perth, 16th December, 1907.

## APPENDIX No. VIII.

## REPORT ON THE BLACKBOY HILL GOLDFIELD, NEWCASTLE.

*The State Mining Engineer.*

In accordance with your instructions I visited the Blackboy Hill Goldfield, situated about 25 miles North-East of Newcastle, and beg to report as follows:—

At the present time very little work is going on in the locality, two prospecting areas, held respectively by Chaseling and Party and by O'Grady, being the only areas worked.

## GEOLOGICAL FEATURES.

The country rock is diorite and schist with intrusions of micaceous granite. Through these rocks run numerous "lode formations" striking approximately North and South and underlying to the East. The formations present a somewhat peculiar "banded" appearance, consisting as they do of small veins of quartz alternating with seams of hornblende schistose rock. Some of the quartz seams when taken by themselves carry high values in gold, unfortunately, however, they only form a small proportion of the whole of the formation—they are too small to be worked separately by hand picking, and when broken with the remainder of the lode the average value—in those portions of the workings which could be inspected and sampled—is too low to be payable.

In addition to the "formations" there are several cross quartz veins striking East and West of from a foot to 15 inches in width; the shafts from which these were worked are dismantled and the workings could not be inspected. Samples were taken from the dumps at two shafts on Mr. Chaseling's property, but the results obtained on assay were very poor.

## PARTICULARS OF WORK AND SAMPLES.

*Chaseling and Party Prospecting Area, 24 acres.*

The lode formation has been tested by two shafts.

No. 1 Shaft.—Vertical 14ft., thence on underlay for 33ft., the underlay portion following the hanging-wall of the lode. The width of formation exposed is 2ft. Samples Nos. 1 to 5 were taken from this portion of the mine; the results are very poor, although from a small quartz vein in this shaft I saw results panned off equal to 4ozs. of gold per ton.

No. 2 Shaft.—Vertical 30ft., thence on underlay 30ft., the underlay in this case following the foot-wall portion of the lode and exposing two to three feet of it in width. At 60ft. a short drive of some 30ft has been put in on the formation, which appears to be much broken up by masses of hornblende rock and by intrusions of micaceous granite. Samples Nos. 16 and 17 were taken from the shaft and drive. No. 7 sample was taken from a costean across the lode formation South of No. 1 shaft—5ft. of the

hanging-wall portion, said to be the best, was sampled. Samples Nos. 6 and 8 were taken from the dumps of two cross reefs.

*O'Grady Prospecting Area, 24 acres.*

This area lies to the North of that held by Chaseling and Party. The same banded lode formation is traceable by occasional outcrops on this property. So far it has not been tested below the surface. A shaft 60ft. in depth has been sunk, and a crosscut is now being put in to cut the lode at this depth. No samples were taken from this property.

*The "Eureka."*

This property was idle at the time of my visit. So far as could be observed it presents a very similar appearance to the other portions of the Field. The same banded formations traversing the country.

Sample No. 9 was taken from an open cut East of main working shaft. No. 10 sample was from the shaft at a depth of 30ft—at this point the formation is 3ft. in width. The workings below here could not be thoroughly inspected, being in an unsafe condition. From what could be seen I am of opinion considerably more formation was mined than was milled in the battery which is erected on the property. It is evident a system of sorting was resorted to, but owing to the smallness of the quartz veins this, as before stated, would not be profitable.

Further South than the above workings a large quartz reef has been exposed in a trench on the surface, where it shows a width of 15ft. A sample was taken across this body, but yielded on panning only traces of gold.

## GENERAL REMARKS.

Taking the field as a whole I am of opinion so far as the "lode formations" are concerned, on which the principal amount of work has so far been done, that although they undoubtedly carry gold, and, as evidenced by samples panned off in my presence, small portions of the lodes are very rich, when taken out in bulk, the results are too poor to be payable.

There are a number of "formations" in the locality, also numerous quartz veins, and it is possible that better portions than any yet exposed may be found, but I regret to say that on present appearances I could not recommend any expenditure in development on this Field.

(Signed) S. CULLINGWORTH,  
Inspector of Mines.

9th July, 1907.

*Assays of Samples from Blackboy Hill.*

No.	Locality.	Results.	Width Sampled.
1	Chaseling's P.A., No. 1 Shaft on hanging wall of lode formation ...	per ton. Gold, 9gr. ... .. Silver, 17gr. ... ..	ft. in. 2 0
2	Do. do. do. ...	Gold, 17gr. ... .. Silver, 4dwt. 18gr. ... ..	2 0
3	Do. do. do. ...	Gold, 1dwt. 20gr. ... .. Silver, 2dwt. 13gr. ... ..	2 0
4	Do. do. do. ...	Gold, 9gr. ... .. Silver, 1dwt. 11gr. ... ..	2 0
5	Do. do. do. ...	Gold, 3dwt. 15gr. ... .. Silver, 4dwt. ... ..	2 0
6	Dump. Western shaft on cross quartz veins, Chaseling's P.A. ...	Gold, 2dwt. 21gr. ... .. Silver, 1dwt. 20gr. ... ..	...
7	South costean, Chaseling's P.A. ... ..	Gold, 1dwt. 11gr. ... .. Silver, 1dwt. 2gr. ... ..	5 0
8	Dump. South shaft on cross quartz vein, Chaseling's P.A. ...	Gold, 1dwt. 2gr. ... .. Silver, 2dwt. 4gr. ... ..	...
9	"Eureka," open cut east of main shaft, lode formation ... ..	Gold, 17gr. ... .. Silver, 1dwt. 11gr. ... ..	Capping of lode only; width not known.
10	"Eureka," 30ft. level in shaft, lode formation ... ..	Gold, 4dwt. 9gr. ... .. Silver, 1dwt. 11gr. ... ..	ft. in. 3 6
12	"Eureka," costean west of shaft, lode formation ... ..	Gold, 1dwt. 2gr. ... .. Silver, trace ... ..	0 14
16	Chaseling's P.A. No. 2 Shaft, 60ft. level, lode formation footwall side	Gold, trace ... .. Silver, 2dwt. 21gr. ... ..	3 0
17	Chaseling's P.A. No. 2 Shaft, 55ft. in shaft, lode formation footwall side	Gold, trace ... .. Silver, trace ... ..	

Nos. 11 and 13 were not representative samples, and were not assayed.

No. 14.—Sample of cyanided tailings not assayed.

No. 15.—Sample from quartz reef on "Eureka" not assayed, but panned off showed only minute trace of gold; width sampled, 15ft.

ADVISORY BOARD OF THE SCHOOL OF MINES OF WESTERN AUSTRALIA.

*The Secretary for Mines,*

Office of the State Mining Engineer,  
Mines Department,  
Perth, 31st March, 1908.

Sir,—

I have the honour to report the meetings of the above Board for the year 1907.

Four meetings of the Board were held during the year, three in Perth and one in Kalgoorlie. The attendance of members was as follows:—

State Mining Engineer, three meetings.

The Government Geologist, four meetings.

The Director of the School of Mines of Western Australia, two meetings.

E. S. Simpson, Esq., four meetings.

The President of the Chamber of Mines of W.A., one meeting.

The President of the Amalgamated Miners' Association, two meetings.

During the year the Director of the School of Mines left the Board as a member thereof, but has since attended the meetings to confer with the Board in his official capacity as Director.

Minutes of the Board's recommendations have been forwarded to the Hon. the Minister for Mines after each meeting.

I have, etc.,

A. MONTGOMERY, M.A., F.G.S.,  
Chairman.

**Report of the Board of Examiners for Colliery Managers' and Under-Managers' Certificates under "The Coal Mines Regulation Act, 1902."**

*To the Secretary for Mines, Department of Mines, Perth.*

Office of the State Mining Engineer, Department of Mines,  
Perth, 22nd April, 1908.

Sir,

We have the honour to forward to you, for the information of the Hon. the Minister for Mines, the following report of the above Board for the year 1907.

The Board held two meetings during the year, 3rd April and 16th October.

No applications for examination were received in response to the March or September advertisements, and no certificates were issued.

Owing to the absence from Perth of Mr. Gibb Maitland, through being engaged on geological survey duties in the Pilbara goldfield, Mr. Harry P. Woodward, the Assistant Government Geologist, took Mr. Maitland's place on the Board at the October meeting.

On the 5th March, 1903, a first-class Certificate of Service as a mine manager was issued to an applicant, subject to the production before the 31st July of that year of the original certificates of service, the copies supplied being accepted in the meantime. It was subsequently proved that some of the copies, with which he had supplied a Statutory Declaration as to the correctness of the same, were entirely incorrect, and that there had been wilful and fraudulent misrepresentation. Proceedings were taken against him, and he was committed for trial, but he forfeited his bail, and it was believed that he had left the country. Legal procedure approved by the Crown Law Department was followed, but nothing further was heard of the applicant, and, under the provisions of Section 26 of "The Coal Mines

Regulation Act, 1902," cancellation of the certificate was approved in the Executive Council on the 26th June, 1907.

An applicant wrote on the 25th March, 1907, enclosing copy of an advertisement regarding a position he said that he had filled in Victoria; the Board gave full consideration to the case, previous information having been supplied and considered insufficient, but it was resolved that the Board did not consider the applicant entitled to a first-class mine-manager's certificate, and he was informed that his application was refused.

On the 15th March, 1907, an application was received for a Certificate of Service, but prior to the date of the meeting of the Board the application was withdrawn.

At the meeting of the Board on the 3rd April, 1907, the Board expressed the opinion that it was advisable that that part of the Act relating to examinations for Certificates of Competency, and the Regulations relating thereto, should be revised at an early date.

We have, etc.,

A. MONTGOMERY, M.A., F.G.S.,  
Chairman.

H. P. WOODWARD, F.G.S.,  
Member.

T. D. BRIGGS,  
Member.

JAMES H. DURES,  
Secretary.



### DIVISION III.

#### *Report of the Government Metallurgist and Engineer on State Batteries for the Year 1907.*

##### *The Under Secretary for Mines.*

Sir,

I have the honour to submit, for the information of the Hon. the Minister for Mines, the following Report on the State Batteries Branch for the year 1907:—

During the year I have visited the whole of the plants with the exception of Tuckanarra, Ravelstone, Kalpini, and the 20-Mile Sandy Creek. Tuckanarra is leased; Ravelstone is only run a few days occasionally; and Kalpini has been run on special terms with local prospectors; whilst 20-Mile Sandy Creek—being situated in the North-West of the State—is too far to visit excepting at great loss of time.

The list of the plants in operation, as shown on Form 2, is similar to that of the previous year, namely, 31 in number, the only alteration being that Randall's has been dropped out owing to its being leased to the New Santa Claus Company, whilst the addition to the list is the Nannine plant.

Many of the plants have suffered severely for want of sufficient stone to run continuously, without which it is impossible to show costs comparable with plants of similar size run by privately owned companies, which are usually supplied from their own mines.

The Department has 25 ten-stamp mills, and 5 with five stamps, all of which are fairly heavy and capable of treating on an average, say 3½ tons per stamp per day, or approximately 300,000 tons per year. The quantity crushed for 1907 was 95,280 tons, so that it is evident that the plants have been occupied only about one-third of the time.

Black Range with 8,974 tons, Meekatharra 8,703 tons, Coolgardie 7,758 tons, Yarri 6,801 tons, and Niagara 6,117 tons, have been the best supplied mills, and with the exception of Meekatharra, all these show a fairly good profit for the year. Meekatharra has unfortunately a very expensive water supply; it has also had a rather heavy account for repairs, and on account of the cyanide plant not being in operation part of the year, milling has been charged with the whole of the management expenses for that period.

Leonora with 4,341 tons, Mt. Ida 2,863 tons, Menzies 4,346 tons, Pig Well 2,710 tons, and Norseman 4,035 tons, are the only other plants that have shown a profit on milling.

Many of the districts in which the plants have operated at a loss have been considered sufficiently promising to justify the Department in keeping the plants in fairly good working order, but as comparatively small tonnages have been available the cost of upkeep has materially increased the unavoidable losses. Notwithstanding this loss the crushing facilities have, with few exceptions, been kept in readiness to meet the prospectors' and leaseholders' requirements.

Districts which have shown heavy losses and are not considered to have a very promising immediate future, are Yundamindera, which only supplied 189 tons, Ravelstone 562 tons, and Kalpini 911.5 tons, Duketon 202 tons, Laverton 379.5 tons, for the period under review. Yundamindera and Duketon have been closed down and the plants removed; Ravelstone and Laverton are in charge of caretakers, and a manager sent occasionally to crush the few tons supplied,

and it has been decided to remove the Kalpini plant to Leonora.

Widgiemooltha and Yerilla are also in the hands of caretakers; in these places, however, the caretaker puts through an occasional parcel for prospectors, but there is not sufficient stone offering to permit of a staff being kept at them.

Yarri is another district that for the time is quiet, but it is believed that a brighter future is near, and with this hope the battery is kept in readiness to meet any demands made on it.

During the year 2,163 parcels have been treated. Many of these were very small, and the numerous clean-ups necessary materially increase the cost of working the mills.

The following is a list of the various plants, showing the number of parcels handled at each:—

Plant.	No. of Parcels.
Black Range	109
Boogardie	98
Burtville	60
Coolgardie	191
Darlot	58
Duketon	8
Greenbushes, B.E.	156
Greenbushes, N.E.	133
Kalpini	30
Laverton	18
Leonora	70
Lennonville	62
Meekatharra	92
Menzies	232
Mt. Ida	45
Mulline	89
Mulwarrie	78
Nannine	20
Niagara	142
Norseman	100
Pig Well	39
Pin Gin	38
Ravelstone	23
Sandy Creek	36
Siberia	25
Tuckanarra	27
Widgiemooltha	21
Wiluna	64
Yarri	69
Yerilla	23
Yundamindera	7
Total	2,163

*Treatment of Tailings.*—The total quantity of sands purchased by the Department during the year was 15,890 tons, the gross value being £18,144, and the cash paid to owners being £10,199.

The quantity treated and paid for on actual extraction was 18,972 tons, valued at £24,917, on which owners received £15,431, or a total of £25,630 has been distributed to prospectors and owners in payment for sands.

*Slimes Plants.*—Many districts have been agitating to have their slimes treated, but in only a few places

has sufficient accumulated to justify the heavy expenditure of erecting a costly slimes plant. At Norseman many years' accumulation was in hand, totalling over 7,000 tons, and as small a plant as can be worked economically was erected at a cost of £2,835 14s. 1d. In a run of about three months it had treated the whole of the available slimes, and will remain idle until a sufficient quantity has accumulated to warrant its being started up again.

*Gas Producer Plant at Nannine.*—With a view to test the usefulness of this new power, a small plant of the Crossley pattern was purchased and erected to drive the new 5-stamp mill at Nannine. Collie coal was selected as the fuel to be used. Several difficulties were met with at the commencement of operations, partly due to small stoppages which are almost inseparable from the starting of new machinery, and partly to the production of and depositing of large quantities of tar in the main outlet gas pipe. This, however, was remedied by the agents supplying a tar trap, and making some slight alteration to the outlet pipes, since which several trial runs have been made with the plant, some of them being fairly successful, but the difficulty of getting Collie coal of even grade and sufficiently fresh from the colliery has caused many difficulties with the generator, being only a very small plant, small variations in the quality or class of coal appears to very materially affect the quality of gas produced. It has now been decided to give it a trial on charcoal, from which a much more regular supply of gas is obtainable.

*Tin Dressing Plants.*—The two plants at Greenbushes have rendered good services to the district.

The Bunbury end plant put through 4,615 tons for a yield of 56.434 tons oxide of tin.

The North end plant handled 5,881 tons for 60.37 tons oxide of tin.

At the North end of the field considerable quantities of stiff puggy material carrying a little tin have been offering, but owing to the clayey nature of the material, the battery was found unsuitable, and a Huntington mill has been erected to deal with it, and gives every promise of being successful.

*Small Testing Plants.*—At the request of the Hon. the Minister, a small crushing plant suitable for testing a district or mine has been designed, and one erected at Morgans, and loaned to the Mount Margaret Lake View Syndicate to test their property.

The plant consists of two stamps of 1,000lbs. each, operating in separate boxes. They are the ordinary pattern of gravity stamps raised by cams from a belt driven camshaft. The stems, tappets, heads, shoes, dies, cams, camshaft, and cam pulleys are all of precisely the same size and pattern as those of the larger plants of the Department that have been in these particular parts standardized. The motive power is a Crossley 10½-h.p. oil engine, which drives the mill and operates a centrifugal pump for return water. The whole of the plant weighs about 30 tons, and is as portable as is possible compatible with sufficient strength to operate on any class of material that may be brought to it, and which any larger gravity stamp plant could treat. The main object of this two unit stamp mill is to test a district before venturing to erect expensive and heavy machinery, and as the Department is usually asked to provide crushing facilities in districts far back from the railway line, the cartage of heavy machinery, boilers, steam-engines, etc., is such a serious item of cost that it prevents their acceding to the request until some guarantee of a permanent supply of stone is forthcoming.

In the past several expensive 10-stamp mills have been erected, and have only run a short time when they have been closed down for want of stone. (Duketon is an example, having only crushed 3,592 tons.)

These small plants will, it is hoped, either be the forerunner of a larger plant, or answer the purpose of saving the loss of erecting expensive plants where not justified.

#### YEARLY OUTPUT.

The following figures are submitted as showing the yearly output:—

	Milling.	
	Tons.	ozs.
Up to 1901 (3 years) ...	68,791	77,533
1902 ...	39,517	57,255
1903 ...	49,233	58,305
1904 ...	71,616	78,309
1905 ...	85,018	92,327
1906 ...	95,831	94,187
1907 ...	95,280	97,962
	505,286	555,878

	Cyaniding.	
	Tons.	ozs.
Up to 1902 ...	29,255	tons
1903 ...	32,369	"
1904 ...	*42,559	"
1905 ...	54,420	"
1906 ...	60,422	"
1907 ...	63,778	"
	282,803	"

\* 692 tons included in error in previous Annual Reports.

	Slimes.	
	Tons.	ozs.
Up to 1904 ...	691	tons
1905 ...	7,028	"
1906 ...	4,737	"
1907 ...	8,220	"
	20,676	"

The 95,280 tons of ore milled entailed a working cost of £62,196 3s., and yielded a revenue of £53,471 13s. 3d.

The total tons cyanided for the year were 63,778, yielding 13,295.25 ounces of gold, valued at £56,472 19s. 3d.

Eight thousand two hundred and twenty tons of slimes have been handled at a working cost of £3,549 6s. 8d., and returned a revenue of £5,532 0s. 3d. They produced 1,797.58 ounces of gold, valued at £7,635 11s. 2d.

Ten thousand four hundred and ninety-six tons of tin were treated at a cost of £2,294 14s. 2d., and produced a revenue of £2,485 9s. 1d.

	Expenditure.		Revenue.	
	£	s. d.	£	s. d.
Milling, per ton ..	12	6	11	4.89
Cyaniding, per ton ..	6	8.76	9	2.81
Slimes, per ton ..	8	7.63	13	5.51
Tin, per ton ..	4	4.46	4	8.83
	Expenditure.		Revenue.	
	£	s. d.	£	s. d.
Batteries ..	62,196	3 0	53,471	13 3
Cyanide plants ..	23,311	10 4	29,785	14 4
Slimes plants ..	3,549	6 8	5,532	0 3
Tin plants ..	2,294	14 2	2,485	9 1
	£91,351	14 2	91,274	16 11
Balance being loss ..				76 17 3
			£91,351	14 2

J. DUNSTAN,

Metallurgist and Engineer.

31st March, 1908.

FORM 1.—Expenditure from "Consolidated Revenue Vote" and "Loan Funds" on Erection of State Batteries for Year ending 31st December, 1907, and Totals since inception.

Battery.	From Revenue.	From Loan.	Total.
	£ s. d.	£ s. d.	£ s. d.
Pin Gin Battery No. 2 Well ... ..	...	22 15 7	22 15 7
Kalpini State Battery, Erection ... ..	...	80 6 4	80 6 4
Norseman Slimes ... ..	...	2,835 14 1	2,835 14 1
Nannine Battery, Erection ... ..	...	5,159 3 3	5,159 3 3
Lennonville Cyanide Plant, Erection ... ..	...	234 7 3	234 7 3
Wiluna Condensing Plant ... ..	...	444 4 0	444 4 0
Meekatharra Cyanide Plant No. 1 ... ..	...	446 15 2	446 15 2
Pin Gin Condenser, Erection ... ..	...	267 18 0	267 18 0
Mulwarrie Condenser, Erection ... ..	...	330 11 5	330 11 5
Niagara Slimes Plant, Erection ... ..	...	171 5 2	171 5 2
Pig Well Condenser and Engine House ... ..	...	200 11 3	200 11 3
Mt. Margaret Battery, Erection ... ..	...	598 17 5	598 17 5
Mt. Linden Battery, Erection ... ..	...	342 17 9	342 17 9
Meekatharra Cyanide Plant No. 2... ..	...	11 5 0	11 5 0
Black Range Battery, Erection ... ..	...	...	...
(Dismantling, etc., Duketon S. Battery)... ..	...	60 11 10	60 11 10
Norseman Condenser... ..	...	142 14 0	142 14 0
	...	11,349 17 6	11,349 17 6
<i>Erection of State Batteries—</i>			
Expenditure to 31st December, 1906 ... ..	90,231 7 2	...	...
Loan Expenditure ... ..	...	135,448 0 3	225,679 7 5
Gross Totals ... ..	£ 90,231 7 2	146,797 17 9	237,029 4 11

FORM 2.—Return showing the Number of Tons Crushed, Gold Yield, Average Value per Ton and Total Value for Year ending 31st December, 1907.

Battery.	Tons crushed.	Gold Yield.	Average per ton in shillings.	Total Value.
Black Range ... ..	8,974	9,692·97	77·76	34,896·13
Boogardie ... ..	5,400	2,255·99	30·08	8,121·53
Burtville ... ..	2,724	8,303·05	219·46	29,890·98
Coolgardie ... ..	7,758	9,815·14	91·09	35,334·50
Darlot ... ..	2,807	1,813·85	46·52	6,529·86
Duketon ... ..	202	171·05	60·96	615·78
Kalpini ... ..	911·5	689·47	54·46	2,482·11
Laverton ... ..	379·5	273·50	51·88	984·60
Lennonville ... ..	3,257·5	1,377·77	30·40	4,959·95
Leonora ... ..	4,341·5	2,721·34	45·13	9,796·83
Meekatharra ... ..	8,703	12,523·64	103·60	45,085·52
Menzies ... ..	4,346	4,666·22	77·30	16,798·30
Mt. Ida ... ..	2,863	5,980·15	150·39	21,528·54
Mulline ... ..	4,057·5	5,004·50	88·80	18,016·20
Mulwarrie ... ..	2,920	2,512·82	61·95	9,046·13
Nannine ... ..	1,908·85	960·75	36·23	3,458·70
Niagara ... ..	6,117·50	3,905·63	45·96	13,960·26
Norseman ... ..	4,035·5	5,164·93	92·15	18,593·72
Pig Well ... ..	2,710	2,982·20	79·23	10,735·92
Pin Gin ... ..	2,623	2,295·72	63·01	8,264·57
Sandy Creek ... ..	1,068	2,001·04	134·90	7,203·74
Siberia ... ..	1,606	760·04	34·07	2,736·16
Wiluna ... ..	4,684·75	3,417·68	52·52	12,303·64
Yarri ... ..	6,801·5	3,767·87	39·88	13,564·33
Yerilla ... ..	1,351	1,247·70	66·49	4,491·72
Yundamindra ... ..	189	212·75	81·04	765·90
Ravelstone ... ..	562·05	511·23	65·49	1,840·44
Tuckanarra ... ..	1,268·5	2,529·66	143·58	9,106·72
Widgiemooltha ... ..	709·5	403	40·89	1,450·90
Total ... ..	95,279·65	97,961·66	74·02	352,563·68

Tin Plants.	Black Tin.	
	Tons.	Yield, tons.
Greenbushes, Bunbury end ... ..	4,615	56·434
Do. North end ... ..	5,881	60·370
Total ... ..	10,496	116·804

FORM 2A.—Return for State Cyanide and Slimes Plants for Year ending 31st December, 1907, showing Tons treated, Yield, and Value.

Plants.	Tons treated.	Yield.	Value.
		ozs.	£
Black Range ... ..	5,539	1,709·62	7,261·92
Boogardie ... ..	5,389	1,438·19	6,098·98
Burtville ... ..	1,740	757·92	3,219·24
Coolgardie ... ..	4,241	1,012·09	4,299·12
Darlot ... ..	4,062	390·95	1,660·79
Duketon ... ..	284	26·31	111·76
Laverton ... ..	499	51·05	216·88
Lennonville ... ..	6,077	1,373·16	5,833·31
Leonora ... ..	2,692	783·11	3,329·20
Meekatharra ... ..	2,940	722·27	3,069·36
Menzies ... ..	3,187	774·31	3,289·53
Mulline ... ..	1,546	338·66	1,439·23
Mulwarrie ... ..	3,903	576·51	2,449·11
Nannine ... ..	1,008	130·93	556·26
Niagara ... ..	5,055	859·36	3,650·57
Norseman ... ..	2,960	770·41	3,272·54
Pig Well ... ..	1,420	337·24	1,432·89
Pin Gin ... ..	1,788	215·54	915·60
Sandy Creek ... ..	698	225·37	957·33
Siberia ... ..	560	120·73	513·56
Yarri ... ..	6,331	447·19	1,900·31
Yerilla ... ..	761	83·78	377·13
Yundamindera ... ..	1,098	145·55	618·35
	63,778	13,295·25	56,472·97
Niagara Slimes ... ..	1,121	165·42	703·10
Norseman „ ... ..	7,099	1,632·15	6,932·46
	71,998	15,092·82	64,108·53
Sands still under treatment ... ..	1,117·5	...	...
	73,115·5	15,092·82	64,108·53

FORM 3.—Return showing the number of Tons Crushed, Gold Yield, average per Ton, and Value, since inception to 31st December, 1907.

Battery.	Tons crushed.	Gold Yield.	Average Gold per ton.	Value.
	tons.	ozs.		£
Black Range ... ..	24,951·15	29,681·21	1·19	107,048·24
Boogardie ... ..	24,719·75	11,920·52	·48	44,308·08
Burtville ... ..	16,090·00	40,772·74	2·53	148,087·68
Coolgardie ... ..	24,939·50	25,002·36	1·00	90,065·72
Darlot ... ..	20,382·25	29,722·87	1·45	110,431·12
Duketon ... ..	3,592·00	2,896·16	·80	10,426·14
Kalpini ... ..	1,845·50	1,327·58	·71	4,779·30
Laverton ... ..	8,696·75	8,414·40	·96	31,463·59
Lennonville ... ..	26,658·34	32,082·05	1·20	120,552·15
Leonora ... ..	31,731·50	26,092·62	·82	97,513·77
Meekatharra ... ..	33,678·60	48,515·62	1·44	177,336·19
Menzies ... ..	18,278·25	19,498·70	1·60	70,042·73
Mt. Ida ... ..	21,997·40	30,123·66	1·36	111,747·37
Mulline... ..	55,083·20	70,011·35	1·27	251,221·00
Mulwarrie ... ..	19,778·40	22,360·21	1·13	83,753·45
Nannine ... ..	1,908·85	960·75	·51	3,458·70
Niagara ... ..	35,781·50	32,983·10	·92	120,926·94
Norseman ... ..	29,214·20	31,790·44	1·08	117,628·07
Pig Well ... ..	7,862·50	7,071·56	·89	25,457·60
Pin Gin... ..	6,964·65	6,277·89	·90	22,599·99
Sandy Creek ... ..	3,860·15	8,241·86	2·13	29,770·68
Siberia ... ..	4,121·50	2,043·88	·49	7,283·34
Wiluna ... ..	16,211·25	12,801·25	·78	46,229·68
Yarri ... ..	17,452·00	10,439·82	·59	37,583·19
Yerilla ... ..	4,474·00	4,241·60	·94	15,267·69
Yundamindera ... ..	5,361·00	6,424·42	1·19	23,719·00
Ravelstone ... ..	8,709·55	8,054·77	·92	30,168·43
Tuckanarra ... ..	11,140·35	14,982·69	1·34	55,561·41
Widgiemooltha ... ..	4,160·00	1,791·15	·43	6,709·19
Randall's ... ..	3,133·20	1,279·29	·40	4,578·99
Batteries closed ... ..	12,509·10	8,071·51	·64	30,437·28
Total ... ..	505,286·39	555,878·03	1·10	2,036,156·72

Tin Plants.	Yield.	Black Tin.
Greenbushes—	tons.	tons.
Bunbury End ... ..	19,067·50	379·973
North End ... ..	12,099·00	176·939
Total ... ..	31,166·50	556·912

FORM 3A.—Return showing the number of tons of Sands and Slimes treated, Yield and Value, since inception to 31st December, 1907.

Plants.	Tons treated.	Yield.	Value.
		ozs.	£
Black Range	13,358·0	4,877·57	20,432·26
Boogardie	17,076·0	4,886·98	20,226·36
Burtville	7,854·5	3,110·47	12,795·35
Coolgardie	12,036·0	2,544·11	10,520·10
Darlot	17,044·0	2,191·55	8,886·62
Duketon	1,941·0	240·35	982·63
Laverton	7,641·0	815·60	3,268·64
Lennonville	21,889·0	6,315·18	25,475·36
Leonora	19,527·0	4,536·62	18,498·64
Meekatharra	14,400·0	2,986·93	12,070·25
Menzies	13,488·5	3,344·50	13,760·19
Mount Ida	3,570·0	357·97	1,423·64
Mulline	32,070·0	8,971·83	35,889·14
Mulwarrie	16,481·0	3,167·07	12,812·76
Nannine	1,008·0	130·93	556·26
Niagara	19,924·0	3,491·03	14,248·83
Norseman	20,861·0	4,207·72	17,115·96
Pig Well	5,807·0	1,220·36	5,064·37
Pin Gin	5,156·0	573·56	2,411·74
Randalls	791·0	56·05	224·80
Sandy Creek	2,731·5	1,054·26	4,344·94
Siberia	1,547·0	215·27	915·21
Southern Cross	3,471·0	452·75	1,815·18
Yarri	15,131·0	1,163·62	4,678·92
Yerilla	3,023·0	409·21	1,737·98
Yundamindera	4,977·0	920·33	3,909·25
	282,803·5	62,241·82	254,065·38
Mulline Slimes	12,456	4,692·96	15,465·47
Niagara Slimes	1,121	165·43	703·10
Norseman Slimes	7,099	1,632·15	6,932·46
	303,479·5	68,732·36	277,166·41

FORM 4.—State Batteries, Tin, Cyanide, and Slimes Plants. Costs per ton for Year ending 31st December, 1907.

Plant.	Tons Crushed.	MILLING AND TIN.			Plant.	Tons Treated.	CYANIDING AND SLIMES.		
		Wages.	Repairs and Maintenance.	Total.			Wages.	Repairs and Maintenance.	Total.
Black Range	8,974	5 4·59	4 4·67	9 9·26	Black Range	5,659	2 5·76	2 10·62	5 4·38
Boogardie	5,400	5 4·07	7 3·10	12 7·17	Boogardie	5,531	3 4·53	3 11·26	7 3·79
Burtville	2,724	7 2·92	9 1·31	16 4·23	Burtville	1,740	5 2·93	3 3·33	8 6·26
Coolgardie	7,758	4 5·75	4 10·37	9 4·12	Coolgardie	4,387	2 11·95	2 2·31	5 2·26
Darlot	2,807	6 11·71	9 1·32	16 1·03	Darlot	4,062	3 8·96	2 4·80	6 1·76
Duketon	202	28 4·94	23 3·67	51 8·61	Duketon	142·5	2 9·57	8 9·96	11 7·53
Kalpini	911·5	9 1·59	7 3·53	16 5·12	Laverton	259	3 0·51	8 2·49	11 3·00
Laverton	379·5	18 9·70	13 4·13	32 1·83	Lennonville	6,077	4 3·48	2 2·11	6 5·59
Lennonville	3,257·5	7 5·22	7 9·25	15 2·47	Leonora	2,692	2 0·85	3 3·08	5 3·93
Leonora	4,341·5	3 9·09	2 9·48	6 6·57	Meekatharra	2,940	4 3·82	3 3·70	7 7·52
Meekatharra	8,703	4 9·03	6 4·30	11 1·33	Menzies	3,247	3 5·93	3 1·08	6 7·01
Menzies	4,346	5 9·68	5 1·42	10 11·10	Mount Ida	...	...	...	...
Mount Ida	2,863	7 8·09	3 11·09	11 7·18	Mulline	1,639	3 9·31	7 9·13	11 6·44
Mulline	4,057·5	7 0·92	9 0·27	16 1·19	Mulwarrie	4,023	4 5·91	2 3·60	6 9·51
Mulwarrie	2,920	5 11·89	6 5·84	12 5·73	Nannine	1,048	3 4·85	3 6·34	6 11·19
Nannine	1,908·85	9 6·11	6 6·72	16 0·83	Niagara	5,055	2 7·02	2 7·71	5 2·73
Niagara	6,117·5	4 10·00	5 3·22	10 1·22	Norseman	2,960	3 7·79	3 7·63	7 3·42
Norseman	4,035·5	5 10·52	7 4·68	13 3·20	Pig Well	1,420	4 3·36	2 6·41	6 9·77
Pig Well	2,710	6 3·18	5 4·74	11 7·92	Pin Gin	1,815	3 0·64	2 2·52	5 3·16
Pin Gin	2,623	10 2·54	8 11·08	19 1·62	Sandy Creek	792·5	8 6·34	8 1·83	16 8·17
Sandy Creek	1,068	13 5·31	16 0·24	29 5·55	Siberia	835	5 3·94	20 0·11	25 4·05
Siberia	1,606	8 7·68	8 0·80	16 8·48	Yarri	6,331	2 4·12	1 9·99	4 2·11
Wiluna	4,684·75	6 7·81	6 7·53	13 3·34	Yerilla	761	4 8·67	4 10·79	9 7·46
Yarri	6,801·5	4 3·17	4 2·03	8 5·20	Yundamindera	1,098	5 10·48	3 4·09	9 2·57
Yerilla	1,351	12 5·09	7 6·87	19 11·96					
Yundamindera	189	27 4·12	30 6·94	57 11·06	Niagara Slimes	1,121	4 8·98	2 7·90	7 4·88
Greenbushes (Bunbury end)	4,615	2 3·22	2 1·05	4 4·27	Norseman Slimes	7,099	3 1·78	5 3·85	8 5·63
Greenbushes (North end)	5,881	2 11·65	1 4·97	4 4·62					

WESTERN AUSTRALIA.

State Batteries—Working Account, Twelve Months ending 31st December, 1907 (excluding Additions to Plant).

Goldfield.	MILLING.					CYANIDING.						
	Plant.	Tonnage.	Expenditure.	Revenue.	Profit.	Loss.	Plant.	Tonnage.	Expenditure.	Revenue.	Profit.	Loss.
			£ s. d.	£ s. d.	£ s. d.	£ s. d.			£ s. d.	£ s. d.	£ s. d.	£ s. d.
East Murchison	Black Range	8,974 00	4,384 11 7	5,286 13 3	902 1 8	...	Black Range	5,659 0	1,518 0 5	3,018 15 5	1,500 15 0	...
Murchison	Boogardie	5,400 0	3,401 7 11	2,709 16 2	...	691 11 9	Boogardie	5,531 0	2,023 4 8	2,753 9 5	730 4 9	...
Mt. Margaret	Burtville	2,724 00	2,228 5 5	1,771 19 10	...	456 5 7	Burtville	1,740 0	741 7 8	1,176 11 11	435 4 3	...
Coolgardie	Coolgardie	7,758 00	3,624 10 7	3,983 10 11	359 0 4	...	Coolgardie	4,387 0	1,138 2 2	1,972 1 0	833 18 10	...
East Murchison	Darlot	2,807 00	2,257 14 4	1,518 0 9	...	739 13 7	Darlot	4,062 0	1,248 8 4	1,556 4 5	307 16 1	...
Mt. Margaret	Duketon	202 00	522 7 1	155 15 11	...	366 11 2	Duketon	142 5	82 17 2	...	...	82 17 2
N.E. Coolgardie	Kalpini	911 5	748 13 2	427 8 7	...	321 4 7	...	...	...	...	...	...
Mt. Margaret	Laverton	379 5	610 2 5	298 8 10	...	311 13 7	Laverton	259 0	145 13 8	91 5 5	...	54 8 3
Murchison	Lennonville	3,257 5	2,476 14 0	1,335 16 9	...	1,140 17 3	Lennonville	6,077 0	1,964 13 4	2,670 1 1	705 7 9	...
Mt. Margaret	Leonora	4,341 5	1,421 6 6	1,922 5 0	500 18 6	...	Leonora	2,692 0	717 3 0	1,647 10 11	930 7 11	...
Murchison	Meekatharra	8,703 00	4,835 4 2	4,386 3 11	...	449 0 3	Meekatharra	2,940 0	1,121 4 11	1,423 6 5	302 1 6	...
N. Coolgardie	Menzies	4,346 00	2,374 3 1	2,704 10 3	330 7 2	...	Menzies	3,247 0	1,069 1 4	1,580 4 9	511 3 5	...
Do.	Mount Ida	2,863 00	1,660 9 7	2,161 15 6	501 5 11	...	...	...	...	...	...	...
Do.	Mulline	4,057 5	3,266 3 10	2,845 0 4	...	421 3 6	Mulline	1,639 0	945 9 1	881 1 9	...	64 7 4
Do.	Mulwarrie	2,920 00	1,821 15 9	1,723 7 6	...	98 8 3	Mulwarrie	4,023 0	1,366 9 6	1,837 17 5	471 7 11	...
Murchison	Nannine	1,908 85	1,533 15 10	992 11 5	...	541 4 5	Nannine	1,048 0	363 5 3	447 8 6	84 3 3	...
N. Coolgardie	Niagara	6,117 5	3,090 7 0	3,405 9 5	315 2 5	...	Niagara	5,055 0	1,321 8 11	2,403 16 4	1,082 7 5	...
Dundas	Norseman	4,035 5	2,676 18 2	2,683 8 10	6 10 8	...	Norseman	2,960 0	1,078 4 5	1,424 11 3	346 6 10	...
Mt. Margaret	Pig Well	2,710 00	1,579 18 11	1,652 17 8	72 18 9	...	Pig Well	1,420 0	483 16 5	803 17 1	320 0 8	...
N. Coolgardie	Pin Gin	2,623 00	*2,509 12 9	*1,601 1 7	...	908 11 2	Pin Gin	1,815 0	477 13 7	617 19 0	140 5 5	...
Coolgardie	Randalls	...	276 17 10	180 0 0	...	96 17 10	Randalls	792 5	661 0 7	727 6 1	66 5 6	...
Pilbara	Sandy Creek	1,068 00	1,573 6 8	947 16 3	...	625 10 5	Sandy Creek	835 0	1,057 17 1	235 19 6	...	821 17 7
Coolgardie	Siberia	1,606 00	1,341 12 0	789 16 3	...	551 15 9	Siberia	...	...	...	...	...
East Murchison	Wiluna	4,684 75	3,110 6 3	2,839 0 3	...	271 6 0	Yarri	6,331 0	1,322 1 6	1,716 18 2	394 16 8	...
N. Coolgardie	Yarri	6,801 5	2,868 1 0	3,539 15 0	671 14 0	...	Yerilla	761 0	366 2 4	281 2 3	...	85 0 1
Do.	Yerilla	1,351 00	1,350 15 8	830 15 8	...	520 0 0	Yundamindera	1,098 0	505 17 3	518 6 3	12 9 0	...
Do.	Yundamindera	189 00	547 6 4	204 6 8	...	342 19 8	Mulline Slimes	...	127 19 11	53 7 4	...	74 12 7
Murchison	Tuckanarra	1,268 5	...	84 2 1	84 2 1	...	Niagara do.	1,121 0	415 4 1	499 9 5	84 5 4	...
Peak Hill	Ravelstone	562 05	636 2 4	299 2 6	...	336 19 10	Norseman do.	7,099 0	3,006 2 8	4,979 3 6	1,973 0 10	...
Yilgarn	Southern Cross	...	...	7 18 0	7 18 0	...	Head Office	...	1,354 14 9	...	...	1,354 14 9
Coolgardie	Widgiemooltha	709 5	314 3 0	182 18 2	...	131 4 10	Inspection	...	237 13 0	...	...	237 13 0
	Greenbushes, Bunbury End	4,615 00	1,005 2 6	1,146 9 1	141 6 7	...						
	Greenbushes, North End	5,881 00	1,289 11 8	1,339 0 0	49 8 4	...						
	Head Office	...	2,678 4 7	...	...	2,678 4 7						
	Inspection	...	475 5 3	...	...	475 5 3						
		105,775 65	64,490 17 2	55,957 2 4	3,942 14 5	12,476 9 3		72,734 0	26,860 17 0	35,317 14 7	11,232 8 4	2,775 10 9
	*Includes Domestic Water Supply	...	197 8 9	65 12 5	...	...						



WESTERN AUSTRALIA.

State Batteries, Tin, Cyanide, and Slimes Plants.—Statement of Receipts and Expenditure for Year, 1907

Locality of Plant.	CYANIDING.													
	Tonnage.	Management.	Wages.	Assays.	Stores.	Total Working Expenses.	Per Ton.	Repairs.	Sundries.	Gross Expenditure.	Per Ton.	Receipts.	Per Ton.	
		£ 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 ...	5,659	131 16 5	569 13 11	314 7 6	336 7 8	1,352 5 6	4 9 35	36 5 8	129 9 3	1,518 0 5	5 4 38	3,018 15 5	10 8 02	
Boogardie ...	5,531	170 12 9	763 2 11	308 19 6	528 4 9	1,770 19 11	6 4 84	106 4 1	146 0 8	2,023 4 8	7 3 79	2,753 9 5	9 11 47	
Burtville ...	1,740	135 12 8	320 13 4	51 3 0	132 10 10	639 19 10	7 4 27	27 16 8	73 11 2	741 7 8	8 6 26	1,176 11 11	13 6 28	
Coolgardie ...	4,387	195 17 7	461 4 2	108 10 2	284 16 0	1,050 7 11	4 9 46	28 8 11	59 5 4	1,138 2 2	5 2 26	1,972 1 0	8 11 88	
Darlot ...	4,062	149 9 6	610 8 4	80 5 5	319 15 6	1,159 18 9	5 8 53	45 10 7	42 19 0	1,248 8 4	6 1 76	1,556 4 5	7 7 94	
Duketon ...	142 5	5 0 0	14 18 9	27 16 8	26 16 2	74 11 7	10 5 61	...	8 5 7	82 17 2	11 7 53	...	...	
Laverton ...	259	16 11 6	22 16 6	22 0 7	25 16 6	87 5 1	6 8 85	34 10 9	23 17 10	145 13 8	11 3 00	91 5 5	7 0 57	
Lennonville ...	6,077	176 5 3	1,127 9 7	152 12 7	366 19 3	1,823 6 8	6 0 00	32 11 8	108 15 0	1,964 13 4	6 5 59	2,670 1 1	8 9 44	
Leonora ...	2,692	136 3 3	142 13 9	67 11 9	137 14 7	484 3 4	3 7 16	203 11 0	29 8 8	717 3 0	5 3 93	1,647 10 11	12 2 88	
Meekatharra ...	2,940	100 1 5	534 16 6	75 2 0	243 10 11	953 10 10	6 5 84	92 1 0	75 13 1	1,121 4 11	7 7 52	1,423 6 5	9 8 18	
Menzies ...	3,247	163 7 6	403 18 0	222 13 2	234 12 1	1,024 10 9	6 3 72	2 11 7	41 19 0	1,069 1 4	6 7 01	1,580 4 9	9 8 80	
Mulline ...	1,639	113 10 5	195 19 7	291 13 0	228 9 11	829 12 11	10 1 48	70 15 7	45 0 7	945 9 1	11 6 44	881 1 9	10 9 01	
Mulwarrie ...	4,023	219 15 9	683 17 1	71 17 6	265 7 0	1,240 17 4	6 2 02	10 12 6	114 19 8	1,366 9 6	6 9 51	1,837 17 5	9 1 64	
Nannine ...	1,048	67 4 9	111 3 6	82 2 6	78 12 7	339 3 4	6 5 67	9 11 9	14 10 2	363 5 3	6 11 19	447 8 6	8 6 46	
Niagara ...	5,055	273 13 0	379 14 2	237 13 3	325 10 2	1,216 10 7	4 9 75	40 18 2	64 0 2	1,321 8 11	5 2 73	2,403 16 4	9 6 12	
Norseman ...	2,960	167 3 10	372 16 4	176 17 2	258 5 7	975 2 11	6 7 06	14 9 8	88 11 10	1,078 4 5	7 3 42	1,424 11 3	9 7 50	
Pig Well ...	1,420	93 0 0	210 17 5	16 3 2	112 4 1	432 4 8	6 1 05	38 15 3	12 16 6	483 16 5	6 9 77	803 17 1	11 3 86	
Pin Gin ...	1,815	101 4 0	175 18 5	48 1 7	127 18 6	453 2 6	4 11 91	1 13 4	22 17 9	477 13 7	5 3 16	617 19 0	6 9 71	
Sandy Creek ...	792 5	180 8 0	157 11 4	147 0 0	62 11 9	547 11 1	13 9 81	71 7 5	42 2 1	661 0 7	16 8 17	727 6 1	18 4 25	
Siberia ...	835	83 10 3	138 18 10	44 0 10	167 4 1	433 14 0	10 4 66	4 19 11	619 3 2	1,057 17 1	25 4 05	235 19 6	5 7 82	
Yarri ...	6,331	169 1 2	572 15 2	95 7 0	208 6 1	1,045 9 5	3 3 63	141 4 11	135 7 2	1,322 1 6	4 2 11	1,716 18 2	5 5 08	
Yerilla ...	761	77 5 3	102 8 4	30 7 2	84 10 8	294 11 5	7 8 90	32 4 8	39 6 3	366 2 4	9 7 46	281 2 3	7 4 65	
Yundamindra ...	1,098	105 17 0	216 11 10	36 19 6	114 15 7	474 3 11	8 7 64	9 14 5	21 18 11	505 17 3	9 2 57	518 6 3	9 5 29	
Cyanide Totals ...	64,514	3,032 11 3	8,290 7 9	2,709 5 0	4,671 0 3	18,703 4 3	5 9 57	1,055 19 6	1,959 18 10	21,719 2 7	6 8 76	29,785 14 4	9 2 81	
Slimes Plants.														
Mulline ...	...	0 13 4	15 6 8	6 16 5	17 2 4	39 18 9	...	87 1 2	1 0 0	127 19 11	...	53 7 4	...	
Niagara ...	1,121	65 9 6	200 13 9	6 0 0	117 5 8	389 8 11	6 11 37	20 11 2	5 4 0	415 4 1	7 4 88	499 9 5	8 10 93	
Norseman ...	7,099	140 4 2	977 8 0	137 6 1	1,578 15 6	2,833 13 9	7 10 95	5 0 0	167 8 11	3,006 2 8	8 5 63	4,979 3 6	14 0 33	
Cyanide and Slimes Totals ...	72,734	3,238 18 3	9,483 16 2	2,859 7 6	6,384 3 9	21,966 5 8	6 0 48	1,168 11 10	2,133 11 9	25,268 9 3	6 11 37	35,317 14 7	9 8 53	
Head Office ...	...	...	...	...	...	...	...	...	...	1,354 14 9	...	...	...	
Inspection ...	...	...	...	...	...	...	...	...	...	237 13 0	...	...	...	
GROSS TOTALS ...	72,734	...	...	...	...	...	...	...	...	26,860 17 0	...	35,317 14 7	...	



## WESTERN AUSTRALIA.

## STATE BATTERIES CYANIDE, SLIMES, AND TIN PLANTS.

*Profit and Loss Account for Twelve Months ending 31st December, 1907.*

	£	s.	d.	£	s.	d.		£	s.	d.	£	s.	d.	
To Expenditure, as per attached Statement—							By Receipts, as per attached Statement—							
Battery and Tin Plants	64,490	17	2				Battery and Tin—							
Cyanide and Slimes Plants	26,860	17	0				Crushing charges	55,957	2	4				
							Cyanide and Slimes charges	35,317	14	7				
						91,351	14	2			91,274	16	11	
							„ Loss on Working Expenses carried down					76	17	3
						£91,351	14	2			£91,351	14	2	
To Loss brought down from Working Expenses							By Net Loss on Year's Operations							
„ Additions and Improvements paid from Revenue						76	17	3			1,698	12	10	
						1,621	15	7						
						£1,698	12	10			£1,698	12	10	

**DIVISION IV.**

*Report of the Engineer for Mines Water Supply.*

ANNUAL REPORT, 1907.

*The Under Secretary for Mines.*

Mines Department, Water Supply Branch,  
Perth, 30th April, 1908.

The boring for water by hand plants is noticeable on account of the number of places tested during the year, and the good results obtained from aggregate feet bored, particularly in the Murchison district. The cost is also satisfactory in this and other districts. Summary attached.

The Diamond Drill "H" plant (page 146), operating on the Catalpa leases made a record in drilling four holes—3,279 feet—at cost of 10s. 4½d. per foot, including all charges. The plant then drilled 1,250 feet in exceedingly hard rock at the Rubicon (in progress at the end of the year).

New water shafts in four districts during the year aggregate 1,800 feet. The principal repairs, improvements, additions, etc., to various water stations are shown hereunder.

Works for conservation of water consisted of five reservoirs, the capacities ranging from small roadside tank to 14 million for town supply.

The principal works in hand during the year were the Leonora Water Supply for the town and mines, and the Norseman Water Supply for batteries. The first was badly needed by the town, and both will be of great benefit to the mines. The cost of the Leonora

Water Supply will be approximately £20,000, and the works, after being administered by the Mines Water Supply for some time, will be transferred to a Board under the 1904 Act.

Preparations are in hand to commence the construction of the Sturt Creek-Wiluna Stock Route, a report in connection with which is published as an appendix hereto.

*Boring Plants loaned, 1907.*

Diamond Drill, Catalpa Lease ..	1	
Diamond Drill, Rubicon Lease ..	1	
Hand-boring Plants .. ..	9	

Watering Stations leased .. ..	31	
Caretakers employed .. ..	18	
Pumpers .. ..	10	
Number of Water Stations main- tained, about .. ..	550	
Average Number of Men employed ..	200	
Maximum Number of Men employed	400	

*Correspondence.*

	Inwards.	Outwards.
Letters .. ..	4,006	3,697
Telegrams .. ..	670	649

P. V. O'BRIEN,  
Engineer for Mines Water Supply.

## WATER SUPPLY BRANCH.

## ANNUAL REPORT, 1907.

## WORKS COMPLETED, UNDERTAKEN, AND INITIATED.

## BORING.

Item.	Class of Work.	Locality.	General Description.	Remarks.
<i>Eastern Goldfields District.</i>				
1	Boring for Water	Linden .. .. .	5 bores, totalling 278ft. 6in.	For State Battery Water Supply. Fair supply salt water No. 5 bore
2	Do. .. .	Mt. Redcliffe .. .. .	4 bores, totalling 185ft. ..	For prospectors. Good supply fresh water, Bore No. 3: equipped as bore well
3	Do. .. .	Copperfield, Mt. Ida .. .. .	3 bores, totalling 259ft. ..	Small supply brackish water bore No. 1
4	Do. .. .	Menzies-Mt. Ida Road .. .. .	4 bores, totalling 130ft. ..	Fair supply fresh water bore No. 2. Fair supply salt water, bore No. 4
			Total .. 852ft. 6in	
5	Boring .. .	At Mulga Queen G.M.L. .. .	2 bores, totalling 418ft. ..	To locate and test quartz reef. Department provided plant and foreman, balance expenses paid by Company
<i>Murchison District.</i>				
6	Boring for Water	Mt. Magnet-Black Range Road, 14 miles 30 chains from Mt. Magnet	1 bore, depth 51ft. ..	Fair supply stock water
7	Do. .. .	Mt. Magnet-Black Range Road, 48 miles from Mt. Magnet	1 bore, depth 7ft. ..	Abandoned, country too hard
8	Do. .. .	Mt. Magnet-Black Range Road, 48 miles 24 chains from Mt. Magnet	1 bore, depth 38ft. ..	Abandoned, country too hard
9	Do. .. .	Mt. Magnet-Black Range Road, 50 miles 14 chains from Mt. Magnet	1 bore, depth 71ft. ..	Small supply good stock water
10	Do. .. .	Peak Hill-Leonora Stock Route, 6 miles N. Lawlers	1 bore, depth 30ft. ..	Small supply good water
11	Do. .. .	Peak Hill-Leonora Stock Route: Woronga	1 bore, depth 33ft. ..	Abandoned, country too hard
12	Do. .. .	Yalgoo-Field's Find Road, Messenger's Patch, near Well	1 bore, depth 11ft. ..	Abandoned, too hard
13	Do. .. .	Yalgoo-Field's Find Road, Messenger's Patch, near Well	1 bore, depth 37ft. ..	Small supply fresh water; abandoned
14	Do. .. .	Yalgoo-Field's Find Road, Messenger's Patch, near Well	1 bore, depth 45ft. ..	Good supply fresh water. To be well site
15	Do. .. .	Yalgoo-Field's Find Road, Messenger's Patch, near Well	1 bore, depth 49ft. ..	Water supply salt, abandoned
16	Do. .. .	Yalgoo-Field's Find Road ..	1 bore, depth 12ft. ..	Abandoned, too hard
17	Do. .. .	Do. .. .	1 bore, depth 12ft. ..	Abandoned, too hard
18	Do. .. .	Nannine-Wiluna Road, on 8-mile Creek	1 bore, depth 82ft. ..	Abandoned, too hard
19	Do. .. .	Nannine-Wiluna Road, 30 chains S. No. 1 Bore	1 bore, depth 52ft. ..	Abandoned, too hard
20	Do. .. .	Nannine-Wiluna Road, 1 mile S. No. 1 Bore	1 bore, depth 94ft. ..	Abandoned, too hard
21	Do. .. .	Nannine-Wiluna Road, 1 mile 16 chains N. No. 1 Bore	1 bore, depth 109ft. ..	Good supply of fresh water. Well sunk here
22	Do. .. .	Nowthanna, 3 miles W. of Quinn's	1 bore, depth 82ft. ..	Small supply salt water. Abandoned
23	Do. .. .	Nowthanna, 3½ miles S.W. of Quinn's	1 bore, depth 53ft. 6in. ..	Small supply fresh water. Well sunk here
24	Do. .. .	2 miles N.E. of Hancock's, near Sandstone	1 bore, depth 84ft. ..	Abandoned, no water
25	Do. .. .	4 miles N.E. of Hancock's ..	1 bore, depth 24ft. ..	Abandoned, no water
26	Do. .. .	.. .. .	1 bore, depth 59ft. ..	Abandoned, no water
27	Do. .. .	3 miles N. of Hancock's .. .	1 bore, depth 106ft. ..	Fair supply fresh water. Bore well
28	Do. .. .	3 miles N.E. of Hancock's .. .	1 bore, depth 106ft. ..	Fair supply fresh water. Bore well.
29	Do. .. .	Sandstone .. .. .	1 bore, depth 106ft. ..	Fair supply fresh water. Bore well
30	Do. .. .	Barrambie-Berrigrin Road, at 12½ mile peg	1 bore, depth 104ft. ..	No indication of water
31	Do. .. .	Barrambie-Berrigrin Road, at 14 mile peg	1 bore, depth 116ft. ..	Small supply fair stock water
32	Do. .. .	Barrambie-Berrigrin Road, near 14 mile peg	1 bore, depth 36ft. ..	No water
33	Do. .. .	Barrambie-Berrigrin Road, at 13½ mile peg	1 bore, depth 143ft. ..	Fair supply fresh water
34	Do. .. .	Coorang (You-an-me) .. .	1 bore, depth 101ft. ..	Good supply fresh water
35	Do. .. .	Montagu-Walga-gunya Road .. .	1 bore, depth 119ft. ..	Small supply fresh water
36	Do. .. .	Montagu-Walga-gunya Road .. .	1 bore, depth 105ft. ..	Fair supply fresh water
			Total .. 2,077ft. 6in.	

## BORING—continued.

Item.	Class of Work.	Locality.	General Description	Remarks.
<i>Pilbara District.</i>				
37	Boring for Water..	At 2-Mile Creek, Wodgina ..	2 Bores, totalling about 132 feet	Boring preliminary to well sinking operations.
38	Do. .. ..	At Cooglegong .. ..	23 Bores, totalling about 300 feet	
39	Do. .. ..	At Yandicoogina .. ..	10 Bores, totalling about 500 feet	
40	Do. .. ..	At Cook's Creek and Galtee More	3 Bores, totalling about 400 feet	
41	Do. .. ..	At Stewart's Track Well ..	4 Bores, totalling about 100 feet	
			Total .. .. 1,432 feet	

*Phillips River Goldfields.*

42	Boring for water ..	At 5 miles from Hopetoun on back road	1 Bore, 84 feet deep ..	Brackish water at 68 feet
43	Do. .. ..	At 5 miles from Hopetoun on back road	5 Bores, totalling 200 feet	Abundant supply salt water
44	Do. .. ..	At 5 miles from Hopetoun on back road	4 Bores, totalling 164 feet	Good supply fairly good water
45	Do. .. ..	At 5 miles from Hopetoun on back road	1 Bore, totalling 33 feet	Good supply stock water
46	Do. .. ..	Hopetoun-Ravensthorpe at 13-Mile Camp	1 Bore, totalling 36 feet	Salt water
			Total .. 517 feet	

## DIAMOND DRILL.

47	Diamond Drill ..	At Catalpa, G.M.L., Cue ..	4 Bores, totalling 3,279 feet	The Department found plant, men, carbons, etc.; the Company pay for carbons used, and all wages except foreman. Average bored, week of 6 days=120 feet. Cost per foot for total bored, 10s. 4½d.; this includes all charges
48	Do. .. ..	At Rubicon G.M., Day Dawn ..	7 Bores, totalling 1,250 feet	

## SUMMARY.

Hand-boring Plants ..	18 Bores, totalling 1,270 feet	..	Eastern Fields—Average cost per foot, 6s. 3d.
Do. .. ..	31 Bores, totalling 2,078 feet	..	Murchison—Average cost per foot, 8s. 4d.
Do. .. ..	42 Bores, totalling 1,432 feet	..	Pilbara—Average cost per foot, 12s.
Diamond Drill ..	4 Bores, totalling 3,279 feet	..	Cue (Catalpa Lease)—Average cost per foot, 10s. 4½d.
Do. .. ..	7 Bores, totalling 1,250 feet	..	Day Dawn (Rubicon G.M.)—In progress
		9,309 feet	

## WELL SINKING.

Item.	Class of Work.	Locality.	General Description.	Remarks.
<i>Eastern Fields.</i>				
49	Well Sinking	Station Creek, Leonora, at No. 17 Bore	6ft. x 4ft. shaft, depth 51ft., 2 drives, totalling 45ft., equipped with windmill and electric pump	Good supply fresh water
50	Do.	Station Creek, Leonora, on No. 1 Bore	6ft. x 4ft. shaft, depth 39ft., 3 drives totalling 97ft., equipped with deep well pump	Good supply fresh water
51	Do.	Station Creek, Leonora, on No. 11 Bore	6ft. x 4ft. shaft, depth 46ft., 2 drives, totalling 41ft., equipped with windmill and electric pump	Good supply fresh water
52	Do.	Linden, near 6-Mile Lease, 406 R.	6ft. x 4ft. shaft, depth 67ft.	Good supply salt water
53	Do.	Copperfield, Mt. Ida, at No. 2 Bore	5ft. x 3ft. shaft, depth 88ft.	Good supply stock water
<i>Murchison District.</i>				
54	Well Sinking	Mt. Magnet-Black Range Road, about 50-miles from Mt. Magnet	5ft. x 3ft. shaft, depth 65ft. 6in.	Fair supply good stock water
55	Do.	Mt. Magnet-Black Range Road, about 14½ chains from Mt. Magnet	5ft. x 3ft. shaft, depth 40ft.	Small supply good stock water
56	Do.	Nannine-Wiluna Road	5ft. x 3ft. shaft, depth 111ft.	Fair supply fresh water
57	Do.	Prominent Hills, near Berrigrin	5ft. x 2ft. 6in. shaft, depth 68ft.	Small supply stock water; constructed under contract
58	Do.	Messenger's Patch, Yalgoo-Field's Find Road	5ft. x 3ft. shaft, depth 41ft. 6in.	Good supply fresh water
59	Do.	Nowthanna, near Quinn's	5ft. x 3ft. shaft, depth 70ft.	Small supply fresh water
60	Do.	Barrambie-Berrigrin road, at 13½ miles	5ft. x 3ft. shaft, depth 126ft.	Fair supply fresh water
61	Do.	Sandstone	5ft. x 3ft. shaft, depth 111ft. drive 6ft. x 3ft. x 6ft. long	Fair supply fresh water
62	Do.	Rafferty's Patch, Maninga Marley	5ft. x 3ft. shaft, depth 110ft. 6in.	Small supply fresh water
63	Do.	Maninga Marley, 16 miles S.E. by E of Nungarra	5ft. x 3ft. shaft, depth 45ft. Windmill, etc.	Good supply fresh water
64	Do.	Mindoolah, near Weld Range Lease	5ft. x 3ft. shaft, depth 88ft., drive 5ft. x 3ft. x 12ft. long	Good supply fresh water
65	Do.	Lawler's-Berrigrin Road, at 53½ mile	5ft. x 3ft. shaft, depth 100ft.	Good supply fresh water
<i>Pilbara District.</i>				
66	Well sinking	Mud Springs, Moolyella Tinfield	5ft. x 3ft. 7in. shaft, depth 17ft.	Good supply fresh water
67	Do.	Port Hedland-Marble Bar Road	5ft. x 3ft. 6in. shaft, depth 58ft. 6in.	Good supply fresh water
68	Do.	Nullagine-Roebourne Road	5ft. x 3ft. shaft, depth 25ft. 6in.	Heavy supply fresh water
69	Do.	At Mt. Francisco, 26 miles S.W. Wodgina	5ft. x 3in. shaft, depth 19ft. 6in.	Good supply fresh water
70	Do.	Shaw's Crossing, Marble Bar-Lalla Rookh Road	5ft. 6in. x 3ft. 4in. shaft, depth 32ft.	Good supply fresh water
71	Do.	Wodgina	5ft. x 3ft. 6in. shaft, depth about 90ft.	Good supply fresh water
72	Do.	6 miles N.E. Yandicoogina	5ft. 6in. x 3ft. 6in. shaft, depth 93ft.	Good supply fresh water
<i>Phillips River Goldfields.</i>				
73	Well sinking	At Hopetoun, on No. 9 Bore	5ft. 3in. x 3ft. 3in. shaft, depth 15ft. 6in.	Good supply brackish water

## IMPROVEMENTS TO WELLS.

Item	Class of Work.	Locality.	General Description.	Remarks.
<i>Eastern Fields.</i>				
74	Repairs and equipping	At Kurnalpi, on Lease 185 E ..	Timbering and equipping with windlass, bucket, rope, trough, etc.	Small supply stock water
75	Equipping well ..	At Kurnalpi, on Lease 516 E ..	New windlass, rope, and bucket	Small supply fresh water
76	Repairs and equipping	At Kurnalpi, on W.R. 16 K ..	Timbering, repairs to brace, new windlass, rope, bucket, etc.	Small supply fresh water
78	Deepening and repairs to well	About 12 miles S. of Mt. Linden ..	Deepened 9ft., repairs to brace, new troughing, bucket, etc.	Small supply fresh water
<i>Murchison District.</i>				
79	Deepening, driving, and equipping	Peak Hill-Lawlers Stock Route	Improvements to water stations, including sinking, driving, and equipments	Good supply stock water
80	Repairs and equipping	Leonora-Lawlers Stock Route ..	Two wells, repairs to brace, new buckets and additions to troughing, etc.	
81	Drive in well and repairs	Leonora-Lawlers Stock Route ..	Drive 6ft. x 4ft. x 10ft. long, also additions to troughing, etc.	Good supply fresh water
82	Repairs and equipping	Leonora-Lawlers Stock Route ..	Repairs to brace, new rope, buckets, and additions to troughing, etc.	Good supply fresh water
83	Repairs and equipping	Leonora-Lawlers Stock Route ..	Timbering, repairs to brace and troughing	
84	Equipping	Mt. Magnet Stock Well ..	Windmill, elevated tank, etc.	
85	Improvements to well	Burnakura, near Nannine ..	Windmill, elevated tank, etc.	
<i>Pilbara District.</i>				
86	Repairs and equipping	N. Shaw, 17 miles N. Coonglegong	Timbering, new windlass, rope, and bucket	
87	Repairs and equipping	Camel Creek, Pippingarra, and other localities	Eight wells repaired and equipped	
88	Repairs to wells ..	Various localities .. ..	Relined six wells.	
89	Improvements to well	Wodgina .. ..	Windmill, etc.	
90	Deepening wells ..	Various localities .. ..	Six wells deepened, totalling about 40ft.	

## MISCELLANEOUS WORKS.

Item.	Class of Work.	Locality.	General Description.	Remarks.
<i>Eastern Fields.</i>				
91	Pump Station, No. 2 Tank	Norseman .. .. .	To supply water to batteries, Plant consists of engine-house, Pearn's D.W. submersible pump (6½ x 15in.), service pump (5in. x 6in.), tubular boiler; 5in. steel rising main, about 1½ miles; 4in. gravitation main, about 2 miles; service tanks 60,000 gals.; telephone line 2 miles	
92	Pump Station, No. 2 Tank	Menzies .. .. .	20 H.P. Diesel Engine. Engine-house and oil room erected, also one 3,000 gal. tank on stand, and turbine pump started	Boiler water
93	Battery and Mines Water Supply	Menzies .. .. .	33 H.P. Diesel Engine and Deep Well pump erected	Salt water for batteries
94	Condensers	Norseman .. .. .	4 feed water heaters; several boilers renewed	
95	Tank Roof, etc.	Edjudina .. .. .	Tank covered with timber roof and rabbit-proof gates placed in inlet and bywash	
96	Fencing	Yilgantie .. .. .	Both upper and lower water holes enclosed with wire netting fences	
97	Fencing and Channels	Goongarrie Road .. .. .	The 33-Mile (Red Tank) enclosed with rabbit-proof fence; channels cut and concrete inlet down slope and concrete water cushion put in	
98	Fencing	Londonderry .. .. .	About 2½ miles new fencing has been done, and ¾ mile of old fence taken down and re-erected	Sub-divisional fence
99	Tank	Hill View .. .. .	One 2,000 gal. tank has been erected	Temporary water supply
<i>Murchison District.</i>				
100	Road Clearing	Barrambie-Berrigrin Road .. .. .	25½ miles cleared for a width of 16 feet	

## WORK DONE FOR ARCHITECTURAL DIVISION, PUBLIC WORKS DEPARTMENT.

Item.	Class of Work.	Locality.	General Description.	Remarks.
<i>Pilbara District.</i>				
101	Repairing Buildings	Marble Bar .. .. .	Repairs and renovations to Police Station	
102	Do.	Do. .. .. .	Repairs and renovations to Warden's Residency	
103	Do.	Do. .. .. .	Repairs and renovations to Post Office	
105	Do.	Do. .. .. .	Repairs and renovations to Court House	
106	Do.	Do. .. .. .	Repairing and painting Charge Room and Police Quarters	
107	Do.	Nullagine .. .. .	Removing and repairing Post Office	

## WORKS FOR CONSERVATION OF WATER.

Item.	Class of Work.	Locality	General Description.	Remarks
<i>Eastern Fields.</i>				
109	14,000,000 gallon Reservoir	Station Creek, 9 miles North of Leonora	A concrete weir across Station Creek to impound 14 million gallons of water (see below in Pump Plants, etc.)	For town's supply, also for Mines and batteries
110	749,000gals. capacity	Jaurdie Hills, $\frac{1}{2}$ mile North of townsite	Tank and contour drains excavated. Tank lined with asphalt, roofed with timber and iron, and enclosed with rabbit-proof fence. A No. 5 Monitor pump and stand erected	For domestic water supply
111	130,000gals. capacity	Yilganie, Kookynie-Edjudina Road	Excavated tank, fenced and equipped	For road traffic and prospectors (leased)
112	85,000gals. capacity	Coolgardie-42-Mile Road	Known as the Red Tank fenced and equipped	For travellers and prospectors
<i>Phillips River District.</i>				
113	5,000,000gals. capacity	Ravensthorpe .. .. .	This No. 1 Tank is partly a dam and partly excavation. Capacity, 5,000,000 gals. Water gravitates $\frac{1}{2}$ mile to pump station at No. 2 Tank, and is then lifted about 100 feet to town	Water for domestic requirements only
115	3,000,000gals. capacity .. . . .	Do. .. .. .	No. 2 Tank, excavation, with bottom puddled. Capacity 3 million gallons. Water is pumped to mines and smelter for boilers. etc.	For batteries, mines, and stock

## PIPE LINES, PUMPING PLANTS, ETC.

Item.	Class of Work.	General Description.
<i>Eastern Fields.</i>		
116	Leonora-Gwalia Water Supply ..	To supply Leonora and Gwalia, also batteries, with fresh water. Pumping plant consists of Suction Gas Producer and 54 h.p. engine, driving direct one two-throw D. W. Pump, one 10 h.p. dynamo and one high lift Turbine pump. On the outlying wells are motor D.W. pumps, and powerful windmills as auxiliaries. Service tanks 60,000 gallons on Mt. George. Rising main, 3 miles, 4in. steel pipe. Gravitation main, 6 miles 4in., 2 miles 3in. Town reticulation, about 1 $\frac{1}{2}$ miles, 2in. pipe. Engine shed, driver's cottage, electric transmitter and recorder, telephone line 10 miles
117	Norseman Water Supply—for Batteries and Mine	To supply the Lady Miller, Mararoa and Cumberland Gold Mines, and also State Battery with boiler water from No. 2 tank, and salt water from No. 2 well. About 1 $\frac{1}{4}$ miles of 5ft. solid drawn steel pipe from No. 2 Tank to Service Tanks. 3 $\frac{1}{4}$ miles of 4in. main laid from Service Tanks to Lady Miller G.M.; 1 $\frac{1}{4}$ miles of 3in. branch main to Cumberland G.M.; and $\frac{3}{4}$ mile of 2 $\frac{1}{2}$ in. main to Mararoa G.M. and State Battery. A three-throw 5in. x 6in. Pearn's Pump, and 6 $\frac{1}{2}$ x 15in. two-throw Deep Well Pump have been erected
118	Menzies Water Supply—Extension to Mines	26 chains of 4in. pipe laid from 5in. main to supply the Shenton, Alpha, and Menzies Gold mines
119	Menzies Water Supply—Extension in Municipal Park	35 chains 2in. pipe laid from No. 2 Tank to Municipal Park
120	Paddington Domestic Water Supply	To supply Paddington and railway with water. About two miles of 3in. main laid from Broad Arrow Tank, and one 10,000 gallon galvanised iron tank on timber stand erected
121	Yundagar Domestic Water Supply ..	To supply Yundagar with domestic water. About $\frac{3}{4}$ mile of 2in. main laid from Menzies No. 1 Tank, connecting with Woolgar Gravitation Main, and one 10,000 gallon storage tank erected at Yundagar
<i>Murchison District.</i>		
122	Meekatharra Battery and Domestic Water Supply	Additions carried out during 1907, to original work, which was finished in December, 1906, are:—30,000 gallon additional storage in service tanks on trig hill. Two wells Garden Gully with oil engine and deep well pump on each, and connected to main pumping station by 3in. steel pipe. Extension to Marmont Mine 1 $\frac{1}{2}$ miles 3in. and $\frac{3}{4}$ mile of 2 $\frac{1}{2}$ in. pipes. Extension to Ingliston Extended, 15 chains 2 $\frac{1}{2}$ in. pipe. Reticulation in town 25 chains 2in. pipe.
<i>Phillips River District.</i>		
123	Ravensthorpe Water Supply ..	To deliver water (domestic), from No. 1 Tank to the town. To deliver water (boiler), from No. 2 Tank to mines and smelter. Plant consists of 1 mile of 3in. steel main, tubular boiler, Knowle's pump, windmill, service tanks in town, engine house, etc.; telephone line 110 miles



## INSPECTIONS AND REPORTS.

Item.	Locality.	General Description.	Remarks.
<i>Eastern Fields.</i>			
124	Norseman	Survey of Pipe Track from No. 2 Tank to Lady Miller and Cumberland G.M.	Reported upon 18-5-07
125	Menzies	Survey and Report Extension to Lady Harris G.M.	do. do. 27-8-07
126	Mt. Monger	Mt. Monger Water Supply	do. do. 12-6-07
127	Never Never	Tank Site	do. do. 31-7-07
128	Ora Banda	Water Supply	do. do. 7-11-07
129	Jubilee	Survey Tank Site	do. do. 22-11-07
130	Marvel Loch	Do.	do. do. 1-3-07
131	Londonderry	Analysis of Soil Londonderry Stock Paddock	do. do. 27-9-07
132	Higginsville	Domestic Water Supply	do. do. 30-8-07
133	Eundynie	Do.	do. do. 30-8-07
134	Do.	Survey Tank Site	do. do. 9-11-07
135	Mt. Redcliffe	Water Supply	do. do. 13-8-07
136	Parker's Range Yelladine Road	Survey Tank Site at 12-Mile	do. do. 27-8-07
<i>Murchison District.</i>			
137	Peak Hill-Lawlers	Water Supply on Stock Route	Reported upon 12-2-07
138	Do.	Re Proposed New Stock Route	do. do. 12-2-07
139	Cue-Fortescue	Re Proposed Deviation of Stock Route	do. do. 16-5-07
140	Murchison	Stock Routes-General	do. do. 6-8-07
141	Barrambie-Berrigrin	Track and Water Supply	do. do. 18-7-07
<i>Phillips River District.</i>			
142	Jerdacuttup - Hopetoun	Water Supply Survey and Report	Reported upon 17-5-07

*Rainfall at various Stations.*

100 points 1 inch.

Station.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Niagara	37	40	304	..	38	28	126	24	10	15	..	..	622
27-Mile Condenser	32	104	..	..	59	..	159	..	..	..	..	..	354
Menzies	39	6	310	7	70	53	139	37	21	18	2	..	702
Davyhurst	23	56	276	25	110	51	223	50	17	12	22	..	865
Siberia	47	100	130	..	..	..	65	50	..	..	..	..	392
Goongarrie	39	238	262	25	105	60	147	49	32	16	33	3	1,009
Black Flag	40	92	493	5	81	43	129	..	..	..	..	..	883
Gindalbie	47	53	439	10	131	60	160	42	36	5	17	..	1,000
Kunanalling	31	14	570	14	47	70	95	32	35	10	10	..	928
Coolgardie	43	111	524	..	109	70	68	47	38	14	25	40	1,089
Widgemooltha	11	121	443	..	92	49	130	..	..	..	25	75	946
Wingarnie	12	52	525	26	30	30	125	..	..	..	..	14	814
15-Mile Condenser	25	43	372	21	58	67	119	43	37	..	36	24	845
Norseman	33	128	277	19	74	103	140	55	36	30	64	23	982
Kundip	..	..	..	..	..	..	45	75	119	64	262	43	608
Ravensthorpe	..	40	140	..	43	108	140	90	101	8	126	9	805
Hopetoun	..	..	..	..	..	..	..	71	49	98	170	20	408



## Return of Revenue and Expenditure for the 12 months, January to December, 1907—continued.

## MURCHISON AND EAST MURCHISON. GOLDFIELDS.

Name of Watering Station.	Revenue. £ s. d.	Expenditure. £ s. d.
1. Peak Hill Well .. ..	82 17 4	132 0 4
2. Day Dawn Well .. ..	2 17 6	19 14 11
3. No. 1 Well, Cue-Black Range .. ..	.. ..	4 14 0
4. No. 2 Well, Cue-Black Range .. ..	.. ..	23 2 3
5. No. 3 Well, Cue-Black Range .. ..	.. ..	3 11 8
6. No. 4 Well, Lawlers-Black Range .. ..	.. ..	0 13 4
7. Milee Well (or Soak) .. ..	.. ..	4 8 8
8. Yarraquin Well .. ..	0 7 0	2 3 4
9. Garden Granites .. ..	.. ..	7 15 2
10. Nannine Water Supply .. ..	231 3 6	25 7 7
11. Bulkahardoo Well .. ..	.. ..	23 19 6
12. Magnet Stock Well .. ..	.. ..	47 11 7
13. Magnet Town Well .. ..	.. ..	0 19 4
14. Ned's, Day Dawn .. ..	.. ..	1 10 6
15. Tuckanarra (Jack's) .. ..	.. ..	9 0 10
16. Maninga Marley .. ..	.. ..	15 7 6
17. Buzza .. ..	.. ..	0 15 0
18. Hancock's Well .. ..	.. ..	54 5 10
19. No. 3 Bore .. ..	.. ..	11 0 0
20. 71 Miles .. ..	.. ..	15 7 11
21. Breakaway .. ..	.. ..	10 18 9
22. Muletah .. ..	.. ..	30 4 10
23. Burnakurra .. ..	12 0 0	6 0 0
24. Mummarra .. ..	.. ..	4 18 4
25. Limestone .. ..	.. ..	2 16 8
26. Meekatharra Water Supply .. ..	1,417 13 11	878 11 1
27. Barrambie Well .. ..	.. ..	1 4 2
28. Bulchina Well .. ..	.. ..	42 9 2
29. Contradiction .. ..	.. ..	6 6 0
30. McGillicuddy Well .. ..	.. ..	15 5 8
31. Nesbit's Soak .. ..	.. ..	8 10 0
32. Horse Shoe Stink Well .. ..	.. ..	10 0 0
33. Milly Soak .. ..	.. ..	8 5 0
34. Mulga Mulga .. ..	.. ..	11 12 6
35. Elya Bore .. ..	.. ..	0 13 4
36. Tainerow Soak .. ..	.. ..	15 2 6
37. Fisher's Well .. ..	.. ..	4 3 4
38. Mistake .. ..	.. ..	4 3 4
39. Worthington .. ..	.. ..	4 3 4
40. Prendergast .. ..	.. ..	1 8 4
41. No. 6, Black Range (Lawlers District) .. ..	.. ..	1 8 4
42. Wallaby Nob Well .. ..	.. ..	2 16 8
43. Gum Creek .. ..	.. ..	2 16 8
44. New England .. ..	.. ..	24 6 5
45. Nungarra Town Well .. ..	35 0 0	4 0 0
46. No. 5 Rocky Soak .. ..	.. ..	0 13 4
47. Mundabooka .. ..	.. ..	12 11 4
48. Wargoo .. ..	.. ..	1 8 4
49. Paynesville .. ..	.. ..	4 7 8
50. No. 5 Well, Lawlers Black Range .. ..	.. ..	0 15 0
51. Minderoo .. ..	.. ..	2 0 0
52. Murphy's Well .. ..	.. ..	2 0 0
53. Gabanintha Windmill .. ..	.. ..	0 11 0
54. Ball Chambers .. ..	.. ..	4 2 6
55. Roads Board .. ..	.. ..	1 7 6
56. Chumerang .. ..	.. ..	1 7 6
57. Boogardie Town Well .. ..	2 0 0	.. ..
58. Boogardie Stock Well .. ..	1 15 9	.. ..
59. Lennonville Water Supply .. ..	34 10 0	.. ..
60. Mt. Fraser .. ..	.. ..	92 13 4
61. Johnson Well .. ..	.. ..	0 7 3
62. Walgagunyah .. ..	.. ..	4 1 8
63. Bubbangundi .. ..	.. ..	4 1 8
64. Kilalo Well .. ..	.. ..	8 3 4
65. Peregrine .. ..	.. ..	4 1 8
66. Cuddingwarra .. ..	.. ..	2 13 4
67. Commodore .. ..	.. ..	10 10 10
68. 18 Mile .. ..	.. ..	2 1 8
69. Chesterfield .. ..	.. ..	5 13 4
70. Illawarra .. ..	.. ..	12 15 0
71. Berrigan .. ..	.. ..	2 16 8
72. Bob's Soak .. ..	.. ..	8 8 4
Carried forward .. ..	£1,818 9 3	1,697 1 8

Name of Watering Station	Revenue. £ s. d.	Expenditure. £ s. d.
Brought forward .. ..	£1,818 9 3	1,697 1 8
73. Lawlers Town Well .. ..	13 10 0	.. ..
74. Nyuing Well on Reserve 9462 .. ..	0 2 6	.. ..
.. ..	£1,832 1 9	1,697 1 8
SUMMARY.		
Charged to C. F. Authorities but not allocated to any special Watering Station.		
Wages of Caretaker, etc., and Maintenance of Wells, Upkeep Pumping Stations .. ..	.. ..	654 5 1
Plant for Maintenance .. ..	.. ..	557 12 2
Office Expenses .. ..	.. ..	11 1 0
Forage .. ..	.. ..	296 7 8
.. ..	£1,832 1 9	3,216 7 7

## PILBARA AND WEST PILBARA GOLDFIELDS.

	£ s. d.	£ s. d.
1. No. 3 Mile Well .. ..	.. ..	3 10 0
2. Big Schist .. ..	.. ..	10 8 0
3. Trig Hill .. ..	.. ..	3 10 0
4. Egina .. ..	.. ..	5 3 0
5. Marble Bar Town Well .. ..	23 0 0	24 4 8
6. Lalla Rookh .. ..	.. ..	6 5 4
7. Coonterooona .. ..	.. ..	1 15 0
8. 42-Mile Well .. ..	.. ..	8 18 0
9. Pippingarra .. ..	.. ..	22 8 6
10. Poondina Well .. ..	.. ..	3 10 0
11. Port Hedland 4 Mile .. ..	.. ..	3 6 0
12. Gorge Creek .. ..	.. ..	11 7 9
13. Farwig's Well .. ..	.. ..	42 3 10
14. Moolyella .. ..	.. ..	22 18 0
15. Croydon Top Camp .. ..	.. ..	6 0 9
16. Condon .. ..	.. ..	16 0 0
17. Condon 12 Mile .. ..	.. ..	4 10 0
18. Towerana Well .. ..	.. ..	68 4 5
19. Stock Paddock Well .. ..	.. ..	3 10 0
20. Brown Well .. ..	.. ..	5 2 0
21. Kangaroo .. ..	.. ..	2 4 0
22. Black Gin .. ..	.. ..	2 4 0
23. Green's Well .. ..	.. ..	5 18 0
24. Turkey Camp .. ..	.. ..	3 10 0
25. 4-Mile Well .. ..	.. ..	1 15 0
26. Robinson 5 Mile .. ..	.. ..	1 10 0
27. Spinaway's Well .. ..	.. ..	3 8 0
28. Shady Camp .. ..	.. ..	4 4 0
29. Little Shaw .. ..	.. ..	4 4 0
30. Carlinda .. ..	.. ..	9 7 4
31. Pindan .. ..	.. ..	3 0 8
32. Whim Creek .. ..	.. ..	0 8 9
33. Nullagine .. ..	.. ..	3 11 0
34. Nullagine 4 Mile .. ..	.. ..	12 19 0
35. Balla Balla .. ..	.. ..	0 10 0
36. Smith .. ..	.. ..	8 13 4
37. Ely's Old Shaw .. ..	.. ..	49 11 10
38. Black Range No. 2 .. ..	.. ..	21 13 4
39. North Shaw .. ..	.. ..	31 13 9
40. Causeway 5 Mile .. ..	.. ..	1 10 0
41. 5-Mile Well .. ..	.. ..	4 18 0
42. Granites No. 2 .. ..	.. ..	15 15 8
43. McKay's Battery Well .. ..	.. ..	11 0 9
44. Pinnacles .. ..	.. ..	4 4 0
45. Wodgina .. ..	.. ..	0 15 0
46. Warrawoona .. ..	.. ..	3 8 0
47. Hall's Grave .. ..	.. ..	4 4 0
48. Carhana .. ..	.. ..	3 8 0
49. Wyman's .. ..	.. ..	3 8 0
50. Brockman .. ..	.. ..	1 14 0
51. Lower Nicol Well .. ..	.. ..	10 9 10
52. Talga Well .. ..	.. ..	2 10 0
Carried forward .. ..	£23 0 0	511 6 6

## Return of Revenue and Expenditure for the 12 months, January to December, 1907—continued.

Name of Watering Station.	Revenue.	Expenditure.	Name of Watering Station.	Revenue.	Expenditure.
	£ s. d.	£ s. d.		£ s. d.	£ s. d.
Brought forward ..	£23 0 0	511 6 6	Brought forward ..	£1,003 10 11	512 9 8
SUMMARY.			SUMMARY.		
Charged to C. F. Authorities but not allocated to any special Watering Station.			Charged to C. F. Authority but not allocated to any special Watering Station.		
Wages of Yardmen, etc., Up-keep, etc. .. ..	..	511 16 7	Maintenance .. ..	..	139 11 9
Plant for Maintenance .. ..	..	510 14 0		£1,003 10 11	652 1 5
Office Expenses .. ..	..	45 12 6			
Forage .. ..	..	152 13 9			
	£23 0 0	1,732 3 4			
OTHER GOLDFIELDS.			SUMMARY.		
	£ s. d.	£ s. d.		£ s. d.	£ s. d.
1. Cordingup Soak .. ..	10 13 4	..	Eastern Goldfields .. ..	9,675 7 11	8,982 7 1
2. Ravensthorpe No. 1 Tank .. ..	593 13 10	247 9 11	Murchison and East Murchison Goldfields .. ..	1,832 1 9	3,216 7 7
3. Ravensthorpe No. 2 Tank .. ..	4 15 0	22 8 9	Pilbara and West Pilbara Goldfields .. ..	23 0 0	1,732 3 4
4. Hopetoun Well .. ..	388 19 7	186 8 2	Other Goldfields .. ..	1,003 10 11	652 1 5
5. Kundip Tank .. ..	5 9 2	31 2 10		£12,534 0 7	14,582 19 5
6. Gifford's Well .. ..	..	25 0 0			
Carried forward ..	£1,003 10 11	512 9 8			

## WATER SUPPLY OF THE WILUNA-EAST KIMBERLEY STOCK ROUTE.

To Engineer Mines Water Supply, Perth.

Sir,—I have the honour to report that I have completed the exploration of the country between Wiluna and East Kimberley with a view to ascertaining if it was possible to find a suitable stock route between these points.

Plans have also been prepared showing a compass traverse of the country travelled over and the position of the proposed stock route.

I am pleased to be able to state that I have located a route, on which I consider sufficient feed and water can be obtained to enable stock to be brought successfully from Kimberley to Wiluna, for distribution through the more populated centres of the State.

We were particularly fortunate in being able to complete our journey through from Day Dawn to Hall's Creek without the loss of either camels or horses, though we had the misfortune to lose one camel in Kimberley from (apparently) congestion of the lungs, and one on our return journey from tetanus, but these are losses that might occur under the most favourable circumstances.

I also had to report the loss of one of the most valuable members of the party, who to my great regret was fatally speared by a native.

The party of which I had the honour to be appointed leader consisted of eight, viz.:—Messrs. H. S. Trotman, Michael Tobin, Joseph Tobin, Tom Burke, Otto Baumgarten, R. S. Moody, and E. Blake. We had with us twenty-three camels, two ponies, eight pairs of water drums with a capacity of 320 gallons.

Boring plant, the necessary camp equipment, and sufficient food supplies to last nine months, with the exception of tinned meats, a sufficient supply of

Perth, Western Australia,  
20th December, 1907.

which it is almost impossible to carry, owing to its bulk and weight, consequently we depended to a certain extent on what game we could get to replenish our meat supply.

We started from Day Dawn on 7th May, 1906, and travelled via Nannine to Wiluna, arriving at that place on the 23rd. We were delayed here a few days owing to the fact that some of the supplies were sent on per team and did not arrive until the 27th.

As our work practically commenced here, and knowing that once we left Wiluna there was no chance of getting anything until we arrived at Hall's Creek, we were careful to make certain that nothing necessary was left behind, also to see that we carried nothing but what we considered essential for the successful completion of the important work we were starting on.

The people in Wiluna were most hospitable, and as we left the town on the 29th May a number of the inhabitants accompanied us as far as the North Pool, which is situated about twelve miles North-west from that place. This pool is a good one, not quite permanent but nearly so; is easy of access, and situated on a fair line of feed.

I propose that the stock route should pass through here, and keep to the West of Wiluna, joining the stock route from the North-West to the Eastern Goldfields about Nigarra Well, as shown on plan there being fairly good mulga and grass country most of the way.

It will be seen that the pool is shown considerably out of position on the old plans, and I would suggest that it be fixed by survey when the route is



Hon. H. Gregory, M.L.A.  
Minister for Mines.

# PLAN OF WILUNA-KIMBERLEY STOCK ROUTE EXPLORATION

BY  
**A.W. CANNING L.S.**  
1906-7

Miles 10 5 0 10 20 30 40 50 Miles



being constructed. The latitude by observation is 26 deg. 27 min. 5 sec. S.

From the North Pool we travelled a little east of north for a few miles over some good saltbush, mulga and grass country to the head of the creek in which the pool is situated, thence over some broken country with mulga, spinifex, and grass for a short distance, dropping into a narrow flat at  $8\frac{1}{4}$  miles, travelling easterly and north-easterly along the flat between hills and breakways for  $1\frac{1}{4}$  miles through mulga, grass, and spinifex, and passing between two fairly high points to the more level country, from which the hills trend away to the south-east and west, those to the south-east finishing up in what I suppose to be Mount Alice.

After leaving the hills we travelled on a compass bearing of 20 deg. (18 deg. 10 min. true) passing over some rubbly mulga country with patches of feed and crossing a fair sized creek at  $1\frac{3}{4}$  miles, then again over mulga and rubbly country with coarse grass crossing a second creek at  $3\frac{1}{2}$  miles with some very good open mulga and claypan country until we reached a low saddle in a broken sandstone ridge, crossing which we came to a small creek running through a small though good mulga, grass and saltbush flat, after which our route lay through fairly thick mulga and over a low rubbly rise running out a few chains to the west, and increasing in height to the east, continuing we gradually get into spinifex country first with mulga and gums, then white gums, quandong, wattle, etc., getting more open until we come to an open spinifex flat at 12 miles.

Crossing the open spinifex flat for a mile we strike granite country, with mulga and a little feed for a short distance, when we again enter sandy spinifex country with scattered sandhills, then fairly open spinifex and spinifex grass country with a few bloodwood gums, wattles, and other bushes, reaching at  $23\frac{3}{4}$  miles some broken granite country with small breakaways facing south, with a strip of mulga, grass and herbage along the foot of them.

At this point, on the 2nd June, we had a little rain, which was exceedingly welcome as the ordinary was very dry; although there was not much, it was sufficient to put water in clayholes or rockholes in hard country.

Continuing our journey on a bearing of 23 deg. we crossed some broken granite country with patches of mulga and good feed for two miles, then travelling along a narrow grassy gully with mulga for two miles, the country to the west being broken, with patches of good herbage and grass, while in the east there is spinifex country. Coming to the end of the gully in a grassy gum flat, and continuing we gradually got into open spinifex country with a good deal of spinifex grass, a few scattered sandhills appearing on either side.

This spinifex country continues for about nine miles with occasional patches of mulga and grass, also gums, acacia and bushes, again coming into mulga country, stony in places, with good patches of feed, especially along the numerous flat water courses, striking a grassy, gum creek at  $16\frac{1}{4}$  miles, coming in from the south-east, and along which there are some particularly good grassy flats.

We put down a bore close to here on our return journey striking water at 6 feet; it was difficult to estimate the supply as it was in drift, but I anticipate no difficulty in getting a good supply of water at a shallow depth.

There appears to be a big rush of water down this creek at times, overflowing and running over the adjoining flats; there are pools in places along the creek but they are not permanent.

Continuing our journey on the same bearing and leaving the creek to the west, we travelled over excellent feeding flats with corktrees, mulga, etc., for three miles, when we again crossed the creek getting into heavier timbered mulga country with patches of rubble and coarse grass all through it to within a few miles of Lake Naberu, when the country opens out into saltbush grass and herbage flats with patches of mulga, gradually becoming a little sandy with samphire flats at the lake.

On striking the lake we travelled easterly along it until we found a good crossing.

On our return journey, from the crossing we went more to the south, striking the creek after passing over some excellent open mulga grass and saltbush country, and travelling up that creek to where we bored, generally through fairly open mulga country with good feed.

At the crossing the lake is almost completely cut in two by encroachment of sand, etc., and is as far as I know always passable for stock; I do not therefore anticipate any difficulty on that score even in a wet season. The distance from Wiluna to the crossing is about 75 miles.

After crossing the lake we continued our journey easterly along the north side which is fringed with mulga, fair grass, and herbage, and is a little stony in places back from the lake, passing a small soak in the samphire close to the edge, which though brackish is not very salt, and I think stock would drink it; however, I have little doubt fresh water could be obtained by keeping a little back from the bank. Continuing along the lake for another  $2\frac{1}{4}$  miles, we then left it and our route lay a little north of east towards Windich Springs through marshy country with a number of small lakes and samphire flats, also good feeding ground, consisting of low sand rises, claypans, good mulga, wattle, etc., with very good grass and herbage on most of the country not actually occupied by lakes.

At about twelve miles from the main lake we came to a creek running from the hills to the east and north through a small gum flat surrounded by excellent feed, into the small lakes to the west. On the north there is a range of hills running to north-west, and to the south there are broken hills nearly all the way, but some distance from our line; water, I think, could be got here at a shallow depth.

Starting from the above point we took a short sweep to the south-east to avoid the broken hilly country and keep in fair feed, then travelling over mulga country with grass, spinifex, and rubble to Kennedy Creek, and up that creek to Windich Springs, which is about 97 miles from Wiluna.

There are a number of pools on either of the two branches of the creek, the main one being a fine large pool, and the whole of them are quite permanent, and contain sufficient water to satisfy any number of stock; in the vicinity of the springs and down the creek there is good herbage and fair grass.

Windich Springs are about 97 miles from Wiluna by the proposed stock route.

From Windich Springs we travelled in a direct line to Pierre Spring, about 29 miles in a compass bearing of 38 deg. Our route lay close to Kennedy Creek for the first seven or eight miles, where it runs from

a large flat; immediately on either side of the creek there is good feed, and along it a number of large pools, some of which contained water both on our outward and return journey, but they are not permanent. The country further away from the creek on either side is open mulga, patchy and rubbly.

From eight to 12 miles we crossed a stretch of good pastoral country running east and west, consisting of strips of mulga, beefwood, needlebush, etc., with saltbush grass and herbage, also scattered claypans, with quartz rubble near the twelve miles, at which point a low stony ridge crosses the line.

After leaving this ridge the country is very patchy with mulga, spinifex, and small grassy flats along the gullies, also patches of rubble (quartz and ironstone).

I think water could be obtained at a reasonable depth in a small flat crossing the line at 15 miles.

We crossed a fair sized creek at about 17 miles, running a little to the south of east; leaving this creek we passed through some fairly thick mulga country, with patches of grass, and bare spaces of ironstone and quartz rubble, to a low rubbly spinifex ridge, after which we came into sandy spinifex country with mallee, mulga, and scrub, then some scattered sandhills, with a little mulga, wattle, quandong, etc., for a few miles, then a little open spinifex and limestone country, with hills to the north-west, the country gradually becoming better until we reach Pierre Spring, round which there is very good saltbush, grass, and herbage, also good top feed, but the area of really good country is not large.

Pierre Spring or soak is a good one, and at about 5 feet gave a supply of at least 300 gallons an hour.

Leaving Pierre Spring we travelled east for a little over a mile over broken country with fair feed, then changing to a general bearing of 63deg. towards Weld Springs, passing along South of fairly prominent sandstone hills, with mulga and stretches of open spinifex further to the South; leaving the hills we came into open gravelly spinifex country, with Mt. Davis showing up prominently to the North, passing over some limestone and quartz rubble with quartz blows lying immediately to the South at about 2½ miles, then through Mulga, spinifex, and grass country with patches of ironstone rubble to five miles, gradually getting into open spinifex and spinifex grass with scattered bushes and striking scattered sand-ridges at six miles, which extend for about 1½ miles, when we crossed over a low ridge with thick patches of mulga and a few stones, continuing over the Southern edge of some broken country, with fair feed in the gullies and open spinifex to the South.

We also passed a few scattered sandhills lying to the North before reaching a very good flat at nine miles, which is evidently a wide watercourse coming from the South-West, containing mulga with saltbush, grass, and herbage, with a few clayholes. This good country extends to 11½ miles, at which point I think water could be obtained at a shallow depth.

Still continuing on the same bearing, we cross some spinifex country with mulga and other bushes, reaching another good flat or watercourse at 12½ miles, with very large mulga and fair grass; from here to 19½ miles the country generally speaking on either side of the line is a good pastoral area. Immediately to the North of the line after crossing the flat at 12½ miles the country is particularly good, consisting of open saltbush grass and herbage flats, with patches of mulga, needlebush, willow, etc., extending away to the North-West. The remainder is good mulga, beef-

wood, and corktree land, with excellent grass in places, and saltbush and herbage scattered all through it. It is rubbly in places, and limestone occurs frequently.

At about 17½ miles, in the line, we put down a bore 50 feet, but it proved a failure; however, I think water could be got at a reasonable depth a little to the North.

Continuing on the same bearing from 19½ miles we cross a strip of spinifex two miles wide, fairly open, with scattered gums, mulga, and bushes, also grass in places.

From here on to near the hills a few miles before reaching Weld Springs, the country is patchy, the greater part of it being fairly open beefwood mulga country with fair grass, and patches of undulating spinifex country; getting near the hills there is some good feed, and to the South some distance a very good grassy creek runs from the hills to the South-West.

The last few miles before reaching Weld Springs is hilly, with good feed along the gullies, while near the spring and down the main creek there is some excellent grass and saltbush country containing good feed for either camels or horses.

Although the water is very shallow, and there is a soak in some ti-tree on the bank near Forrest's marked tree, F46, it can scarcely be called a spring. We cleaned out the soak, which is about 10ft. deep, and it filled to within 2ft. or 3ft. of the surface, but did not make rapidly. However, we put a shot in the limestone forming a coating along the bed of the creek and obtained over 200 gallons an hour at 7in., it filling right to the surface with splendid water.

I think by putting down a well close to here we would get an excellent supply of water at a very shallow depth.

Weld Springs are about 161 miles from Wiluna, along the proposed stock route, and the latitude is 25deg. 1min. 18secs. S. by observation, approximate height 1,600 feet.

Up to this point we had travelled over country which was fairly well known, and although it is patchy, with stretches of spinifex and a few sandhills, still there is a very fair proportion of good pastoral country which will carry stock through well in a fair season.

The country ahead being practically new, I decided to make in the direction of the North-West corner of Lake Disappointment, but being doubtful as to the nature of the country I thought it better to leave the greater part of the equipment behind and prospect the country ahead for water and feed, intending if unable to find water to bore for it in a suitable place, and in getting a supply to send back for the rest of the camp.

Leaving Baumgarten and Moody to look after the camels and equipment left behind, we started on the 19th June with seven camels and a native from the locality; we travelled over broken country in a North-Easterly and Northerly direction for about six miles, with numerous sandhills and knobs, crossing a creek at two miles with very good feed, also numerous small flat watercourses running to the North-West, with mulga, good grass and herbage, after which we travelled in a compass bearing of 30deg. over good mulga and grass country for a short distance, after which up to 6½ miles it is very patchy, with alternate patches of mulga and gravelly spinifex rises; at that point we came to a watercourse with mulga, good grass and herbage, running to the North from

some hilly country to the South and South-East, this gully spreads out over some very good feeding country with open large mulga, but to the East and along our direct track there is open spinifex with scattered bushes up to a sandstone ridge, the North-West end of which we pass at about nine miles.

This point is fairly prominent and can be seen for some distance, again passing through some thick mulga we crossed a small sandridge at  $9\frac{1}{2}$  miles; this sandridge runs out a few chains to the West, beyond which there is good mulga and fair grass. Continuing on same bearing through mulga and spinifex, growing in a sandy loam to a broken sand ridge at  $11\frac{1}{4}$  miles. Turning more to the North over broken stony mulga country for a short distance, then through some good open mulga and grass with a very good flat to the East, we came to some low knobs of rock. From here the native pointed to water to the North of East, to which the camp went, while I continued over a stony hill and some sandhills to a salt lake which was dry, and along this lake back to where they were camped at the water, which I named Goodwin Soak.

On our return journey we travelled more direct for the first few miles from Goodwin Soak, passing through some excellent feeding country on flats to the East of our outward route.

The soak, which is in limestone, when cleaned out gave 300 gallons an hour at seven feet of excellent stock water; it is situated at the end of a small samphire flat running out from the lake, to the North is the lake shown on plan near which we saw the first Desert or Red Oaks; they are fine trees, very straight in the barrel, with heavy dark foliage, and always sound. There are sandhills and samphire flats at a short distance to the West, while immediately round the soak on the limestone country there are patches of mulga with good grass and herbage extending further to the East and South-East.

Having found such a good water, I decided to bring the remainder of the party on from Weld Springs; for that purpose I sent Trotman and Burke back, the two Tobins and I spending the first day improving the well, after which I took a camel and went out to look at the country ahead for two days; when I returned the whole of the camp had arrived.

Having everything together again, I decided to take the whole caravan on, trusting to get water; unfortunately the native we had had ran away and consequently we would have to do the best we could without native aid until we were able to get more.

The latitude at Goodwin Soak is 24deg. 45min. S., the distance from Wiluna about 183 miles and approximate height 1,220 feet.

Leaving Goodwin Soak on the 25th June on a bearing of about 80deg., travelling over good feeding country for a short distance, thence through spinifex and mulga and a few sandhills between  $1\frac{1}{4}$  and two miles, then through mulga with grass and spinifex, gradually getting into open spinifex with gravel before reaching the four miles, thence turning North-Easterly we travelled over gravelly spinifex country with scattered patches of mulga, saltbush, and grass for one mile, when we again reached sandhills and spinifex with oaks, wattle, quandong, etc., until reaching a samphire flat on the East of which there is a small mulga slope containing good grass and herbage, with a small soak on edge of samphire, which, on opening up proved salt; however, as it is only seven miles from Goodwin it will not be needed.

From here we continued in a Northerly direction still over broken sandhills with fair top feed and patches of oaks and mulga with saltbush and soft spinifex, again striking part of the lake on the Eastern side at  $2\frac{3}{4}$  miles from samphire flat, thence travelling along Eastern side. There is a narrow strip of land with topfeed and herbage along the lake, with broken sandhills to the East, though there is some topfeed and a little grass in places amongst the sandhills it is poor country and heavy travelling except immediately adjoining the lake.

From the end of the lake we travelled on a bearing of about 20deg. to the foot of some stony mulga-clad hills for  $4\frac{3}{4}$  miles, over high broken sandhills, at first with no feed, gradually leaving them and getting into open spinifex country with grass in the gullies along the foot of the hills. On our return journey I went more to the East, though only about a mile, still on that line the sandhills are more scattered and there is more grass. I think water can be got shallow, in some limestone country, close to a patch of oaks, about  $2\frac{1}{4}$  miles from the end of the lake on the line of our return journey. The latitude at the foot of the hills by observation was 24deg. 33min. 44sec. S.

From here we travelled over open spinifex round South of the hills, with sandhills running up close to the hills on the South-East, leaving the hills at three miles around which there is a little grass, especially in the gullies which empty themselves into the sand; our route lay North-Easterly, first over an open spinifex flat for one mile, at that point crossing a low sandridge, thence running along an open spinifex flat with spinifex grass and grass for three miles, with sandridges and a few low mulga rises as far as we could see to the South-East, also to the North-West, the sandridges fortunately just here running more to the North-East and South-West, owing to their being deflected from their usual course by the hills. We then crossed some rubby spinifex country and some mulga, snakewood, etc., for two miles, thence again over sandridges for a short distance, then over some open spinifex and gravel, and on through a patch of mulga, mallee, wattle, etc., over a small open soft spinifex flat to another sandridge, after crossing which we ran down between the sandridges on a mulga flat containing good saltbush herbage and grass to a native well.

We partly cleaned this well out, and though there was a fair amount of water in it, it was brackish; however, we found later the horses would drink it readily as it improved when drawn on; at the time I thought it was a large rock hole filled with sand, but from experience gained later my opinion is that if sunk on probably a good supply of water would be obtained. However, not thinking it advisable to spend much time on it, we continued on for  $1\frac{1}{4}$  miles in a more Northerly direction, to the end of a creek running from the hills which lie to the East and North-East, and decided to bore, reaching this point on the 28th June.

Not knowing whether we would strike water in the bore, I sent the camels back with the two camel men, Burke and Baumgarten, to Goodwin Soak, to give them water and fill the water-drums.

We started boring on the 29th June, striking water at 35 feet, but owing to the poor supply, continued it to 70 feet, and even at that depth we only got 54 gallons an hour; this would not be sufficient for travelling stock, but I believe a better supply will be got



in some limestone about one mile to the West, or in the vicinity of the native well shown on plan.

I was disappointed in this bore, as the formation would lead me to expect a good supply, the first 12 feet being sand, then 43 feet of soft sandstone with bars of opaline, the last 15 feet being yellow pug.

While the boring was progressing I examined the country to the North-East and East over the hills lying close in those directions, and found what is unusual on the Eastern side of hills in this country, a fairly large extent of mulga country, sandy in places, but without sandhills for some distance.

There were a number of crested pigeons along the creek, at the end of which we bored, but I could not find where they were getting water. I also saw the track of a sheep a little to the North, and on our return journey we saw the same tracks with the addition of those of a lamb.

The camels arrived back from Goodwin Soak on the evening of the 3rd July. As the bore was finished, and we had marked a post  $\begin{matrix} \text{A} \\ \text{C} \\ 2 \end{matrix}$  we decided to continue our journey in the morning; the distance from Wiluna to this bore is about 215 miles.

Starting on the 4th July, with all the water we could carry, and travelling in a Northerly direction around the hills lying immediately to the East, mostly over spinifex, a fair proportion of which is soft spinifex, with an occasional low sandhill, scattered wattle, mulga, quandong, and other bushes, also a little grass, to  $7\frac{1}{2}$  miles from this point, there being prominent mulga-clad hills lying to the West a few miles with sandridges between the open space travelled over and the hills.

We then, travelling on a compass bearing of 29deg. 30min., crossed three sandridges during the next mile, coming then into limestone and sandy country with spinifex, wattle, quandong, mulga, white gums, etc.

(On our return journey we put down a bore in a patch of white gums a few chains east of line, striking water at 23ft., and continuing it to 51ft., though the water afterwards rose to within 21ft. of the surface, it only gave a supply of 104 gallons an hour. I expected to get a much better supply here, but it may be partly accounted for by the fact that this particular stretch of country was very dry, no rain having fallen here for a long time.)

Continuing on same bearing over sand and limestone country for another mile, we then came into mulga country gradually opening out into mulga, grass and herbage, with samphire and claypans; camping at five miles on this bearing, there being good feed for camels and horses, date 4th July, latitude at camp 24deg. 15min. 7sec.

This strip of good pastoral country apparently extends a considerable distance east and west, and in a wet season would contain excellent feed.

At this point we came across the fresh tracks of a camel, it having apparently been running in the locality for years; on our return journey we again saw fresh tracks of the same camel.

On the morning of the 5th July we saw smoke go up some distance ahead; thinking perhaps we would be able to find a native who knew the country ahead, Trotman and M. Tobin started off immediately on the ponies with that object in view. Some of the camels having strayed a considerable distance during the night, while they were getting them together I went on a bearing of 306deg. to some hills five miles away, going through good mulga, grass, and saltbush country most of the way. We saw a number of galahs

about here, but could not find where the stray camel or they were getting water. Coming back to camp, the camels by that time having been got together and packed, we continued on the same bearing, the first mile being through similar mulga, saltbush, and grass country, thence through spinifex country with mallee, wattle, etc., for another mile to a low spinifex ridge, crossing which we continued through open spinifex to end of a sandhill with gums running away to the east; we then passed through mulga, wattle, etc., with limestone outcropping in places for a short distance, getting again into open gravelly spinifex country with a few gums to the east, passing a low red sandstone hill also to the east, and on through some fair feeding country with mulga, a few gums, grass, and herbage to point of a sandstone ridge running to the west and north-west; this point is about  $11\frac{3}{4}$  miles on the bearing we were travelling, and to the south-east a short distance there are a few sandstone hills with a fairly good mulga flat between. Leaving this point we gradually got into open spinifex with a few patches of mulga, scattered gums, and very little feed crossing the first sandridge for some distance at  $14\frac{1}{4}$  miles, and passing a small rockhole immediately to the west of the line in some conglomerate a few chains further on. This rockhole was quite dry both on our outward and return journey.

Seeing a smoke go up to the north-west, we decided to put off to it, as we thought probably Trotman and Tobin had either found a native or some water. After travelling down a spinifex flat with bloodwood gums and some grass for about two miles, another smoke went up quite close, and we saw them with a smart looking native whom they found at a small native well about two miles further on; they reported some fairly good feeding country running towards the hills which lie to the south-west and west from here.

There being no available water in the well, we camped in a patch of gums, where there was a little feed. The camels appeared restless and dissatisfied and made off during the night; in the morning we had some difficulty in finding them.

Leaving them still looking for two of the camels, I went back to the line, after having had a look at the country to the east, where I found a patch of good grass, down a small gully running from the rockhole, in some mulga and gums, but the area is small.

Continuing then on the same bearing for a few miles over spinifex and scattered sand ridges with a few patches of mulga and sandstone rises, I gradually got into high, thick sandhills, with scattered gums in the hills; after walking  $8\frac{1}{2}$  miles, I got on to the highest sandhills I could find, and in every direction the outlook was wretched, nothing but sandhill after sandhill, excepting away to the west where they were broken by a range of hills. Owing to the camels not being found till late, the camp did not arrive until nearly dark, consequently we were compelled to camp amongst the sandhills, tying the camels up to a few wattles for the night.

Travelling on the same bearing the next morning, we found the sand ridges gradually getting lower and more scattered, with gums and bushes and further on some patches of red oak, a little cajeput and grass; after travelling about  $4\frac{1}{2}$  miles in this line the outlook straight ahead was bad, nothing but red sand ridges being visible for a long distance.

Seeing some hills to the north-east, and the native pointing to water more to the east, we decided to change our course, having travelled  $27\frac{1}{2}$  miles on the last bearing; travelling more to the east, the native took us to a small native well quite dry; as it did not look at all promising we continued our journey over a fairly open spinifex and grass flat passing some low breakaways with spinifex flats and strips of mulga and saltbush to the south; on the breakaway there are some very noticeable umbrella mulgas growing; we also found a gnamma hole here, which however was quite dry.

Leaving the breakaways at four miles we continued on a bearing of about 65 deg. over scattered high sandhills, with mallee, wattle, and a little mulga in the flats, also some limestone, and gravelly slopes until reaching a mulga saltbush and herbage flat with claypans, at the edge of which we camped, the latitude being 23deg. 55min. 21sec. S. There is a nice piece of feeding country lying to the south and south-west, with some open spinifex and gums to the north, but in that direction one soon gets into the spinifex again.

Continuing the following morning still on a bearing of 65 deg. (the natives persisting in pointing that way for water), and after crossing the north edge of the saltbush flat we again came into poor sand ridges with gums and bushes, and occasional outcrops of limestone for eight miles; we then turned more to the east for a mile, when the native pointed south-east to the water, and seeing a smoke go up in that direction eight or 10 miles distant we thought perhaps the water was there. I decided to wait and send Trotman and M. Tobin with the native to see if the water was close. He led them straight to a native well amidst the sandhills, in a small claypan, with a few stunted ti-trees round it. We then shifted the camp over to the well, which was only  $1\frac{1}{2}$  miles away.

There was a little feed round the well and on the slopes of the nearest sandhills, and we decided to clean it out thoroughly at once, which we did, but it looked quite dry and not at all promising; however, we decided to make a well of it; squaring it out we sunk a shaft 3ft. by 5ft., and 10ft. deep, getting a supply of 100 gallons an hour of splendid water at that depth.

It was a great relief to get this water as we were getting anxious, and the camels were thirsty, not having been used to going many days without water; certainly it was in wretched country, and it did not seem a suitable place for a stock route; still it proved to us in a measure that the native wells, if properly tried, are permanent, and made the prospects ahead look better.

While they were working at the well I went away north to ascertain if there were any prospects of getting around the east of the hills lying in that direction, but this way the sandhills are high, and are driven by the prevailing south-east winds right up on the hills. Coming back to camp after walking over a good deal of country, I decided to go out west and north-west round the west side of the same hills, and found the country was better, the sandhills being broken and standing a considerable distance from the breakaways forming the west and north-west side of the hills, which occurs in nearly all cases, as we found later, and the knowledge of which proved of considerable value to us on the remainder of the trip. We named this well "Sunday Well," and

found by observation its latitude to be 23 deg. 53 min. 19 sec. S. We also marked a post at the well  $\overset{\text{A}}{\underset{\text{C}}{\text{C}}}$ .

Having watered our camels and filled the water drums, we again started, travelling westerly over sand hills, and then along a narrow flat between sand ridges, first through oaks and then open spinifex till we came to the hills previously mentioned at  $5\frac{1}{2}$  miles, then turning a little south of west round south of hills for  $\frac{1}{2}$  a mile, thence north-westerly and northerly with bluffs to the east, open spinifex to the west, and crossing broken, stony country in places with good mulga grass and herbage in others. We camped on the 11th July near some very prominent sandstone bluffs in a patch of good mulga and grass country, on the hills close to the edge of the bluffs we erected a post and cairn.

From here, on the 12th July, we went northerly over broken country in places and open spinifex in others, crossing two small creeks and on to another at four miles, which we followed down to a gum flat with good feed, and decided to bore. We erected the boring plant and got everything ready to start the following morning. The country is fearfully dry, and is evidently suffering from a prolonged drought, still the camels and horses had fallen away very little. After rain there would be patches of very good feed about here, as was proved on our return journey.

While boring operations were proceeding on the 12th, I went easterly to north-west point of the hills round which we had travelled; this point is a very prominent sandstone bluff, and took bearings to the different hills visible. I could also see Lake Disappointment to the north-east. Seeing a smoke go up near some hills to the west of north, I came back to camp and sent Trotman and Burke to see if they could get another native who knew the country ahead. They were successful in getting a native, who showed them a spring named Diebil in the hills.

We continued the bore to 42ft. through sand and narrow layers of sandstone, the last few feet being fairly hard sandstone. We struck water at 25ft. and got a supply of 150 gallons an hour of excellent water, the supply apparently increasing rapidly at the bottom, but as the sand kept drifting in from higher up it was difficult to get a fair test. Lat. at bore, 23 deg. 44 min. S. by observation. Marked a tree (mulga)  $\overset{\text{A}}{\underset{\text{C}}{\text{C}}}$ .

On consulting the natives they seemed quite anxious to point out all the waters they knew, and particularly pointed to a large water to the east round point of the hills. Before we got the second native, the one we had previously did not seem inclined to give us much information, but now was very anxious to point out and explain everything he knew; he took Trotman to a small spring called "Biella" to the south-east and shown on plan. This spring, though permanent, is of no value for stock.

On the 16th July Trotman took the camp to Durba Springs, travelling north-easterly around the most northerly point of the hills, then south-easterly close to steep, high, sandstone breakaways to the spring, through country containing fair feed, though patchy, consisting of stretches of spinifex and patches of mulga grass and herbage, with low hills and knobs; in the gullies running from the hills there is very good grass and herbage in a fair season. Durba itself being a series of pools in a creek run-

ning between sandstone cliffs about eight chains wide at opening and gradually closing in, this space is timbered with large gums, and covered with a coarse couch grass.

As the water is apparently quite permanent, easy of access, and the pools fairly large, it is an ideal place to water stock. We marked a large gum

close to the main pool  $\overset{\wedge}{C}_6$  and found the latitude by observation to be 23 deg. 45 min. 13 sec. south.

While the camp was travelling to Durba I went north to Diebil Spring, shown on plan. It is unique, as it is situated on the western slope of high break-aways, and is running out at the foot of some very large sandstone rocks about 30 feet from the top, forming a small pool of beautifully clear water. This water is not of any value for stock, being inaccessible, but a thirsty man could get a drink and carry water to his horse. In the locality I saw a large number of the beautiful crested, brown partridges:

Between the bore and the Diebil there is a stretch of very bad sandhills.

Around Durba in the hills there are a few rock wallabies, the first game, with the exception of pigeons, we have seen for some time.

On our return journey we did not put into Sunday Well, and it would not be advisable to use it on stock route as it is out of our course and in wretched country, but instead we travelled round hills till near where we erected a post and cairn, and then a little east of south to the saltbush flat where we camped before reaching Sunday Well. We put down a bore here, but it proved a failure, still I think water will be obtained shallow in some limestone and sandstone country near.

From this bore we travelled south-easterly, putting down another bore in some gums, near a large rockhole surrounded by mulga and a small area of good feed, but it also proved a failure. I found that generally it is not advisable to try for water in the mulga, as the country is too close, but I wished to test it. We then continued our journey back in a fairly straight line to the prominent point of a range of hills passed on the outward journey, the sandridges being more scattered and lower this way, with fairly large gaps of open spinifex and spinifex grass.

Continuing our journey from Durba, which is about 291 miles from Wiluna *via* Sunday Well, and about 278 miles along the proposed stock route, we travelled a little east of north to the western point of a hill we named Terrace Hill from its peculiar formation rising from the north in a series of mulga-clad terraces. The first seven miles (with the exception of  $1\frac{1}{4}$  miles from Durba, which is open spinifex with gums and herbage) over fairly high broken sandhills with spinifex, scattered gums, cajeput, wattle, etc., also patches of grass and limestone outcropping in places, after which the sandridges are more scattered and low, with large limestone flats on which there is a good deal of acacia, mallee, and other bushes, with soft spinifex, a little grass and herbage, also a few scattered oaks, until we reach the hills at about 14 miles, thence going round north of hills easterly through mulga with rubble, saltbush, and grass to Onegunjah Rockhole, which though fairly large with a good catchment, at the time of our first visit was quite dry, but on our return journey we found a good quantity of water in it.

Immediately north of the rockhole there is a small area of splendid grass and herbage with a fairly large claypan about 30 chains distant; to the east there is

a patch of oaks with mulga and saltbush in places further on.

On our return journey we put down a bore near the claypan, but though we struck water, much to our surprise, it was salt; however, shifting about  $2\frac{3}{4}$  miles on a bearing of 250deg. we put down another bore, near a strip of oaks in limestone country, where at eight feet we struck water, and putting it down to 20 feet, in soft sandstone, got a splendid supply of between 400 and 500 gallons an hour without apparently making any impression, the water at the same time being of excellent quality; this bore is about  $12\frac{1}{2}$  miles north from Durba.

On leaving Onegunjah we travelled north-westerly towards a native well, under the guidance of the native whom we got near Diebil (the other one having returned to his country), over broken sandhills with oak and limestone flats, scattered gums, wattle, and other bushes, the whole covered with spinifex and some grass, striking a samphire flat at seven miles, with a little grass and saltbush; running away easterly towards Lake Disappointment, crossing this flat we again came into poor red sandhills with a few scattered gums, till reaching a samphire and saltbush flat with stunted titree, on which Kunanaggi Native Well is situated. There is the usual grass and herbage round this well, but the area of good feed is small. We cleaned out this well and made a small shaft of it, sinking it to 11 feet, at which depth we got a supply of between 260 and 300 gallons an hour of splendid water. This well is in sandstone, situated in latitude 23deg. 25min. 44sec. South, being about 10 miles distant from Onegunjah Rockhole, on a bearing of 328 degrees, and about 302 miles from Wiluna by proposed stock route. We marked an oak tree bearing 125deg. 30min., and distant 12 chains from

Well  $\overset{\wedge}{C}_7$ .

There were a great many crested pigeons at this well; we were lucky enough to bag about 60; they are splendid eating, and made a delicious change from tinned meat.

After leaving this well on the 22nd July we retraced our steps to the samphire flat previously mentioned, and then travelled easterly and north-easterly to Lake Disappointment, passing over undulating oak country with spinifex, wattle, quandong, and other scrub, striking the lake at  $5\frac{1}{2}$  miles from where we crossed the samphire flat previously mentioned.

Continuing on a bearing of 50deg., over undulating oak and limestone country, with spinifex flats containing saltbush and grass, with patches of wattle, quandong, and other scrub, striking the lake again at 10 mile, where a narrow arm runs out forming into a salt creek further to the north-west and gradually opening out into spinifex and samphire flats, with fair grass and herbage to the west.

After crossing the narrow arm of lake, we then continued along north-west and west of lake to the north-west point, over open spinifex and samphire flats, with fair feed in places in the way of grass and saltbush, with undulating limestone and sandy country with oaks, wattle, quandong, etc., further out from the lake. When this country is burnt a good deal of herbage springs upon it, and the spinifex, which is edible, makes good feed, but when it becomes old it is too full of resin and stock do not eat it readily.

After reaching the north-west end of the lake (near which we put down two shallow bores on our return journey, striking salt water each time. To get fresh

water on the west side of the lake it will be necessary to get further out from its edge; on the north and east side I do not anticipate any difficulty) we travelled north for a little over nine miles, thence north-easterly for  $1\frac{1}{2}$  miles to a creek running from Mackay Range, about a mile up which there is a permanent spring, crossing sandridges for eight miles, at first scattered with saltbush and spinifex flats, then thick and broken till near the range, where it is more open, with gums and fair feed in the creeks which run from the hills and empty themselves into the sand. Up the creek near the spring there is a small area of very good saltbush, grass, and herbage.

Arriving at this spring on the 24th July we camped there on the 25th and 26th to allow the camels and horses to benefit by the good patch of feed, also to give one or two suffering from sore backs a chance to recover. I went out west and east examining the country in the vicinity. Trotman and Burke went out to a smoke to the west and brought some natives back to camp; we needed another, as the one we got near Diebil Spring was getting out of his country.

When we arrived here there were three very old gins and a boy camped near; on taking them over some food, they appeared very hungry, especially the boy, who looked starved, he joined our camp and apparently making up his mind the food was better, never left our camp until we returned to his country nine months later. While we were camped here we had a few showers of very welcome rain, and though it was not much, if it went east it would be sufficient to put water in rock holes or hard clayholes. We marked a gum tree  $\overset{\wedge}{\underset{8}{C}}$  at spring.

Starting again on our journey on the morning of the 27th July, we travelled round the south of the hills, in open spinifex with gums and bushes for  $2\frac{3}{4}$  miles, thence turning a little north of east over poor sandridges for  $6\frac{1}{2}$  miles; owing to the sandhills running east and west we only crossed three in that distance. We then travelled over open spinifex flats with scattered gums and bushes and a little feed, bunches of hills showing up clearly to the north and sandhills running parallel further to the south until reaching some prominent hills at about  $17\frac{1}{2}$  miles, up a gully in which were two rockholes containing a fair amount of water, but inaccessible to stock. After travelling round the north of these hills we then continued in a general easterly direction over spinifex flats running between numerous sandstone hills and knobs. Leaving the hills we came into a large spinifex flat, with gums, cajuput, wattle, etc.; some prominent hills lying to the north, with sandhills adjoining, and more hills visible to the north-east, camping the second day out from Mackay Range at a point about  $32\frac{1}{2}$  miles distant.

Not knowing which was the best way to proceed, and the native with us pointing a little south of east for water, leaving the camp Trotman and I started under the guidance of the native on a bearing of 117 deg. 30 min., first over spinifex with fairly thick wattle, poplar tanja, and other scrub with low hills and sandhills to the north-east, gradually getting into opaline and limestone country, with claypans and good feed, to the point of some prominent hills at  $3\frac{1}{2}$  miles, then travelling along north side of hills with good soft spinifex grass and herbage, also scattered mulga, needlebush, acacia, etc., on flat extending some distance to the north-east, passing on between hills and some gravelly country with a little

mulga and patches of good feed, to the point of some stony hills running to the north-east, rounding this point and running down a grassy gum creek in an easterly direction between low stony mulga-clad hills to two soaks called by the natives Karara; there being sufficient water here for our purpose, we went back and brought the camp on. We cleaned out one of the soaks, and found, though the water was excellent, the supply was poor, only making 10 gallons an hour at 10 feet.

We erected a post and cairn here, marking the post  $\overset{\wedge}{\underset{9}{C}}$ ; the latitude by observation was 23 deg. 6 min. 30 sec. S.

On our return journey we found another native well named Nimberra, shown on plan and situated a little south of west from Karara, about 8 miles distant, which though brackish was relished by our stock and gave a good supply at a shallow depth. I decided also that it would be better to take the stock route nearly direct to Lake Disappointment from point of hills seven miles back from Karara in the line travelled by us on our outward journey, where though there is a longer stretch of sand ridges, they are running nearly in the direction travelled by us, and there are patches of saltbush and herbage in places, besides very fair topfeed, and I think there will be little difficulty in getting water here. We passed a small native soak, very shallow, in some limestone country, besides numerous small ti-tree flats where there is every indication of shallow water.

An arm of Lake Disappointment runs out very nearly to Nimberra Well.

Leaving Karara Soaks on our outward journey on the 1st August, we continued down the creek, with low hills on either side, and good grass and herbage along the flats immediately adjoining, in a north-easterly and northerly direction until it empties itself into a large flat at  $3\frac{1}{4}$  miles, thence travelling in a bearing of about 64 deg., we crossed an open soft spinifex flat for a short distance with fair herbage, then through rubbly quartz country, with claypans, patches of mulga, grass, and herbage, and some quartz and ironstone reefs, gradually getting into thicker mulga country, with patches of good grass and scrub, striking sand ridges again at six miles in that line. This country looked to me auriferous, but some prospectors who have been out there since were not successful, and report unfavourably on it. We found water in places in clayholes, left apparently by a recent shower.

Continuing our journey north-easterly we travelled over sand ridges for  $12\frac{1}{4}$  miles with open spinifex, scattered gums, acacia, poplar, and other bushes and occasional outcrops of limestone and a few sandstone rises. There is very little feed here. On our return journey we kept more to the north-west, and though the sand ridges occurred the same, there was slightly better feed.

At  $12\frac{1}{4}$  miles we came into a good feeding flat, with strips of mulga, fair grass, saltbush, and other herbage; camping on 2nd August in a small creek about 50 chains from sandhills in lat. 22 deg. 53 min. 21 sec. S., where we found a little water in a clay-hole and good feed for camels and horses.

When getting the camels together in the morning they found the remains of a camel, probably one lost by Wells, or the search party under Rudall. In the meantime, I had gone to the top of some sandstone hills lying close to the north-east, and when there saw

some natives in the flat, but they disappeared before I could communicate with them.

Starting again on the 3rd August we continued north-easterly across a saltbush flat passing to the north-west of prominent hills at 60 chains, and crossing a low sandhill at  $1\frac{1}{4}$  miles we turned more to the east, still with red sandstone hills and breakaways more to the south, knobs and hills away to the north-east, and open spinifex on our line. Again passing between sandstone hills and numerous knobs on either side we gradually get into poor open spinifex at about eight miles with sand ridges running on a bearing of about 110 deg.; crossing a few of these and travelling a little south of east through wretchedly poor country we camped at about 17 miles in the open spinifex with very little feed for either horses or camels. By my calculations we were in the same latitude as Separation Well and apparently close to it. Starting in the morning directly east, I walked on ahead expecting to find the well in a short distance, but it was further than I thought owing to the longitude given by Mr. Wells and mine not agreeing. Travelling for 12 miles I came to native tracks with cajeput growing about, following these tracks for a short distance I came to the well; I then went back and brought the camp up, the native we had with us apparently not knowing the well, or if so pretending not to.

This place is historical owing to the fact that Wells and his party found it, and separated here, the two who left (C. Wells and Mr. Jones) the main party perishing near Johanna Springs before they were able to get through. Camping here we found a native, who though a comparatively old man, was a very fine specimen, and as he seemed to know the country well we decided to take him on for a short distance; he had evidently been in that locality when Wells passed through as he endeavoured to explain to us that a number of people came there and separated, pointing out the different directions taken by the main party, and the two who perished, no doubt after great hardships.

On cleaning the well out the next morning we found that those visiting it formerly had done little to it, so we decided to square it up and sink on it. Working at it all day we improved it considerably and found it gave a splendid supply of first class water, but we could not complete the work, as during the night of the 5th August we had a heavy thunderstorm during which about an inch of rain fell, filling the well to the surface and covering the small claypan surrounding it with water; this rain was very welcome as the country around here was exceedingly dry, the grass and herbage round the well being completely dried up.

We marked a post here <sup>A</sup>C, Wells' tree being burnt down; the lat. is 22 deg. 51 min. 14 sec. S.

Leaving Separation Well on the 7th August we travelled north-easterly under guidance of the old native, who pointed to water in that direction, over thick sandhills with poplars, wattle, and some poison near well. After going a few miles, I was as usual walking ahead, when on topping a sandhill I saw three young bucks hunting in the flat below. We caught two of them; they were fine types of natives, in excellent condition, and had a number of bandicoots, lizards, etc., hung on a string round their waists. Taking the old native and the two young bucks, as far as the next well, which we struck at  $9\frac{3}{4}$  miles in lat. 22 deg. 45 min. 10 sec. S.

The young bucks immediately cooked their game, and wished to share it with us, but we declined with thanks.

The water in this well is shallow, but it is badly situated, amidst broken sandhills, with a very small area of grass and herbage round it, and scarcely any timber; we did not attempt to do much to it. We let two of the natives go here, taking the smartest looking young fellow along with us; he was an exceptionally handsome blackfellow, and proved a most intelligent and useful man.

Under his guidance we continued our journey still in a north-easterly direction over sand ridges and spinifex flats, with scattered gums and bushes, and occasional sandstone and gravelly rises visible in different directions, passing over a low gravelly rise at five miles with low breakaways in places especially to the north and north-west, continuing again over sand ridges and spinifex flats, with low sandstone hills and breakaways a short distance to the south-west running generally nearly parallel to our course, gradually getting more prominent, and apparently finishing up in an abrupt point ahead, but on reaching this point at  $14\frac{1}{4}$  miles from last well we found the hills running away to the east with escarpments facing north. On a bearing of 118 deg. and about 35 chains from the point mentioned, the native took us to a soak or rockhole in the sandstone and conglomerate, with a small gnamma hole immediately above it, in both of which there was water. We camped in a small patch of mulga close by, filled our barrels and watered the camels, the lat. by observation being 22 deg. 36 min. 17 sec. S.

During the night, owing to there being very little feed, the camels made off, and it took us till afternoon the following day to get them together. The native in the meantime having pointed to two waters, one nearly north and the other north-east, the camp with the native going north, and I walking out on a bearing of 37 deg. thinking I might pick up the other water. After travelling over poor sand ridges and spinifex flats with wattle, gums, corktrees, and other bushes, also numerous small sandstone outcrops, I came out into a limestone flat, after crossing a strip of mallee, wattle, quandong, and other scrub, at a little over seven miles. Hearing a noise like some person hitting a piece of wood with a stone, I followed the sound and, to my surprise, saw an old gin crushing honey blossoms in a Coolaman. She was so intent on her work that she did not hear me until I touched her, and then she appeared too terrified to give me any information, but after some time pointed towards where the water was, but though I looked for some time I could not find it then. As it was now nearly dark and I saw a smoke go up in the direction I expected to find the camp, I made in that direction and found them camped at Nurgurga Native Well. This well is a good one, and after being partly cleaned out gave a supply of 160 gallons an hour. It is in limestone and though the water is slightly sweet it is excellent stock water. To the south there are thick sandhills with a good many gums, and to the north there are a few low sand rises with a limestone flat beyond. Immediately round the well there are wattles with herbage and grass; there is also some poison in the vicinity, which though the camels do not touch readily, in case of the stock route being constructed it would be advisable to clear.

The following morning Trotman and I, accompanied by the native, went to Wullowla native well, lying about seven miles a little south of east from

here, which is situated on a claypan surrounded on the north and north-east by limestone country containing good topfeed, and on the south and west by spinifex and sand.

On the claypan and immediately surrounding it there is the usual herbage and grass, but between the two wells there are scattered poison bushes, though the limestone flat a little to the north is free from it. Finding the well looked promising, we shifted camp to it, and decided to sink a well close to the old one.

Knowing that there was a fairly large flat north of Wulowla, extending a little north of west past Nurgurga, and also seeing by Wells' report that he crossed a flat four or five miles wide east of Auld Lake, I decided to examine the country that way, to see if a better route could be got, the country via Separation Well being very poor and the sand ridges continuous, though the well itself is a good one.

Taking Baumgarten and the native we had with us, we started out on the 13th August, first going to Nurgurga, then travelling west to Mujingerra about 9½ miles, through scattered sand ridges with spinifex, gums, wattle, poplar, etc., and limestone outcropping most of the way, while to the north after crossing a few sand ridges is the limestone flat referred to before.

Mujingerra is a unique water, in limestone, very difficult to find without correct data. There is an opening about 12ft. by 10ft. on top, and 10 feet deep, at the bottom of which, on the south side, there is a narrow tunnel running towards the west for about 40 feet, gradually sloping downwards till at the end there is a fine pool of water. When I first went down I could not see the size of the pool, but on our return journey we went down it with lanterns, and found it about 30 feet long, five to six feet deep, and 10 feet wide, with a roof of opaline and limestone two feet above the surface of the water. From appearances I should say it was the general water-level.

From here we saw a smoke go up a short distance away, and the native informed us it was at another water called Dunda Jinnda, which we reached after travelling two miles on a bearing of 308deg. When getting near the well we came suddenly on about 20 natives, all thoroughly armed and evidently on the war path; they were apparently looking for us, and were decidedly hostile; had it not been for the native with us, who belonged to the same tribe, we would probably have had trouble; he persuaded some of them to put down their spears and come up; luckily at that moment some cockatoos flew over, and I having a shot gun managed to shoot them, which appeared to surprise them very much, and apparently convinced them it would be wiser to be friendly.

This well, which is in limestone country, surrounded by large bloodwood gums, poplars, and other bushes, also patches of herbage and grass, is well situated. On our return journey we sunk a well 12ft. deep in a flat close to the native well, getting a supply of splendid water, it making 200 gallons an hour, and improving as it went down; we marked a gum tree

▲  
C. The latitude by observation was 22deg. 30min. 34  
37sec. S.

The natives pointing to another water, we started for that, accompanied by about 20 bucks, who ran ahead clearing all the loose bush away from the track, laughing and talking all the time. We found the water, after travelling about 5¼ miles on a bearing of 305deg., through poplar, acacia, scattered gums, honey-tree, soft spinifex, and some grass, growing on

limestone country. The well is in limestone, about 10 feet deep, surrounded by exceptionally large poplars, and a few bloodwood gums.

We then continued westerly to Auld Lake, still through similar country, with fair feed; finding the flat extended that far, we concluded it would be the best way for a stock route, as by travelling along this flat we would avoid a lot of wretchedly poor sandridges, and keep on fair feeding country. Being satisfied with what we had seen we returned to camp, the native we had had with us, and whom we had let go, joining us with a friend as we journeyed back, and returning to our camp.

On our return journey we came this way as far as Nangabbittagarra, at which place we marked a gum tree  
▲  
C.  
35

A native being camped here, who volunteered to lead us to water, pointing in a south-westerly direction, we travelled under his guidance in that direction for 10½ miles, the first 3¼ miles across the flat, then striking poor scattered sandridges and open spinifex flats, passing King Hills near which Wells' party travelled.

We then went nearly south; still following the native, for about four miles, who, however, was apparently leading us astray, as he then pointed south-east, leading us to believe the water was quite close, but on following him in that direction for two miles he then pointed in other directions, and thinking it was no use following him further we retraced our steps for two miles and camped, leaving the native to go where he wished.

From here we travelled westerly towards the lakes, over poor sandridges and spinifex flats, until at about eight miles we reached a fairly good feeding flat; travelling a little north of west down this flat through wattle, mulga scrub, etc., with patches of good grass, saltbush and herbage at three miles, we decided to bore; putting the bore down 49 feet we got a supply of 180 gallons an hour of good stock water, which rose to 26 feet from the surface. While the boring was in operation I examined the country north and north-east to Auld Lake and along that lake to the limestone flat previously mentioned, and found by bringing the stock route along the flat and along the south-east of the lake for a few miles, and thence to this point, there will be better feed, and though there will be a fair number of sandhills to cross, they are scattered, and I think there will be little difficulty in getting water near the north-east end of Auld Lake.

We marked a post  
▲  
C.  
36  
at this bore, and then continued on a bearing of 206deg. over a fairly good feeding flat, with saltbush, grass, and herbage for the first mile, then over sandridges and spinifex flats, with gums, wattles, etc., to 12 miles, with very little feed on the whole. The sandridges occur on an average about every half-mile (coming to sandstone hills and knobs), one of which is probably "Helen Hill," passed by C. Wells and Jones after leaving Separation Well.

Continuing in a bearing of 220deg. we passed between a number of sandstone hills, over occasional low sand hills, with white gum flats containing a little grass, where I think water could be got at a shallow depth. We again struck fairly thick sandhills at two miles and continued over them for four miles when we came into open spinifex with sandstone hills to the south-east, keeping still on the same bearing to south-west point of hills at six miles. Then travel-

ling south-west mostly across open spinifex flats, with occasional patches of mulga and a little saltbush to our outward camp in latitude 22deg. 53min. 21sec. at four miles. Deciding to bore near here we chose a spot about a mile and a-half down the flat to the north-west, but it proved a failure. Putting it down 53 feet we only got a very little water at the bottom. I was disappointed at not getting water here as it is in good feed, but from experience I find that amongst the mulga and saltbush it is difficult to get a supply of water, while in the limestone it is almost certain; to the south-west from here I feel certain water will be obtained at a shallow depth.

While boring here I found a native well about nine miles north-easterly, but it was in conglomerate, and more of a rockhole; the water was bitter, and the supply not too good. We then had to put in to Separation Well for water, at which place the natives who were there on this occasion were decidedly hostile, but when the camels arrived they became afraid and disappeared.

Reverting back to Wulowla, where I left the party sinking a well on our outward journey. When I returned from Auld Lake they had put it down 10 feet, but though we got excellent water, the supply was only 80 gallons an hour, the water rising to within 4 feet 6 inches of the surface. We marked a post

here  $\overset{\Delta}{C}$ , and found the latitude by observation to be 22deg. 32min. 50sec S. The distance to Wiluna from this point is about 454 miles per proposed stock route.

Starting from here on 17th August, and taking a fresh native with us (though the one we had with us previously was anxious to accompany us further, but we were afraid he would soon be out of his country).

We travelled north for six miles, through limestone and sandy country, with wattle, poplar, needle-bush, quandong, and gums for 2½ miles, coming then to sandhills thick and broken at first but gradually getting more scattered, with gums and scrub, continuing on a bearing of 27 deg. for two miles and 28 chains, and north east for six miles, through sand ridges with a fair quantity of gums, also scrub with scattered poison bush through it. Finding the country poor, and the native pointing to the south of east for water, we travelled in that direction still through poor sand ridges and spinifex flats, striking a native well called Mallowa at five miles. This well is badly situated, being in sandy country amongst low sandhills, and constantly in danger of being filled up (?) from drift. We only did a little work in it, getting sufficient water for the horses.

A short distance to the south-east there is an open flat, in which I think we will get water at a shallow depth. If so, it will not be necessary to use this well.

When about to start from this well in the morning a native walked boldly into the camp, all smiles, and insisted on accompanying us. He was the same native who had returned to camp with the one we left behind at Wulowla.

On resuming our journey from Mallowa we travelled easterly round the point of some sandhills for a short distance, thence a little north of east along a flat with fair top feed in the way of wattle, poplar, plum bush, etc., with an open soft spinifex flat containing a few scattered cork trees to the south-east, extending to a low line of hills facing the north-west, and a tableland beyond. On the north-west the flat extends to the sandhills which lie from a mile to two miles distant.

Continuing in the same direction we came to a native well called Gunowaggi, at about 11¼ miles, situated in a small open flat with good grass and herbage around it, and to the south-east comparatively large cajeputs running into open soft spinifex, and fair grass at places at foot of hills. As the position of this well looked promising, we put one down near, sinking it to a depth of 12 feet, through hard sandstone, with narrow veins of opaline, getting a supply of 160 gallons an hour of excellent water, which rose to within five feet of the surface.

We marked a post here  $\overset{\Delta}{C}$ , the latitude by observation being 22min. 21sec. S.

On my return journey I travelled from here to Wulowla more direct, keeping a little to the south-east of Mallowa, and utilising the open spinifex flat which lies to the north-west of the hills extending well on towards Wulowla. Travelling this way we only have to cross about 2½ miles of broken sandhills, and though from opposite Mallowa to within a short distance of Wulowla the country is poor, still there is a fair proportion of soft spinifex, with a little grass in places near the foot of the hills, and the travelling is good. If, as I think, water can be got south of Mallowa in the flat, the distance between the wells will not be too great, as it is only about 26 miles between Gunwaggi and Wulowla by the more direct and best route.

Having watered our camels and filled the water drums we again started, travelling along the flat on a bearing of about 60 deg., through fair top feed and the usual spinifex, also occasional outcrops of limestone; the sandhills gradually encroaching from the north-west, and the hills to the south-east getting further away, until at eight miles we again got into sandhills, continuing on the same bearing to 8½ miles. We then turned more to the north, reaching a native well named Nibil at 9½ miles. This well is as usual situated in an open flat, surrounded by wattle, poplar, and other scrub, also fair grass and herbage, and when cleaned out gave a supply of 200 gallons an hour at eight feet and rose to within about four feet of the surface.

I examined the country away to the north and north-east, finding very high broken sandhills in that direction.

Leaving this well on 24th August we continued almost due east, under the guidance of a native to a small rockhole on the hills about 10¾ miles, first passing between sandhills for four miles, then coming out into open soft spinifex with a few scattered cork trees and bushes, gradually becoming more open until we reach the foot of the hills, around which there is some grass with a little mulga on the slopes, camping here, though there was not much feed for the camels, but fair horse feed.

We took an observation for latitude, which we found to be 22deg. 16min. 2sec. S.

In the morning we found that the camels had made away south, and thinking it would probably take some time to catch them I went out on a bearing of 336 deg. to a patch of oaks visible from the hills, under the impression I would find a native well there, travelling over open spinifex with a few scattered bushes for three miles, then over a low sandhill, I reached a native well situated in a large ti-tree flat, and which I have no doubt will be a good one. Immediately to the north there is a fairly extensive oak forest, with good top feed and fair grass. The native name for the well is Minju.

Coming back to camp after having a good look round, I found only a few of the camels were back, and it was nearly noon before they were eventually got together.

Starting immediately we had packed, round point of hill, we struck north-easterly over open spinifex flats and occasional gravelly spinifex rises, with sandstone hills and breakaways running away to the east, coming into sand ridges at a little over three miles, thick in places with occasional large flats containing spinifex, wattle, cork tree, scattered poplar, patches of oaks and fair grass in places, coming to a native well (Bungabinni) at  $10\frac{1}{4}$  miles, the last two miles being over bad sandhills with very little feed. The well is situated in the usual ti-tree flat, with oak and limestone country to the north. We found afterwards on our return journey the strip of oaks extended as far as Minju, with very fair feed and occasional broken sandhills, most of which can be avoided. I would suggest the proposed stock route go from Bungabinni to Minju, and from there to Nibil.

We put down a well here seven feet, getting a supply of 120 gallons an hour of excellent water, which rose 2 feet 6 inches in well. We also marked a large oak  $\overset{\wedge}{C}$ , bearing 53 degrees and distant  $12\frac{1}{4}$  chains from the well.

While camped here I examined the country westerly and north-westerly, but after leaving the strip of oaks I found it very poor, high sand ridges running in a general bearing of 110 degrees, with gravelly rises running nearly north and south, the country in that direction having the appearance of being bad for both water and feed.

Leaving Bungabinni on the 28th August our route lay a little north of east for  $6\frac{1}{2}$  miles to another native well named Wanda, passing over sand and limestone country, with small broken sandhills and oak flats, containing comparatively good feed, till near the well where the oaks run further to the north, leaving the well as usual just clear of them. Immediately round the well there is the usual grass and herbage, with wattle, cork tree, poplar, etc. In the oaks near there is fair top feed with grass and soft spinifex.

We cleaned out the native well and got a fair supply of good water.

While we were observing for latitude, the native who had seemed quite contented and had proved very useful, showing us several waters, he having joined us voluntarily at Mallowa, suddenly left us, running off in the dark. We had no chance of catching him. From what we could understand he expected to find other natives at this well, but not finding them, and seeing by recent tracks that they had left, he apparently made up his mind to follow.

I was sorry to have lost him without first getting another, though one knowing the nature of the country might find the water. Still, it would entail a lot of searching, whereas with their aid we could go straight to it.

On the morning of the 29th August, thinking the strip of oaks was trending too much to the east, we decided to try the country to the north-east and north, to ascertain if we could get an outlet in that direction.

Travelling a little east of north, after passing through fair oak country for  $1\frac{3}{4}$  miles we came into wretched country. Sand ridges and open spinifex

flats with a few scattered gums, and occasional sandstone and gravelly rises, generally running at right angles to the sand ridges. We came to a small rock hole or soak at nine miles. Continuing on through the same wretched country for another five miles we camped, but as there was no feed we were compelled to tie the camels up for the night. I examined the country away to the east, but it was still poor. After walking a considerable distance I returned to camp some time after dark. Trotman, who had gone north-west, following a native's track from last rock-hole, coming in at the same time. He had discovered a small rock hole under some breakaways.

Seeing a fire go up about two miles to the south-east from our camp, we concluded it was a native answering, as he thought, other natives. Very early in the morning Trotman and M. Tobin went across to where he had located the fire and managed to secure an elderly native who was camped there (his only companions being apparently two or three dingoes) and brought him to camp.

In the meantime, I had located the rock hole seen by Trotman about  $1\frac{1}{2}$  miles a little south of west from camp. There being sufficient water in it for the camels, we took them over and gave them a drink.

Returning to camp we packed up immediately and resumed our journey in a north-easterly direction, over the same wretched country, the native taking us to a deep rockhole in some conglomerate about  $5\frac{1}{2}$  miles from camp, but quite dry. We then turned in a north-westerly direction, and after travelling over very high sandhills for another  $7\frac{1}{2}$  miles, we camped in a larger flat than usual in this locality, it being then quite dark. We let the camels go, though there was very little feed, but we did not wish to tie them up a second night; however, it would have been better, as they wandered over the sandhills and knocked themselves about without getting any feed, the horses contenting themselves with what edible spinifex or spinifex grass they could find.

Getting the camels together as early as possible in the morning, we continued in the same direction for two miles, when we came to another rockhole called Kumba, which though deep, was also quite dry. I decided to camp here and search the country ahead to see if it improved any; if not, to return to Wanda and continue further east along the line of oaks in the hope of finding a better outlet to the north-east that way; the only feed about here being a little mulga for the camels, and some very dry grass for the horses.

Seeing some fresh native tracks going to the north-west, I sent Trotman with one of the ponies to see if he could get a young man, the one we had being too old and not at all inclined to give us any information, while I examined the country in a northerly direction, but it proved only a continuation of the poor country we had travelled over for the last two days.

Trotman arrived back about dark with a smart young buck, so we decided to take the other man back to where we found him and let him go.

We again tied the camels up for the night, and starting very early we travelled right back to Wanda, about 26 miles in a straight line, over bad sandhills nearly all the way, arriving there about 10 p.m., thoroughly tired and disgusted with the country we had seen.

We decided to put a well down near the old one, so as to give the camels a spell in fair feed, they hav-



ing had very little for the last four days. On sinking the well it proved fairly good, going through sandstone for about seven feet. We came into drift, and could not get further without timbering. At that depth it gave 120 gallons an hour, and the sand underneath seemed full of water. It rose in well to within four feet 6 inches of the surface. Near this well there are a few scattered poison bushes, which we cleared.

On 6th September we continued our journey easterly along strip of oaks, passing two native wells, one at  $3\frac{1}{2}$  miles and one at  $6\frac{1}{2}$  miles, named respectively Goondin and Ural, arriving at the third "Libral" at about twelve miles.

Goondin and Ural were partly filled in by sand, and we did not improve them.

Libral was also in the same state, but on our return journey we put down a well near it, striking a good supply of water at 10ft. 8in., which rose four feet in the shaft.

We also marked a large oak tree  $\overset{\wedge}{\underset{15}{C}}$  distant seven chains from the well in a bearing of 297 degrees.

Along the strip of oaks the country is limestone and sand, containing good top feed with soft spinifex and grass.

From Auld Lake to Libral we have very few sandhills to cross; certainly through the oaks there are scattered low sand rises, but they can be avoided excepting in very rare cases, and along this line of country the feed is comparatively good, and the water shallow and plentiful, though it could not be called good pastoral country. My horses and camels did well on it.

I examined the country easterly from Libral, finding another native well ("Billigilli") about four miles away on a bearing of 65 degrees, which would probably prove good if cleaned out. There is very fair feed in the oaks west of it, and the usual herbage and grass round, and in the ti-tree flat in which it is situated. Finding the main strip of oaks continued away a little south of east, I decided to break away to the north-east, as I wished to make towards Godfrey's tank, discovered by the Hon. D. Carnegie's party. The native we had with us pointing to some waters in that direction.

Leaving Libral on 7th September we travelled north-east through oak country for a little over a mile, then through broken thick sandhills, getting more open with occasional gravelly rises, near some rockholes in conglomerate which we reached at  $7\frac{1}{4}$  miles, they being quite dry.

Then travelling nearly north over sand ridges and spinifex flats, the sand ridges being low and scattered in places and in others fairly thick, with numerous sandstone rises and outcrops, for  $6\frac{1}{4}$  miles, then over open spinifex, crossing a creek at seven miles running to the west, and down which there is some fair grass, continuing over low sandstone hills with breakaways to the north and north-west, and gravelly slopes falling from the east to a fair sized creek with a large rockhole named "Wardabunna," about 16 miles from Libral via Wandurba rockholes.

Wardabunna is a large rockhole or soak in the bed of the creek, and when full would hold about 20,000 gallons; at the time of our first visit it was nearly dry, the country apparently suffering from a drought, but on our return journey there was plenty of water in it. However, we were able to get sufficient water for our camels. There is some feed down the creek

to the west, and I think water will be obtained where the creek runs out into the flats in that direction. We marked a gum tree  $\overset{\wedge}{\underset{15}{C}}$  and made the latitude by observation 21 deg. 56 min. 30 sec. S.

On our return journey we travelled direct from here to Libral, which bears about 198 deg. and is distant about  $14\frac{3}{4}$  miles; the country was not quite so bad, though there are sand ridges nearly all the way; they are more scattered, and there is more soft spinifex and spinifex grass, still the country on the whole is poor and the travelling heavy.

Leaving Wardabunna on the 9th September we continued our course on a bearing of 26 deg. for  $10\frac{1}{2}$  miles over sand ridges all the way, some of them scattered and low, and others higher and thicker, but on the whole not very bad, with spinifex flats, scattered gums and bushes, but not much feed. On either side there are sandstone rises running nearly parallel with our line. We then turned more to the east over thick sandhills for  $1\frac{3}{4}$  miles, then over wider flats to Murguga Native Well, a little over 14 miles from Wardabunna. It is situated in the usual ti-tree flat between sand ridges, with fairly good grass and herbage round it.

We only partly cleaned this well out, it being a large one, with tunnels running away underneath. When we first visited it the water was about five feet from the surface, but on my return journey it was quite full. Certainly when we first saw it everything was exceedingly dry, even the spinifex being dead in places.

There were quite a number of young bucks at this well; at first they ran off, but on the native we had calling them, they came back and became quite friendly. They were all in good condition and appear to be able to get plenty of small animals for food in this country. The latitude is 21 deg. 45 min. 56 sec. S.

From here we travelled north-easterly, first through sand ridges with spinifex flats, scattered gums, wattle, poplar, etc., coming into a strip of oaks at  $\frac{1}{4}$  mile, passing through which we reached a long narrow lake at  $2\frac{1}{2}$  miles, running north of west and south of east as far as we could see. From what we could ascertain from the natives this lake extends a long distance either way, and they speak of a number of waters being situated along its course. Crossing this lake in a north-easterly direction we found that it was more of a marsh than a lake, a great deal of it being covered with good grass and herbage. When we first crossed it the grass was burnt up and the feed very dry, but on our return journey it was very good.

Towards the eastern edge of the lake it is boggy in places but most of it is sound, and I don't anticipate any trouble in crossing it with stock.

Arriving at the sandhills on the north-east side of the lake at about  $8\frac{1}{2}$  miles we then crossed broken sandhills with small samphire and ti-tree flats, containing grass and herbage, to a native well named Waddawalla, situated on the eastern edge of a small, white claypan surrounded by sandhills, and about  $10\frac{1}{4}$  miles from Murguga.

We camped here on the 12th September and cleaned the well out, after which we proceeded to sink on it. Before we had got a foot into the hard sandstone forming the sides and bottom, it gave a

supply of at least 300 gallons an hour of excellent water, the depth of well being about seven feet.

We marked a prominent gum  $\overset{\text{A}}{\underset{16}{\text{C}}}$  distant 16 chains on a bearing of 68 deg. 20 min. from well.

At this well on our return journey we had the great misfortune to have one of the most important and valuable members of our party (Michael Tobin) speared fatally by a native. It happened on the 5th April, about 5.30 p.m., he dying, after suffering bravely, at 1 p.m. on the 6th. It was a very sad thing, as he was a splendid man, took a most intelligent interest in the work, and was always ready and willing to perform any necessary task. His loss was a great blow to me personally, and of course to the whole camp, with whom he was a great favourite, his brother feeling his death keenly. The native who speared him was shot by Tobin at the instant he was fatally speared.

We buried poor Tobin at the foot of the marked tree on the opposite side, cutting a cross, with the date of his death, etc., on the tree.

The loss of such a valuable member of the party, in a spot so far away from civilisation, cast a gloom over the remainder of the trip, and I hope when it comes to my turn I may be able to look death in the face as bravely as he did.

Waddawalla is about 567 miles from Wiluna by the proposed stock route.

From here we travelled on a bearing of 25 degrees to a native well named Tiru about  $8\frac{1}{2}$  miles, passing over broken sandhills, thick in places and fairly high, with scattered gums, wattle, poplar, etc., also grass and herbage in places with a fair amount of soft spinifex, but it is bad travelling and on the whole poor.

Camping at the well, which is situated on a ti-tree flat, with fair feed around it, in lat. 21 deg. 33 min. 25 sec. S., we cleaned it out, and found that it was a comparatively large one, being 12 feet deep, very irregular and at first made very little water, but when the sandstone rock was chipped away a little it made about 80 gallons an hour and rose to within four feet of the surface, but on our return journey, owing probably to the summer rains, the water stood practically at the surface, and I think if a well was sunk here a good supply would be got at a shallow depth.

Finding the natives we had with us were getting out of their country, and as they informed us there was water a short distance away at which some natives were camped, Trotman went out with one of those we had, found the native well Guowarba, shown on plan, bringing back two natives with him, when we let the others return to their people.

On the morning of the 15th September, after marking a cork-tree  $\overset{\text{A}}{\underset{17}{\text{C}}}$  distant about 13 chains on a bearing of 85 degrees from the well, we continued our journey in a north-easterly direction, first over scattered sand ridges, and spinifex flats with wattle gums, mallee, cork-tree and other bushes for about two miles, then over a bunch of high broken sandhills for another two miles, after which the sand ridges are very scattered and low, with large gravelly open spinifex flats, the country being very poor, till about 10 miles, when the sandhills again become very bad, and the country generally wretched and heavy until reaching Warrabuda native well at 16 miles. This well is very shallow, and situated in the usual open

flat. If the surrounding country were not so wretched this would be a valuable well, but owing to it being so badly situated it will not be suitable for a stock route.

From Warrabuda we travelled a little north of west to a water named Guli, through poor sand ridges and spinifex, with scattered gums and bushes, but very little feed, until reaching the south side of the lake or marsh on which Guli is situated at about  $5\frac{3}{4}$  miles; then continuing over the edge of the lake on which there is good grass and herbage, we came to the water at  $6\frac{3}{4}$  miles. This well or small pool is in sandstone, and is 20 feet by 10 feet on top. On our outward journey the water stood about 12 inches from the surface, but on our return journey it was practically full. As the country was apparently suffering from a severe drought at the time of our visit, we probably saw it at its worst, and I think when it is properly cleaned out and improved, there will be a splendid supply of good water almost on the surface.

The latitude of the place is 21 deg. 18 min. 39 sec. S., and on a bearing of 345 degrees and 20 chains distant we marked a large oak  $\overset{\text{A}}{\underset{19}{\text{C}}}$  near which there are

four others, visible for a considerable distance from any high ground. On our return journey we did not go into Warrabuda but went fairly straight to Tiru well, and though there are patches of high sandhills to be crossed, there are also some fair sized flats with ti-tree, grass, and soft spinifex. At about 13 miles from Guli there is a flat or claypan, in which I think water can be got. If so, it would be a better position for a well than at Tiru, as it would be nearly equidistant from Guli and Waddawalla.

From Guli to Tiru is about 18 miles, which, in my opinion, is too far to travel stock over the sand ridges without water.

There are a few scattered poison bushes through this country, but I am very doubtful if cattle will touch it, as the camels, even when hungry, would not eat it.

Leaving Guli we travelled in a north-easterly direction towards water pointed out by the natives, first across the marshy lake referred to previously, and the flat surrounding it for three miles, on which there is good grass and herbage, with limestone country containing fairly good feed to the north-west, where the sandhills stand further back from the lake.

(These small lakes will be found most useful as feeding spots for cattle, after the sandhills which are more continuous here than on any other stretch of country we have passed over.)

Leaving the lakes we again got into the usual sand-ridges and spinifex flats, with scattered gums, wattles, etc. The sand-ridges are not very high or thick, still it is poor country, with little feed excepting soft spinifex and spinifex grass. This country continues right up to the next water, Billowaggi, which is about  $8\frac{1}{2}$  miles from Guli, on a bearing of 39 deg. 32 min.

We cleaned out this well and found that at seven feet it gave a fair supply of fresh water, rising to within four feet of the surface. At this well there were a number of natives, men, women, and children. Previous to this we had seen no women for a long distance, though numerous small lots of bucks. The women and children appeared very nervous, and endeavoured to hide themselves. We selected a very

smart-looking buck to accompany us further on, letting the two natives we had with us return.

We marked a cork tree <sup>A</sup><sub>20</sub> C, situated 10 chains from well on a bearing of 37deg. The latitude being 21deg. 12min. 38sec S.

On enquiring from the natives as to water ahead they apparently knew of no water within a reasonable distance north or north-east, but pointed a little north of east to water, as we thought at the time one half a day's journey away, but which proved to be much farther.

Starting on the morning of September the 18th, and travelling a little north of east, we passed through wretched country all day, scattered sand ridges and open spinifex flats with a few gums and bushes, but scarcely any feed, camping at night amidst sandridges with more gums. Still camel feed was extremely scarce. Continuing our journey the following morning through the same wretched country, with sandridges in every direction as far as we could see, we arrived at a native well called Kattamudda, with good feed around it, situated in a flat with ti-tree, samphire, couch grass and herbage, about 32 miles from Billowagi. On cleaning this well out we found that it gave a good supply of excellent water at seven feet, rising to within about three feet of the surface. It is in sandstone, and is larger than the average native well. The latitude of the place is 21deg. 9min. 55sec. S., and from its position I should think it was about 12 miles north of Helena Spring, found by Carnegie in 1896, which he reports as being a splendid water. On the sandhills in the vicinity of this well there is a good deal of poison.

We were successful in bagging a good many crested pigeons and a few bronzewings.

From Kattamudda we travelled west of north over wretched country, sand ridge after sand ridge, with gums and scattered bushes and low scrubs, passing at 10 miles a deep sandy native well called Kanjimanilba, with a poor supply of water and difficult to get at. Around this well quite a number of natives were camped. Continuing on through the same heart-breaking country, innumerable sand ridges, with gums, scattered bushes, and low scrub, but very little feed of any kind, to the north and north-east hills were visible, giving us the hope of better country ahead. At 24½ miles the sand ridges broke up and we came into a large flat, with sandstone hills and knobs close on the east, and extending away in that direction. Crossing this flat, which is lightly timbered with gums, cork-trees, scattered acacia, and cajeput, with fair grass and soft spinifex, we again came to a few more sandhills at 25½ miles, opening out after 1¼ miles into another large flat, at first with open spinifex and scattered bushes, then bloodwood gums, wattle, etc., with patches of grass, changing into limestone and sandy country with scattered cajeputs and gums, also fairly good soft spinifex, until we got close to Kuduarra Native Well, when we entered a patch of scrub with a few mulga trees and a patch of white gums immediately round the well.

At the time of our first visit it was exceedingly dry, and the country was parched, so that there was very little feed; but on our return journey there was quite a small swamp around the well, which was under water, with really good grass and herbage in the vicinity.

The latitude of the well is 20deg. 38min. 38sec. S.

When we arrived here we did not attempt to clean the well out, as a native who was at the well pointed

to a water named Kunningarra to the north-east, and intimated we would get plenty of water there. As feed was scarce, and the well deep and difficult to clean out, we decided to push on, letting the native we had brought with us from Billowagi return.

Leaving on the 24th September we travelled first east of north, under the guidance of the native we had found here, across an open spinifex flat for 1¼ miles, thence getting into fairly thick sandhills for a short distance.

The native then seeing a smoke rise to the west of north pointed there for water and started in that direction. Travelling for miles over scattered sand ridges and open spinifex flats, gravelly in places, with a few bloodwood gums, mallee, wattle, cajeput, and other bushes, eventually we reached a rather large flat with cork trees, a few scattered gums and bushes at about 18 miles. The native then seeing another smoke go up a little north of east, suddenly started off in that direction, it being almost dark now. Trotman followed the native, and we kept on his tracks with the camels, but after travelling in that direction for about two miles we could not run the tracks any longer. We therefore camped near a few small gums, tying the camels up, as there was soft spinifex for the horses, but no camel feed. Soon afterwards Trotman returned to the camp with native, having seen where the fire went up, but found no water. We therefore came to the conclusion the native was leading us astray. Getting away early in the morning we travelled easterly along the flat, passing through some gums and open soft spinifex to a claypan at about 4¼ miles, with a strip of gums turning away to the south-east, still continuing a little north of east, with some low sandhills on the north side, and a large flat extending away to the south, which contains fairly good feed both for camels and horses.

We then crossed two low sand ridges, and passed between some sandstone hills at 9¾ miles, running away to the north and south; still travelling a little north of east over poor country with a few scattered low sand ridges, spinifex, and scrub, also occasional stony outcrops, for a little over two miles. The hills in which Godfrey's tank and Kunningarra are situated being now visible lying to the north-east, we turned in that direction and crossed some thick low sandhills for about four miles, when the sandhills became more scattered and the feed better, there being wattle, soft spinifex, and grass. Getting nearer the hills we crossed a scrubby flat, eventually reaching a cork tree flat with good soil and excellent feed in a fair season. We camped here, having travelled 18½ miles for the day. Trotman had gone ahead to find Kunningarra or Godfrey's tank, but, owing to it getting dark, and the native humbugging him, he was not successful; however, in the morning we had little difficulty in finding them. Godfrey's tank, named by Carnegie, was quite dry, and Kunningarra was practically so, though there was a little water visible in a hole the natives had sunk in the sand at the bottom.

Going back to the camp, which was about three miles distant, we brought some of the camels and the two ponies up the gully to Kunningarra and commenced work on it, and though we worked till well on in the afternoon, we did not even get sufficient water for the two horses. As by this time we were very nearly out of water, and the camels were showing signs of distress, we decided it would be better to travel back to Kudnarra and clean it out, in the hope of getting a supply there, than to try and push on to the Sturt

with the prospect of getting no water there, owing to the drought; consequently we returned to camp immediately, leaving most of the equipment under cover there. We started back, though by this time it was quite dark, still we managed to travel nearly half way (15 miles) by 1 a.m. the next morning, where we camped amidst some acacia bushes, tying the camels up to them, so that they could have something to eat, it being useless to let them go as they would make off in search of water. Pushing on again first thing in the morning, Trotman and Tobin riding the ponies and carrying tools, to start work as soon as they arrived at the well, and by the time the camels appeared had done some good work. We continued working at the well all night, and by good luck struck a storage of water in a cave, or tunnel, down the well, which enabled us to get sufficient water by 8 a.m. to water all the camels, but still it was too dirty for human consumption, so we still worked at the well for the remainder of the day, and got it thoroughly cleaned out. We then cut the rock away at the bottom for about two feet, when the water came in freely, and we were able to retire, feeling assured of sufficient good water to take us on.

By this time we were all dead tired, and I decided to camp here for the next two days to give the camels a chance to recover. It was necessary, as I did not know where we would get our next water, and the camels had cut up rather badly.

While the camp was here I went to the south-west and found a small marshy lake with good feed, about five miles distant.

Some very fine specimens of natives came in for water, they having apparently stayed away until they were forced in through thirst, and, as we found all through here, wore apparently no clothes or ornaments.

Starting again for our camp near Godfrey's Tank on 1st October, we camped in a patch of gums and prickly acacia, where the camels got good feed, about 16 miles, continuing back to our old camp the following day, where we found everything intact. The latitude being 20deg. 15min. S.

From here we continued our journey on 3rd October, on a bearing a little east of north, with prominent bluffs and hills to the east, some of which rise 300 feet above the flat, we passed over good country with scattered acacia, cork tree, and other bushes, the flat running away to the north-west to claypans or small lakes, carrying excellent feed in fair seasons. Passing around Twin Heads, named by Carnegie, at about two miles, then gradually working more easterly round the hills, with prominent bluffs of sandstone to the south and south-east, crossing several small creeks running from the hills and emptying themselves eventually in the claypans to the north-west, the country in that direction being excellent feeding land. Rounding another point at  $4\frac{1}{2}$  miles we went easterly over spinifex country and between numerous hills and knobs for another  $1\frac{1}{2}$  miles, still continuing easterly through open spinifex flats and scattered sand ridges with fair grass, we gradually got into country with patches of limestone and a fair number of gums; also good grass and soft spinifex in places when nearing Lumba Well, which we reached at about  $13\frac{1}{2}$  miles, the last two miles being more to the north. This native well is not permanent, and was almost dry at the time of our first visit.

We put a bore down here on our return journey 50 feet, and only got a supply of 40 gallons per hour.

From Lumba to Billowaggi, on our return journey, we made several deviations from the route followed on our outward journey, getting generally better country, and making the route shorter, the proposed stock route approximately following the latter rough traverse.

I will now give a short description of the route travelled on our return journey between these points.

After putting down a bore at Lumba, and marking

an oak tree  $\overset{\wedge}{\text{C}}$  distant 16 chains, and bearing by compass

235 deg. from well, we travelled due west, at first over a few limestone rises, with patches of rubble, also scrub and grass, and then along a gum flat between sand ridges, with soft spinifex and grass to five miles, then travelling generally in a south-westerly direction to Twin Heads, first through spinifex country with a little grass and hills on either side, coming into gums, etc., with a most luxuriant growth of grass near the main hills.

I had thought when passing through it before that it was good grass country to the north-west and north of hills, but I never anticipated such a growth as had occurred after the summer rains, in some of the gullies the rice grass reaching as high as eight feet. Of course in such places it was coarse, but generally speaking for some distance out from the hills it is excellent pastoral country. After rounding Twin Heads, we travelled to a spot close to our old camp in lat. 20 deg. 15 min. S. and put down a bore in a patch of gums, but though we got water at 28 feet and continued to 46 feet, it only made 24 gallons an hour. I think it will be better to try near the claypan, where I think a good supply will be certain. We marked a gum  $\overset{\wedge}{\text{C}}$  near the bore.

At this time Godfrey's Tank and Kunningarra were full; they are large rockholes or pools, Kunningarra being easy of access, but Godfrey's Tank is hard to get at, as it is in a very stony creek. There was also sufficient water in pools in the creek, and claypans for stock, but of course these are not permanent.

From this bore we continued in a south-westerly direction, keeping to the west of our line on the outward journey, first passing through gums with good grass, and then sandy scrubby country with soft spinifex and fair feed to  $1\frac{1}{2}$  miles, after which we crossed a few low sandhills with fair feed in the flats up to  $4\frac{1}{2}$  miles, when the sand ridges become thicker (though still low) and the country gradually poorer being mostly buck spinifex between the sand ridges, with scattered gums and some scrub up to eight miles, when again the sand ridges become more scattered, until we have passed between the sandstone hills in the same position as on our outward journey at 11 miles. Still continuing in a south-westerly direction we cross two sand ridges coming into a fairly open flat with scattered corktrees, acacia, and wattle, and sandstone hills and knobs to the south-east. Crossing this flat on which there is very fair feed, we reach a strip of gums at about  $13\frac{3}{4}$  miles, very low-lying, and containing excellent flinders and other grasses with good acacia.

After travelling through the gums more to the south for another mile, we decided to bore near the southern end of the strip, which we did, striking a splendid supply of water in sandstone, which gave 400 gallons an hour at 18 feet, and rose to within four feet of the surface.

The strip of gums runs away northerly and north-westerly to the line of our outward journey, and at this time the area within the gums was covered with excellent grass.

To the east and north-east of this bore there are gullies running from the hills into the flat, along which there was a luxuriant growth of grass, very thick and high, and over the flat which is fairly extensive, there was on the whole good pasture, also at this time there were a number of small pools in the creeks, but these are not permanent, still after the tropical rains, which appear to extend a considerable distance south, surface water would be got in many places for a short period. The latitude of the bore is 20 deg. 23 min. 7 sec., and we marked a gum

tree <sup>^</sup><sub>29</sub> C near the bore on the south.

From here we travelled almost direct to Kudwarra for about 48 chains over spinifex and grassy flat, with acacia and other bushes, then over scattered sand ridges occurring about every mile or so for the first seven miles, with mallee, wattle, cajeput, and scattered gums, then a little more frequently up to about 11 miles, with spinifex, scattered gums, and bushes in the flats; the sandhills then become fairly thick and high till within 1¼ miles from Kudwarra, that distance being open soft spinifex and scattered bushes, until immediately round the well there are gums and mulga with scrub. Owing to the late rains there was a small area round the well covered with water, and the well itself was completely submerged. There were a few ducks in the water, some of which we managed to bag.

The country on the whole is poor between <sup>^</sup><sub>29</sub> C and Kudwarra, and the distance 16 or 17 miles.

From Kudwarra we travelled on a bearing of 210 deg. by compass for about five miles through scrub for a short distance, crossing two small sand rises, then through sand and limestone country with gums, corktrees, soft spinifex and grass to a small lake or marsh; crossing this lake, which contains samphire and grassy flats, with patches of thick ti-tree, also scattered small patches of boree for about four miles, when we came into sandy country, with occasional low sand rises, and limestone flats, timbered with bloodwood gums, white gums, cajeput, soft spinifex, and grass, until at 12 miles from Kudwarra we put down a bore, near limestone outcrops, with cajeputs and white gums, also patches of fair feed. We were not mistaken in the indications here, as we struck water at 11ft., and continuing it to 31ft., we got a supply of 330 gallons an hour of splendid water, which rose to within 9ft. of the surface. The latitude of the bore is 20 deg. 47 min. 36 sec. S. We marked a white gum <sup>^</sup><sub>30</sub> C close to bore.

While here we found a very intelligent native, who pointed to water. Taking the bearing by compass, which was 230 deg., I went out 6½ miles, and found a large shallow claypan, nearly full of water, with fairly good feed surrounding it, but as it is shallow, the water would only last a comparatively short time and would be of no value in a dry season.

Continuing our return journey on a compass bearing of 200 deg., over scattered sand ridges, about two to the mile, and open spinifex flats, with occasional gravelly rises, also scattered white and bloodwood gums and patches of grass, reaching a bunch of thick broken sandhills at four miles; crossing these

we came to open spinifex, forming top of a rise falling away to the south and west with low breakaways; continuing across this rise and a spinifex flat with gums, mallee, etc., we turned to the south over low sand ridges and gravelly rises, with sandstone hills scattered about to the east, reaching a clay pan at 7¼ miles called Pijallinga, with small gums and fair feed immediately around it, and at the time containing water, but very shallow.

Leaving this claypan we continued across an open spinifex flat, with mallee and some grass, for a little over a mile, again coming into scattered sandhills about two to the mile, with sandstone hills visible to the east, and stony rises occurring occasionally, the country generally being covered with spinifex, scattered bushes and a little grass, reaching a native well called Jimberingga at 14 miles from last bore. I think this is a permanent well. At the time we visited it it was full with fair feed around it.

Leaving this well we travelled on a general bearing of about 210 deg. over sand ridges and fair sized open spinifex flats, with scattered desert gums and bushes. Passing a small sand soak called Burnagu at 4¾ miles, still travelling over the same wretched sand ridges and open spinifex flats with occasional gums and scrub, fair grass growing wherever the spinifex had been burnt, but on the whole very trying country.

Turning more to the west we reached Billowaggi in about 18 miles from Jimberingga.

Thinking it advisable to put a well down on the open claypan near Billowaggi, we did so, but to our surprise struck salt water, though the water in the native well was quite fresh. North-east from Billowaggi about a mile, there is a fairly large flat, with good feed on it, where I think water can be got shallow. If so, it would be in a more suitable position.

Reverting back again to Lumba, where I broke off to describe the deviations, from that point to Billowaggi on our return journey.

Leaving that well we continued, generally speaking, due east, avoiding sand ridges which run almost in the same direction here, we travelled over limestone and sandy country with gums, cajeput, soft spinifex and fair grass for 2½ miles, then through open spinifex and patches of low scrub for one mile, coming into an oak forest about two miles across, but running away to the north east and south, containing patches of fair grass and soft spinifex in ordinary seasons. Getting away from the oaks we travelled along a scrubby spinifex flat between sand ridges, the country here being poor, but gradually improving until we pass a stony rise and come into bloodwood gums with open spinifex flats to the north; in these gums, which are at the end of a flat watercourse running from the hills to the east, we put down a bore 50 ft. and another one further up the flat, the same depth, but found both quite dry. I was extremely disappointed in this, as I expected to get water here. It will be necessary to put down more bores in this locality, if the construction is carried out, as water will be needed within a few miles from here.

On my return journey when the bores were put down, I examined the country north and south, and only found similar country, with a number of sandstone hills and knobs; certainly there was at that time good grass and herbage, all through the spinifex, most of which is soft.

After crossing over the hills by a gully, which at the time of our return journey had water in a number of clay holes, we left the hills at 15½ miles,

and continued on a bearing of 82 degrees by compass, travelling over spinifex country mostly soft, alternately open and in other places with gums and bushes, passing a conspicuous patch of oaks at seven miles, then over soft spinifex and sand, with gums, corktrees, wattle, and scrub, with occasional low sand ridges on either side for five miles. We then came into a hard loamy and sandy flat, with good soft spinifex, scattered small bloodwood gums and corktrees for two miles, then mallee, wattle, and patches of white gums to Weriaddo (native well) at 15 miles. This is apparently a permanent well.

We put down a bore near here on our return journey, struck water at 12ft., and at 26ft. got a supply of 248 gallons an hour of fresh water.

Weriaddo is about 722 miles on proposed stock route from Wiluna. We marked a white gum <sup>▲</sup><sub>24</sub> at well.

Continuing our journey from Weriaddo on the 5th October, on a compass bearing of 75deg. through sand and loamy country, with occasional lows and rises, scattered white gums and patches of boree, with soft spinifex and fair grass, we came to a narrow lake or marsh at two miles, with a fringe of bores and good herbage.

Crossing this lake or marsh, which was quite dry, with fair herbage and grass, and which extended away to the south-east and north-east, we passed through another fringe of boree and good feed, into open spinifex with scattered gums and patches of boree and grass. We then travelled over fairly open spinifex with scattered gums and bushes, patches of grass and an occasional sand rise, coming again into boree, with good feed, and striking a second lake at about eight miles from Weriaddo, continuing in a north-easterly direction along that lake, and across a point of it, to a fairly deep creek emptying itself into the lake about 1¼ miles further.

The creek was quite dry and the lake appeared to be, but on searching we found some clayholes, containing water, which was quite fresh. There being good feed on the lake and surrounding it we camped here, thinking at the time we were at the mouth of the Sturt, but finding afterwards it was an overflow. Still we knew we were in the vicinity, and felt that our difficulties were nearly over for the present. Feeling delighted at the fact that we had been able to cross the desert without the loss of a camel or horse; certainly the horses had fallen away, owing to the country generally suffering from a drought, but from appearances there had been a recent thunderstorm here, though not heavy, it would probably cause a little green herbage to appear, and I felt confident, without accident, I could get all the stock safely through, a thing I did not anticipate when leaving Wiluna.

There were a number of natives here, and on getting one, we found he could speak a few words of English, and had evidently been up the Sturt, as far as the occupied country.

They had sunk holes in the creek at the bottom of which there was a little water, the native name for the place being "Guda."

From here, which is in latitude 20 degrees 7min. 33sec. S., we travelled due north for 7¾ miles, first along the creek with claypans and samphire flats, also stretches of boree, with good grass country on either side; gradually leaving the creek to the west, its course being marked by boree, we came into open

soft spinifex country, with scattered gums, wattles, and acacia, again reaching boree and claypan country at four miles, travelling over this sort of country containing good grass, blue bush, and herbage, turning then to the north-west to some fair-sized pools surrounded by good feeding country at 8½ miles; these pools, though practically dry at the time of our visit, are I believe nearly permanent, and would contain water, excepting in very bad seasons. We marked a boree tree <sup>▲</sup><sub>25</sub> on the west bank.

We continued our journey north-easterly through claypans with patches of boree, ti-tree, and blue-bush swamps, and stretches of soft spinifex, hitting the main channel of the Sturt at about 10½ miles, then travelling up or near the main creek for 4¼ miles through good pastoral country on either side timbered with gums, bastard sandalwood, and other bushes to a large pool named Billiluna, which had a considerable amount of water in at the time of our first visit.

We marked a gum tree <sup>▲</sup><sub>26</sub> on west bank in latitude 19deg. 52min. 52sec. S.

Continuing, the country is very good immediately on either side of the creek, but on the east side the sandy country encroached fairly close in places; while on the west, where the creek is constantly overflowing in wet seasons, it is an excellent pastoral country, especially between the Sturt and the main overflow which runs down into the second lake we struck, and is shown on the accompanying plan. Continuing up the river, we passed several small pools, though apparently the river or creek had not run for some time, probably not for nearly two years, owing to the fact that the tropical rains had practically missed last year; the country on the whole being very good, especially on the west side. West of latitude 19deg. 40min. 42 sec. S, in the main overflow from the Sturt, there are some very deep pools, known as Stretch's Lake, but at the time I first saw them they were quite dry. However, I think they are nearly permanent, certainly excepting in a very dry time they would contain a good supply of water.

Further up the Sturt, where a creek comes in from the East, there are extensive grassy flats, apparently extending much further from the Sturt than usual on that side. From here to the junction of the Wolf the sand and spinifex battle with the grass country for possession of the creek; still, generally speaking, there is good feed, especially on the west side, and even where the spinifex encroaches up to the creek it is mostly a good class of soft spinifex, and through this country there is a good deal of grass and herbage.

Near the junction of the Wolf the hills come in close on the north-east, and at the junction there is a marked tree <sup>▲</sup><sub>21</sub> to where a survey has been made, consequently it was unnecessary to traverse any further.

The junction is about 802 miles from Wiluna.

From here upwards the Sturt widens out into large flats, which in flood time are covered with water, with deep pools occurring sufficiently often to allow of stock travelling down it without further provision being necessary in the way of wells, etc.

Continuing up past the old Denison Downs station, which we expected to find occupied, but instead found it dismantled, and that the new owner, Mr. Copley, had had it shifted. As we got further up the Sturt

we gradually got among the cattle, they being in great numbers on the river, owing to the very dry season.

We also managed to get a fair amount of game, which proved a very welcome change after so long on tinned stuff. With the exception of pigeons, we had seen no game in any quantity until reaching the Sturt.

Continuing up the Sturt to Cow Creek, then up that creek through splendid open downs, on which, owing to the unusually dry season, the feed was not very good. After leaving Cow Creek and crossing open downs for a few miles, we came into broken hilly country, with numerous small creeks, mostly dry at the time, until getting near Flora Valley homestead on the Elvire River, where the flats are particularly good.

Arriving at Flora Valley Station, the owners (Gordon Bros.) of which were away, we saw the nephew and Manager, Mr. John Gordon, who kindly showed us a suitable camping ground. As there was good bush for the camels, I decided to camp here and proceed to Hall's Creek and report to head quarters. Mr. Gordon considerably lent us horses for that purpose, accompanying us in the 24 miles to Hall's Creek, where we arrived on the 29th October, and reported by wire immediately. Hall's Creek is about 930 miles from Wiluna.

I was pleased to be able to report I had got through without the loss of either camels or horses, and that all the members of the party were well.

The people of East Kimberley appeared delighted at the prospects of a stock route being possible as an outlet to the Southern part of the Colony.

We were compelled to camp at Flora Valley till the rainy season was nearly over. We had difficulty in getting supplies to take us back; however, eventually we did so, and were ready to start on our return journey in February.

The people at Flora Valley were most hospitable and kind to us, helping us in every way possible.

Unfortunately while we were camped here one of the camels died, and two of them got away, travelling right back to Wiluna, where eventually we found them.

Also Mr. Trotman had an accident to his foot, running a stake into it; as it did not improve I reluctantly had to arrange for him to return to Perth via Wyndham.

After saying good-bye to the good people of Hall's Creek and Flora Valley, on the 27th February, 1907, we started on our return journey with 20 camels, three horses, and 20 wether goats for killing purposes. The goats, though an experiment, proved a great success, and I was sorry afterwards that I did not take sufficient to see us right through instead of carrying tinned meats.

Travelling at first nearly the same route as we came up, there was a vast difference in the appearance of the country; where it was dried up before the whole country was now like a field of wheat, there being miles of luxuriant grass and herbage three to five feet high, and water everywhere, making it necessary at times to keep a considerable distance from the river to avoid the boggy country. Even so at times we got stuck, and had to camp for a day or two in places.

The flies and mosquitoes being almost unbearable, swarming in myriads everywhere; this, combined with the heat, made it most unpleasant. The camels in particular suffering torture from the mosquitoes. We had continually to light fires for them, when they

would stand in the smoke the greater part of the night. During the day the flies were an incessant worry, and we were constantly suffering from bad eyes in consequence.

We saw a great number of natives on the lower end of the Sturt, and quite a large mob followed us, but they appeared quite friendly, and insisted upon helping drive the goats.

There were numerous wild fowl all along the Sturt, and as it was breeding season, the young ducks were in hundreds everywhere.

The natives were all in excellent condition down the Sturt, most of them being very fine specimens, certainly after the rains there is plenty of food—meat and vegetable.

We continued the same route, or nearly so, as on our outward journey until we reached the pools at <sup>A</sup>C, the whole way being covered with luxuriant herbage, and as the spinifex was in seed, and four or five feet high, it was specially good feed at the time.

From there we travelled down a second overflow, which runs into the first marsh or lake we touched on our outward journey, on which there are pools and swamps, with good feed, but the spinifex encroaches very close in places on the west. We continued down this watercourse to where it empties itself into the lake, crossing that, which we found quite dry and covered with a sort of wattle scrub, grass, and herbage, to where we crossed on our outward journey. We then left it and travelled to Weriaddo, camping there on the 1st March, and as previously described put a successful bore down near the well.

While boring operations were being proceeded with at Weriaddo I, accompanied by Burke and a black boy, who had come with us from Flora Valley, went to Gregory's Salt Sea, into which the main Sturt empties itself, to see if we could see traces of the missing camels, and also to satisfy myself as to whether there was any outlet to the south. We were successful in finding tracks of the camels which proved they had gone round the lake and made on towards Wiluna.

The main lake was nearly full and quite fresh. We also found a deep creek which flows into it from the south, or rather into a channel which connects a series of lakes, running from the main lake to the second one we touched on our outward journey, all of which were nearly full and quite fresh, surrounded by excellent pastoral country, patches of boree, etc. The grass at the time of our visit growing in the greatest luxuriance.

The fact that the water from the south empties itself into the lakes proves beyond doubt that there is no outlet in that direction, and all the water from the Sturt remains in the lakes. Seeing the lakes after the wet season, the name Salt Sea for the main one would appear a misnomer, but it may become salt when the water is low.

I look forward to the time when all this country will be stocked, though at present the natives are plentiful, and as has been proved higher up the Sturt where stock are running, they are a constant annoyance to the squatter, not only killing his cattle in fairly large numbers, but by running them about, making them very wild and hard to manage. Certainly the police are on the alert, and a good number of them have been sent to gaol when caught, but it does not seem to act as a deterrent, the natives who

have been in gaol apparently having a contempt for those who have not.

From Weriaddo which we left on our return journey on the 6th of March, we travelled sometimes along the same route, and sometimes making considerable deviations which have been described earlier in this report.

The heavy tropical rains they had in the North we found had extended in a diminishing degree most of the way along the route, missing a few patches, leaving water and feed in places that were quite dry and parched on our outward journey. Our camels and horses did particularly well right through, arriving at Wiluna in splendid condition.

We did a good deal of work on our return journey putting down 20 bores, a fair proportion of which were successful. We also sunk a few small wells, which, with the exception of one, gave a good supply of water at shallow depth.

We had the misfortune to lose a second camel from tetanus on our way back, but we found the two we lost from Flora Valley at Wiluna, they having crossed ahead of us. We landed 21 out of the 23 camels, safely back in Day Dawn, after being 13½ months away.

We found the natives extremely useful to us throughout, showing us their native wells freely, and thus probably saving us months of searching. They were fairly numerous through the central part, were usually in good condition, and though not so big as those on the Sturt, were active, clean-limbed men, in features I think more intelligent, and on the whole better looking than those in the North.

We saw very few women after leaving Weld Springs, they being apparently hidden away, but I daresay they are in equal numbers with the men.

Through the desert the natives very rarely go in tribes, but appear to be scattered all through the country in small families, and we had little difficulty in getting a fresh native at short intervals, never taking them out of their country. They wore no clothing of any kind, and made little or no provision in the way of shelter, and in fact never provide for the morrow in any way. The unmarried men wear their hair done up in a chignon, letting it drop when married.

It might be wondered how they get sufficient to live on, but there are a great number of small animals in the spinifex—spinifex rats, various kinds of bandicoots, and numerous other small marsupials, also a variety of lizards.

The marsupials appear to breed very quickly, some of them having as many as five young ones at a time. They (the natives) also eat the seeds of various grasses, which they grind up between stones.

Some of the older natives and children suffer from a skin disease but it is not to be wondered at, when one considers the insanitary condition of the wells; in fact it is a marvel to me, knowing the awful stuff they drink, that they don't all die. We improved their waters very much, and the supply we left behind was infinitely better than we found, both in quantity and quality.

The dialect changes very rapidly in latitude, but not so quickly in longitude. The constantly changing language made it difficult at times to make ourselves understood, though a native in one district generally knows the word used for anything in the adjoining district. They are adepts at drawing

plans on the ground, the information conveyed to us in that way proving very useful.

On the whole route we passed altogether 37 permanent waters, two of them being surface waters, Windieh Springs and Durba, while most of the others were very shallow, in most cases rising to within four or five feet of the surface. As a good proportion of these are in sandstone, they will not require much timbering. We also put down 20 bores, in ten of which we struck good water, the remainder proving failures, being dry or salt.

The amount of water at a shallow depth in the central part, which was supposed to be a waterless desert, was a revelation to me, and I am confident, in places at either end, the water on the whole will be deeper. By thoroughly testing sufficient water will be got at a reasonable depth to make it a really well watered stock route.

It will be necessary to sink about 54 wells, and I hope to have no longer space than 16 miles between the wells.

As far as feed is concerned, in a good season such as we came down in, fat stock could, I think, have been landed in Wiluna, but in a bad season, such as we went up in, it would probably not be possible to land cattle fat, but I think in any ordinary season forward stores could be travelled through without much or any loss. Certainly there are stretches of very poor country, with sand ridges to cross, making it very heavy for miles at a stretch. Still, patches of feed occur frequently, and a fair proportion of the spinifex is edible. There is also a good deal of edible bush scattered all along the route, on which our camels did well.

I think where camels and horses can get through successfully as ours did, cattle should do fairly well. Camels being browsers and horses grazers, cattle making use of both bush and grass as feed ought to do even better.

If the proposed stock route proves a success when constructed, as I believe it will, it ought to be a great boon to East Kimberley, as at the present time the squatters there can only get rid of their prime bullocks, the breeders and stores being unsaleable, without they forward them to Queensland, as they have done recently.

When travelling cattle to Wyndham from the higher country about Hall's Creek and further out, where they are fairly clean from tick, they suffer heavy losses from Red water, whereas by bringing them across the proposed stock route traversed by me, there would be no losses from that source, and I am sure the cattle with tick would lose them after travelling a short distance through the dry atmosphere of the so-called desert.

I would recommend that a stock route 5 miles wide be reserved, as shown in colour on the attached plan, from near Wiluna to the junction of the Wolf with Sturt's Creek; from there to Hall's Creek a strip one mile wide would I think be sufficient. When the wells are completed, and the stock route generally properly equipped, also the position accurately fixed, the width might be curtailed where considered necessary.

I might say, in conclusion, that I consider the expedition was a success, which was only marred by the sad loss of Michael Tobin, who had worked throughout with the greatest intelligence and goodwill, his death being a great shock to the party, with whom he was a general favourite.



I would like to thank the remainder of the party, for their loyal support and hearty co-operation in helping to bring our expedition to a successful issue.

I would like also to thank the Government for the honour they did me in tendering us such a splendid Parliamentary reception on our return, and also the

officials of the different departments who gave us such a flattering and kindly welcome.

I have the honour to be, sir,

Your obedient servant,

A. W. CANNING.

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**DIVISION V.**

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**ANNUAL PROGRESS REPORT**

OF THE

**GEOLOGICAL SURVEY**

**FOR THE YEAR 1907.**

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*Annual Progress Report of the Geological Survey for the Year 1907.*

*The Under Secretary for Mines.*

Geological Survey Office,  
Perth, February 10th, 1908.

SIR,

I submit in conformity with the usual custom, for the information of the Hon. the Minister for Mines, a concise account of the operations of the Geological Survey for the calendar year 1907.

This account, which contains a statement of the work carried out by the different members of the staff, both in the field, office, laboratory, and museum, has been arranged upon slightly different lines from those adopted hitherto, in so far that all reports of a purely technical or scientific character have been omitted and their place taken by a *précis* thereof. The full text of such of these as are not of sufficient length to warrant independent publication will be included in a miscellaneous bulletin which it is proposed to issue shortly.

In addition to the ordinary field work and its contingent office duties, the staff has been engaged upon 56 special reports bearing upon the alienation of land set apart for mining purposes, five in connection with the granting of State Aid under the provisions of the Mining Development Act, and one relating to Mining on Private Property, under the provisions of "The Mining Act, 1904."

**THE STAFF.**

The operations of the Department have been carried out during 1907 by a staff of 13 officers, four of the staff being geologists and one a topographical surveyor; the office staff comprising two draftsmen and one clerk; whilst the laboratory staff is made up of a Mineralogist and Assayer, with two permanent and two temporary assistants. One of the latter, Mr. C. C. Williams, who resigned during the preceding year, rejoined the staff in a temporary capacity and has remained upon that footing since the position he formerly occupied was omitted from the estimates. The second temporary assistant, Mr. Murray, has been employed since the 4th of July, owing to the large amount of work carried on for the Battery Branch of the Mines Department, out of which vote he is paid.

**FIELD WORK.**

The field work for the past year has been distributed over such portions of Western Australia as the exigencies of the situation demanded.

A GIBB MAITLAND, Government Geologist.—From the 1st of January to the 11th of February, I was absent on leave and by the permission of the Minister was granted 14 days special leave for the purpose of attending the eleventh meeting of the Australasian

Association for the Advancement of Science held in Adelaide, to preside over the section of Geology, and took for the subject of my presidential address "The Recent Advances in the Knowledge of the Geology of Western Australia." In this address, I brought before the meeting the present condition of our knowledge and the contributions which this State had made towards the progress of Geological Science in Australasia during the last decade. This address, with an explanatory map, will appear in the forthcoming volume of the Association's Proceedings, and has already been published in Bulletin No. 26.

The presence of the Government Geologists of Tasmania and South Australia at the meeting afforded an opportunity of conferring on points affecting official geological survey work, and cannot fail to have a very beneficial effect.

During my stay in South Australia, prior to and after the meeting of the Association, the Government of the State, as represented in the person of the Premier, the Minister for Mines, the Government Geologist, and the administrative heads of the Mines and Works Departments, placed very many facilities at my disposal to enable me to enlarge my experience of the geological structure, mineral resources, and underground water supplies of the State, in addition to extending many other acts of official courtesy.

*Artesian Water Boring in the Murchison, Gascoyne, and Kimberley Districts.*

In the month of April, as the result of a conference between the Surveyor General and the Engineer for Water Supply and Sewerage, the following report was submitted to the Government:—

"In accordance with the wishes of the Government, we have discussed the question of the sites for boring for artesian water in those northern portions of the State within the area which has already been geologically defined as being that likely to yield overflowing supplies of water.

"As pointed out in reports submitted by one of us on 13th February, 1906 (P.W. 12067/05), and 25th July, 1906 (P.W. 893/06), that boring might be carried out with a reasonable degree of confidence, we are of opinion that, upon the grounds of public utility, the two most convenient spots for such operations are:—

- (a) At Gladstone, and
- (b) At Lake Culcurdoo, a little to the north of the Murchison River.

"The question of the chances of success in boring for artesian water in the Lyndon Valley already has been dealt with by one of us on 10th April, 1906 (P.W. 896/06), and the Assistant Government Ge-

ologist on 14th January, 1907 (M. 1871/06). We are of opinion that the public interest would be best served by putting down a bore:—

- (c) On Crown lands, at a spot between Maud's Landing and Winning Pool, about 13 miles east from the jetty.

"The prospects of artesian water in the Kimberley Division having been recently exhaustively dealt with by Dr. Jack, who was specially commissioned for the purpose (P.W. 893/06), and the possibilities of town areas defined and discussed, we are of opinion that the interests of the community would be best served by putting down an experimental bore:—

- (d) in the valley of Christmas Creek at a suitable spot about 12 to 15 miles above its junction with the Fitzroy River.

"We do not consider that any boring on the Antrim Plateau should be undertaken until considerably more data than are at present available have been obtained. In this connection, we would especially direct attention to the advice of Dr. Jack (in which we concur) that the compilation of reliable data followed by logical reasoning is much to be preferred to embarking upon expensive boring operations of the nature of 'blind-stabbing.'

"Having given the whole question careful consideration, we are of opinion that boring operations at the four sites to which we have drawn attention should suffice to demonstrate the possibility or otherwise of the occurrence of artesian water in the Western and Kimberley Divisions, and if successful would lead, as has been the case in the Gascoyne, to private enterprise doing its part in embarking on a policy of water boring and the better utilisation of those areas of pastoral country which are known to exist."

#### *The Country between the Gascoyne and Roebourne.*

This area was examined by myself between the months of May and December for the purpose of investigating and reporting upon its copper, lead, and gold resources, as well as the possibilities of the occurrence of its underground water supplies and that of Coal in the basal members of the Carboniferous Formation, which occupies such an extensive area in the district.

The ground traversed embraces portions of the Gascoyne, Ashburton, and West Pilbarra Goldfields, in addition to other country outside the limits of any legally defined mineral field.

Field work was commenced at Carnarvon early in May last. Leaving the township, I followed the valley of the Gascoyne as far as its junction with the Lyons River. From here, I travelled *via* the Lockier Range as far as the mining centre of Bangemall, at which locality about three weeks were devoted to such an investigation of the field as the condition of the workings allowed. Having completed the survey of Bangemall, Mounts Phillip and Augustus were visited and thence a traverse *via* Coorabooka made across the rough country dividing the waters of the Lyons from those of the Ashburton as far as the Soldier's Secret Mining Camp.

From the Soldiers Secret, the valley of the Ashburton was traversed as far as the Dead Finish and Mount Mortimer centres, at both of which places a few days were spent. I travelled from Mount Mortimer *via* Coorara Claypan, as far as Uaroo, where are some extensive copper and lead deposits. About four weeks were spent in this locality examining and

mapping the mineral belt, which proved to be about six miles in length.

From Uaroo, I visited Weston's Copper Find, which lay some miles to the west, and from thence proceeded to the Minilya River for the purpose of examining the basal members of the carboniferous strata in the vicinity of Windalia and Chugareyardoo. The hurried investigation in this neighbourhood having been completed, I travelled *via* Yanyerredie, Glen Florrie Station and Coorara to Mount Stuart. From this locality, the Cane Hill Copper Workings were visited and examined, and, thereafter, those of Red Hill and the Fortescue River.

From the Fortescue River, I travelled as far as Cossask, reaching that place on the 12th December, having been continuously engaged in the field for 236 days.

H. P. WOODWARD, ASSISTANT GOVERNMENT GEOLOGIST.—Upon Mr. Woodward's return from the Minilya district on January 5th, 1907, he assumed the duties of Acting Government Geologist during my absence from this State. He was also engaged upon the preparation of his report upon the possibilities of obtaining artesian water along the coastal belt between the Gascoyne and Ashburton Rivers, which report, accompanied by a plan, appeared in Bulletin No. 26.

In the middle of February he proceeded to Mingenew, after which he furnished the following report upon an application made by the Geraldton Coal Co. for State assistance in boring for coal at Depot Hill, in the Irwin District:—

#### *Boring for Coal at Depot Hill, Irwin Coalfield.*

"Depôt Hill is upon the Irwin River, about 3½ miles north-west of Mingenew, a railway station upon the Midland Railway line, 227 miles north of Perth, and 79 miles south of Geraldton.

"The general character of the country is a high sandy tableland, intersected by deeply cut river valleys, along which are strips and patches of fertile land, with here and there rock outcrops in the stream bed itself.

"At Depôt Hill itself, beds of coloured, shaley soft sandstones make their appearance, having a slight but constant dip to the westward, whilst about one mile to the north-east, still in the river valley, beds of shale with small seams of brilliant black lignite were cut.

"This series is in all probability of Mesozoic Age, being the southern extension of the Jurassic rocks, which outcrop upon the Greenough River.

"In this river valley no further rock outcrops are visible for about 15 miles, where Lower Carboniferous limestone outcrops, overlaid by the Permo-Carboniferous series with coal seams dipping to the north-eastward.

"In the Lockier River, which junctions with the Irwin River at Strawberry, a little below Depôt Hill, the same series of rocks are met with as far as Mingenew, a short distance above which Lower Carboniferous limestones make their appearance.

"Close to Mingenew, which is on the same line of country as Depôt Hill, a bore hole was put down some years ago with State assistance, this passed through rocks apparently belonging to the Mesozoic series, and would if continued deeper have in all probability encountered the Lower Carboniferous series, lying unconformably beneath them; therefore, there appears to be little hope of

meeting with the coal measures by boring at Depôt Hill. It is possible, however, that the black lignite beds may be cut, but since these coals are too friable to stand handling, they would be of but little value, particularly at a point so far from market.

"Several other Government reserves were inspected with the object of shifting the site of boring operations, but since these were either too small or situated directly upon formations of greater age than the coal measures, none of these could be recommended."

This report being unfavourable, the Company made an application for a portion of the Coal Boring Reserve, situated upon the southern side of the Greenough River, between Eradu and Mullewa. He, therefore, inspected this locality in company with a representative of the Company, after which he made the following report:—

*Boring for Coal at Eradu, Greenough River.*

"Eradu is situated upon the Geraldton-Murchison Goldfield railway line, 34 miles east of Geraldton, and 225 miles West of Day Dawn; it was formerly known as the Greenough River Cross from the fact that the railway crosses the river at this point.

"Like the Irwin basin, rocks only outcrop in the river valley, the higher land being covered by elevated sand plains.

"In the river valley a series of sandstones and shales outcrops to the eastward until the crystalline rocks are met with near Mullewa.

"With the object of testing this, which appeared to be the northern extension of the Irwin basin, a bore was put down upon the sand plain at a point some 15 miles to the eastward of Eradu, but owing to the great thickness of mesozoic rocks passed through, which consisted largely of soft sandstone to a depth of 950 feet, it was found impossible to bore deeper than 1,360 feet, although the last 400 feet appeared to be in the coal measure series. It was therefore decided to prove the section by a series of shallow bore holes along the river valley.

"With this object the first hole was put down half a mile north of Eradu, which passed through sandstones and shales to a depth of 118 feet, when a 6ft. 6in. seam of weathered coal was cut.\*

*\*Analyses of Coal by the Mineralogist and Assayer.*

I have analysed three sections of the coal seam cut in this bore at 118 to 125½ feet with the following results:—

		2720	2721	2722
Moisture	.. ..	8.14	9.59	6.99
Volatile Hydrocarbon	.. ..	38.08	40.28	30.05
Fixed Carbon	.. ..	30.80	37.97	27.06
Ash	.. ..	22.97	12.16	35.90
		100.00	100.00	100.00
Colour of Ash	.. ..	Greyish-white	White	White
Coke	.. ..	None	None	None
Calorific Value, B.T.U.	.. ..	—	9900	—

Of these three [2720] is a poor friable shaley coal of little or no value. [2721] is a very dull friable coal which appears to be much weathered, and may therefore improve at a greater depth in the basin. Its calorific value is equal to that of the lower grades of Collie Coal. [2722] is coaly shale of no practical value.

"At this juncture the Geraldton Coal Co. made an application to the Government for a portion of the Mining Reserve, with assistance in the shape of a subsidy, and since the Company were unfortunate in their selection of the Depôt Hill site, I would recommend that their request be favourably considered, since at this locality there are certainly considerable prospects of success."

His next main piece of work was the preparation of his report upon Cue, Day Dawn, and Cuddingwarra Mining Districts, which report, accompanied by three geological maps, and a number of mining plans, is now issued as Bulletin No. 29. Owing to the fact that in the preceding year Mr. Woodward had been recalled from the Murchison Goldfields to proceed north before his field work was quite complete, he found it necessary to return to Cue and Day Dawn for a short time before finishing his report.

Upon my departure for the north in the first week in May, I placed Mr. Woodward in charge of this office, with instructions to superintend the carrying out of all departmental duties until my return, and if possible, not to undertake any field work which would necessitate an absence for a longer period than one week. He also had instructions to revise and correct proofs, and to generally superintend the publication of the Annual Report and Bulletins Nos. 26 to 30, whilst any spare time he was to occupy upon a geological examination of the Greenbushes Tinfield, including the bringing up to date of my geological map, and to extend this work to the boundaries of the field.

But slow progress has necessarily been made upon this piece of work owing to the fact that only a week could be devoted to it now and again as opportunity offered, whilst of the six days in the week two would be occupied in travelling. However, Mr. Woodward informs me that he will be able to complete it in two weeks of solid work.

The result of this work, with a large scale geologically coloured topographical map, it is hoped will be published early in the year.

In the first week in June, Mr. Woodward received instructions to visit and report upon an application for deep boring from the British and Foreign Development Syndicate, Ltd., upon their property known as Fraser's Mine, situated at Southern Cross. The following is a condensed version of his report, which will appear *in extenso* in a Miscellaneous Bulletin to be published:—

*Deep Boring on Fraser's Mine, Southern Cross.*

"This property, which embraces the Central, Fraser's and Fraser's South mines at Southern Cross, has been worked continuously since 1888, during which period a total of 151,771 tons of stone have been treated, which yielded 67,870.33 ounces of fine gold, or at the rate of .44 ounces per ton, or close upon half an ounce per ton, whilst if the rich sands which were used for mine filling before cyanide extraction was introduced are taken into account, it would most probably equal that.

"The reef or ore channel is of the composite order, striking in a north-westerly and south-westerly direction, with a dip which varies from 60 to 70 degrees to the westward. It averages something like 20 feet in

width, consisting of numerous strings and bunches of quartz, intermixed with a considerable quantity of schistose rock, enclosed between well-defined amphibolite walls, the whole being cross faulted at two or three points.

"It is accompanied by two parallel auriferous reefs, whilst the whole belt is contained between a white barren reef upon the east, and a series of banded hematite quartzites upon the west, the country rock being granite upon the east and amphibolite upon the west, whilst the whole formation is traceable for a length of two miles. This main formation has proved auriferous for a length of 60 chains, and the deepest point reached in sinking is at present 480 feet, but the main workings only extend to a depth of 350 feet, at which level it has been worked for a considerable length.

"The present owners consider that if they can prove the continuity of this large low grade lode at a depth of 750 and 1,000 feet, they would have no difficulty in obtaining the necessary capital to equip and develop it; they are therefore making application for a £1 for £1 subsidy to put down bores to this depth. Since this is a question of vital importance, not only to this mine or district, but to the State as a whole, this request is worthy of consideration, for should the fact be once established that these large low grade bodies carry payable ore at a depth, there is not the least doubt but that a number of others of the same class will also be tested.

"This lode is especially suitable for this experiment, firstly because its great size and length and the character of its walls point to the conclusion of permanency in depth; secondly, the general dissemination of the gold through the lode body for so great a length without the marked occurrence of shoots or lenticular bunches affords great encouragement with regard to its continuation to carry values to a depth; thirdly, the enclosure of a well-defined ore channel between a white barren reef of considerable extent upon the one side, and the ferruginous quartzite veins upon the other also support the theory of permanency; fourthly and lastly, this lode lying in a contact zone parallel to and dipping from the intruded granite which lies at a short distance to the eastward, is also favourable to both permanency and the continuity of values.

"The only conclusion that can be drawn is that if boring is undertaken here conjointly by the Government and the Company, it will be with every probable prospect of success."

Upon July 27th, he was summoned by the Royal Commission on Water Supply and Sewerage to visit and report upon the prospects of obtaining a solid foundation for a dam at Kelmescott, but in order to make a thorough examination he found it necessary to revisit the locality a few days later by himself, after which he furnished the following report:—

#### *Alternative Dam Site at Kelmescott.*

"The proposed dam site as surveyed is just within the Darling Range in the old Kelmescott townsite, about one and a-half miles from the railway station.

"The survey line crosses the river at a point where it breaks through the last granite bar before making its *debut* on the plain.

"This bar is clearly visible, running up the hill on the south side of the river, but upon the north it is

overlaid first by alluvium then by a bank of boulders embedded in clay, with, higher up the hill, soil and occasional rocky outcrops consisting of granite diorite and quartz reefs.

"After a careful examination of the proposed dam site, I find that the rock can nowhere along the surveyed line be at any great depth beneath the present surface, since in the section marked A-B, which lies upon the southern side of the river, granitic rocks outcrop almost to the water's edge. In section B-C upon the northern side a bank of what appears to be made ground occurs, but judging from the evidence afforded by a thorough examination of the river bank, which lies parallel to it at this point, I do not consider that this formation will prove to be of greater thickness than from 10 to 15 feet, the greatest thickness being probably about where a house stands upon Sub. 105, close to Marmion street. In the remaining section C-D rock outcrops are of frequent occurrence.

"The nature of the rock in section A-B is of a solid granitic character, the only weakness apparently being a pegmatic dyke near the main road. In this section I should estimate that at a depth of about 10 feet a good solid foundation would be obtained.

"In section B-C, which includes the river channel, the nature of the rock cannot be determined, therefore it is possible that diorite dykes or other fissures may occur, causing lines of weakness, but leaving these out of the question, I estimate that a solid foundation should be obtained at depths of from 20 to 30 feet, varying with the thickness of the superficial deposits.

"In the section C-D, although the rock outcrops it is not of such a solid nature as that in A-B, being intersected by diorite dykes and quartz veins, and in consequence it is probable that solid rock will lie a little deeper, say 15 feet. In this section it is not probable that so good a foundation will be obtained, but owing to its elevation the weir at this point will not be called upon to stand so great a pressure as in the other two sections.

"Upon the whole I do not apprehend that any out of the way engineering difficulties will be met with, but at the same time it is impossible for me to make any definite statement with regard to section B-C."

In the middle of August the question of extending the municipal boundaries of Kalgoorlie-Boulder City towards the Golden mile belt was raised, it therefore became necessary for him to proceed to that district in order to delineate upon a plan, in conjunction with the Government Land Agent, that portion of the auriferous area which should be reserved exclusively for mining purposes, and that portion of the abandoned leases over which subdivisions might take place.

The following week he visited Eulaminnna (late Anaconda) with the object of examining the Mt. Malcolm Copper Mine, in order that a reference could be made to it in the *Baser Metals Bulletin*, No. 30, a full report of which will be issued in a bulletin to be published shortly of which the following is a condensed outline:—

#### *The Mount Malcolm Copper Mine, Eulaminnna.*

"The Mount Malcolm Copper Mine, more generally known as the Anaconda, is situated upon the railway line between Mount Malcolm and Murrin Murrin. It was first worked from 1899 to 1904, during which period it produced 32,981 tons of ore valued at

£60,191. The Company then went into liquidation, and the leases were sold, and are now owned by the West Australian Copper Company, Ltd., who had raised up to July, 1907, 7,101 tons of ore valued at £117,305.

"The lode has been worked at three points over a length of 1,300 feet, but of this so far only about one-half of the total has been driven on above the water level, and about one-third below, the deepest shaft being 386 feet. Above the water level at the three points worked, the rich portion of the lode occurred in the form of lenses, the upper part of which had been removed by denudation. The ore in these consisted for the most part of carbonates, with ferruginous gossan (iron oxides) and a certain amount of siliceous gangue. Below the water level secondary sulphides were met with, the richest portions occurring immediately below the water, whilst the zone of enrichment gradually decreased in value with depth.

"The zone of primary sulphides has not yet been tested, but to judge from the character of them in that portion of the lode where secondary enrichment has taken place, this will in all probability prove to be of considerable size and of generally low grade, with bunches of shoots of higher values.

"This mine has been the greatest producer of copper in this State, it having yielded up to July, 1907, about one-half of the total production, whilst owing to the fact that relatively little prospecting has been done there are great possibilities of other large and rich bunches still being discovered between the existing workings."

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#### *Guano Deposits at Watheroo.*

In October he proceeded to Watheroo with the object of examining some reported guano deposits in that district. These he found to consist of recent accumulations in caves beneath heavy beds of quartzite, which latter in one place were over 70 feet in thickness. These deposits consist of wallaby dung, and bat and bird guano, the latter being of high quality but of limited quantity, whilst the main deposit, which proved to be 20 feet in depth at one point, contains a considerable quantity of sand, and is particularly siliceous near the bottom. The value of this discovery apparently rests upon the extent of the caverns and the quantity of the deposit.

In November he visited Mundijong, where gold was reported to have been discovered upon private property and a number of leases applied for, the following being his report:—

#### *Reported Gold Discoveries at Mundijong.*

"At a point 29 miles from Perth upon the South-Western Railway is the township of Mundijong, formerly known as Jarrahdale Junction, from the fact that the Rockingham-Jarrahdale timber line crosses and junctions with the Government line at this point. The township is situated upon the coastal sandy plains, close to the base of low foot hills, composed of ironstone gravel and shingle, which in all probability overlie the clay slate beds which outcrop to the northward between Cardup and Armadale.

"Between one and one and a-half miles eastward from the station the range rises fairly abruptly from the plains, but not so steeply nor does it attain such an elevation as it does to the eastward of Perth.

"The rocks constituting this range are crystalline schists intersected by numerous coarsely crystalline diorite dykes and quartz reefs, these latter often pre-

senting the structural character of altered pegmatic dykes due to metasomatic action, in which process the potash and alumina have been replaced by silica.

"Near the face of this range is the old Mundijong silver and lead mine, from which a few tons of massive galena were shipped as far back as 1870, since which time until recently it has been closed down owing to the low price of lead. This lode strikes in a more or less north and south direction, and has been tested to a depth of 100 feet, the vein stuff consisting mostly of quartz. Near the surface galena occurred in fair-sized bunches, but made into zinc blende near the water level, beneath which these two ores were met with in small quantities disseminated through the quartz, which also contained small quantities of copper.

"The ore is confined to a more or less pipe-like shoot of little longitudinal extent and presents indications of making into copper ore with depth.

"Other deposits of a similar character are met with along this range face near the contact of the schists with the slates at Cardup, and at other points between here and Armadale, which line of country is decidedly worthy of further attention.

"From the lead mine, the range rises rapidly for about one mile, but the rocks assume a less promising mineral character, quartz reefs and diorite dykes being of less frequent occurrence, whilst the hill tops and spurs are capped with ironstone (laterite), what quartz there is being of that small lenticular character common to schistose rocks.

"The line of leases as applied for extends in a more or less south-westerly direction from the road covering Locations 12, 49, 51, and 147, following the same line of country as that prospected at Serpentine, the No. 1 lease being about one mile north-east from the old shaft.

"Although quite some twenty leases must be pegged out, absolutely no work has been done upon them, whilst the No. 1 lease, from which 4 to 5 dwts. stone is said to have been obtained, is situated upon the top of an ironstone hill, upon which no quartz is visible.

"The small scattered fragments of stone upon the various leases did not appear to be worthy of trial, as no reef outcrops could be discovered, whilst a couple of stream concentrates tested did not yield even a trace of gold. As the original prospectors were not present at the time of my examination, until they are in a position to meet me and show me upon the ground that they have made a *bona fide* discovery of value, I cannot recommend that this land should be resumed for mining purposes."

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He also made numerous minor reports upon conditional purchase and other applications under the alienation of mineral lands, also reports upon assisted boring upon various gold mines and boring for artesian water and coal, the latter, including the Lennard River road bore, which is as follows:—

#### *Boring for Artesian Water, West Kimberley.*

"I have made a careful examination of the core samples from the Derby-Lennard Road bore (67m), and find that they consist of a series of sandstones and shales with occasional beds of grits, conglomerates which are often calcareous, particularly below a depth of 1,000 feet.

"The bore is of great interest, owing to the fact that an artesian supply was cut at such a shallow



depth, the first which consisted of 1,000 gallons being encountered at 170 feet below the surface, then at 230 feet it was at first 3,000 gallons, but later on increased to 40,000 gallons, whilst yet another supply yielding 65,000 gallons was met with at 327 feet.

"Below this depth, no water supply was apparently cut until a depth of 1,003 feet was reached, when a flow of 142,000 gallons was struck. Below this depth a series of calcareous grits, limestones, and conglomerates was passed through to 1,090 feet, being apparently the Napier Range series of lower carboniferous age.

"The striking of this supply is of very great importance, since this tract of country was previously considered to be waterless. This bore, however, not only proves conclusively that a good supply of fresh artesian water can be obtained at a depth of 1,000 feet, but also that a series of small supplies may be tapped at a comparatively shallow depth with the aid of a hand drill.

"The geological age of the upper series in this bore appears to be either Permo-Carboniferous or Upper Carboniferous, both of which formations contain the great coal deposits of the world, therefore, in future boring there is always the possibility of not only obtaining a water supply, but also of cutting a coal seam."

"Mr. Grill, in charge of the drill, informs me that this bore is situated in a depression in the 'Pindan' and that the hydrostatic head is only 7 feet; therefore if other bores were put down to tap this bed at points where the surface was more elevated no overflow would be obtained.

"This being the case I would recommend that this bore hole be carried down to the basement beds of this series, as it is probable that the hydrostatic head in these beds will prove to be greater since their intake is situated at a greater elevation. I should estimate the vertical thickness of these beds at from 400 to 500 feet, but it is quite possible that further supplies may be cut before the entire series is penetrated.

#### *Boring near Wyndham.*

Mr. Woodward also reported upon the cores from the bore near Wyndham in which a half-inch seam of coal was cut at a depth of 115 feet, which when assayed yielded:—

Moisture .. .. .	1.74
Volatile Hydrocarbons .. .. .	42.80
Fixed Carbon .. .. .	51.52
Ash .. .. .	3.94

"The beds passed through to a depth of 159 feet consist of a series of shales and sandstones which have been classed as Upper Carboniferous from their relation to rocks of undoubted Lower Carboniferous and Devonian age.

"Since in this series a small seam of high-class coal has been cut it is possible that others of workable size may also be met with. This point, owing to the geographical position of Wyndham, is of the very utmost importance, since if a good seam of coal of this quality could be obtained in this locality the mines would command the entire trade of the Indian Ocean."

Owing to my prolonged absence from town so large a portion of Mr. Woodward's time was occupied upon official correspondence and other duties including the revision of the publications for press that he

has had little time for field work during the past season, his total being only 60 days spent out of town upon official duties during the year under review.

W. D. CAMPBELL, ASSISTANT GEOLOGIST.—In the early part of the year 1907 this officer was engaged in bringing his work for the Kalgoorlie statistics and mining plans up to date.

#### *Wolfram and Tin near Brookton.*

Towards the end of January, a specimen (L2848) was received from Mr. N. Nesbitt for determination, and proved on examination to consist of wolfram (tungstate of iron and manganese). The locality from which it came is stated to have been from a spot 60 (16?) miles east of Brookton.

In the early part of last month, two samples were sent in from Mr. J. O. Summers of the York Hotel, York; the first consisted of a good sample of stream tin, which yielded in the Survey laboratory 66.5 per cent. of tin; whilst the second proved to be an admixture of quartz and wolfram, identical in its character with that sent in by Mr. Nesbitt. The locality from which these came, as declared to the Department, was 60 (16?) miles south-east of Brookton, and the two were obtained from spots 8 miles apart.

From information which subsequently came to the knowledge of the Department, it appeared that the first sample from Mr. Nesbitt was obtained from a spot on the Avon River Valley about 12 miles east of Brookton.

Having due regard to the present high prices of both tin and wolfram and the importance of obtaining some further knowledge regarding the occurrence thereof, Mr. W. D. Campbell, Assistant Geologist, visited the district and reported to me as follows:—

"I have visited the Wolfram lode at Mr. Nesbitt's. It is in Loc. 5868 and adjacent portion of 6100 on its south side; it strikes 20 degrees and underlays east at a high angle; there appear to be two parallel granite lodes with quartz veins contained in the lease applied for by Mr. Nesbitt. I cannot say what is the exact width of the lode but about 23 feet was exposed at the time of my visit; the surface indications show a poor proportion of wolfram in the lode. I searched the bed of the river Avon near Nesbitt's but did not see any indications of tin deposits; if any has been obtained it has probably been adjacent to the lode.

"I saw Mr. J. O. Summers at York Hotel, York, but he would not give me any exact position where the tin he sent for analysis came from, beyond saying that it came from the river bed east of Mr. Nesbitt's on the south side of Loc. 7677, and that he would shortly continue his prospecting. This place is where there are some granite outcrops and coarse sand. I saw this place and panned off several dishes without success, as already reported above."

Operations do not appear to have been carried sufficiently far on the deposit to enable very much information to be given about it. It is however important to note that it occurs in a new locality. Wolfram is marketable, and in this instance it seems to be merely a question of concentration provided the mineral occurs in such quantities as to make it worth the expense. The deposit would certainly seem to be worth prospecting on judicious lines.

He then took his long service leave amounting to three months and two weeks annual leave, after which he prepared his plans, etc.

At the end of July he visited Eradu with the object of selecting a site for the State-subsidised bore to be put down by the Geraldton Coal Company and reported as follows:—

*Boring for Coal at Eradu, Greenough River.*

"I have to report that I arrived at Eradu on Thursday night, 25th inst., with the boring foreman, J. Milne, and on the following day I took the positions and heights of the various bores. From these data, I find that the true dip of the coal seam is in the direction of 102½ degrees true bearing, and its amount is 5 degrees 38 minutes.

"The nearest Crown land in this direction is the commonage about 70 chains distant; I have therefore pegged a site for the No. 2 deep bore at the south-west corner of the commonage, north of the railway. It is half a chain from the railway boundary and two chains from the corner which is fenced. Mr. Hindley saw the peg and said that he was satisfied.

"The calculated depth of the coal seam here would be 646 feet, as shown in the statement below, but in all probability the dip lessens farther east so that the probable depth to expect would be 600 feet.

Depth of coal seam in Calyx bore	
No. 1 .. .. .	121 ft.
Depth of this bore site below	
Eradu Railway Station ..	50 ft.
Height of proposed site above	
Eradu Railway Station ..	30 ft.
Calculated increase of depth in distance of 70 chains .. ..	455 ft.
	—
	656 ft.
	—

"I returned to Geraldton on Saturday evening and on Sunday I was asked to stay so as to be present at a directors' meeting on Monday; this I did and explained what I had done. It appears that they had let a contract with Mr. Hindley to bore at Depôt Hill and this will be transferred to Eradu; they said that Hindley had arranged to employ an experienced foreman.

"The Government has offered to either supply a foreman in charge of boring or a representative to preserve a record of the strata and sample. The latter would be the arrangement required, as I explained to the meeting that to have a Government foreman and a contractor as well would be to create the trouble that has occurred with the bore already put down. The syndicate, or contractor, have portions of a boring plant already at Eradu, and Mr. Hindley asked whether he could now "go ahead," but I told him that I could not give him any instructions.

"Four directors were present at the meeting besides Mr. Pope, and after discussing matters generally, including Depôt Hill, which I endeavoured to show them would have only duplicated the Atkinson bore, they said that they would endeavour to have matters arranged quite clearly in regard to the new bore.

"I examined the strata in the neighbourhood, and I consider that they are all belonging to one series, including the cliff to be seen at Eradu Pool, which I included in the other series of sandstones in my report on the Greenough River last year.

"On Saturday I drove out with Mr. Milne's guidance to Pearse's farm, No. 2828, about 11 miles in a direct line north-westerly, where some carbonaceous beds have been found in sinking a well, and also to

Forrester Bros.' farm, 2½ miles farther, where a carbonaceous seam occurs in a gully.

"The route traverses undulating sand plains until within a mile of Pearse's, when an outcrop of horizontally-bedded sandstones appears on the west side of a hill near the track. At the farm the soil is clay, and a well has been sunk 79 feet through dark-coloured clay, and a bore below this went into a dark carbonaceous shale to 104 feet, but no water was found. This spot is about 400 feet above Eradu. At Forrester's the height is 100 feet lower than at Pearse's and the carbonaceous material occurs in the stream bed for a distance of one-third of a mile, and also in patches on the south bank.

"The soil in this neighbourhood is rich in patches, which probably denotes clay and shale beds where not covered by the sandstone, probably all belong to the carboniferous series, and it might be worth while to put down a bore at one or both these localities, at least I would suggest this. The nearest railway station would be Northern Gully.

"The accompanying plan shows the correct position of the Calyx bore and Nos. 1 and 2 hand bores, and the site for the proposed new bore and the localities visited.

"I attach also a diagram of the bore and graphic representation of the strike and dip.

"I can send a sample of clay and carbonaceous bed from Pearse's when I send some samples from Mingine in a few days time.

"By invitation of the Mayor, I accompanied him to the site of the proposed source for a water supply for the town. This is about three-quarters of a mile south of it, where a good supply of fresh water is found to be procurable from a hollow in the sand dunes, the surface is about 17 feet above the sea; springs appear to occur in a trench that has been cut across the hollow. The Mayor (Mr. Armstrong) appears to have been the originator of this proposition."

After this he commenced a detailed examination of the Irwin River coal measure series, upon which piece of work he is still engaged.

During the year he has been engaged in the field for 148 days and at the head office 107 days, the balance being taken up by his leave of absence.

C. G. GIBSON, ASSISTANT GEOLOGIST.—From January 2nd to May 27th this officer was at the head office, principally engaged in preparing his maps and reports and compiling statistics for publication as Bulletin No. 28.

Between May 27th and 30th he visited Yandanooka to report upon some new copper discoveries, the following being his report:—

*Copper Deposits at Yandanooka.*

"In accordance with instructions, I visited Yandanooka and made an examination of the copper deposit recently reported by Mr. W. B. Gordon.

"The deposit is situated on private property adjoining the Midland Railway line on the east side, and about three and a-half miles on the Perth side of the Yandanooka siding. The only work done consists of a few costeens and potholes—the deepest being only about 12 feet—in two or three of which a small body of copper ore has been exposed.

"In the north costeen, which is about 10 feet deep, from three to four feet of siliceous lode matter has been exposed, this carries small seams of carbonate—with a little sulphide—of copper throughout, but

taken in bulk, *i.e.*, as far as opened up, it is of low grade.

"Some eight chains south from here are several other costeens, two of which expose copper-bearing material; the more northern of these shows two to three feet of copper-stained material, but the country is too broken—the costeen being only five or six feet deep—to form any idea of the probable value of this; so far it is pretty low grade (a sample subsequently submitted by Mr. Gordon from a depth of 10 to 12 feet gave on assay 9.00 per cent. of copper).

"In the most southern costeen—which is about 12 feet deep—some 18 inches of lode matter is exposed; this consists of rubbly copper-stained lode material, carrying rounded lumps or boulders of rich sulphide and carbonate ore; these lumps of ore are up to six and eight inches in diameter, and consists of a mixture of chalcocite (black sulphide) and malachite (green carbonate), and are apparently the remains of a small rich seam of ore. This seam should be worth opening up into settled country.

"The following are the results of the assay of two samples of ore from this southern costeen:—

No. 1: copper, 33.16 per cent.; gold, 21grs. per ton; silver, 16dwts. 7grs. per ton.

No. 2: copper, 55.53 per cent.

"No. 1 is a 'grab' sample broken from a number of the 'boulders.' No. 2 is a sample of the unweathered part of one of the 'boulders.'

"The lode exposed in the most northern costeen appears to be running about north-east and south-west, and that in the south about north and south. The connection has been proved between the two bodies, and they do not appear to me to be continuous.

"The whole of the surface is covered to a depth of several feet with a secondary deposit of travertine, and no outcrops are visible. The deposit occurs in a belt of volcanic tuff interbedded in sandstones, and is about a quarter of a-mile from the junction of these with the main western body of granite; the sandstones and tuffs are the continuation of the Arrino belt.

"Owing to the superficial covering of travertine it is impossible to follow the line of the copper deposit, but there does not appear to me to be the least likelihood of its extending into the Government land on the south-west side of the railway line."

From May 31st to July 3rd he was engaged upon the compilation of the *Baser Metals Bulletin*, No. 30, also in preparations for reporting upon the Bonnievale and Kintore districts.

From July 3rd to August 10th he was engaged in the field in making a geological examination of the Bonnievale, Kumanalling, Kintore, Carbine, etc., districts, returning to Perth upon August 11th, after which he was engaged upon his plans and report until September 19th, when he started for the Black Range district, after making an examination of which he took his annual leave, returning to Perth on November 23rd, since which date he has been engaged upon the preparation of his report.

During the year he has been 95 days in the field and 270, less his annual leave of 14 days, were spent in office work in Perth.

H. W. B. TALBOT, FIELD ASSISTANT.—In the early part of the year this officer was engaged at the Perth Exhibition, and later on upon the

removal and return of the specimens lent. After this he prepared a series of large scale plans of the Greenbushes tinfield, to which district he proceeded upon April 3rd in order to carry on a topographical survey, which occupied him until June 17th, from which date until August 5th he prepared plans of the Phillips River district, with the object of carrying on a similar piece of work which he started on the latter date, and had not completed at the end of the year.

During the year this officer has spent 235 days in the field and 130 in town, the latter including his annual leave.

#### LABORATORY WORK.

Mr. E. S. Simpson, the Mineralogist and Assayer, who has, as usual, the control of the operations in the Laboratory, reports to me as follows upon the work of the year carried out under his more immediate direction:—

"In the accompanying table is a statement of the samples entered in our books for assay, etc. These figures again establish a record for the laboratory, the number of examples showing an advance of 33 per cent. and the number of assays and analyses 45 per cent. on the figures for last year. As this increase was largely in assays of tailings made for the State Batteries Branch, arrangements were made with that branch to pay the salary of another Assistant Assayer, Mr. D. G. Murray being appointed to the position. A labourer was employed for as great a part of the year as funds would allow. Such a one should form a permanent portion of the staff as otherwise it is impossible to avoid the accumulation of arrears, besides which professional officers are obliged to waste their time over labourers' work. For the same reason there is a need for a junior in the laboratory, either as messenger or cadet, as the correspondence alone entails a lot of clerical work, over 1,000 letters and certificates having been written besides minutes on departmental files. It is to be remembered that whilst the accompanying table gives a complete list of samples entered in the office registers, fully half the time of the staff is employed in attending to matters incapable of tabulation. Thus almost the whole of my time during the last quarter of the year was devoted to the preparation of a mineral exhibit for the Franco-British Exhibition, whilst most of the rest of my time was devoted to correspondence, museum work, assisting field officers in the petrological and mineralogical examination of their collections, etc. During the year a bulletin entitled "The Distribution and Occurrence of the Baser Metals in Western Australia" was prepared in collaboration with Mr. C. G. Gibson, and subsequently published.

#### Miscellaneous Mineral Notes.

Several minerals not previously recorded as occurring in this State were noted during the year, *viz.*:—

*Meymacite* (hydrated oxide of tungsten), resulting from the alteration of wolfram by sulphuric acid derived from decomposing pyrites. Locality described as Wodgina District, probably Black Gin Range, 20 miles west of Wodgina.

*Tagilite* (hydrated phosphate of copper), from the walls of a cave (Jingemia), containing much bat and marsupial guano at Watheroo.

*Amazonstone*, variety of *Microcline* (silicate of aluminium and potassium). Locality, Cape Arid.

*Zoisite* (hydrated silicate of aluminium, calcium and sodium), in large porphyritic masses in fine-grained greenstone, at Sir Samuel.

*Hemimorphite* (hydrated silicate of zinc), somewhat plentiful in copper-lead ore, Lennons Find, Mt. Edgar."

Classification.	Public.		Departmental.		Total.
	Pay.	Free.	Geological Survey.	Other Departments.	
Total samples dealt with	128	683	111	565	1,487
Assays for gold	88	313	36	403	840
Assays for silver	13	202	24	32	271
Assays for mercury	...	1	...	...	1
Assays for copper	35	152	14	19	220
Assays for tin	6	63	1	3	73
Assays for lead	6	31	7	10	54
Assays for antimony	...	2	...	4	6
Assays for bismuth	...	2	...	...	2
Assays for zinc	...	4	...	8	12
Assays for nickel	...	5	...	1	6
Assays for cobalt	...	4	...	...	4
Assays for iron	...	4	...	...	4
Assays for manganese	...	7	...	...	7
Assays for aluminium	...	1	...	...	1
Assays for tungsten	1	16	...	...	17
Assays for tantalum	1	4	...	...	5
Assays for niobium	1	4	...	...	5
Assays for molybdenum	...	3	...	...	3
Assays for thorium	...	3	...	...	3
Assays for cerium	...	2	...	...	2
Assays for phosphorus	...	36	...	1	37
Assays for nitrogen	...	3	...	...	3
Assays for tellurium	...	1	...	...	1
Analyses complete	...	8	25	25	58
Analyses proximate	...	6	4	5	15
Analyses partial	...	2	7	2	11
Determinations of rocks and minerals	10	299	30	84	423
Calorific valuations	4	9	3	4	20
Gold specimens valued	...	...	...	55	55
Miscellaneous	...	13	5	10	28
Totals	165	1,200	156	666	2,187

#### GEOLOGICAL COLLECTION.

During the past year the collection has been increased by 736 specimens collected by the staff in illustration of their reports and maps, in addition to many which have been presented to the Department which bring the total number in the register up to 7,832; of microscopic slides there have been 119 made, making a total to date of 838.

The various members of the staff have taken 64 photographs of various subjects connected with their work, several of which have been reproduced in illustration of their reports, whilst others have been enlarged for use in the Museum. The total number of registered negatives of geological and cognate subjects now amounts to 354.

In order that an effective display may be made of the specimens collected during the last 11 years in illustration of the geological structure and mineral resources of the State, increased Museum accommodation has become a necessity and it is to be hoped steps will soon be taken tending towards this end.

In last year's annual report attention was drawn to the need for getting together a collection which would find a place in the Survey Museum and be available for exhibition in any part of the world as required. The need for the nucleus of such a collection has been rendered apparent in connection with the display which it is hoped to make at the Franco-British Exhibition in London in 1908.

The Survey collection has been drawn upon to meet requirements, but in respect to the telluride minerals our collection has left much to be desired. In a lecture on "The Foundation Stones of Western Australia," delivered by myself in Perth and Kalgoorlie in 1907, I drew attention to this in the following words:—

"Kalgoorlie being the home, as it were, of the (West Australian) telluride minerals, it is strange though true that our National Institutions do not possess an adequate typical collection thereof, despite the fact that a unique, magnificent, and costly collection was despatched from this State for exhibition at Paris and Glasgow, almost all of which were either melted down, sold, or given away, and now adorn the show cases of European Museums; practically none were retained for the Museum of the State itself. If specimens of this kind are not preserved for science before it is too late they are lost for ever."

It is to be hoped that the collection which is about to be despatched to the Franco-British Exhibition to be held in London in 1908 will not be dispersed without effort being made to secure for the National Collection such of the specimens as may be held to be of educational and scientific value. Many specimens possess both an educational and scientific value far in excess of their metallic contents, and should find a permanent resting place in the Geological Survey Museum.

## PUBLICATIONS.

The following is a list of the different publications issued by the Geological Survey during the year:—

Annual Progress Report for the year 1906.

Miscellaneous Reports, 1-8. *Bulletin No. 26*, containing:—Possibility of the Occurrence of Artesian Water in the Northampton and Geraldine Districts; On the Country between the Ashburton and Minilya Rivers, with a view to determining the Northward Extension of the Gascoyne Artesian Area; The Phosphatic Deposits near Dandaraga; Notes on a Meteorite from the Nuleri District; The Geology of Princess Royal Harbour, with reference to the occurrence of Oil; Notes upon a Geological Map of the Greenough River District; Recent Advances in the knowledge of the Geology of Western Australia; and The Prevention of External Corrosion of Goldfields Water Supply Pipes.

Palæontological Contributions to the Geology of Western Australia. *Bulletin No. 27*, containing:—Plant Remains from the Collie Coalfield; Notes on Fossils from the Collie Coalfield in the Collection of the National Museum, Melbourne; Fossils from Mingenew, Irwin River Coalfield; Descriptions of Carboniferous Fossils from the Irwin River; Foraminifera from a Calcareous Marlstone, Gingin.

The Geology and Mineral Resources of Lawlers, Sir Samuel and Darlot, Mount Ida, and a portion of the Mount Margaret Goldfield. *Bulletin No. 28*.

A Report upon the Geology, together with a Description of the Productive Mines, of the Cue and Day Dawn Districts. Part I.—Cue and Cuddingwarra Centres; Part II.—Day Dawn Centre. *Bulletin No. 29*.

The Distribution and Occurrence of the Baser Metals in Western Australia. *Bulletin No. 30*.

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The Geological Survey Library now contains 2,740 volumes devoted to works on Geology, Mineralogy, and other kindred subjects; of these 514 have been added during the year, 481 having been received as donations from various Geological Surveys and Mining Departments throughout the world, and 33 having been acquired by purchase.

A very large number of Geological Maps have been presented to the Department, principally from the United States of America and the various State Surveys; also from the Geological Survey of Great Britain and Ireland, Canada, Cape of Good Hope, Transvaal, Natal, British Guiana, India, Russia, Sweden, Austria, Java, the Philippine Islands, Japan, New Zealand, and the other States of Australia.

I have, etc.,

A. GIBB MAITLAND,  
Government Geologist.

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## DIVISION VI.

### *School of Mines of Western Australia.*

#### DIRECTOR'S REPORT.

##### *The Under Secretary for Mines.*

I have the honour to submit, for the information of the Hon. the Minister, my Annual Report for the year 1907.

The past year has been one of progress, the number of students has increased, provision has been made for the conduct of all the classes required in the full Diploma Course, and several of the more advanced students have obtained highly remunerative positions as a consequence of their training at the School.

In April Mr. W. H. Baker, lecturer in Metallurgy, Chemistry, and Assaying, resigned his lectureship to take up the position of Director of the "Thames School of Mines," and in August Mr. L. K. Ward, lecturer in Geology and Mineralogy, was appointed Assistant Geologist for Tasmania. Both these officers discharged their duties in a competent manner, and their departure from the School of Mines was much regretted both by the students and the staff. I am glad to record that satisfactory arrangements have been made to fill the vacant positions with competent lecturers so that the class work will proceed uninterruptedly during the coming year. Messrs. Conigrave and Adams have carried on the work of the Metallurgical division of the School in a painstaking and capable manner, Mr. Larcombe has already performed good service in his position as lecturer in Geology and Curator of the Museum, and Mr. Moore, the newly-appointed lecturer in Metallurgy, Chemistry, and Assaying will take up his duties in February, 1908. In July, 1907, Mr. J. T. Dixon commenced duty as Registrar and Clerk in place of Mr. F. G. Shand, who for the previous twelve months had occupied the position of temporary Clerk.

The attendance at classes has been well maintained throughout the year, and the examination results, although not up to the standard of the previous year, show that good work has been accomplished, and my thanks are due to the members of the staff for their assistance in promoting the welfare of the School.

The Engine-driving and Practical Electricity classes continue to be well attended, and Mr. Bircher has again secured excellent results at the Government examinations for Engine-drivers' Certificates, held by the Chief Inspector of Machinery. During 1907, 16 students of the School of Mines obtained Certificates, two secured First class Certificates, three students passed their examinations as Second class Engine-drivers, 10 others the examination for Third class Certificates, and one student obtained a Locomotive and Traction Certificate. A number of excellent models illustrative of Engine details have been obtained for the Engine-driving class, which has been

divided into two sections, Senior and Junior, to meet the requirements of the students, and the results of the examinations show that the candidates who possess the necessary practical experience are enabled, by a course of instruction at the School, to take a high position in the Government examinations for Engine-drivers' Certificates.

During the year three separate classes in Practical Electricity have been in operation, with good results, and one of the advanced students, Mr. Harold Beech, has been appointed to the responsible position of Chief Electrician on one of the largest mines in the State. As the School is now provided with a good Electrical equipment for testing and experimental purposes, the students in Practical Electricity have exceptional opportunities of gaining a thorough insight into this important subject.

It is gratifying to record that the first student to obtain the Associateship of the School of Mines, Mr. Solomon I. Beech, has been appointed Metallurgist and Manager of one of the up-country mines, and his employers have expressed to me their satisfaction at the manner in which he has conducted their affairs.

The School has continued its system of free assays for prospectors, to whom much valuable information has been given concerning the samples brought in for examination. During the year 496 free assays, and mineral determinations have been made for prospectors, as follows:—

Assays for gold and silver	360
Assays for copper	79
Assays for tin, lead, etc.	9
Determinations of minerals, rocks, etc.	48
Total	496

These assays and determinations have all been made by responsible members of the Staff who have spared no pains to ensure accuracy in the results.

Good progress has been made in the display of the samples in the newly-erected Mineral Museum attached to the School. The official opening of the Museum performed by the Hon. the Minister for Mines in December attracted a large number of interested visitors, who expressed their appreciation of the action of the Government in providing such a valuable aid to the mining man and the prospector. Valuable donations of minerals and rock samples have been received from Mt. Bischoff, Broken Hill, and other parts of Australia; the mine managers of Western Australia have liberally responded to the request for samples illustrative of the mineral occurrences of the goldfields, and the classification and arrangement of all the samples are being proceeded with as rapidly as possible. When this has been completed,



the collection which is a fine one and is being constantly added to, will, I am convinced, prove extremely useful for the purposes of a mining community. Mr. Larcombe deserves special praise for the energetic and capable manner in which he has carried through the arduous task of setting out the mineral samples and preparing the Museum for the official opening.

Numerous donations of mineral samples, catalogues, and reports have been made to the School during the year, for which I duly record my thanks. The Mechanics' Institute has generously granted free membership to three of our Senior students, and Messrs. Bewick, Moreing, & Co., through their General Manager in Western Australia, Mr. J. A. Agnew, have granted a valuable concession which is capable of proving of great advantage to the School, namely the inclusion of the West Australian School of Mines in the list of institutions from which senior scholars will be selected and provided with employment.

The Students' Association formed in the early part of 1905 for the purpose of advancing the interests of the students in School matters, as well as socially, has gradually increased until it now embraces more than half the students, and on account of its power for good deserves every encouragement. The Association unites the students with a bond of common interest, it has shown strength and ability to carry out several important functions, and generally has accomplished good work during the last three years. It is to be hoped that as time goes on every student will become a member of the Association.

The question of meeting the requirements of a section of the students by establishing a course in Mechanical Engineering has now arisen. Most of the necessary classes are already in operation, the remainder can be conducted by the present staff if slight rearrangements are made in the time-table, and with a certain amount of additional equipment in the workshops the whole course can be adequately provided for. There is no doubt that this section of the work is necessary at Kalgoorlie, and the establishment of a course in Mechanical Engineering will improve the status of the School.

*Practical Classes.*—As far as possible prominence has been given to practical work in connection with the School classes. Students have excellent opportunities of gaining practical experience in Chemistry, Assaying, and Metallurgy in the well-equipped laboratories. Models for the Mechanics, Engine-driving, 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.

#### CLASS FEES (PAYABLE IN ADVANCE).

	Per term.		
	£	s.	d.
Mathematics .. ..	1	1	0
Chemistry .. ..	1	11	6
Assaying .. ..	1	11	6
Metallurgy .. ..	1	1	0
Geology .. ..	1	1	0
Mineralogy .. ..	1	11	6
Petrology .. ..	1	11	6
Mining .. ..	1	1	0
Mining Geology .. ..	1	1	0
Surveying .. ..	1	11	6
Mechanical Drawing ..	1	1	0
Applied Mechanics ..	1	1	0
Building Construction ..	1	1	0
Physics .. ..	1	11	6
Engine-driving .. ..	1	1	0
Practical Electricity ..	1	1	0
Fitting and Turning ..	1	1	0
Practical Plane Geometry ..	0	10	6
Descriptive Geometry ..	1	1	0

A full course of Lectures may be taken for £5 5s. per term.

#### TERMS—1908.

The year's work will be divided into three terms as follows:—

Entrance Examination—February 17th and 18th.

First Term—February 24th to May 16th.

Second Term—May 25th to August 8th.

Third Term—August 17th to November 7th.

Practical Examinations—November 9th to November 14th.

Theoretical Examinations—November 16th to December 5th.

Students are expected to enrol themselves on the Wednesday, Thursday, and Friday preceding the beginning of each term. The Secretary will be in attendance from 9.30 a.m. to 12 noon, and from 7 to 9 p.m. for the purpose of receiving fees.

#### HOLIDAYS.

The following days will be observed as Public Service Holidays:—

(a.) The Anniversary of the Birthday of the Sovereign.

Foundation Day (1st June).

Proclamation of Self-Government (21st October).

(b.) All days which the Governor may appoint, and which shall be notified in the *Government Gazette* as Public Service Holidays.

When any of these days fall on any day other than a Monday, the following Monday shall be a holiday instead of such day.

#### RAILWAY AND TRAMWAY CONCESSIONS.

Students will be given certificates by the Director enabling them to obtain reductions on the railways and tramways equivalent to half-fare when travelling to and from the School of Mines.

Candidates for School of Mines Scholarships are also granted reduced fares on the railways when attending the examinations.

#### SCHOOL OF MINES OF WESTERN AUSTRALIA.

The School of Mines of Western Australia was started in November, 1902, in the Exhibition Buildings at Coolgardie, where classes were regularly conducted up to the end of 1903.

In the meantime plans and specifications were drawn up by the Public Works Department from drawings and notes supplied by the Director of the School, and a main building at Kalgoorlie, which was commenced in April, 1903, was completed at the end of the year. Lectures in several subjects were given from the beginning of November, 1903, but on the completion of the school, early in 1904, lecture work was systematically entered upon in all School of Mines subjects, with a full Staff of Lecturers and a good equipment, and the Coolgardie Branch was closed.

In accordance with the recommendation of the School of Mines Commission, and following out the wishes expressed by the mining men on the goldfields, the School of Mines has been placed under the direct control of the Mines Department, which will issue diplomas and certificates to students complying with the regulations.

#### LOCATION.

The School of Mines at Kalgoorlie is built upon about two and a-half acres of ground on the block between Egan, Cassidy, and Macdonald Streets, and is a commodious one-storey building 104ft. by 140ft. in the form of a square enclosing a central quadrangle. The right wing consists of assaying, chemical, and metallurgical laboratories and balance rooms, the left wing of lecture rooms for mining, geology, physics, drawing, etc., all being adequately equipped with the necessary appliances for the proper instruction of the students. The School, by its position in the centre of one of the chief goldfields of the world, offers exceptional opportunities to students to become acquainted with the most modern methods of mining and ore treatment, and the managers of the mines and mills at Kalgoorlie, many of them School of Mines men, have at all times assisted the students to gain the practical knowledge which is the necessary accompaniment of a course of lectures at a School of Mines.

#### EQUIPMENT.

*Chemistry.*—There are two Chemical Laboratories—one for Junior Students, the other for Seniors—both being equipped with the necessary re-agents and apparatus for the class-work, while a special preparation room, attached to the Lecture Hall, has been provided with a supply of the apparatus necessary to demonstrate the lectures.

*Assaying.*—The Assay Room contains eleven melting furnaces and six muffle furnaces. The muffles are stoked from behind, all flues are external to the walls, and coke and charcoal are supplied over grizzlies through openings in the wall from large storage bins outside. The laboratory, which is equipped with modern appliances for pulverising ore and performing the numerous operations of assaying, accommodates a large number of students.

The separate balance room contains balances of various types, including an Ainsworth precision balance, all set upon slate slabs supported by brick piers, and each balance is provided with a dust-proof cover.

*Metallurgy.*—A separate laboratory has been fitted up with the necessary apparatus for the practical work in Metallurgy, and a series of diagrams have been obtained for the illustration of the lectures. Excellent opportunities are afforded students who are undertaking studies in Metallurgy, Chemistry, and Assaying to obtain a sound practical knowledge of their work, and facilities are provided for carrying out practical tests in the laboratories on the different methods of ore treatment.

*Physics.*—The lectures are demonstrated with the ordinary apparatus in the several divisions, Mechanics and Hydrostatics, Heat, Light, Sound, Electricity, and Magnetism, aided by several hundred lantern slides; and suitable apparatus is available to enable students to obtain the necessary practical work in experimental physics. A new physical laboratory has been provided and a complete course in Practical Physics has been arranged.

*Mining.*—For this subject sets of diagrams illustrating various appliances and methods, etc., used in the different branches of Mining are provided along with models of mining apparatus.

*Surveying.*—Land surveyors' theodolites (Troughton & Sims), Stanley mining theodolite, levels (Stanley and Troughton & Sims), levelling and stadia staves, plane table, tapes, rods, Abney levels, compasses, etc., are provided. Several of these instruments are fitted for tacheometrical work, and one for solar and stellar observations for determination of true North point. Field practice is held every alternate Saturday. A good assortment of the usual drawing appliances for use in the plotting section of the work is available.

*Geology.*—The School possesses good collections of rocks, minerals, and fossils from all parts of the world, as well as a large assortment of Western Australian samples forwarded by the Government Geologist. A good display is made of the most striking of the samples in a number of show cases placed around the lecture room and in the new and commodious Museum Buildings which have just been erected. These are free for inspection by the general public.

*Mineralogy.*—For illustration of the lecture work and for practical work, suitable collections of ores, minerals, etc., and of wooden and glass crystallographic models have been provided. Considerable attention is devoted to Determinative Mineralogy, for which work special benches and a good assortment of mineral samples for test purposes by the blowpipe, etc., have been placed in the classroom.

*Petrology.*—In this work the necessary rock-breaking and rock-cutting machines, apparatus for mounting, grinding, and polishing rock sections, and students' petrological microscopes and accessories have been provided.

*Mining Geology.*—A collection of ores and minerals of economic value is available, while a collection of specimens illustrative of ore deposition processes is being gradually gathered together.

*Drawing.*—This office contains four long drawing tables properly fitted up, a plan press, drawing board cupboard, sun-printing frame, and working drawings. Models and apparatus for instruction in geometrical and elementary mechanical drawing have been provided.

*Applied Mechanics.*—The lectures in this subject are supplemented by models illustrating different kinds of mechanical motions and devices, models of various types of steam-engines, sections of machine parts, etc.

*Engine-driving.*—A series of models, illustrating various types of steam-engines, valve motions, parallel motions, sections of machinery, etc., make the instruction in this subject thoroughly practical, and students have an excellent opportunity of becoming acquainted with the working details of machines.

#### WORKSHOPS.

*Practical Electricity.*—A brick room containing slate benches and a good supply of electrical testing apparatus is available for the use of students entering the Practical Electricity Class, while in a separate workshop provision has been made in the way of tools, benches, etc., for the construction of new apparatus by the students.

The workshop, which is 50 feet by 24 feet contains a screw cutting lathe, automatic and hand feed power drilling machine, independent hack saw, etc., the machines being all driven by an electro-motor.

With a view to giving adequate instruction in commercial tests in electrical work, a motor generator set comprising an electric motor direct-coupled to two dynamos, producing either or both continuous or alternating currents, has been installed, and the necessary switchboard with its controlling instruments has been erected by the students under the supervision of the Lecturer.

#### MUSEUM.

In the Western angle of the School ground a brick building suitable for the combined purposes of a Museum and for class rooms in Geology, Petrology, etc., has been erected. The Museum room is 70 feet by 30 feet in size, the Geology classroom adjoining is 40 feet by 27 feet, and provision has been made for such extensions as may be necessary in the future.

Already a large number of Western Australian mineral and rock samples have been given to the School, notably a large and valuable collection by A. Gibb Maitland, Esq., Government Geologist; others have been collected by the Director and his staff, while the managers and other officials of the mines in Kalgoorlie have made numerous donations of mineral samples, so that the School is gathering together a valuable collection which will prove of great assistance to the prospector, the School of Mines student, and every mining man on the fields.

These, along with several special collections of rocks and minerals obtained from reliable European and American sources and samples of economic and metallurgical products from Broken Hill, New South Wales, Mt. Bischoff, Tasmania, etc., have now been displayed in suitable cases, and form a very instructive exhibit, which is constantly being added to by donation and by purchase.

By educating the public in ready recognition of minerals by means of a well-stocked museum, the State will reap the benefit in the new finds that will be made in consequence, not only in auriferous deposits but in minerals of commercial value which are now too frequently overlooked or neglected by the prospector.

#### READING ROOM.

For the convenience of students the Reading Room is open at all times during school hours, and

contains all the text-books and books of reference mentioned in the syllabus, as well as a large number of other publications which have been added by purchase or donation from time to time.

The following technical papers and magazines are available for reference in the Reading Room:—

The Mining Journal.  
The Australian Mining Standard.  
The Engineering and Mining Journal.  
The Chemical News.  
The W.A. Mining Journal.  
The Surveyor.  
The Mineralogical Magazine.  
The Geological Magazine.  
The Mining Magazine.  
The Quarterly Journal of the Geological Society.  
The School of Mines Quarterly (New York).  
The New Zealand Mines Record.  
Queensland Government Mining Journal.  
Journal of the American Chemical Society.  
Journal of the Chemical and Metallurgical Society of South Africa.  
Transactions of the American Institute of Mining Engineers.  
The Government Gazette.

#### CONDUCT OF WORK.

The regular school work has been divided into two main sections:—

- I.—Mining.
- II.—Metallurgy.

Each full course of study for an Associateship in either of these divisions will require three years, and is calculated to qualify a student to enter upon responsible work about a mine or battery.

As far as possible the class subjects are treated from a practical standpoint, the lectures will be illustrated by periodical visits to the mines and batteries, the proximity of which to the School of Mines now established on the Goldfields affords an excellent opportunity to students to enter into the practical application of much of the work covered by the lectures.

Whenever necessary, classes, preparatory to and more elementary than the classes for the Associateship courses, will be held to enable those engaged in practical work to take advantage of the School.

A two years' course for the Assayer's Certificate has been arranged for students who may be unable to attend the full course in Metallurgy.

To meet the requirements of the newly gazetted Mines Regulations bearing on Mines Surveys and Plans, a two years' course for a Mine Surveyor's Certificate has been provided.

Students taking an Assayer's Certificate are recommended to also study the extra subjects required for the Mine Surveyor's Certificate.

To meet the requirements of students working in the mines and batteries, all the classwork is duplicated by repeating in the evening the lectures held during the day, and students unable to enter upon a full course in either division for the Associateship are afforded opportunities of taking a partial course of study in the subjects more immediately useful to them.

#### SCHOLARSHIPS.

Valuable scholarships arranged upon a liberal scheme, are offered annually for competition. The Junior scholarships are intended for those who have

not already attended classes in any School of Mines subjects, and successful candidates are expected to at once enter upon classes in Preparatory Mathematics and the first course in Chemistry and Physics as laid down in the School of Mines syllabus. The Entrance Scholarships are open to students who are attending the elementary classes in School of Mines subjects, and the Senior Scholarship is for competition by those who are completing the first year's course for one of the Associateships.

Scholarship holders must devote their whole time to the work of the School and comply with the Scholarship Regulations, a copy of which is obtainable on application to the Director.

The following Scholarships are offered by the Mines Department for competition by youths who are at least 15 years of age, and have been *bona fide* residents in Western Australia for six months:—

- (1.) Three JUNIOR SCHOLARSHIPS of an annual value of £40 with remission of class fees and tenable for three years.

The subjects of examination are:—

English (Standard VII., State Primary Schools), Arithmetic, Algebra, Geometry, and Physiography.

- (2.) Two ENTRANCE SCHOLARSHIPS of an annual value of £60 with remission of fees and tenable for three years.

The subjects of examination are:—

Preparatory Mathematics, and Elementary Physics and Chemistry.

- (3.) One SENIOR SCHOLARSHIP of the annual value of £75 with remission of fees and tenable for two years.

The subjects of examination are:—

Mathematics I., Chemistry I., Assaying I., Physics I., and Geology.

- (4.) In the event of a Scholarship not being awarded, bursaries ranging in value from £20 to £35 may be offered for competition in its place, and holders of bursaries will be permitted to engage in outside work, provided they take three class subjects each year.

#### CHAMBER OF MINES SCHOLARSHIPS.

The following Chamber of Mines Scholarships are offered for competition by School of Mines students:—

*Metallurgy.*—A scholarship of the value of £15 for one year, for the highest aggregate in Preparatory Mathematics and Geometrical Drawing.

The successful candidate must take the next year's work in Mathematics, I., Chemistry, I., Physics, I.

A scholarship of the value of £20 for one year for the highest aggregate in Chemistry, I., and Geology.

The successful candidate must take the next year's classes in Chemistry, Mineralogy, and Metallurgy.

*Mining.*—A scholarship of the value of £20 for one year for the highest aggregate in Mathematics, I., and Physics, I.

The successful candidate must take the next year's classes in Mining, Surveying, Mechanical Drawing.

*Mechanical Engineering.*—A scholarship of the value of £20 for one year for the highest aggregate in Mathematics, I., and Physics, I.

The successful candidate must take the next year's classes in Mathematics, II., Mechanical Drawing, Applied Mechanics.

The following Chamber of Mines Scholarships are offered for competition by Technical School students, and will be tenable at the Boulder Technical School.

A scholarship of the value of £15 for one year for the highest aggregate in Fitting and Turning, Mathematics and Drawing, as laid down in the Technical School syllabus.

A scholarship of the value of £10 for one year for the highest aggregate in Mathematics, Drawing, and either Carpentry or Plumbing, as laid down in the Technical School syllabus.

Successful candidates are expected to regularly proceed with the next year's work in the trades classes as detailed in the syllabus.

#### *Regulations for the above Scholarships.*

1. No scholarship may be held concurrently with any other scholarship.
2. No candidate will be allowed to hold more than one Chamber of Mines scholarship at one time, although he may compete for several.
3. The scholarships will be awarded to the first eligible candidate on the list of the aggregate of marks gained in the subjects of examination.
4. Payment will be made by quarterly instalments on the certificate of the Director as to regular attendance and satisfactory progress on the part of the holder of the scholarship.
5. Any scholarship may be forfeited if the holder is reported for misconduct or irregular attendance.
6. Candidates who have gained a scholarship and are able to satisfy the Director that they are already proficient in one or more of the subjects prescribed for the next year's work, may be allowed to select other class subjects instead.

#### EXAMINATION PRIZES

Students who are first in order of merit, and obtain a first-class pass in any subject of the examinations for diplomas and certificates, will be granted free tuition for one year in the next grade of the same subject, or, if there is no further grade, in an allied subject.

The President and Committee of the Kalgoorlie Mechanics' Institute offer three Free Annual Membership Tickets yearly to suitable students nominated by the Director.

Australian Mining Standard: Critchley Parker, Esq., proprietor, offers an annual prize of one year's issue of the Australian Mining Standard for the best Senior Student completing his Associateship course.

#### OFFERS OF EMPLOYMENT.

J. W. Sutherland, Esq., General Manager of the Golden Horseshoe Estates has offered to find 12 months employment for one Associateship student each year to enable him to obtain the practical experience necessary to complete his course.

Messrs. Bewick, Moreing, & Co., through their General Manager in Western Australia, J. A. Agnew, Esq., have generously included the School of Mines at Kalgoorlie in the list of institutions from which two students completing their course will be selected each year and given employment for a period of two years.

#### PARTIAL COURSES.

*For students unable to enter upon a full course.*

As a guide to students desiring to take a partial course only, the following subjects are suggested and

should be taken in the order indicated. Such partial courses will, in general, require two years of study:—

*For Mining Men.*—Mathematics, Mining Geology, Drawing, Mining, Surveying, Mechanics applied to Mining, Ore Dressing.

*For Engine-drivers.*—Mathematics, Electricity, Drawing, Applied Mechanics, Mining.

*For Assayers.*—Mathematics, Chemistry, Geology, Mineralogy, Assaying.

*For Electrical Workers.*—Mathematics, Chemistry, Electricity, Drawing, Mechanics.

*For Surveyors.*—Mathematics, Drawing, Surveying, Geology, Mine Sampling.

For those desiring a knowledge of *Ore Treatment, Cyaniding, etc.*—Mathematics, Chemistry, Geology, Mechanics, Drawing, Assaying, Metallurgy, Mineralogy.

It cannot be too strongly impressed upon new students that Mathematics, being the groundwork of all the classes, and of especial value in the study of Surveying, Mechanics, and Electricity, should be among the first subjects taken up, and students are recommended to make an early commencement with Chemistry, Geology, and Mechanical Drawing.

Students intending to take up Assaying should recognise that they should have a previous knowledge of Chemistry in order to obtain a complete acquaintance with the subject.

The Director will gladly furnish students with any further information required in connection with the School courses.

SCHOOL OF MINES OF WESTERN AUSTRALIA.

EXAMINERS.

The following Examiners conducted the Examinations in November, 1907:—

Subject.	Examiners.
Mathematics, Preparatory	F. B. Allen, M.A., B.Sc.
" I. ...	J. Parr, B.Sc., M.E.; F. B. Allen, M.A., B.Sc.
Mechanics (Theoretical)	J. Parr, B.Sc., M.E.; F. B. Allen, M.A., B.Sc.
Physics, I. & II. ...	J. B. Allen, B.Sc., A.I.E.E.; D. McDougall, A.I.E.E.
Chemistry, I., II., & III.	E. S. Simpson, B.E., F.C.S.; I. H. Boas, B.Sc.
Assaying, I. & II. ...	M. R. Conigrave, A.S.A.S.M.; F. C. Stockwell, A.S.A.S.M.
Metallurgy, I. & II. ...	F. B. Allen, M.A., B.Sc.; F. C. Stockwell, A.S.A.S.M.
Petrology ...	E. S. Simpson, B.E., F.C.S.; C. O. G. Larcombe, F.G.S.
Geology ...	C. O. G. Larcombe, F.G.S.; F. C. Stockwell, A.S.A.S.M.
Mining Geology ...	C. O. G. Larcombe, F.G.S.
Practical Plane Geometry	D. McDougall, A.I.E.E.
Descriptive Geometry ...	J. M. C. Corlette, B.E. (Cvl.) B.E. (Mng.).
Drawing, I. & II. ...	J. Parr, B.Sc., M.E.; J. M. C. Corlette, B.E. (Cvl.), B.E. (Mng.).
Applied Mechanics, I. ...	J. M. C. Corlette, B.E. (Cvl.), B.E. (Mng.); H. J. Clucas, B.C.E.
Prime Movers ...	
Building Construction ...	F. A. Moss, S.M.B., General Manager, "Kalgurli Gold Mine"; T. Butement, A.O.U.S.M.
Mining, I. & II. ...	

EXAMINERS—continued.

Subject.	Examiners.
Surveying, I. & II. ...	G. W. Ellis, Inspecting Surveyor; T. Butement, A.O.U.S.M.
Engine-driving, I. & II.	C. J. Mathews, A.M.I.C.E.; C. Bircher.
Practical Electricity, I., II., & III.	J. B. Allen, B.Sc., A.I.E.E.; C. Bircher.

JUNIOR SCHOLARSHIP.

English ...	J. B. Newbery.
Physiography ...	C. O. G. Larcombe, F.G.S.
Mathematics ...	F. B. Allen, M.A., B.Sc.

ENTRANCE SCHOLARSHIP.

Mathematics ...	F. B. Allen, M.A., B.Sc.
Physics ...	D. McDougall, A.I.E.E.
Chemistry ...	M. R. Conigrave, A.S.A.S.M.

ATTENDANCE, 1907.

Class.	Total Enrolment.		
	First Term.	Second Term.	Third Term.
Preparatory Mathematics ...	45	36	26
Mathematics I. ...	12	11	8
Mechanics (Theoretical) ...	6	5	5
Physics I. (Lectures) ...	18	15	10
Do. (Laboratory) ...	18	15	10
Chemistry I. (Lectures) ...	37	29	26
Do. (Laboratory) ...	37	29	26
Chemistry II. (Lectures) ...	6	7	6
Do. (Laboratory) ...	6	7	6
Chemistry III. (Laboratory) ...	1	1	1
Assaying I. (Lectures) ...	10	12	13
Do. (Laboratory) ...	10	12	13
Assaying II. (Lectures) ...	10	10	8
Do. (Laboratory) ...	10	10	8
Metallurgy I. ...	10	7	6
Metallurgy II. ...	1	1	1
Geology ...	10	9	7
Mineralogy ...	8	8	7
Petrology ...	1	1	1
Mining Geology ...	1	1	1
Ore Dressing ...	10	8	7
Mining I. ...	1	1	0
Mining II. ...	1	1	1
Surveying I. ...	5	7	4
Surveying II. ...	4	6	5
Applied Mechanics ...	6	4	4
Descriptive Geometry ...	10	9	4
Building Construction ...	3	3	3
Mechanical Drawing I. ...	12	11	7
Mechanical Drawing II. ...	4	3	3
Engine-driving I. ...	19	18	15
Engine-driving II. ...	9	9	8
Practical Electricity I. ...	31	28	22
Practical Electricity II. ...	10	9	6
Practical Electricity III. ...	5	5	5
Plane Geometry ...	2	3	3
Total Enrolment ...	389	351	286

	1905.			1906.			1907.		
	1st Term.	2nd Term.	3rd Term.	1st Term.	2nd Term.	3rd Term.	1st Term.	2nd Term.	3rd Term.
Total Enrolment ..	244	231	241	332	332	275	389	351	286
Average Attendance	177	175	174	227	232	205	320	306	268
Individual Students	105	108	102	122	134	116	166	157	141

## EXAMINATION RESULTS, 1907.

The following table shows the passes obtained by students of the W.A. School of Mines, Kalgoorlie, at the Annual Examinations held in November, 1907:—

Subject.	First Class.	Second Class.	Third Class.	Total.
Assaying I. ... ..	...	1	6	7
Assaying II. ... ..	...	...	3	3
Building Construction ... ..	...	...	1	1
Chemistry I. ... ..	...	...	6	6
Chemistry II. ... ..	...	...	1	1
Chemistry III. ... ..	...	1	...	1
Geology ... ..	1	1	1	3
Preparatory Mathematics ... ..	...	...	2	2
Mathematics I. ... ..	...	...	...	...
Mechanical Drawing I. ... ..	1	...	4	5
Mechanical Drawing II. ... ..	...	1	1	2
Mineralogy ... ..	1	2	1	4
Mining I. ... ..	...	...	...	...
Mining II. ... ..	1	...	...	1
Applied Mechanics I. ... ..	1	...	1	2
Applied Mechanics II. ... ..	...	...	...	...
Theo. Mechanics ... ..	...	1	...	1
Metallurgy I. ... ..	...	1	4	5
Metallurgy II. ... ..	...	...	...	...
Mining Geology ... ..	...	1	...	1
Physics I. ... ..	1	2	4	7
Petrology ... ..	1	...	...	1
Surveying I. ... ..	1	1	2	4
Surveying II. ... ..	...	...	1	1
Practical Electricity I. ... ..	2	4	8	14
Practical Electricity II. ... ..	1	1	...	2
Practical Electricity III. ... ..	...	...	2	2
Engine-driving I. ... ..	1	1	4	6
Engine-driving II. ... ..	1	1	1	3
Plane Geometry ... ..	1	1	1	3
Total ... ..	14	20	54	88

## ENGINE-DRIVERS' CERTIFICATES.

The following students of the School of Mines passed the examinations held by the Chief Inspector of Machinery during 1907, for Engine-drivers' Certificates:—

## EXAMINATION FOR FIRST CLASS ENGINE-DRIVER'S CERTIFICATE.

Kissane, E. W.  
Trim, S.

## EXAMINATION FOR SECOND CLASS ENGINE-DRIVER'S CERTIFICATE.

Grigg, J.  
Hunt, J. H.  
Thornett, F. E.

## EXAMINATION FOR THIRD CLASS ENGINE-DRIVER'S CERTIFICATE.

Doyle, W. J.  
Holman, J. G.  
Henderson, D. F.  
Moxham, F. G.  
Moran, N.  
Phillips, J. C.  
Porter, F. A.  
Ryan, T. J.  
Redman, J. E.  
Warnes, R.

## EXAMINATION FOR LOCO. AND TRACTION CERTIFICATE.

Coghlan, A. G.

## ENTRANCE EXAMINATION.

At the Entrance Examination in Preparatory Mathematics, held on February 19 and 20, 1907, the following candidates were credited with a pass:—

J. Head, Kalgoorlie School of Mines.  
D. Head, Kalgoorlie School of Mines.  
W. M. Manners, Kalgoorlie School of Mines.

This examination qualifies successful candidates to enter upon a regular Associateship Course at the School, and all class certificates which they obtain count towards the diploma of the School.

## DIPLOMAS AND ASSAYER'S CERTIFICATES.

The following students of the Perth Technical School, which has been in existence for several years, and whose students are admitted to the School of Mines Examinations, have gained certificates:—

H. Adams, Assayer's Certificate, March, 1904.  
P. Adams, Assayer's Certificate, February, 1905.  
T. Brown, Assayer's Certificate, November, 1906.  
J. Brooking, Assayer's Certificate, November, 1906.

## PRIZES.

The following students of the Kalgoorlie School of Mines have gained diplomas:—

S. J. Beech, Diploma in Metallurgy, November, 1906.  
P. Adams, Diploma in Metallurgy, November, 1907.

The following students have gained prizes entitling them to one year's free tuition in the next grade of the respective subjects:—

Practical Electricity I.—Gould, H. E.  
Engine-driving I.—Porter, F. A.  
Engine-driving II.—Thornett, F.  
Practical Plane Geometry—Godden, F. W. R.  
Mechanical Drawing I.—Peat, J.  
Applied Mechanics—Peat, J.  
Mining II.—Gabel, J.  
Surveying I.—Adams, P.  
Geology—Feldtman, F. R.  
Petrology—Hutchinson, D. M.  
Mineralogy—Feldtman, F. R.  
Physics I.—Hendry, C. A.

The following awards of prizes offered by Critchley Parker, Esq., have been made on the results of the Annual Examinations:—

1906.  
Australian Mining Standard .. S. J. Beech.  
Mining and Metallurgy .. J. Gabel.  
1907.  
Australian Mining Standard .. Philip Adams  
Metallurgy of Tin .. F. R. Feldtman.

The Cup offered by J. H. Cummins, Esq., for the best student in 1907, has been awarded to J. Peat.

## SCHOLARSHIP EXAMINATIONS, 1907.

## JUNIOR SCHOLARSHIPS.

South-West and Eucla Division—  
 Woodward, J., Perth.  
 Montgomery, A. M. P., Perth.  
 Hoare, W. L. F., Perth.  
 Cook, W. E., Perth.  
 Pike, E. M., Perth.  
 Perryman, J., Perth.  
 Murdock, J., Perth.  
 Knott, M., Perth.

J. Woodward gains a "Junior Scholarship."

## ENTRANCE SCHOLARSHIPS.

1. Eastern Division—  
 Parker, O., Kalgoorlie  
 Wheeler, S. J., Kalgoorlie.  
 Scholarship not awarded.

2. Outside Eastern Division—  
 Cook, Hugh J., Perth.  
 Brisbane, D. W., Perth.  
 Compton, G. S., Perth.

H. J. Cook gains an "Entrance Scholarship."

## SENIOR SCHOLARSHIP.

Bradley, W. S., Kalgoorlie.  
 Scholarship not awarded.

## CHAMBER OF MINES SCHOLARSHIP.

The following candidate has been recommended for a Chamber of Mines Scholarship:—

Metallurgy Scholarship, £20, Bradley, W., Kalgoorlie.

## SCHOOL OF MINES EXAMINATIONS, 1907.

## PREPARATORY MATHEMATICS.

Name.	School.	Result.
Burrows, M. F. G.	P.T.S.	Second Class
Martin, Allan	P.T.S.	Second "
Langsford, C. M.	C.I.T.S.	Second "
Cook, Hugh J.	P.T.S.	Second "
Bromilow, G. G.	P.T.S.	Second "
Compton, G. S.	P.T.S.	Second "
Senior, F. H.	P.T.S.	Third Class
Leslie, W.	P.T.S.	Third "
Thompson, Thr.	P.T.S.	Third "
Brisbane, D. W.	P.T.S.	Third "
Wheeler, S. J.	K.S.M.	Third "
Reedy, H. J.	P.T.S.	Third "
Parker, O.	K.S.M.	Third "
McKenzie, W. D.	P.T.S.	Third "

## MATHEMATICS.

## First Course.

Pollard, F. D.	P.T.S.	Third Class
Pike, R. W.	P.T.S.	Third "

## PHYSICS.

## First Course.

Hendry, C. A.	K.S.M.	First Class
Pike, R. W.	P.T.S.	First "
Pollard, F. D.	P.T.S.	Second Class
Brisbane, D. W.	P.T.S.	Second "
Davies, C. H.	K.S.M.	Second "
Parker, O.	K.S.M.	Second "
Cook, Hugh J.	P.T.S.	Second "
Rowledge, H. P.	P.T.S.	Second "
Bradley, W.	K.S.M.	Third Class
Wright, P. H.	P.T.S.	Third "
Dobson, Clive O.	P.T.S.	Third "
Klem, L. G.	P.T.S.	Third "
Godden, F.	K.S.M.	Third "
Head, J.	K.S.M.	Third "
McCull, A. D.	P.T.S.	Third "
McDowell, L. J.	P.T.S.	Third "
Burrows, Monte	P.T.S.	Third "
Wilkinson, B. F.	P.T.S.	Third "
Burrows, M. F. G.	P.T.S.	Third "
Johnston, F. M.	P.T.S.	Third "
Ellson, R. M.	P.T.S.	Third "
Dunne, W.	K.S.M.	Third "
Compton, G. S.	P.T.S.	Third "

## Second Course.

Bogle, A. C.	P.T.S.	Third Class
Cooke, Lionel E.	P.T.S.	Third "

## CHEMISTRY.

## First Course.

Cook, Hugh J.	P.T.S.	First Class
Pike, R. W.	P.T.S.	Second Class
Compton, G. S.	P.T.S.	Second "
Gracie, Miss Eva A.	P.T.S.	Second "
Cramb, F.	K.S.M.	Third Class
Pollard, F. D.	P.T.S.	Third "
Hendry, C.	K.S.M.	Third "
Rainsford, A. F.	P.T.S.	Third "
Fimister, W. J.	P.T.S.	Third "
Rowledge, H. P.	P.T.S.	Third "
Burrows, M. F. G.	P.T.S.	Third "
Knight, W.	K.S.M.	Third "
Bowen, G.	K.S.M.	Third "
Wright, P. H.	P.T.S.	Third "
Parker, O.	K.S.M.	Third "
Bradley, W. S.	K.S.M.	Third "
McDowell, L. J.	P.T.S.	Third "

## Second Course.

Baxter, R. R.	P.T.S.	First Class
Gabel, J.	K.S.M.	Third Class

## Third Course.

Banks, R.	K.S.M.	Second Class
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## ASSAYING.

## First Course.

Baxter, R. R.	P.T.S.	First Class
Pike, R. W.	P.T.S.	Second Class
Bradley, W. S.	K.S.M.	Second "
Grigg, J.	K.S.M.	Third Class
Rentoul, W.	K.S.M.	Third "
McGhie, A. H.	K.S.M.	Third "
Burkett, J.	K.S.M.	Third "
Cash, F.	K.S.M.	Third "
Watson, W.	K.S.M.	Third "
Walters, W. J.	C.T.S.	Third "
Carswell, W. C.	C.T.S.	Third "

*Second Course.*

Hardwicke, A. ...	P.T.S. ...	Second Class
Woolf, M. ...	K.S.M. ...	Third Class
Osborne, G.W. ...	K.S.M. ...	Third "
Head, J. ...	K.S.M. ...	Third "

## THEORETICAL MECHANICS.

Adams, P. ...	K.S.M. ...	Second Class
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## METALLURGY.

*First Course.*

Woolf, M. ...	K.S.M. ...	Second Class
Gabel, J. ...	K.S.M. ...	Third Class
Osborne, G. W. ...	K.S.M. ...	Third "
Hardwicke, A. ...	P.T.S. ...	Third "
Jackson, L. T. C. ...	P.T.S. ...	Third "
Banks, R. ...	K.S.M. ...	Third "
Golding, H. S. ...	K.S.M. ...	Third "

## MINERALOGY.

Feldtman, F. R. ...	K.S.M. ...	First Class
Baxter, R. R. ...	P.T.S. ...	Second Class
Osborne, G. W. ...	K.S.M. ...	Second "
Woolf, M. ...	K.S.M. ...	Second "
Brisbane, D. W. ...	P.T.S. ...	Third Class
Hardwicke, A. ...	P.T.S. ...	Third "
Fraser, W. ...	K.S.M. ...	Third "

## PETROLOGY.

Hutchinson, D. M. ...	K.S.M. ...	First Class
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## GEOLOGY.

Feldtman, F. R. ...	K.S.M. ...	First Class
Baxter, R. R. ...	P.T.S. ...	First "
Bradley, W. S. ...	K.S.M. ...	First "
Pike, R. W. ...	P.T.S. ...	Second Class
Klem, L. G. ...	P.T.S. ...	Third "
Brisbane, D. W. ...	P.T.S. ...	Third "
Williams, C. C. ...	P.T.S. ...	Third "
Fraser, W. ...	K.S.M. ...	Third "

## MINING AND ECONOMIC GEOLOGY.

Malcolmson, J. ...	K.S.M. ...	Second Class
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## PRACTICAL PLANE GEOMETRY.

Godden, W. F. R. ...	K.S.M. ...	First Class
Dunne, W. ...	K.S.M. ...	Second Class
Gibson, R. ...	K.S.M. ...	Third Class

## MECHANICAL DRAWING.

*First Course.*

Peat, J. ...	K.S.M. ...	First Class
Osborne, G. W. ...	K.S.M. ...	Third Class
Henderson, J. ...	K.S.M. ...	Third "
Jaentsch, P. ...	K.S.M. ...	Third "
Brisbane, D. W. ...	P.T.S. ...	Third "
White, A. S. ...	K.S.M. ...	Third "

*Second Course.*

Nowland, L. R. ...	K.S.M. ...	Second Class
Hutchinson, D. M. ...	K.S.M. ...	Third Class

## APPLIED MECHANICS.

*First Course.*

Williams, A. S. ...	P.T.S. ...	First Class
Peat, J. ...	K.S.M. ...	First "
Randell, G. H. ...	P.T.S. ...	Third Class
Bogle, A. C. ...	P.T.S. ...	Third "
Davis, S. K. ...	P.T.S. ...	Third "
Sivewright, W. A. ...	P.T.S. ...	Third "
Eilbeck, T. ...	P.T.S. ...	Third "
Davies, M. ...	K.S.M. ...	Third "

## BUILDING CONSTRUCTION.

Randell, G. H. ...	P.T.S. ...	First Class
Peat, J. ...	K.S.M. ...	Third Class

## MINING.

*Second Course.*

Gabel, J. ...	K.S.M. ...	First Class
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## SURVEYING.

*First Course.*

Adams, P. ...	K.S.M. ...	First Class
Cramb, F. ...	K.S.M. ...	Second Class
Fowler, H. ...	K.S.M. ...	Third Class
Moran, F. ...	K.S.M. ...	Third "

*Second Course.*

Peat, J. ...	K.S.M. ...	Third Class
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## ENGINE-DRIVING.

*First Course.*

Porter, F. A. ...	K.S.M. ...	First Class
Doyle, W. J. ...	K.S.M. ...	Second Class
Edwards, G. A. ...	P.T.S. ...	Second "
Tindal, R. ...	K.S.M. ...	Third Class
Ryan, T. J. ...	K.S.M. ...	Third "
Williams, E. ...	K.S.M. ...	Third "
Moxham, F. G. ...	K.S.M. ...	Third "
Collins, A. ...	C.T.S. ...	Third "

*Second Course.*

Thornett, F. ...	K.S.M. ...	First Class
Twells, G. ...	K.S.M. ...	Second Class
Curran, F. J. ...	K.S.M. ...	Third Class

## PRACTICAL ELECTRICITY.

*First Course.*

Gould, H. E. ...	K.S.M. ...	First Class
Parker, O. ...	K.S.M. ...	First "
Ireland, F. M. ...	K.S.M. ...	Second Class
Lang, J. H. ...	K.S.M. ...	Second "
Thompson, E. P. ...	K.S.M. ...	Second "
Burns, S. ...	K.S.M. ...	Second "
Law, H. ...	K.S.M. ...	Third Class
Docherty, P. ...	K.S.M. ...	Third "
Stanton, H. D. ...	K.S.M. ...	Third "
Kilrain, A. ...	K.S.M. ...	Third "
Cronk, E. ...	K.S.M. ...	Third "
Williams, E. ...	K.S.M. ...	Third "
Nankervus, W. ...	K.S.M. ...	Third "
White, A. S. ...	K.S.M. ...	Third "

*Second Course.*

McMullen, F. D. ...	K.S.M. ...	Second Class
Sewell, F. W. ...	K.S.M. ...	Third Class

*Third Course.*

McMullen, E. H. ...	K.S.M. ...	Third Class
Trenbath, W. ...	K.S.M. ...	Third "



## LIST OF DONATIONS TO THE SCHOOL LIBRARY.

The Calendar and Syllabus of the following Institutions:—

- Transvaal University College.
- Adelaide University.
- Edinburgh University.
- Leland Stanford Junior University, California.
- Bristol University College.
- Charters Towers School of Mines.
- Waihi School of Mines.
- Geological Reports, etc.:—
  - Geological Survey of India, Vols 31, 34, 35.
  - Geological Survey of Victoria, Vol. 4, 19/20.
  - Geological Survey of South Australia, various Reports and Maps; also Mining Records etc., 1897-99, 1905-7.
  - Reports on the Mineral Industry of Tasmania (various).
  - Mines Department of W.A. (various).
  - Geological Survey of W.A., Bulletins 26, 30.
  - Geological Survey of N.Z., Bulletin 3.
  - Department of Agriculture, Cape of Good Hope.
  - Mines Department, Queensland. Reports, 208/211.
  - "W.A. Timber Tests," G. A. Julius, B.Sc., M.E.
  - Report of Commission on Primary and Technical Education, Education Department, N.S.W.
  - Australasian Institute of Mining Engineers, Proceedings.
  - Monthly Journal of the Chamber of Mines.
  - Queensland Mining Journal.
  - Australian Official Journal of Patents.
  - The W.A. Mining and Engineering Journal.
  - The Murchison Times.*
  - The Kalgoorlie Miner.*
  - The Boulder Star.*
  - The Western Argus.*
  - Truth.*

## DONATIONS TO MUSEUMS.

- From A. E. Seal, Esq., Ceylon:—
  - 5 samples of graded graphite, with trade names.
  - 10 specimens of associated rocks.
  - 4 samples of successive layers of gem-sands and overburden. Ceylon.
- From L. K. Ward, Esq.:—
  - 31 rock sections of rocks from different parts of W.A. (chiefly).
- From Captain Rich, Broad Arrow:—
  - A large specimen of copper ore, Broad Arrow.
  - A large specimen of lead ore (cupriferous), Londonderry, Coolgardie.
- From F. A. Moss, Esq.:—
  - Typical specimens of ore from Kalgurli G.M., and samples of tin ore and associated minerals from Greenbushes, W.A.
- From J. W. Sutherland, Esq.:—
  - Typical specimens of ore from Golden Horseshoe G.M., and drill core samples of about 800 feet of bore right across the property. (Latter on loan).
- From R. B. Nicolson, Esq.:—
  - Typical specimens from Ivanhoe G.M.
- From R. Hamilton, Esq.:—
  - Typical specimens from Great Boulder Proprietary.

From G. M. Roberts, Esq.:—

Typical specimens from Associated G.M., also samples of bore core from same.

From J. Morgan, Esq.:—

Typical specimens from Oroya-Brown Hill G.M.

From O. B. Ward, Esq.:—

Typical specimens from Lake View Consols G.M.

From Mrs. Williams, Kalgoorlie:—

A set of ores and minerals, mainly from Broken Hill, N.S.W.

From J. E. Ede, Esq. (G. Horseshoe):—

Collection of minerals from Broken Hill, N.S.W.

From the Director of Public Intelligence, N.S.W.:—

60 lantern slides of Geological subjects.

## W.A. SCHOOL OF MINES.

Catalogues have been received from the following firms:—

- E. S. Wigg & Son, Perth.
- Hocking & Co., Kalgoorlie.
- McKenzie & Co., Kalgoorlie.
- Davey, Paxman, & Co., London.
- Mr. H. B. Harker, Kalgoorlie.
- The General Electric Co., Kalgoorlie.
- Baird & Tatlock, London.
- McMullen & Co., Melbourne.
- Townson & Mercer, London.
- Griffin & Co., London.
- F. E. Becker & Co., Germany.
- Boulton & Co., London.
- F. Newton & Co., London.
- Perkin, Son, & Co., London.
- Veritys, Ltd., London.
- F. N. Spon, Ltd., London.

I have, etc.,

F. B. ALLEN, M.A., B.Sc.,

Director.

## ANNUAL DEMONSTRATION.

The Third Annual Demonstration and Distribution of Certificates took place in the large Lecture Hall of the School on the evening of Thursday, February 21st, 1907, when a large number of people responded to the invitations issued by the Director to attend and inspect the resources of the School.

The Mayor of Kalgoorlie, who made the presentation of Certificates, expressed his gratification at the increased number of successful candidates, and stated that interest was further heightened by the fact that the first Diploma—an Associateship in Metallurgy—had been gained by Mr. S. J. Beech at the end of the third year's existence of the School. It was pleasing to see the appreciative interest taken in the School evidenced by so many residents sending their boys there. From here he hoped the future managers of the mines of the State would, in a few years, be drawn, and a goodly proportion of those required in the Commonwealth generally.

The Director of the School, Mr. F. B. Allen, expressed his pleasure at the large attendance of visitors. The students were settling down to their work more systematically, and better results were apparent each year. He hoped such would continue to be the case, and it certainly would be so, as far as

he himself and the staff were concerned. He invited all present to look through the School to see the equipment and apparatus generally, so as to gain an idea of the scope and thoroughness of the work carried on.

Mr. Bircher then delivered an interesting and instructive lecture, illustrated by numerous experiments, on the recent developments arising out of electrical research. After the lecture the visitors inspected the School and its equipment, and were greatly interested in the experimental illustrations carried on in the various sections.

## SCHOOL OF MINES MUSEUM.

### THE OPENING CEREMONY.

The Mineralogical and Geological Museum which the Government has placed under the control of the authorities of the School of Mines of Western Australia at Kalgoorlie, was formally opened by the Hon. the Minister for Mines on Saturday afternoon, December 7th, 1907, in the presence of a large and representative gathering of goldfields residents.

The speech-making of the occasion, conducted in the large lecture room at the rear of the museum, was under the presidency of Mr. F. B. Allen, M.A., B.Sc., Director of the School of Mines. He was supported by the Minister for Mines (Mr. H. Gregory, M.L.A.), Messrs. R. D. McKenzie, Patrick, and Glowrey, Ms. L.C., the Mayor of Kalgoorlie (Mr. Mark Rosenberg), and Messrs. J. A. Agnew, F. A. Moss, R. B. Nicolson, J. Sutherland, and T. Maughan. Apologies for an unavoidable absence were received from Mr. Richard Hamilton (President of the Chamber of Mines), Mr. G. M. Roberts, Mr. H. S. King (Secretary for Mines), Mr. A. Montgomery (State Mining Engineer), and Mr. Thos. H. Bath, M.L.A.

The Minister for Mines in the course of an interesting address remarked that the Kalgoorlie School of Mines, which was opened in 1903, was now fully equipped with all the necessary apparatus and appliances, and had the best of teachers for Chemistry, Assaying, Metallurgy, Surveying, Geology, Engineering, and the other subjects of a School of Mines' course, and they were trying to make the School, as far as possible, give that education which was required for the proper development of mining in Western Australia. He was quite satisfied that some of the students of the School would make a name for themselves both in Western Australia and in places outside Western Australia, but the School, and especially the museum attached to it, afforded a means of education for others than students. It would prove a great benefit to prospectors. They had that day witnessed a show exhibit in the shape of the beautiful specimens from Mulgabbie, which had been bought by the Government to be placed on exhibition in the Old Country, and he felt satisfied that later on he could obtain pictures and other works of art from the Perth Gallery to be placed on exhibition in the museum for the benefit of those who did not go in for the dry pleasure of looking at rocks and stones. Mr. Larcombe's classification of the exhibits had been exceedingly well carried out, and thanks were due to many gentlemen for collections donated to the museum—to Mr. Keyser of the Mt. Bischoff Tin Mines, to Mr. Klug for silver and lead specimens from Broken Hill, to Mr. Delprat, to Mr. Merritt and others for interesting and varied exhibits, and the mine managers of the goldfields had also rendered a great deal of as-

sistance. The Minister instanced several cases where prospectors, for want of sufficient knowledge or in not placing their knowledge in the right quarter, were liable to lose the value of their discoveries, and in conclusion reiterated his remarks concerning the educational advantages which the museum offered to the prospector. He confidently believed that the School of Mines and the museum would confer many advantages upon the community.

Mr. R. D. McKenzie, M.L.C., referred to several interesting stages in the development of the East Coolgardie Goldfields, and in dealing with the utility of Schools of Mines for the improvement of Mining methods he instanced the good work done at Kalgoorlie by mine managers and metallurgists who had received their training in Australian Schools of Mines.

Mr. J. A. Agnew, General Manager for Messrs. Bewick, Moreing, & Co. in Western Australia, spoke at length upon the advantages of the technical instruction given at Schools of Mines. He contrasted the mining knowledge of fifty years ago with that of the present day and showed how the present schools with their opportunities of higher education tended towards the employment of better mining methods. The School of Mines would exercise a good educational effect upon the mining industry of the State. Several of the old students of the Kalgoorlie School were already doing excellent work and gave great promise of doing even better.

The Director, after thanking those present for their attendance, made reference to the valuable donations made to the School, and made special mention of the Scholarships offered by the Government, by the Chamber of Mines, and by Messrs. Bewick, Moreing, & Co.

The President of the Students' Association then presented the Minister for Mines with a silver key as a memento of the occasion, and the Minister, after making a suitable reply expressive of the deep interest he took in the welfare of the students, proceeded to unlock the doors of the museum, and to formally declare it open.

### FOURTH ANNUAL DINNER.

This function was held at the Railway Hotel on the night of Saturday, 7th December. There was a large and representative attendance, including the Minister for Mines (Hon. H. Gregory, M.L.A.), Messrs. McKenzie, Patrick, and Glowrey, Ms.L.C., the Mayor of Kalgoorlie (Mr. M. Rosenberg), Messrs. R. B. Nicolson, J. W. Sutherland, F. A. Moss, A. Wauchope, J. A. Agnew, E. J. Wellsted, and others. Apologies were made for the absence of the Attorney General, Mr. R. Hamilton, Mr. H. S. King, and others. The chair was taken by Mr. D. Hutchinson, President of the Association.

The toast of the State Parliament, proposed by the Mayor, was briefly responded to by the Minister.

The Hon. R. D. McKenzie, after expressing his pleasure at being present, called attention to the greater opportunities now afforded to boys than in days gone by, and hoped that the rising generation would take full advantage of them.

The Hon. W. Patrick spoke of the wonderful progress made by Kalgoorlie, and the Hon. J. Glowrey stated that Western Australia had the best mines, the best managers, and the best miners in the Commonwealth.

In proposing the toast of the Mining Industry, Mr. Maughan paid a high tribute to the administrative

ability of the Mines Department and of the Minister for Mines. After eulogising the efforts of Sir John Forrest, he referred to the expansion of the Mines Department, the establishment of the State Batteries, and the assistance to prospectors, and stated that the gold production of the State was valued at £70,000,000 sterling.

The toast was supported by Mr. T. Butement and enthusiastically honoured.

The Minister for Mines, who was received with loud applause, stated in reply that he greatly appreciated the silver key presented to him that afternoon by the students, and that much of the credit for the good work of his Department was due to the members of the staff. Regarding mining legislation, strict provisions were necessary to promote the health and comfort of the miner. He thought the Mines Act 1904 (for which he took some credit to himself) the best Act of its kind in the Commonwealth, although it required some amending. It preserved the rights of the people and yet gave an incentive to mining. The investor was better protected in W.A. than elsewhere. The prospectors were well looked after, and the Department did its best to devise means to assist the development of the resources of the country. Reference was made to the railway programme of the Government to assist the Norseman and the North-West fields. He instanced a case where a prospector arrived in Perth from the latter field, with rich specimens, but in ignorance that he could have pegged out for himself two reward claims; he (Mr. Gregory) had reserved 300 acres to enable him to do so. As for the School of Mines, the bulk of the credit was due to Mr. Allen in his selection of the Staff, and in conclusion stated that as long as students were forthcoming the Government would do its part in maintaining the efficiency of the School.

Mr. Deeble, Inspector of Mines, also responded to the toast.

"The W.A. School of Mines, Director and Staff," was proposed in very happy terms by Mr. J. W. Sutherland (Golden Horseshoe Estates). He said he was still a student. Having to turn out a large amount of gold and to reduce costs compelled one to be a student. He thought Western Australia had a great future before it, and that its base metals must not be neglected. They had heard a great deal about Schools of Mines, but he reminded the Minister that they could not be kept up without money. He concluded with a complimentary reference to the Director and the Staff, and his remarks were received with great applause by the students.

Mr. E. H. Irving in a graceful speech supported the toast, as also did Mr. Loutit, who put forward a strong plea for a Mechanical and Electrical Engineering Course.

The Director, Mr. F. B. Allen, responded in happy terms. After dealing briefly with the progress made by the School, he remarked that some extension of the workshops was necessary, and an engine and boiler were required. The School was young but had a promising future before it. He trusted that it would show satisfactory results other than those of examination, and already several of the senior students had secured good appointments.

At this stage the Minister presented to Mr. S. J. Beech the Diploma of "Associate in Metallurgy," the first gained in the School.

"The W.A. School of Mines Association" was proposed by Messrs J. H. Cummins, J. M. C. Corlette, and J. Dixon, and responded to by Messrs. W. Fraser and G. W. Osborne.

"The Mining Industry" was proposed by Mr. Gregory, supported by Mr. Larcombe, and replied to by Messrs. J. A. Agnew and R. B. Nicolson.

The toast of the "Chairman" brought the proceedings to a close.

## DIVISION VII.

### *Annual Report for the Year 1907 on the Operations of "The Inspection of Machinery Act, 1904."*

CHIEF INSPECTOR OF MACHINERY'S OFFICE,

PERTH, 9TH MARCH, 1908.

*The Under Secretary for Mines, Perth.*

Sir,—

In accordance with Section 81 of "The Inspection of Machinery Act, 1904," I have the honour to submit the following report on the operations of the Act during the year ended 31st December, 1907, in the several districts proclaimed thereunder, together with statistics, for the information of the Hon. the Minister for Mines.

Since my last report the Governor by Order-in-Council, which took effect from the 1st March, 1907, has made some important and necessary additions to the Second Schedule of the Act, by including machinery used in a number of factories and processes to which the Act did not previously apply. By the same order certain machinery, such as engines and motors under one (1) horse-power, motor cars used for carrying passengers for reward, electric tramcars, railway carriage and wagon rolling stock, etc., etc., was rightly exempted from the provisions of the Act. The Schedule now reads:—

#### MACHINERY SUBJECT TO ACT.

"All machinery worked by steam, water, electricity, gas, oil, compressed air, or any other manner (other than machinery driven by hand, treadle, wind, or animal power) and used in printing, flour-milling, saw-milling, quartz-crushing, rock-crushing, batteries, weight-raising, chaff-cutting, foundries, and breweries. Also machinery used in, upon, or in connection with mines under the operation of 'The Mines Regulation Act, 1906,' or 'The Coal Mines Regulation Act, 1902,' air-compressing, conveying, pumping, exhausting, blowing, refrigerating; propelling any boat, ship, or vessel; dredging, preserving, grinding, chopping, crushing, and blending of vegetable or other substances; bone crushing, malting, wool pressing, flock milling; in the working of wood, metal, leather, stone, fabrics, or glass; in the making of gas, bricks, soap, or confectionery; in potteries, laundries, bakeries, electric light and power stations, and aerated water and bottling works."

#### EXEMPTIONS.

In addition to that specified in Section 4 of the Act: "All machinery to which 'The Inspection of Machinery Act, 1904' now applies, or any machinery which may hereafter be added to Schedule II. where the maximum horse-power of the engine or motor used in connection therewith is under one horse-power. Also all machinery used for domestic purposes only. Also direct acting pumps worked by compressed air, motor cars used for carrying passengers for reward, electric tramcars, railway carriage, and wagon rolling stock; also ropes and cages used in mining."

A new Regulation relating to the issue under certain conditions of Engine-drivers' Certificates, without examination, to holders of Certificates gained in the other States after examination, has also been made and is referred to more fully under Division V.

The work of the Department is the same as last reported, and following the practice adopted in the past, is dealt with in this Report, for convenience in reference, under the following headings:—

- (1.) Inspection of Boilers.
- (2.) Inspection of Machinery.
- (3.) Survey of Machinery of Harbour and River Boats.
- (4.) Survey of Machinery of Vessels registered under "The Navigation Act, 1904."
- (5.) Engine-drivers' Examinations, and inquiries.
- (6.) Accidents.
- (7.) General.

#### DIVISION I.—INSPECTION OF BOILERS.

*New Registrations.*—The total number of boilers registered under the Act steadily increases each year, notwithstanding permanent condemnations and "scrapping." After allowing for those written off the registers, for the above reasons, as being useless

for generating steam under pressure, the total number of serviceable boilers registered on the 31st December last was 3,257 as against 3,178 in registers on the corresponding date in 1906—a net increase of 79 for the year.

The types principally represented in this increase are Loco-type-Portable (18), Loco-type-Stationary (7), Water-tube (13), Vertical (12), Locomotive (10), Cornish (7), Lancashire (3), Return-Multitubular (3), Semi-Cornish (2), Miscellaneous (4). It will thus be seen that the Loco-type-Portable has been in greatest demand during the year. This can be readily associated with the increased activity which has been apparent in the agricultural districts during the last two (2) years, as fully 90 per cent. of these new boilers are registered as being used for agricultural purposes. The Water-tube-type is second in point

of numbers imported, but this class easily shows the best increase per centum. It is no doubt owing to the inland districts of the State generally, and the Goldfields particularly—outside the range of the Coolgardie water scheme—having such a wretched reputation for bad feed waters that steam users do not more largely instal this economic and useful boiler, whose first essential requirement is good feed water.

The Cornish-type in so far as our Goldfields are concerned appears, according to Return 1, to be still regarded as the most serviceable and the one best adapted for use under the unfavourable conditions obtaining. Upon referring to hereunder classification, it will be noted that excepting South-Western Districts, where the Vertical type shows the highest number of registrations, the Cornish boiler predominates in every other district.

RETURN NO. 1.—Return showing Classification of the various Boilers registered in each District on 31st December, 1907.

Type of Boiler.	DISTRICTS.										Total.
	South Western.	Coolgardie and Yalgarn.	Dundas.	East Coolgardie.	North-East Coolgardie and Broad Arrow.	North Coolgardie.	Mt. Margaret.	East Murchison.	Murchison, Peak Hill, and Yalgoo.	Filbara and West Filbara (not Proclaimed).	
Lancashire ... ..	19	6	...	44	5	14	9	5	19	...	121
Cornish ... ..	96	91	21	172	51	91	94	62	122	...	800
Semi-Cornish ... ..	30	3	3	6	2	5	...	2	27	...	78
Vertical, Stationary ... ..	332	66	14	87	40	70	68	45	79	...	801
Do. Portable ... ..	78	5	...	3	1	2	...	...	5	...	94
Do. Multi-Stationary ... ..	29	3	...	4	1	8	8	3	5	...	61
Do. Multi-Portable ... ..	15	...	...	...	...	...	3	...	...	...	18
Do. Patent Tubular ... ..	11	...	...	2	...	...	...	...	...	...	13
Loco. Type, Rectangular, Firebox, Stationary	60	8	2	19	15	9	15	9	18	...	155
Do. do. do. Portable	293	16	6	12	7	8	9	8	12	...	371
Do. Circular Firebox, Portable ...	92	1	...	3	...	1	...	...	...	...	97
Locomotive ... ..	58	7	...	7	2	...	3	5	3	...	85
Water Tube ... ..	78	14	2	89	...	3	17	8	1	...	212
Return Multitubular, underfired, Stationary	89	16	2	44	6	9	13	6	11	...	187
Do. do. do. Portable...	5	5	...	3	...	...	...	...	3	...	16
Do. do. internally fired, Stationary	63	4	...	2	...	...	1	...	4	...	74
Do. do. do. Portable	1	...	...	...	...	3	...	...	...	...	4
Egg End and other types not elsewhere specified	16	7	1	5	1	...	2	1	1	24	58
Digesters ... ..	12	...	...	...	...	...	...	...	...	...	12
Totals ... ..	1,368	252	51	502	181	223	242	154	310	24	3,257

*Boilers Locally Constructed.*—It seems regrettable that we are still obliged to record a very small percentage of new locally made boilers, notwithstanding the excellent results given by the work of local manufacturers in previous years. There is no apparent reason why, with a little enterprise, these same shops should not and cannot supply every boiler required in the State. Fourteen (14) boilers have been built in Perth, four (4) in Kalgoorlie, and three (3) in Yarloop, = 21 as against sixteen (16) made during 1906. With one or two exceptions, drawings and specifications have been submitted to this Department for approval before building has been commenced—a proceeding which has proved satisfactory in every instance, to the Department and owner alike.

To the former inasmuch as a reliable record of construction (gained during visits of inspection) can be filed for official information, and for the latter in that he is assured of materials of standard quality being used; of good workmanship; and the provision of requisite mountings and fittings required by the Act.

Boilers imported to the State from abroad have been of good workmanship generally, and, excepting one or two American manufacturers, have been equipped by the makers with all safety devices required by law. I have been in communication with the firms referred to and am hopeful of future importations not requiring to be altered and refitted after landing in the State, thereby obviating disappointments and annoyance to the importers. Generally, I must say,

that manufacturers both at home and abroad have insured the State's laws being fully respected and shown a splendid willingness to co-operate with me in compliance with.

RETURN No. II.—Return showing operations in each of the proclaimed districts (boiler inspections only).

	DISTRICTS.											Total.
	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.	
Total number of boilers	1,368	252	51	502	81	50	223	242	154	310	24	3,253
Inspections for the year:												
Thorough ...	934	146	33	324	46	31	138	184	117	175	...	2,128
Working ...	105	4	...	92	10	11	26	42	26	13	...	318
Boilers condemned:												
Temporarily ...	39	8	...	3	...	...	19	16	9	13	...	98
Permanently ...	5	...	...	1	...	...	...	6	2	4	...	18
Total Number of Notices issued for Repairs	290	42	9	126	21	9	95	95	27	34	...	748
Number of Certificates issued	836	139	33	318	45	30	132	158	108	163	...	1,962
Total amount of fees ...	£ 2,168 7 4 s. d.	£ 311 8 7 s. d.	£ 74 5 0 s. d.	£ 918 7 6 s. d.	£ 116 5 0 s. d.	£ 72 0 0 s. d.	£ 276 17 6 s. d.	£ 382 8 5 s. d.	£ 247 5 0 s. d.	£ 376 12 6 s. d.	£ ... s. d.	£ 4,943 16 10 s. d.
Number of Inspectors ...	5			2			1		1			9

NOTE.—This Return does not include the work done under "The Navigation Act, 1904," or that specially arranged for Fremantle Harbour Trust Commissioners.

Operations in Each District.—Comparing Return No. II. with similar returns for the previous years a slight decrease in the total number of thorough inspections of boilers is noticeable, viz.: 48. This apparent falling off is not, however, due to inspection work not being up to date, but rather to the fact that

a larger number of steam boilers was out of commission during the year than was the case in 1906—they having been replaced by other prime movers, *e.g.*, oil and gas engines, electric motors, etc., which are more particularly referred to in Division II. wherein there has been a more than compensating increase both in registrations and inspections. The return shows clearly the inspections made, certificates granted, boilers condemned, revenue collected, etc., in each of the proclaimed districts, which are the same as previously reported, viz.: 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 are still unproclaimed, and the number of steam plants in these districts is practically unknown.

*Working Inspections.*—313 surprise inspections, or inspections while boilers are under working conditions, were made during the currency of certificates. As these inspections have been made without any warning of the Inspector's visit, they are invaluable

for the purpose of noting whether the certified working pressure given in the certificates is being exceeded; whether safety devices are kept in good working order; and whether any conditions which may have been imposed are being carried out. I am pleased to be able to report that no breaches of the Act have been brought under my notice in this particular direction. Owing to the great expense incurred in travelling, and the inconvenient and slow methods of locomotion, especially in the outlying districts, further work in this direction has not been practicable.

*Thorough Inspections, etc.*—Of the 2,244 thorough inspections made, certificates were immediately granted for 1,962 boilers. In the interests of safety it was considered desirable to refuse certificates for 98 boilers pending the execution of necessary alterations and repairs, whilst 18 were condemned outright as being worn out or dangerous. 73 boilers are still under temporary suspension, being either under repair at the end of the year, or in the same condition as when last inspected. Return III. hereunder sets out in detail the alterations and repairs required.

RETURN No. III.—Return of Boilers for which Certificates were refused pending Completion of Repairs.

No.	Type of Boiler.	Description of Repairs, etc.
1	Semi-Cornish	New flue to be fitted.
1	Cornish	Hole to be drilled where patch is grooved, and tapped and plugged.
1	Do.	Defective portion of plate in second section of flue to be cut out and patch fitted.
1	Do.	Shell where cracked to be patched.
1	Do.	Defective plate at fire line each side of first section of flue to be removed and patches fitted.
1	Do.	Patches to be fitted at flange of front and back plates.
1	Do.	Defective portion of flue to be patched; cracked plate at seam between second and third sections of shell to be cut out and patched; also cracked plate between third and fourth sections cut out and patched.
2	Do.	Defective portion of shell around blow off cock to be cut out and patched. Flue to be patched where defective.
2	Do.	Defective portion of shell to be cut out and patched; also one gusset stay to be renewed.
1	Do.	Defective portion of flue to be cut out and patched; bulges in second and third sections of tube to be set back, and all defective rivets in circumferential seams of shell to be renewed.
1	Do.	Defective portion of tube cut out and three patches fitted.
1	Do.	Defective portions of front and back end plates to be cut out and patched. Three water space stays to be renewed.
1	Do.	Boiler to be removed from brickwork for inspection.
2	Do.	Patch 5ft. by full length of first section of shell to be fitted.
1	Do.	Bulges in shell to be removed and defective rivets in shell and end plates to be removed.
1	Vertical	Corroded portion of shell to be cut out and patched.
5	Do.	New up-take to be fitted.
1	Do.	To be thoroughly cleaned out for internal inspection.
2	Do.	Defective portion of up-take to be cut out and a patch fitted.
1	Do.	Fire-box to be taken out and vertical seams and cross tubes re-riveted.
1	Do.	Clip to be fitted around up-take where corroded through.
1	Do.	Patches to be fitted around fire-hole, and patch on crown of shell.
1	Do.	Patch on crown of shell, new up-take, new bottom in fire-box and shell.
1	Do.	Patch to be fitted on fire-box around fire-hole.
1	Do.	Defective portion of shell cut out and patched, and defective steam pipe renewed.
1	Do.	Patch on shell. Two patches around mud-holes; new tubes.
	Loco. Portable	Patch to be fitted inside front plate, and new fire-box complete.
	Do.	New set of tubes and crown stays.
2	Do.	Boiler damaged by fire and not to be worked until inspected.
1	Do.	Left side of fire-box casing to be patched.
1	Do.	Mud-well cut off and hole patched.
1	Do.	New crown plate in fire-box. Set of crown stays, and set of tubes. Sheathing-plate on top of fire-box tube-plate. (Boiler damaged by fire.)
1	Do.	New set of tubes; 20 new fire-box stays; 3 mud-holes to be enlarged.
1	Do.	Burst tube to be renewed; new plug fitted in wash-out plug-hole; new set of tubes.
1	Do.	New bottom to barrel, and patch on throat-plate.
1	Do.	Two patches fitted to throat-plate; 10 new tubes.
1	Do.	New stays to smoke-box tube-plate.
1	Do.	All tubes to be drawn and boiler thoroughly cleaned for inspection.
1	Do.	Two new mud-wells; 5 new tubes.
1	Do.	New bottom to be fitted to fire-box casing.
1	Do.	Boiler in dirty condition not to be worked until further inspection.

## RETURN No. III.—Return of Boilers for which Certificates were refused, etc.—continued.

No.	Type of Boiler.	Description of Repairs, etc.
1	Locomotive ... ..	New plate on barrel; W.I. seating for feed check valve.
1	Do. ... ..	New smoke-box tube-plate.
1	Do. ... ..	New copper tube-plate.
1	Do. ... ..	Patch on bottom of throat plate; side and crown of fire-box straightened; new set of tubes and new copper tube-plate.
1	Do. ... ..	Boiler to be removed from frame; all tubes drawn; patches to be renewed and extended.
1	Do. ... ..	Boiler to be removed from frame; smoke-box tube-plate cut out to allow inspection of interior
1	Do. ... ..	New smoke-box tube plate; new barrel, and fire-box shell.
1	Do. ... ..	Rivets in seams of crown-plate; tube-plate and back-plate to be taken out and renewed. New set of crown stays, patch fitted on 3rd course of barrel; new set of tubes and ferrules; wash-out and stay holes re-tapped.
2	Do. ... ..	Defective portion of barrel to be cut out and patch fitted.
1	Do. ... ..	Defective portion of plate in barrel to be cut out, patch fitted, and new throat plate fitted.
1	Lancashire ... ..	Patch to be renewed, and boiler thoroughly cleaned for internal inspection.
1	Do. ... ..	1st and 4th sections of each flue to be renewed.
1	Return Multitubular	Circular seams to be caulked and made steam tight.
1	Do. ... ..	New plate in bottom of shell; patch on left side of furnace.
1	Do. ... ..	Patch on back of dome; new smoke-box and chimney.
3	Do. ... ..	Defective portion of shell cut out, and patch fitted.
1	Do. ... ..	Three longitudinal stays removed, and boiler thoroughly cleaned for internal inspection.
1	Do. ... ..	Patch to be removed from shell, and one row of tubes removed to allow of further inspection.
1	Do. ... ..	Defective portion of bridge to be cut out and patch fitted.
1	Do. ... ..	Boiler not to be worked until thoroughly cleaned and inspected.
1	Do. ... ..	Patch to be fitted on 3rd section of drum.

In every instance the owner has been served by the Inspector with a notice clearly specifying the nature of the defect or other requirement, and furnished with particulars of the best methods of effecting the alteration or repair, expeditiously and economically. Much of my own and the Inspector's time is taken up in personally advising owners of the best means of insuring the granting of a certificate for the maximum pressure a given boiler can carry, with the usual margin of safety. It is in this direction I find a difficulty in adequately and clearly recording, for the information of the Hon. the Minister, the extent and nature of an Inspector's daily duties, which have to be carried out in addition to ordinary inspection work. I have, however, brought this and similar matters under notice in other papers which I understand are receiving consideration.

Adverting to Return II. it will be noted that 748 repair notices were issued during the year, including those specified in Return III. Of this total, many repairs were of a minor nature, being neither worthy of a detailed description in this report, nor of sufficient importance to warrant the withholding of certificates. The method adopted in cases of this kind is to issue a notice allowing reasonable time wherein to attend to the requirement, then to grant certificate if instructions have been complied with in a satisfactory manner. Should an Inspector find—during a working or thorough inspection—that a repair notice has not been faithfully carried out, or that workmanship has been bad, or an alteration not correctly attended to, he is vested with sufficient power under the Act to suspend or cancel a certificate that may have been issued conditionally. At the end of the year, however, only 73 notices remained uncomplished with, which speaks well for the way in which owners generally respect the provisions of the Act. On the larger plants both on coast and goldfields where it is practicable to retain a competent staff of engineers, the greatest care and attention are given in most cases to the boilers, and everything possible is done to facili-

tate the work of inspection. The want of knowledge and carelessness displayed by a number of the smaller owners is positively appalling, especially in some cases where there are responsible persons who, from their position and training, might be supposed to know better. Taking into consideration the average nature of the feed water, and the carelessness occasionally noted, one can only imagine the extent of destruction to life and property which would most assuredly occur were the prevention of such not in the hands of the State.

The general condition and maintenance of boilers have been fair to good. The workmanship on the whole has been satisfactory and with one or two exceptions, material of good average quality has been used. There is still noticeable an extraordinary diversity in the details of construction of boilers of the same type, and there appears to be much need for the adoption of greater uniformity in this respect by manufacturers, particularly in regard to designs of vertical fireboxes, staying of flat surfaces, etc. In the riveted seams, especially, numerous instances of improper design have come under my notice, such as important discrepancies between the plate and rivet strength, which should be equal or as near so as is practicable.

*Boilers under Suspension.—Loco. Portable and Locomotive Types.*—26 of these boilers were refused certificates during the year, pending satisfactory repairs being effected. As pointed out in my previous report, this boiler is the type principally used in agricultural districts of the State, where most difficulty is still experienced in inducing the owners to understand the efficacy of frequent cleaning, and that the actual condition of a boiler can only be ascertained by a thorough internal and external examination of all parts. Strenuous opposition to requests for withdrawal of tubes from neglected boilers over 10 years old is occasionally met with—one instance being in connection with a portable boiler which had not been



thoroughly inspected internally, owing to its construction, for 11 years, had been using all kinds of impure feed water, and had been receiving indifferent treatment. The aggrieved owner strongly protested against what he termed the "harsh provisions of the Act," and was not convinced when a subsequent internal inspection disclosed very serious defects caused by general wasting and pitting of shell plates and tubes. The inspection probably saved the owner some hundreds of pounds as the boiler would hardly have run for another year, and was regarded as a distinctly bad case.

*Vertical Types.*—15 of this useful type of small boiler, of which there are 987 registered, were temporarily or permanently condemned during the year. Many others were laid up temporarily for various periods, but the fact that they are generally easily repaired accounts for so small a proportion—equivalent to 1.5 per cent.—being registered as "condemned."

*Cornish-Lancashire Type.*—The principal defects responsible for 20, or 2 per cent., of this class of boiler being laid up for important repairs are—as previously reported—overheating and wasting of furnace flue-tubes, wasting of bottom of shell in the vicinity of blow-off cock, and grooving of end plates near gusset-stay angles, etc. Careful inspection of these parts is essential each time a boiler is opened up, as boiler cleaners have a weakness for neglecting them when chipping, owing to the difficulty in gaining access. Feed water, other than that drawn from Coolgardie Water Supply, in the majority of districts where this type of boiler is chiefly used (Goldfields) is no doubt as bad in quality as can be found anywhere, and makes the cost of the periodical cleaning of boilers (although compensated for in other directions) a very serious item in mining costs.

I am in receipt of data from the Mt. Margaret and Murchison Goldfields showing the cost of cleaning nests of big Lancashire boilers on two mines to be anything from £50 to £80 per cleaning, with an annual average cost of £180 per boiler. The cost of cleaning varies naturally with the size of boiler, quantity of scale to be removed, time allowed, and whether skilled men are available. On the larger mines with Cornish and Lancashire boilers, the average cost by contract is £20. On the other hand, isolated cases have been brought under notice of a cost of £50 being incurred in getting a boiler thoroughly cleaned. The question of the advantage or otherwise of having "Galloway" tubes where bad feed water has to be used has received some attention, in this connection, and the consensus of opinion amongst engineers and others who have gone carefully into the matter is that the cost of cleaning quite outweighs the advantages these tubes undoubtedly confer when better conditions in the matter of feed obtain. So far are managers and engineers impressed in this direction, in which I concur, that new boilers, and new flues to replace old ones, are invariably ordered without "Galloway" tubes.

*Return Multitubular Types.*—The number of this type of boiler marked down as unsafe has shown a considerable increase over that for the previous year, representing 3.55 per cent. of registrations as compared with .71 during 1906. The defects being various.

*Water-tube Type.*—One water-tube boiler only was uncertificated at the end of the year, owing to its being dangerous. In this case a new drum plate was required, the defect being regarded as due to a bad

plate rather than to abnormal deterioration at the particular spot affected.

*Boilers temporarily and permanently condemned.*—There has been a slight increase in the number of boilers temporarily condemned during the year, amounting to 98, or 4.36 per cent., as against 87, or 3.98 per cent. during 1906. Permanent condemnations have been less than last year, and total 18, or .802 of inspections made. For the number of boilers temporarily and permanently condemned, each year, per 100 inspections made since 1899, please see Return No. IV. hereunder:—

## RETURN NO. IV.

Year.	Temporarily condemned.	Permanently condemned.
1899	2.64 per cent.	1.42 per cent.
1900	5.21 "	.498 "
1901	4.35 "	.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 "

All district inspectors report the provisions of the Act relating to boilers to be well observed with the exception of proper preparation for thorough inspection when due, and the display of a little tardiness in giving effect to notices requiring the fitting and renewing of mountings, etc., within a specified time. There is still much to be desired in the direction of care—or want of it—and maintenance of boilers which are only intermittently used. I am satisfied that many persons who are now in charge of steam boilers and engines, used for agricultural purposes, which do not come under the provisions requiring a certificated engine man, do not from sheer ignorance know when a boiler is or is not being ill-used. Two causes of boiler explosions are natural deterioration and maltreatment. They are principally the natural consequences of defects which have not been seen because they have not been suspected.

*Feed Waters.*—The question of effectually dealing with our bad feed water has been more seriously handled during the last year than at any other period. From the old method of precipitating solids in the boiler by the aid of fluids, sandalwood, whitegum, etc., etc., owners are being more inclined to realise the fact that cleaning will cost less and a boiler give better results if water is put into it minus its scale forming, and other injurious properties.

In previous reports I have referred to the great importance of the proper treatment of corrosive, and scale forming feed water, and have also pointed out the detrimental effects of oil in boilers. The question of the better treatment of bad feed water with a view to the prevention of all its attendant evils, is one of peculiar interest to steam users in this State, and I trust that the following remarks will prove of interest to steam users affected.

Before referring to any of the different methods of treatment, it may be advisable to briefly review some of the effects produced when boiler plates become coated with scale or oil. In dealing with this part of the subject it is interesting to note that the common objection to scale forming water, viz., the reduction in heat efficiency, is, though often serious enough, not nearly the most serious consideration.

If plates are kept clean, the heat from the furnace is transmitted direct to the water, and the tempera-

ture of the plates is but very slightly higher than that of the water, consequently the variation in temperature of the furnace plates, due to the opening and shutting of furnace doors, is small—probably not more than 20deg. F. If, however, the plates be coated with scale even 1/8in. thick, there is at once a marked rise in the temperature of the plate as compared with that of the water, *e.g.*, the difference may amount to 300 deg. F. and consequently whenever the furnace door is opened it is possible for the plate temperature to suddenly drop about this amount.

It can easily be seen what fearful strains must be set up in plates subject to such tremendous variation in temperature *dozens of times per day*. All kinds of visible defects such as fracture, grooving, and distortion occur under such conditions, and in addition there are the subtle unseen defects due to "fatigue" producing crystallization, etc.

Under quite ordinary conditions it has been proved by direct experiment that scale or oil coated plates can rise to such temperatures (*e.g.*, 700deg. to 800deg. F.) as to seriously affect their strength. According to one authority, at a temperature of 750deg. F. the tensile strength would be reduced about 25 per cent. and by the time 930deg. is reached the reduction in strength becomes 62 per cent. Further comment on this aspect of the case appears unnecessary.

The various risks and losses due to impure water may be summed up as follows:—

(a.) Loss of efficiency in heat;

- (b.) Loss of heat and water wasted in the necessary frequent blowing off of the boiler.  
 (c.) Loss of money expended in removing scale from the plates.  
 (d.) Loss of time in removing scale (a very serious loss where there is no spare boiler).  
 (e.) Risk of distortion and collapse due to overheating.  
 (f.) Greatly increased wear and tear owing to undue expansion and contraction, and weakening of the plates by corrosion.

Neglecting (a.) and (b.) the losses referred to in (c.) and (d.) have to my knowledge amounted to a very large sum. Cases have occurred during the past year where it has taken many weeks at a cost of from £20 to £100 to clean *one* boiler *once*. With regard to (e.) and (f.) when it is considered that given the proper conditions (and they are unfortunately common enough) the furnace may be working on the verge of collapse all the time, and that such strains are constantly at work as must reduce the life of the boiler enormously, it appears unnecessary to urge on steam users the necessity of installing some system of water treatment, which will very largely do away with all these evils.

The following analyses, made by the Government Analyst, Mr. Mann, of seven samples of feed water, actually used in different parts of Western Australia, will show the class of water that boiler owners in this State have to contend with:—

"Figures represent grains per gallon."

	1.	2.	3.	4.	5.	6.	7.
Silica ... ..	1.4	...	2.10	trace	2.31	1.54	4.34
Iron and Alumina ... ..	1.4	...	1.54	.70	.21	.28	trace
Calcium Carbonate ... ..	12.46	39.90	10.62	120.74	12.50	12.13	17.62
Magnesium Carbonate ... ..	281.82	14.70	31.27	163.26	10.26	4.17	5.62
Calcium Sulphate ... ..	480.90	50.96	116.10	95.54	35.01	23.11	18.20
Magnesium Sulphate ... ..	407.40	228.90	173.25	222.81	34.20	27.98	45.05
Magnesium Chloride ... ..	916.02	...	613.13	...	21.28	...	10.78
Sodium Sulphate ... ..	...	...	...	22.86	...	6.21	...
Sodium Chloride ... ..	8,133.51	614.46	2,694.84	1,416.03	...	272.08	158.81
Potassium Chloride ... ..	...	...	17.94	...	...	...	...
Total solids ... ..	10,234.91	948.92	3,660.79	2,041.94	429.70	347.5	260.41
Hardness (degrees), estimated by Soap method ... ..	...	...	...	...	112.0	65.0	91.0

With such water as sample (1) which is undeniably a very bad one, containing 10,234.91 grains of solids per gallon, a boiler evaporating say 25 cubic feet of water per hour, would, if blow-off-cock were kept closed, retain 227lbs. of solids at the end of one hour, and in a week of 48 hours would, under the same conditions, accumulate 4.8 tons of solid matter. When such a case as this is possible, it can easily be seen what an enormous tax on the resources of a company the item "boiler cleaning" may become.

In this report I do not intend to touch on the question of "boiler fluids," "compositions," "disincrustants," etc., as the very best these can do is to more or less insufficiently deal with the water or scale in the boiler, whilst I contend that the only place to treat feed water effectively is before it gets into the boiler. Once inside the most that can be done by any boiler fluid is to precipitate the solids in such a way that they can be easily removed by the blow-off cock. A method necessitating much loss of water and heat.

As to the best means of treating any particular feed water, this must always depend on the analyses of the water in question. There are numerous "water soft-

teners" on the market, which all deal with the water *before it enters the boiler*. It would be invidious to recommend any particular method, especially as there are so few installations in this State that sufficient local data is not available to enable me to discriminate between the various methods. However, with a view of showing what is being done, one mine manager writes me—"We have had this 'softener' in constant use for the past nine months, making a tremendous saving in boiler repairs as compared with previous months, and also a saving of at least 25 per cent. in our fuel consumption." He adds, "the cost of running the 'softener' is very small as no extra labour is required—the fireman attending the boiler looking after the 'softener' as well—the only amount directly chargeable is the

18lbs. soda ash per day at 1d. lb. equal 1s. 6d.  
 15lbs. caustic soda per day at 2d. lb. equal 2s. 6d.

Total per day of 24 hours (Fremantle price) 4s. 0d."

This charge was for softening 10,000 gallons of water, the average degree of hardness before treat-

ment being 42, and after 4 degrees. In a second case the manager reports—"The actual saving in the cost of cleaning the seven boilers which are constantly under steam, after due allowance for chemicals, is £70 per month. The maximum time that a boiler was allowed to run without stopping to clean and scale previous to the erection of the water softener, was for five weeks, and the time taken to remove the scale was not less than five days. The last boiler was cleaned after a continuous run of 14 weeks (nearly three times that previously allowed) and took only 12 hours to clean, the plates being found in excellent condition, having suffered in no way from pitting or grooving."

In addition to the above, a plant erected by the Railway Department at Laverton for the supply of water for locomotives is said to be giving excellent results.

Steam users who wish to go into this matter more fully will find an interesting description of many of the best known softeners in the report of "An inquiry into the working of various water softeners" by Mr. C. E. Stromeier, M. Inst. C.E., M. Inst. M.E., Chief Engineer of the Manchester Steam Users' Association; and Mr. W. B. Baron of Manchester, read before the Institution of Mechanical Engineers, and published in the Minutes of the Institution's proceedings. As far as I have been able to ascertain the above report embodies the only collective and reliable information on this subject, yet published. The following list gives the names of some of the best known softeners:—

Archbutt Deeley.  
Atkins Company.  
Babcock & Wilcox (Guttman).  
Bele Bros.  
Boby (Chevalet).  
Carrod.  
Desrumaux.  
Doulton.  
Harris-Anderson.  
Kennicot.  
Lassen & Hjort (Brum-Lowener).  
Maltras & Platt.  
Maxim (Warwick).  
Porter Clark.  
Pulsometer.  
Reisert.  
Isaac Storey & Sons Ltd.  
Tyacks.  
Wollaston.  
Wright.

The main features of all the processes consist in chemical reaction, settling, and filtration. The chemicals used in almost all cases are soda and lime in some form. Most of this will deal with a certain amount of oil (the condensed water containing oil being added to the impure water to be treated).

Some of the methods are continuous and some intermittent. In the former the addition of the chemicals is continuous, and the necessary plant is not large. In the latter the water is treated in large known quantities, definite quantities of chemicals being added, and after settling and filtration the purified water is drawn off and another batch treated. Of course with the intermittent treatment large tanks are necessary. When the quality of the feed water is fairly consistent the continuous treatment is the cheaper, but if its character is continually altering as is the case with some waters, the intermittent treatment may prove the best, as by this method the exact quantity of chemicals

to be added to deal with a certain quantity of water, can be determined with greater accuracy.

It need scarcely be stated that to run any system of water softening successfully, needs a certain amount of skilled attention—frequent analyses of the water should be made, with a view of determining the proper quantities of chemicals required. The neglect of this precaution will mean either imperfect results or, if too much chemicals are used, unnecessary expense. Most mining assayers are, however, possessed of sufficient chemical knowledge to enable them to supply the necessary skilled attention, so that the installation of a "softener" need not entail the employment of a specialist.

Before leaving this water question, I should like to call pointed attention to the deleterious effects of oil in steam boilers. Wherever condensing engines are used, oil, to some small extent at least, is always present in the boilers. No filter or separator will entirely extract it, though a really good separator fixed in the proper place, *i.e.*, on exhaust pipe close to the engine, does excellent work. But however good the separator it will probably always remain for the "water softener" to remove the last of the oil.

In the interesting paper on softeners already quoted, the authors in referring to the action of oil in boilers, make the following statement:—

"The peculiarity of grease deposits in boilers is that their effect is out of all proportion to their thicknesses. It has been seen that scale of  $\frac{1}{8}$ in. thickness will raise the temperature of furnace plate about 300deg. F. As grease offers ten times more resistance to heat, one would expect that  $\frac{1}{80}$ in. (of oil) would have the same effect as this thickness of scale, but experience shows that the merest trace of grease, certainly less than one thousandth of an inch can cause far more serious injury than scale."

In conclusion, oil of any kind inside a boiler is objectionable, as it is almost sure to lead to a certain amount of overheating sooner or later. Animal or vegetable oils should never be used for cylinder lubrication, as when they arrive in the boiler fatty acids are formed and corrosion ensues in addition, and overheating. The objection to the admission of oil of any kind is intensified where the deposit from the water is carbonate of lime or other light powdering matter. The oil and lime combine, and then sinking on to the furnace plates in a sticky pasty condition, cause rapid and dangerous overheating.

It is stated by a well known authority on marine boilers that during an 18 years' experience "80 per cent. of furnace accidents in marine boilers were directly attributable to oil." Most mining engineers on our Goldfields know to their cost the disastrous effects of oil in the tubes of the various types of water tube boilers.

Considering all the evidence available on the subject it is a matter of considerable surprise to find so few efficient oil separators in use. There are a few doing good work, but generally some form of filtration or skimming is relied on, and this method is next to useless as emulsified oil cannot be extracted satisfactorily by any known form of filter.

*Mishaps and Explosions.*—I have again to present a clean sheet under this heading, there being no record of explosions or mishaps due to defects having occurred during the year to cause injury to any person, or damage to property. A case of serious scalding of a cleaner whilst in one of a range of coupled boilers occurred, but this was due to the thoughtlessness of a fellow-workman who happened to open the feed-valve.

## DIVISION II.—INSPECTION OF MACHINERY.

## RETURN No. V.

Return showing classification of Machinery and operations during the year ending 31st December, 1907.

	South-Western.	Coolgardie and Yilgarn.	Dundas.	East Coolgardie.	North-East Coolgardie.	Broad Arrow.	North Coolgardie.	Mount Margaret.	East Murchison.	Murchison, Peak Hill, and Yalgoo.	Total, all districts.
Total number of registrations ... ..	1,121	156	29	388	25	17	157	190	116	243	2,442
Total number of inspections made ... ..	997	108	21	392	19	17	59	110	77	121	1,921
Certificates issued bearing fees ... ..	502	20	...	286	3	...	13	38	13	27	902
Certificates issued (steam) without fees	435	87	21	104	16	15	46	72	64	94	954
Repair notices issued ... ..	60	1	...	49	...	5	...	...	5	7	127
Electric Winding engines ... ..	13	1	...	2	...	...	...	...	...	...	16
Electric Lighting and Power Plants ... ..	17	2	...	3	1	...	1	6	6	5	41
Electric Motors for all purposes ... ..	252	19	...	229	...	...	8	39	4	18	569
Electric Lifts for passengers ... ..	29	...	...	...	...	...	...	...	...	...	29
Electric Lifts for goods ... ..	51	...	...	9	...	...	...	...	...	...	60
Refrigerating Plants ... ..	14	...	...	5	...	...	...	...	...	...	19
Oil Engines ... ..	202	8	...	2	2	...	10	6	13	21	264
Horse power of Oil Engines ... ..	1,447.4	96.75	...	33	45	...	140	47	54	170	2,033.15
Gas Engines ... ..	39	...	...	...	...	...	...	...	...	...	39
Horse power of Gas Engines ... ..	298.73	...	...	...	...	...	...	...	...	...	298.73
Air Winches ... ..	1	3	...	16	2	...	...	...	...	...	22
Gas Producer Plants ... ..	...	...	...	...	...	...	...	...	...	1	1

NOTE.—This return does not include the work done under "The Navigation Act, 1904," or that specially arranged for with Fremantle Harbour Trust Commissioners.

*Registration and Inspection.*—There have been 378 new machinery registrations during the year, the total on registers now being 2,442 as compared with 2,064 at the end of 1906. 1,921 inspections have been carried out and 1,856 clear certificates granted as against 1,625 inspections and 1,551 certificates for the preceding 12 months. In Return No. V. is conveniently summarised the work of registration and inspection, carried out in each of the districts proclaimed under the Act. The first striking feature in this Return is the diminution in the number of fencing, guarding, and repair notices which have been issued, when compared with the result shown in the last two years' tables, viz.: 409 for 1905; 231 for 1906; and 127 for 1907. Upon looking into this I find that of the 378 new registrations no fewer than 240 are oil and gas engines, and electric motors. In view of the fact that the Act's requirements are now fairly well known, I have instructed inspectors to the effect that a certificate is to be formally refused until necessary guarding has been provided, without going through the routine of serving written notices. This method has a twofold advantage inasmuch as on the one hand it prompts owners to conform to the Act promptly, whilst on the other it saves an inspector's time and simplifies recording. This then accounts in a great measure for the fewer notices, notwithstanding the large number of registrations which have been necessary.

*Dangerous Machinery.*—Under the Act the provisions respecting the fencing and guarding of machinery are explicit, and an Inspector's powers ample; yet at the same time the little assistance given by some owners is discouraging enough to Inspectors who are not generally disposed to recommend the adoption of stringent measures owing to the general belief that it is not so much callousness on the part of an owner, as it is an idea that fencing savours of faddishness, especially if he uses or has used the machine himself. Unfortunately, also, the machinist generally has an objection to guards (which is freely expressed) as though their adoption reflected upon his ability to take care of himself. Inspectors have a very difficult task to face in an endeavour to secure

a fair degree of safety for factory and mine workers, when one considers how simply accidents occur, how largely mechanical appliances are being used, how imperfect many of the local machines are, how work is rushed through in busy seasons, how careless employees are, and how difficult it is to get employees and workers to see the seriousness of these conditions. Speaking in general terms, I should say that the Act has been amply justified and that the good work done in reducing causes and removing sources of accident compare very favourably with that done under similar legislation in other parts of the world, with perhaps the exception of Great Britain, where factory machinery inspection is most rigid and searching. The ignorance and apathy of factory employees concerning the requirements of the Act, are simply astonishing. And the amount of educational work an Inspector has to do is incredible. The admissions made by some when found committing breaches of the Act are almost amusing when not annoying. Forgetfulness is a common failing, so with ignorance and forgetfulness combined with carelessness, an Inspector has much to do to keep owners up to the mark. It is part of an Inspector's duty to make the Act plain to every owner or his representative; but to have to go into details on the same question every visit is to exact too much. There is much to be said for a considerate administration of the Act, but human nature is too prone to impose upon forbearance; and I am of opinion that much laxity on the part of owners is probably due to the fact that the Department has possibly erred on the side of indulgence. Although an owner of machinery subject to the Act is obliged (under a penalty for neglect) to advise an Inspector of such ownership within three (3) months of becoming an owner, experience has shown that the Inspector has in most instances to take the initiative and assist in registration.

*Lifts.*—Although a fruitful source of accidents, I am pleased to report that there has not been any accident caused by lifts resulting in injury to persons during the year. A few minor accidents have occurred, such as:—seizing of a bearing; serious cut-

ting of worm gear; hanging up of a goods lift cage by the safety grips through uneven loading; the blowing out of a few fuses, etc. All of these were avoidable by a little attention to lubrication and the exercise of a little care. In one case a cage got "stuck" up in a shaft and nearly a whole day was wasted in trying to free it. At last it occurred to someone to prospect into the roof and see if the motor, etc., was right. It was then discovered that the speed governor (which had been insecurely fixed) had been displaced and was the whole cause of the trouble. It is a golden rule where an accident has occurred, to overhaul the whole of the machinery and not only the part obviously affected or broken. Seventy-five certificates were granted for various types of lifts and hoists. These represent:—

	Electric.	Hydraulic.	Belt driven.	Total.
Passenger lifts ...	28	1	...	29
Goods " ...	32	10	4	46
	60	11	4	75

Of the above, one passenger lift (electric) and one goods lift (electric) were destroyed by fire early in the year, and two (2) goods lifts were put out of commission. Of the latter, one was dismantled owing to alterations to building, and the other was condemned as being unfit for further use. Several ropes which had been under close observation were replaced by new ones. Nine (9) new lifts were erected and registered in the course of the year—4 passenger and 5 goods lifts—all electrically driven. At the end of the year five (5) additional lifts were in course of erection. It is gratifying to note that the most recent installations show a marked improvement on most of the other lifts, much more attention having been given to safety devices of all kinds than has been the case formerly. In one of the lifts under construction, the automatic control system has been adopted, and I hope the example set will be followed by all persons who intend erecting up-to-date and thoroughly safe lifts. Several instances of careless workmanship were discovered pointing to the idea that "Good enough" is the working motto of some lift repairers, *e.g.*, in one case new ropes had been ordered, and when an Inspector visited to inspect, it was found that the ends of the new ropes had been merely passed through the holes in the drum, and were not secured in any way whatever. Door catches and runners continue to give trouble, attributable to two causes: 1st, flimsy catches and runners; 2nd, shrinkage and swelling of woodwork. I find difficulty in impressing upon owners the absolute necessity of keeping doors and catches in such condition as to render it an impossibility to open them easily from the outside. It is only when a nasty accident occurs, such as happened in Adelaide recently when a wrong door was opened by a passenger who was killed, that some interest in this direction is evinced. During the year the following list of "useful suggestions to owners of lifts" has been issued to them for their information and guidance:—

1. "Every lift should be in charge of a competent person of not less than 18 years of age and with not less than one month's experience under the instruction of a competent operator.

2. "The operator should not absent himself from the lift during the time he is in charge, unless he be replaced by another operator, or unless he securely fastens all doors to lift shaft before leaving same.
3. "All doors should be kept locked except *when in actual use*. The fastenings should, except in the case of an automatic lift, be so arranged that to open the same from *outside* the operator's key is necessary. These fastenings should be tested *daily*.
4. "The operator should see to the proper oiling of the motor and attached machinery *daily*. He should examine, and oil if necessary, the safety appliances under the cage bottom *weekly* and see that the guides and sheaves are properly lubricated, and that the ropes are well oiled. In case the ropes get dry, a good 'Rope Oil' should be used, as it is essential that the lubricant penetrates the whole rope. Grease is not so efficient as a good 'Rope Oil.'
5. "The operator should see that the Automatic Stops are in good working order, and should test these frequently.
6. "The operator should *at once cease* to work the lift should he notice or suspect any defect likely to endanger life or limb. He should then report his action to the owner or to his representative immediately.
7. "The electrical portions of the machinery should be placed under the care of some qualified person or firm accustomed to this class of work, and should be overhauled thoroughly at least every three months.
8. "Whether personal injury is incurred or not, particulars of any accident, or failure of any part of a lift, should be immediately reported, in writing, to the Chief Inspector of Machinery, 605 Wellington Street, or to any Inspector of Machinery in the District.
9. "The owner should obtain and keep a record of ropes used, entering up the date when put into use, the maker's name, the number of strands, number of wires in each strand, diameter of wires (B.W.G. or decimals of inch), nature of core, breaking load of rope, and kind of steel used in its construction.
10. "The Inspector of Machinery should be advised when it is intended to renew any rope, and, if possible, a sample of the old rope taken from the worst worn part should be kept for his inspection. It would also be well to keep a short sample, say 1 foot of each new rope as it is put into use, for the sake of comparison as wear goes on.

"By following the above suggestions it is hoped that while securing additional safety, economy will be realised by owners, inasmuch as the lives of ropes and appliances generally should be greatly prolonged."

A shocking example of bad balancing of a lift was detected during the year. The installation was an old one and had given much trouble until it was discovered that the balance weights were much too heavy. This lift, when empty, took 2.36 amps. to run it up, and 7.67 amps. to run it down. On further experimenting it was found that it took 1.18 amps. *more* to *lower* the cage with 5 persons in it than to send it up empty.

DIVISION III.—SURVEY OF HARBOUR AND RIVER VESSELS' MACHINERY.

*Harbour and River Steamers.*—The machinery and boilers of all steam craft, and the machinery of oil launches, plying for hire in the harbours and rivers during the year, have been thoroughly surveyed. Thirty-six vessels have been surveyed as against 31 during 1906. Under "The Boat Licensing Act, 1878" (which is administered by the Fremantle Harbour Trust Commissioners) the hulls of these boats must be periodically examined, and licensed for sea-worthiness. In this connection a most satisfactory and economical arrangement was entered into with the Trust whereby the hull surveys are now being carried out simultaneously with the engineering surveys, by an officer attached to this Department. The arrangement has worked well and given satisfaction to both Departments. Owing to inaccessibility to satisfactorily survey some boilers whilst in the vessel, it has been found necessary to remove them for that purpose, and ship-

ping owners as a rule have been quite prepared to assist the surveyor in every way possible. Every consideration has been given by the Department so as not to interfere unnecessarily with existing contracts, and, where circumstances would admit it, a short extension of time in a few cases has been allowed in which to complete repairs. On the whole the condition of these vessels is very good—a notable feature being at present the almost total absence of grease from the boilers. In a number of cases, acting on Departmental advice, owners recognise the advantages to be gained in cleaning boilers quarterly, where formerly vessels were only laid off for this purpose when the annual survey fell due; consequently they are now better cared for, are cleaner, and kept in a higher state of efficiency than heretofore.

Return No. VI. hereunder furnishes a description of the machinery surveyed, nature of alterations, repairs, etc.

RETURN VI.—Return of Surveys of Boilers and Machinery on Steamers, etc.

Name of Vessel.	Description of Machinery.	Means of Propulsion.	Motive Power.	Date of Last Survey.	Nature of Defects, Instructions, and Repairs Effected, etc.
"Florrie" ...	Single Cylinder Condensing, High Pressure	Screw	Steam	14-3-07	
"Nirimba" ...	Compound Surface Condensing	Paddle	do.	19-7-07	Fusible plug to be fitted.
"Helena" ...	Compound Condensing Engine	do.	do.	10-4-07	New steam pressure gauge.
"Kepler" ...	Double Cylinder non-Condensing Engine	Screw	do.	6-2-07	
"Duchess" ...	Compound Surface Condensing Diagonal Engine	Paddle	do.	7-3-07	Crown of furnace to be chipped and tubes to be removed.
"Torrens" ...	Compound Surface Condensing Engines	Screw	do.	14-11-07	
"Countess" ...	Compound Surface Condensing Diagonal Engines	Paddle	do.	28-2-07	
"Susan" ...	Vertical Compound Condensing Engine	Screw	do.	18-4-07	Additional set of water gauges and protectors.
"Lady Forrest"	Triple Expansion Surface Condensing Engine	do.	do.	1-6-07	
"Brownie" ...	Tandem Quadruple Condensing Engines	do.	do.	1-3-07	
"Harley" ...	Compound Condensing Engine	Paddle	do.	8-2-07	
"Taniwha" ...	Single Cylinder non-Condensing Engine	Screw	do.	28-6-07	
"Kentish Lass"	Double Cylinder non-Condensing Engine	Stern Wheel	do.	14-6-07	
"Eagle" ...	Compound Surface Condensing	Screw	do.	2-3-07	
"Decoy" ...	Direct Acting Paddle Engines, non-Condensing	Paddle	do.	22-8-07	
"Loch Lomond"	Double High Pressure non-Condensing	Screw	do.	10-1-07	
"Zephyr" ...	Two Triple Expansion Surface Condensing Engines	Twin Screw	do.	6-11-07	
"Silver Star" ...	Triple Expansion Surface Condensing Engine	Screw	do.	26-4-07	New stern and rudder fitted.
"Reliance" ...	Compound Surface Condensing	do.	do.	26-4-07	
"Westralian" ...	Two Compound Surface Condensing Engines	Twin Screw	do.	24-10-07	Approved protectors and suction pipe fitted to bilge injection.
"Waratah" ...	Compound Surface Condensing	Screw	do.	5-7-07	Additional set of water gauges and protectors.
"Fremantle" ...	Triple Surface Condensing	do.	do.	15-7-07	Additional water gauges and protectors.
"Eclipse" ...	Vertical Compound Surface Condensing	do.	do.	4-6-07	
"Valkyrie" ...	Internal Combustion Engine	do.	Oil	28-2-07	
"Olga" ...	Do. do. do.	do.	do.	13-3-07	
"Swan" ...	Do. do. do.	do.	do.	19-2-07	
"Ophir I." ...	Do. do. do.	do.	do.	25-4-07	
"Valhalla" ...	Do. do. do.	do.	do.	22-3-07	
"Spray" ...	Do. do. do.	do.	do.	5-11-07	
"Ophir II." ...	Do. do. do.	do.	do.	31-1-07	
"Auguste" ...	Do. do. do.	do.	do.	5-12-07	
"Linnet" ...	Double Cylinder Internal Combustion Engine	do.	do.	12-3-07	
"Valdemar" ...	Double Cylinder Internal Combustion Engine	do.	do.	24-10-07	
"May" ...	Internal Combustion Engine	do.	do.	1-2-07	
"Brooke I." ...	Do. do. do.	do.	do.	5-2-07	
"Etta" ...	Do. do. do.	do.	do.	5-2-07	

DIVISION IV.—ENGINEERING SURVEYS  
UNDER "NAVIGATION ACT, 1904."

The following 26 deep-sea vessels were surveyed and certificated during the year, as against 14 for 1906:—"Leeuwin," "Glenlee," "Dunskey," "Petrel," "Tareoola," "The Bruce," "Maitland," "Venus," "Bia," "Meeinderry," "Gannett," "Scharnhorst," "Penguin," "Awhina," "Bullara," "Uraidla," "Kalomo," "Pilbarra," "Cape Corso," "Colonial," "Indramayo," "Una," "Kolya," "Junea," "Ferret," "Governor."

In some cases extensive repairs to hulls, boilers, etc., and machinery were proved to be necessary. To several vessels temporary repairs were permitted to enable them to proceed to the Eastern States for docking and permanent repairs; the State thereby losing thousands of pounds which would have been spent here had a graving dock been available. Under this Act boilers and machinery are surveyed at least half-yearly and hulls annually. Each survey occupies the Inspector at least the greater part of two days, and if repairs are being effected, further visits are necessary, according to the extent and importance of such, during the progress of the work. Lighthouses have been inspected, and adjustments and repairs made where necessary. All iron and steel coal hulks in commission have received careful attention, as it is realised that the foundering of any one of these in Port through leakage, or overloading, would be decidedly inconvenient to shipping. In reference to the inter-Departmental arrangement for carrying out engineering surveys for the "Navigation Department" I desire to direct your attention to the fact that this Department still provides for the whole of the Surveyor's salary. It is my intention to move, during the current year, in the direction of having this matter adjusted, viz., by the payment of a fair proportion of the officer's salary and allowances by the Harbour and Light Department.

DIVISION V.—ENGINE-DRIVERS' EXAMINATIONS, ETC.

The Constitution of the Board of Examiners is the same as last reported, but there has been a change in the personnel. Mr. J. T. Arrow of the Mines Water Supply Branch retired in May, 1907, owing to other duties rendering it inconvenient for him to attend to Board matters regularly. Inspector Gill of this Department was appointed in his stead.

Examinations for Certificates of Competency have been held in the following places:—Perth (4), Bunbury (2), Kalgoorlie (2), Menzies (2), Malcolm (2), Cue (2), Albany (1), Northam (1), Lawlers (1), Ravensthorpe (1): Total (18).

Seventy-five meetings of the Board have been held, and 398 applications were considered and dealt with, and 211 certificates of various grades were issued, as shown in Return No. VII. following:—

RETURN No. VII.—Return showing Total Number of Certificates (all Classes) granted during 1907.

Class of Certificate.	Number granted.
First Competency ... ..	15
Second Competency ... ..	26
Third Competency ... ..	67
First Service ... ..	...
Second Service ... ..	3
Third Service ... ..	19
Locomotive and Traction Competency ... ..	21
Locomotive and Traction Service ... ..	11
Traction Competency ... ..	2
Traction Service ... ..	1
Marine Competency ... ..	5
Marine without Examination ... ..	8
Interim ... ..	15
Copies of Certificates and Boat Licenses ... ..	18
Total ... ..	211

Since the 28th February, 1907, the limit fixed for the expiration of the privilege of granting Certificates of Service to Engine-drivers who could at least prove 12 months experience as driver-in-charge, the Board of Examiners has not received any application for Service Certificates, which fact accounts for the number of candidates registered being fewer than in 1906. A few Service Certificates were granted since the date mentioned, on applications which had been lodged prior thereto, and which had been deferred pending the production of satisfactory proof of practical experience. During the year it was found desirable and expedient to make several amendments and additions to the Regulations relating to the conduct of examinations, qualifications of the applicants, etc., with a view of—

- (a) Giving the Board greater power when dealing with applicants whose experience had been confined to one particular class of engine, and who had no desire to take charge of any other.
- (b) Obviating expense of obtaining Medical Certificates prior to a candidate passing his examination
- (c) Simplifying conditions under which an applicant may in certain cases apply for 2nd Class examination.
- (d) Correcting several obvious errors.

Particulars of the amendments and alterations, which were gazetted on the 14th February, 1907, are as follows:—

Regulation 6.—(1) Amended by adding after word "Revenue," last line:

"Or if a Candidate absents himself from an examination without sufficient reasonable excuse, his application fee may be forfeited."

- (2.) (c) Amended by adding after the word "duties," last line:

"Provided that in certain cases applications for Engine-drivers' certificates may be received without a Medical Certificate, but a Certificate shall not be issued under the Act until after the production of a satisfactory Medical Certificate as provided by the Act."

**Regulation 15.—New Clause (f) :**

“Provided that where an applicant has had experience on only one engine or class of engine the Board may restrict the privileges conferred by any of the Certificates mentioned in Clauses (a), (b), (c), (d), and (e).”

**Regulation 17.—Clause (c) amended by adding after the word “diameter,” last line:**

“This Clause shall not apply to an applicant who has served an apprenticeship of at least four years as an engineer, and has been employed on the making or repairing of steam engines, boilers, etc., for at least three years, or if he has not served an apprenticeship he must prove that for not less than three years he has been employed as a journeyman mechanic in a factory or workshop in the making or repairing of engines.”

**Regulation 19.—Clause (c) amended by striking out the words “commencement of this Act” in sixth line, and inserting “date of examination” in lieu thereof; and**

By striking out the words “Six (6) months prior to the commencement of the Act,” and inserting “twelve (12) months prior to the date of examination” in lieu thereof.

**Regulation 38.—Amended by striking out the words “or either of them” in line five.**

**Regulation 40.—Clause (a) amended by inserting after the word “Certificate,” second line, “of similar grade.”**

**First Schedule.—Amended by striking out the words “Outside the State” after the word “authority.”**

*Complaints.*—Many complaints relating to the employment of uncertificated persons were received and inquired into during the year, but, with the exception of several cases which are referred to under “Prosecutions” it was found that the facts and circumstances did not warrant the taking of extreme action. There are, I believe, occasions in remote places where uncertificated drivers are temporarily employed in emergencies, and although a contravention of the Act, it would be most unreasonable to undertake prosecution, which would merely have the ultimate effect of closing down a plant and loss of time and money alike to employer and employed, on every occasion a certificated engine-driver did not happen to be at hand when he was required. I have also received a number of complaints regarding the conduct of certificated drivers in some of the outlying districts, one of which, culled from the report of the Inspector in charge of the Murchison, Peak Hill, Yalgoo, and East Murchison Districts, is quoted for general information:—

“*Engine-drivers.*—Various reasons are given for the strong feeling against them, but the chief one appears to be that, unlike all other classes of labour, drivers have not to rely on good work alone for employment, but have the law assisting them to coerce employers to accept a very poor return of service for a high wage, especially in out-back places where men are scarce. In a large engine-room where an engine-driver has nothing to do but to attend to bearings, etc., everything goes smoothly, but when, as in so many places, the engine-driver is called upon to do his own firing or attend to other things such as battery plates and pumps in his spare time, there is constant friction. The man feels he is doing work

beneath his dignity, and the owner considers it unreasonable that he should be compelled to employ a certificated man to look after an engine that practically needs no watching. Drunkenness is frequently complained of, but I cannot get anyone to come forward and substantiate general charges with a specific case, although I have tried repeatedly. I know scores of very worthy drivers but many more who without certificates could not earn a living.”

In view of the above and other complaints I have issued a circular letter to Inspectors, the Chamber of Mines, and the Amalgamated Certificated Engine-drivers’ Association, requesting all cases of carelessness, incompetence, drunkenness, and improper conduct on the part of drivers be promptly brought under the notice of the Board of Examiners in order that offenders can be punished. This phase of the system of certificating engine-drivers is, I regret to say, almost entirely neglected. If a certificated driver has been guilty of some improper act, or is considered to be incompetent, it is the business and duty of an employer to draw attention to it, and for the Board to inflict the amount of punishment earned; whereas if the same person were not certificated or licensed, an employer would have no alternative but to dismiss and set him at liberty to go and offend elsewhere.

*Inquiries.*—Preliminary inquiries have been held by the Board into the following six complaints against certificated drivers:—

- (1) Overwinding at the Ivanhoe Gold Mine.
- (2) Damage to property, Great Boulder G.M.
- (3) Overwinding at Brown Hill Extended G.M.
- (4) Increasing pressure in boiler over that authorised by Certificate.
- (5) Overwinding at Great Boulder Perseverance G.M.
- (6) Overwinding at South Kalgurli G.M.

In each case the Board considered the appointment of a special Board of Inquiry unwarranted, and the administering and recording of a caution as sufficient.

The drivers concerned were notified accordingly, and warned that a second complaint of a similar character would be dealt with more strongly.

*Prosecutions.*—For being in charge of an engine at the “Paddington Consols” G.M. without holding the requisite certificate, A. C. Nelson was convicted and fined £2 with 15s. 4d. costs. After having been previously warned, the manager of “Star of Fremantle” G.M., Kumanalling, was prosecuted for employing an uncertificated driver, and fined £2 7s. including £1 7s. costs, whilst the driver, a son of the manager, was fined 10s.

Messrs. Millar’s Karri and Jarrah Co. and an employee were summoned to answer charges of employing, and being employed, as driving without a certificate, respectively. Owing to the information in the former case being improperly laid, the case was dismissed; but in the case against the uncertificated engine-driver a conviction was obtained and a fine of £2 and costs imposed.

*Interchange of Certificates.*—The proposals of the Conference between representatives of Tasmania, Victoria, New South Wales, South Australia, and Queensland, which was held in Melbourne in 1906 to propound a scheme whereby an engine-driver’s certificate in any one of the States would carry the same privileges throughout the Commonwealth, have



been adopted in this State, in so far as they affect first and second classes of Certificates of Competency for Mines Engine-drivers, and the following new Regulation by direction was framed and gazetted on 13th September, 1907, as a consequence:—

Regulation 9 (a).—“Upon production of a satisfactory Medical Certificate and payment of Registration fee of £1 the Board may grant to any person of good repute and who, being the holder of a First or Second Class Mining Engine-driver's Certificate issued in any other State of the Commonwealth, takes up his residence in Western Australia, a Certificate of equal grade without examination, and such Certificate shall entitle the holder to the same privileges that he was entitled to under his Certificate in the State wherein it was issued.

Provided always that the applicant has not been previously granted a Certificate by a Board of Examiners under ‘The Inspection of Machinery Act, 1904,’ or ‘Coal Mines Regulation Act, 1902,’ or ‘Mines Regulation Act, 1895,’ and amendments.”

Certificates under this Regulation are not, strictly speaking, issued without examination. The Board has found it wise for many reasons to require applicants to personally appear before it or some other qualified officer to prove *bona-fides*, and the possession of a knowledge of the duties imposed on first and second class engine-drivers by the “Inspection of Machinery Act, 1904,” and “Mines Regulation Act,” and particularly as regards the code of signals in force on our mines, and the classes of engines they have been in charge of.

### DIVISION VI.—ACCIDENTS.

#### RETURN NO. VIII.

Cause.	Districts.											Total.
	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.	
Circular saws ...	2	...	...	2	...	...	...	...	...	...	...	4
Lathes, planing, and shearing machines ...	...	...	...	5	...	...	...	1	1	...	...	7
Hoists ...	...	...	...	3	...	...	2	1	...	...	...	6
Shafting, belting, couplings, pulley drums, and other mill gearing* ...	4 (1)	1	...	23 (2)	1	...	...	5 (1)	3	2	...	39
Moulding machines ...	1	...	...	...	...	...	...	...	...	...	...	1
Scalding ...	...	...	...	1	...	...	...	...	...	...	...	1
Wood-working machines	1	...	...	1	...	...	...	...	...	...	...	2
Grinding and emery wheels ...	...	...	...	1	...	...	...	...	...	...	...	1
Totals ...	8	1	...	36	1	...	2	7	4	2	...	61

\*Excluding accidents covered by other headings.

Figures in parentheses denote number of fatal accidents.

There has been, it will be noted in above Return, a further decrease in the number of accidents caused by machinery as compared with each of the two preceding years, the figures representing them being:—

1905.		1906.		1907.	
Fatal.	Non-Fatal.	Fatal.	Non-Fatal.	Fatal.	Non-Fatal.
4	72	1	64	4	60

*Fatal Accidents.*—The first fatality occurred on 1st May, 1907, at the Golden Horseshoe G.M., Boulder, and resulted in the death of William Ryan, a battery pan-man. The accident was caused when passing the end of a broken mill belt under a revolving driving pulley. Ryan by some misadventure got his head and neck in between the pulley and a battery foundation log. The finding of the jury was “Accidental death,” but a rider was added that the “Machinery should have been stopped while doing the work,” which must be concurred in by everyone. The second fatal accident occurred on the “Associated Northern Blocks,” Boulder, on the 2nd June, 1907, to William Rear, a child about seven years of age. Rear, with his brother, on returning home from an errand went over the residues dump, which was not a thoroughfare, and when under a belt conveyor he placed his pocket handkerchief in between the belt and a revolving pulley, which drew him in also. The

jury returned a verdict of accidental death, blame not attachable to anyone.

The third victim was Percy Lucas (commonly known as James Ellis), who received serious injuries at the “Sons of Gwalia” Mine on the 5th August last, resulting in his death ten days later. From the evidence adduced it appears that Lucas was engaged pouring oil on a collar on the main shafting of the mill engine, when an overcoat which he was wearing owing to the coldness of the night, got caught and he was carried around several times before his clothes were torn off. When examined, however, several ribs were broken, legs sprained and bruised, skull fractured at base, and system severely shocked.

The fourth fatal accident was one of a similar nature to the third, and resulted in Robert Williams, a part owner, being killed on the 7th September at the Cookernup Sawmills. Williams was operating a small friction winch when an overcoat which he was wearing was blown on to a revolving spindle, which immediately seized it, wound the unfortunate man in, and broke his spine. The whole four of these accidents were caused by either belting or shafting; but it was also worthy of note that anyone of them could not have been avoided, excepting by precautions taken by the deceased persons themselves.

Of the sixty non-fatal accidents no less than 62 per cent. have also been caused by shafting, belting, couplings, pulleys or other mill gearing. In regard to the causes mainly responsible for accidents, I am afraid that conditions have not improved since commenting on the same matter in my report for 1905, when it was endeavoured to be shown that the continuous running of plants is responsible for many accidents. There is a general incentive both by an employer and employee to keep plants running, although managers and officials in charge frequently state that if an employee considers he will be taking more than an ordinary risk to do a certain thing with the machinery in motion, the machinery should be stopped. Employees generally admit that this can be done, but the risk is taken just the same. The term "ordinary risk," as generally used in connection with accidents, is difficult of definition, for what would be considered to be an ordinary risk to one person might prove distinctly dangerous or fatal to another. Experience has shown that injured workmen do not as a rule blame their employer for their injuries, and are usually content to furnish a statement to the effect that the fault was their own, or it was simply an accident.

One rather serious accident, in which a young girl narrowly escaped with her life, occurred at the "Excelsior" White Works Factory, Perth, on the 31st August last; the girl was a machinist. Upon commencing duties in the morning she stooped to put on the small belt of the sewing machine, when her hair, which was being worn down, got caught in the small shaft, resulting in a considerable portion of her scalp being torn off. In order to avoid a recurrence of similar accidents, a circular letter was sent (although having no statutory authority to do so) to owners of all clothing factories, registered under the Act, containing useful advice, and I am pleased to state that employees have been compelled to comply with the suggestions contained in the circular.

#### DIVISION VII.—GENERAL.

In one instance only was it found necessary to prosecute an owner for working a boiler without a certificate. The case was a flagrant one; repeated requests for payment of fees and taking up of Certificate having been totally disregarded. A conviction was obtained and a fine of £5 and costs imposed.

I am glad to be able to report after a review of the experiences of the last two years, that the provisions of the Act have been generally readily complied with, and with few exceptions fees have been paid without demur. As illustrating the appreciation of the work of the Department, particularly in the boiler inspection division, I have only to point to the fact that second-hand boilers rarely change hands until the prospective purchaser has consulted the records of the boiler or machinery, as kept by the Department, or has made a proviso in his contract that a satisfactory Government Certificate must accompany the purchase. This result is excellent; as it not only gives an opportunity to prevent a person (who may not be skilled enough to know better) being saddled with a useless and possibly dangerous machine, but is also a safeguard against a dangerous boiler being put under steam, unknown to an Inspector, and thereby creating a source of danger to life and property.

During last session of Parliament, certain strictures were made in the Legislative Assembly on the administration of the Act, and I desire to take this opportunity of impressing upon the Hon. the Minister the urgent necessity and desirability of taking steps to have alleged complaints fully and thoroughly inquired into before being brought before Parliament and the public. I feel sure if this were done much misconception could be avoided, and wrong impressions which now get abroad, and misrepresentations (unintentional and otherwise) might be arrested. Every officer on the Staff naturally feels the matter keenly, for to be erroneously criticised, and then denied an opportunity to explain or refute, is, to say the least of it, not conducive to contentment, confidence, and good steady work.

Since the beginning of August last, the Department has undertaken, in consideration of a small annual payment, the inspection and general supervision of all the mechanical plants ashore and afloat, under the control and in the possession of the Fremantle Harbour Trust Commissioners. This plant, which now embraces 2 steam and 6 electric cranes, 10 electric capstans; the pilot steamers "Lady Forrest" and "Susan"; ferry boat "Victor," floating fire-punt; and the lighthouses on the North and South Moles, Fremantle, was previously attended to by an officer of the Harbour and Lights Department, who has since resigned. The work now being done by this Department for the Harbour Trust and the Harbour and Lights Department (referred to in Division IV.) without additional staff has resulted in a saving of £360 (approximate) per annum to the State.

Miscellaneous inspections of various kinds have been made on behalf of other Departments and reports chiefly of an advisory nature, on renewals, alterations, or additions, have been furnished on various kinds of machinery. The knowledge and experience gained through coming in daily contact with complicated and costly plants, if utilised, would in all probability prove economical as well as beneficial to the Departments desiring advice—as against the past practice of each branch of a Department commissioning one of its own officers, whether fully qualified or not, to collect data, and to report to that Branch.

The total revenue received during the year amounted to £4,934 16s. 10d., showing a slight decrease on last year's fees. The reason for this is the same as put forward to account for more boilers being out of use than formerly, viz.: installation of electric and other motors, and the placing aside of steam boilers.

To carry out the 2,244 boiler inspections and 1,921 machinery inspections, a total mileage of 49,495 was travelled (by rail, 28,927; road, 20,220; steamer, 348). This works out at 11.8 miles per inspection.

There has been no alteration in the number of Inspectors under the Act, but several changes have been made. Inspector Hursthouse, South-Western District, resigned in February; and Inspector Lovegrove, Mt. Margaret and North Coolgardie Districts, resigned in April. This necessitated the holding of a competitive examination in April, when Mr. G. McCulloch and Mr. W. Brodie were selected to tem-

porarily fill the vacant positions. In point of numbers, Head Office staff is the same as last year. Two clerical positions are, however, still filled by temporary instead of permanent officers, and I trust that necessary appointments will be made at an early date.

Inward correspondence totalling 9,273 has been received at Head Office, and 6,944 letters, telegrams, etc, have been dispatched.

In conclusion, permit me to thank the several inspectors of Mines, Mining Registrars, Clerks of Courts, and Postmasters for assistance kindly rendered in connection with the issue of Engine-drivers' Certificates, etc.

My thanks are due to each member of the Staff for the loyal and capable manner they have carried out their various duties.

I have, etc.,

C. J. MATHEWS,  
Chief Inspector of Machinery and  
Chairman Board of Examiners.

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## DIVISION VIII.

### *Report of the Chief Inspector of Explosives and Government Analyst for the Year 1907.*

*The Under Secretary for Mines.*

The Government Chemical Laboratory,  
Perth, 31st December, 1907.

Sir,

I have the honour to submit for the information of the Hon. the Minister my twelfth Annual Report, dealing with the work carried out under my direction, during the year ending 31st December, 1907.

The examination of safety fuse (a matter referred to specially in my last report) has received considerable attention during the year, and though my suggestion for the appointment of a special committee has not been approved, a good deal of information has been gathered from the special tests carried out.

The detection of mercury perchloride in certain brands of explosives imported into this State was the most notable occurrence of the year, and will be fully described below.

Considerable changes on my staff, to which further reference will be made, have made it impossible to do more than keep up with routine work, and some of the larger spheres of research work, which we had begun to explore have, unfortunately, had to be again neglected. I trust, however, that before long such investigations will be recognised as an essential part of the work of a Scientific Department such as this, and that adequate provision will be made accordingly.

#### IMPORTATION OF EXPLOSIVES.

Under this heading the following tables provide the statistical information usually afforded in my Annual Report:—

TABLE I.  
*Importation for 1907.*

	Quantity. lbs.	Value. £
Gelignite ..	2,469,780	69,442
Blasting Gelatine ..	552,600	23,226
Gelatine Dynamite	297,500	10,394
Detonators ..	..	3,935
Fuse ..	402,140 coils	8,476
Powder, Blasting ..	282,750	5,403
Powder, Sporting ..	3,057	288
Explosives N.E.I.	..	1,066
Fireworks ..	..	362
		<b>£122,592</b>

TABLE III.

*Kinds and Quantities of Principal Industrial Explosives imported in 1906 and 1907.*

	1906. lbs.	1907. lbs.
Gelignite ..	2,554,565	2,469,780
Blasting Gelatine	445,650	552,600
Gelatine Dynamite	424,250	297,500
Dynamite ..	7,000	..
Blasting Powder	112,544	282,750
Sporting Powder	4,500	3,057
	<b>Total .. 3,548,509</b>	<b>.. 3,605,687</b>

TABLE IV.—Comparison with other States.

	Western Australia.	Victoria.	Queensland.	New South Wales.	South Australia.	Tasmania.	Proportion of total for Australia imported into W.A.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	
Nitro-Glycerine Compounds	3,319,880	1,273,281	1,721,945	1,997,850	991,750	374,900	
Blasting Powder ... ..	282,750	160,000	333,000	1,239,124	169,950	77,700	
Sporting Powder ... ..	3,057	57,025	746	18,522	2,863	9,900	
	3,605,687	1,490,256	2,055,691	3,255,496	1,164,563	462,500	29.96 per cent.
	£	£	£	£	£	£	
Fuse ... ..	8,476	3,435	Not given	Not given	4,605	Not given	
Detonators ... ..	3,935	3,473	3,216	3,805	1,404	1,094	
Other Explosives ... ..	1,066	3,956	1,086	3,110	336	Not given	
	13,477	10,864	4,302	6,915	6,345	1,094	31.34 per cent.
	£	£	£	£	£	£	
Total Value of Explosives enumerated above ...	116,539	53,777	55,056	70,794	44,255	19,839	32.34 per cent.

It will be seen that the value of the importations showed a marked decrease, which has a special explanation.

The values in the above tables are compiled from the Customs returns, and these have shown a remarkable drop since the imposition by the Federal Tariff of an ad valorem duty in connection with the Commonwealth preferential trade proposals. It appears that either the cost of manufacture of explosives has been very greatly diminished, or that the old rates of values, which have been employed in the Customs declarations for some years were misleading. In the past the values have represented the old rate of cost of manufacture, or were maintained at a high standard for commercial purposes, but now that this duty has been imposed the manufacturers have naturally been quick to reduce their declared values to a limit more nearly representing the true cost; while the annual value of the trade has therefore diminished, its volume, as shown by the quantities imported, has actually increased, as shown by Table III. above.

TABLE V.—Tests made on Explosives.

	No. of Samples.
Special Tests for Mercury * ..	377
Dynamite .. ..	27
Gelignite .. ..	1,089
Gelatine Dynamite .. ..	176
Blasting Gelatine .. ..	261
Fuse .. ..	598
Kolax .. ..	1
Monobel .. ..	1
Rippite .. ..	1
Excellite .. ..	1
	---
Total ..	2,532
	---

Special interest was given to the testing work carried out during the year, by the discovery in July of the presence of Perchloride of Mercury in considerable quantities of explosives imported into this State.

It has been well known for a considerable time that Perchloride of Mercury, when incorporated with the

Nitro-Glycerine compounds,\* even in very small quantities, has the effect of prolonging the "Heat Test" of the explosive, thus making it appear of a greater degree of purity than it really is. This effect, known as "masking" the "Heat Test," would naturally interfere very much with the inspection and proper control of explosives, and must obviously be checked on important public grounds.

Such masking of the test has been suspected by me on various occasions, and explosives have been tested for the presence of Mercury to see whether this had been employed.

The methods of testing which were applied were not, however, sensitive enough to detect the small quantities which were apparently present, and I had therefore to content myself with issuing explicit warnings to at least two of the importing firms that I suspected the presence of such a masking agent, and that if it were subsequently discovered, no leniency would be shown.

These warnings were as long ago as 1898 and 1900, in one case, and in another, 1905, but although various subsequent attempts were made to detect the presence of a masking agent, they were unsuccessful until the publication of certain investigations made by H.M. Inspectors of Explosives at the Home Office in England, during the latter end of 1906 and the early part of 1907.

This investigation, which disclosed the presence of Perchloride of Mercury in certain explosives in England, revealed also the approximate quantities employed, and thus enabled the preparation of a test method of commensurate delicacy.

The application of this test revealed the fact that large quantities of explosives coming into the State contained Chloride of Mercury, as I had previously suspected. The particulars of this method of testing, which may be of more than local interest, are given in Appendix 2.

The result was that 1,932 cases, representing 96,600 lbs. of Gelignite, Gelatine Dynamite, and Blasting Gelatine were seized and condemned, in addition to which proceedings were taken against the importers of the goods in three instances, and a fine of £100 and costs was imposed in each case.

\* Including Blasting Gelatine, Gelatine Dynamite, and Gelignite,

\* One part of Perchloride in 100,000 parts of explosives ( $\frac{1}{10000}$  per cent.) has a marked effect.

The severity of the action taken was, in my opinion, quite justified by the gravity of the case and by the fact that in two instances previous warnings had been issued. It was pleaded by the manufacturers of the explosives that the Chloride of Mercury was not added to deliberately mask the Heat Test of the explosive; that it was used in much of the Nitro-Cotton manufactured on the Continent as a preservative or antiseptic, and that there was no attempt to mislead either the inspector or the consumer. It is only fair to state that only in one instance there appeared to be some grounds to support these contentions, but in the other two cases, in view of the fact that they had been so explicitly and carefully warned that their explosives gave evidence of the presence of a masking agent, and also that they must have been aware that Perchloride of Mercury would act as such a masking agent; there did not appear to be any room for the exercise of that leniency for which these claims were made an excuse.

Another matter which has received considerable attention during the year has been the testing of fuse imported for use in our mines. As I pointed out last year, the question of the burning rates of fuse and the relation of fuse generally to mining accidents, is one which requires careful attention. The regulation which was imposed specifying the burning rate (for mining purposes) of 80 to 100 seconds per yard, was alleged by some to be an impracticable one, but experience has shown that it is quite possible to keep within these limits.

Three hundred and eleven samples of fuse were tested in the ordinary way during the year, and of these only 28 samples went beyond the limits prescribed by the regulation. Of these 17 went over, and 11 under the prescribed limits of 80 to 100 seconds per yard.

The remaining 287 samples of fuse examined were the result of special tests made to try to throw some light on the alleged quick burning of fuse. From time to time in connection with accidents on the gold-fields, it has been alleged that samples of fuse have "run through," causing premature explosion. In the course of 13 years inspection of the fuse of this State, involving the examination of many thousands of samples, I have never encountered one which "ran." A sample might occasionally explode or mis-fire, but I have always discredited any report which described the "running through" of an ordinary safety fuse.

It occurred to me, however, that it might be possible that "short circuiting" occurred, due to the method of handling the fuse in our mines. When a miner fires a "round" of holes, it is customary for him to tightly double up the length of fuse protruding from the holes and force it, in a crushed condition, into the mouth of the bore hole, this being done to prevent the fuse being cut by flying stones, etc., from the earlier holes in the "round." It seemed to me that this treatment might, by injuring the wrapper of the fuse and putting it in a state of strain, cause the flame (when such a fuse was ignited in its turn) to communicate from one bend of the fuse to another at a point much closer to the charge, thus causing the latter to explode very much sooner than was expected, and giving rise to the idea that the fuse had "run."

In order to test this, galvanised iron tubes were employed of  $1\frac{1}{8}$ in. internal diameter (the size of the ordinary machine hole on our mines), and about 12in. long, and lengths of fuse 6ft. long (about the

average length of the miner's "stick") were coiled or bent and tightly crushed into these tubes; they were then burned along-side of lengths of the same fuse laid out on the ground in the ordinary way.

The results were very striking. Out of several hundred tests, no increase of speed was manifested by the samples in the tubes, and in fact, as a general rule, by this treatment the rate of burning was retarded, in some cases to a considerable extent. This is illustrated by the following table taken at random from the schedule of tests:—

No.	Ordinary Rate of Burning. Seconds per yard.	In Tube. Seconds per yard.	No.	Ordinary Rate of Burning. Seconds per yard.	In Tube Seconds per yard.
1 ...	85	112	16 ...	104	116 $\frac{1}{2}$
2 ...	100	120	17 ...	98 $\frac{1}{2}$	115
3 ...	102 $\frac{5}{8}$	120	18 ...	99	116 $\frac{1}{2}$
4 ...	105	120	19 ...	101 $\frac{3}{8}$	130
5 ...	96 $\frac{1}{2}$	125	20 ...	99 $\frac{1}{2}$	130
6 ...	90	122 $\frac{1}{2}$	21 ...	104	112 $\frac{1}{2}$
7 ...	90 $\frac{3}{8}$	108	22 ...	105	127 $\frac{1}{2}$
8 ...	96 $\frac{3}{8}$	125	23 ...	97 $\frac{1}{2}$	126
9 ...	79	125	24 ...	79	125
10 ...	97 $\frac{1}{2}$	124	25 ...	101	112 $\frac{1}{2}$
11 ...	96 $\frac{3}{8}$	120	26 ...	97	117 $\frac{1}{2}$
12 ...	100	105	27 ...	96 $\frac{1}{2}$	125
13 ...	91 $\frac{3}{8}$	110	28 ...	97 $\frac{1}{2}$	125
14 ...	105	120	29 ...	95	125
15 ...	104	126	30 ...	95	125

Of the total number of 287 fuses tested in tubes 107 showed a retardation as compared with fuses burnt in the open, while only two showed an acceleration of speed, and this very slight.

While this method of treatment, therefore, has no effect in *accelerating* the burning rate of the fuse, and the tests still further emphasise the improbability of any of our safety fuse "running through" during use, it is of some importance to note that a certain retardation of explosion may be caused by this doubling of the fuse, and give an additional reason for discouraging the tendency, which often exists, for men to return too quickly to holes which they suspect have missed fire.

A still further subject of study has been the question of the stability and reliability of test paper used in connection with the Heat Test of explosives, and made under the conditions of the Home Office Regulations.

This is a matter chiefly of chemical interest, but may, perhaps, be fitly referred to here.

Some of the filter paper used in the preparation was found to be incapable of keeping after it had been impregnated with potassium iodide and starch, and great difficulty was experienced in obtaining a stable paper. In consequence of this, H.M. Inspectors of the Home Office were communicated with, and after some investigation on advice of their Chemical Advisers (Messrs. Dupré), a modified method was introduced in the preparation of their paper to meet such conditions.

It is interesting to note that prior to my communicating with them, they had not experienced any trouble of this sort, but during the course of our correspondence Messrs Dupré themselves encountered the same difficulty as that which I had met.

In this and in many other matters, H.M. Inspectors have shown me the greatest possible courtesy and kindness, and have been most ready to assist me

in any difficulties, and I should like specially to acknowledge my indebtedness to them on this account.

The modified method suggested by Messrs. Dupré for preparing test paper has not yet been completely successful in my hands, but probably further experiment will overcome the difficulties.

There were six Importation Licenses in force at the close of the year, and four new Explosives have been authorised for importation or manufacture or storage after due examination, viz. :—

Kolax  
Rippite  
Excellite  
Monobel Powder.

#### STORAGE.

There has been little or no increase in the storage capacity on the reserves or elsewhere during the year, although as will be seen below, the number of magazines has been somewhat increased; in some cases the licensed capacity of other magazines has been reduced; in fact, the explosives trade of the State seems to have now reached a fairly permanent level, and such changes as have occurred have been more in the nature of the readjustment of supplies to newer mining centres or fresh fields, replacing others which have gone back.

I regret to say that the difficulty with regard to the Lightning Conductors, referred to in my last report, is not yet settled.

The delay with regard to the Kalgoorlie Reserve has been due to the projected removal of this depot to another site. The Coolgardie magazines I expect to be put in order within the next month or so, but other reserves are still awaiting the convenience of the Government electrician to be inspected in a similar manner to the two depots already mentioned.

A great deal of time and discussion has been occupied during the year with the proposed removal of the Kalgoorlie Reserve. A suitable site has been selected beyond the Somerville Ridge, to the Westward of the city, and I understand that the Government has now approved of the proposals for the construction of a special railway siding and connections, and for the removal of the buildings. The large expenditure involved has been the principal cause of delay, and I hope that in my next report I will be able to announce the completion of this work.

There are at present 72 magazines erected on Explosives Reserves, including three Government magazines, but exclusive of detonator buildings, and having a total licensed capacity of 1,210 tons. Outside of Government reserves there are 30 licenses in force for magazines, with a capacity of 34 tons. Two magazine licenses have been cancelled during the year.

There are 40 reserves for explosives in various parts of the State, with a total area of 3,078 acres.

#### LICENSED PREMISES.

Licenses issued and revoked are shown in the following table:—

	Applications received.	Licenses Issued.	Licenses Revoked.	Licenses Remaining in force.
1907 ...	59	59	42	179

As was the case last year rather a number of Store Licenses have been revoked during the past 12 months, chiefly in connection with premises licensed for the sale of fireworks. But, nevertheless, the continuance of a careful system of inspection is gradually bringing all premises under the Act and regular supervision, as shown by the annual increase in the number of licenses in force.

#### INSPECTION.

I regret to say that for a great part of the year the Travelling Inspector and Assistant Government Analyst, Mr. Guest, has been absent from duty through a severe breakdown in health, and it seems doubtful whether he will be able to resume his duties. The loss of his capable and energetic services has been severely felt, and has put a severe strain upon the energies of the staff. His inspection work has, however, been ably carried out by Mr. T. N. Kirton, as Acting Travelling Inspector, and the following inspections have been made during the year:—

Magazines .. .. .	166
Store Premises .. .. .	148
Total .. .. .	314

as against 240 for the previous year.

The following centres have been visited, in some cases more than once:—Kalgoorlie, Coolgardie, Menzies, Kookynie, Malcolm, Leonora, Mt. Morgans, Laverton, Geraldton, Yalgoo, Magnet, Black Range, Cue, Nannine, York, Bunbury, Bridgetown, Busselton, Donnybrook, Mingenew, Northampton, Collie, and Parkerville. In addition, a number of inspections were made of the store premises, and magazines in Perth and Fremantle.

The prosecutions that have taken place as the result of the inspection work of the Department, are shown in Appendix No. 1.

The following explosives have been condemned, destroyed, or otherwise disposed of during the year:—

Date.	Locality.	Kind and Quantity.	Remarks.
1. 26-1-1907 ... ..	Lennonville ... ..	Blasting Gelatine ... 110 lbs.	Condemned owing to chemical deterioration.
2. 18-4-1907 ... ..	Menzies ... ..	Celignite ... .. 200 "	Do. do. do.
3. 23-4-1907 ... ..	Kalgoorlie ... ..	Blasting Gelatine ... 200 "	Do. do. do.
4. 20-11-1907 ... ..	Leonora ... ..	Gelignite ... .. 200 "	Do. do. do.
5. 8-7-1907 ... ..	Fremantle ... ..	Gelignite ... .. 13,000 "	Condemned owing to containing an unauthorised ingredient.
6. 8-7-1907 ... ..	Fremantle ... ..	Blasting Gelatine ... 1,000 "	Do. do. do. do.
7. 8-7-1907 ... ..	Fremantle ... ..	Gelatine Dynamite ... 2,000 "	Do. do. do. do.
8. 8-7-1907 ... ..	Fremantle ... ..	Gelignite ... .. 37,300 "	Do. do. do. do.
9. 8-7-1907 ... ..	Fremantle ... ..	Gelatine Dynamite ... 15,600 "	Do. do. do. do.
10. 8-7-1907 ... ..	Fremantle ... ..	Blasting Gelatine ... 24,250 "	Do. do. do. do.
11. 8-7-1907 ... ..	Fremantle ... ..	Do. do. ... 3,450 "	Do. do. do. do.
		Total ... 97,310 "	

## GENERAL ANALYTICAL WORK.

The general chemical work under my charge has shown a considerable expansion during the year, not only in the actual number of analyses carried out, but also in the intricacy and importance of the investigations made, of which very little can be gathered from tabular statements.

*General Classification of Analysis.*

	No. of Samples.
Explosives .. ..	2,532
Spirits .. ..	414
Waters .. ..	284
Boiler Scales, etc. ..	4
Soils .. ..	95
Rocks and Deposits ..	19
Fertilisers .. ..	189
Essences .. ..	108
Oils .. ..	509
Foodstuffs, etc. ..	96
Sewage .. ..	152
Paints .. ..	18
Wheat .. ..	30
Tea .. ..	26
Stomachs .. ..	10
Criminal Investigation ..	32
Lead .. ..	12
Beets .. ..	10
Woods .. ..	4
Gas .. ..	1
Fabrics .. ..	126
Butter .. ..	6
Jewellery .. ..	7
Vinegar .. ..	24
Road Metal .. ..	2
Chemicals, Medicines ..	94
Leather .. ..	6
Milks .. ..	15
Turpentine .. ..	18
Hydrometers .. ..	37
Cyanide .. ..	4
Barks .. ..	2
Total samples .. ..	4,886

*Departments for which work was performed.*

Agricultural Department ..	323
Customs Department ..	1,264
Crown Law .. ..	42
Inspector of Liquors ..	190
Mines Department ..	34
Public Health .. ..	49
Public Works and Railways	400
Explosives .. ..	2,532
Miscellaneous .. ..	14
Crown Contracts .. ..	38
	4,886

This shows an increase of 314 analyses on the records of the previous year, and I should like to make a few comments on some of the principal spheres of work covered.

## CROWN CONTRACTS.

A report made by the special committee appointed by the Government on the question of the manage-

ment of the Government Stores recommended the establishment of a Crown Contract Laboratory as a branch of the work of this Department, to provide by means of chemical analysis a check on the quality of goods supplied under Crown contracts. Although this system has not yet been completely established, a commencement has been made in applying the principle involved, and some 38 samples have been examined during the year in connection with these contracts.

There is no doubt that considerable expansion is to be expected in this direction, and the work should be of some public value.

## AGRICULTURAL WORK.

In connection with the Agricultural Department, a new class of work has been introduced of great importance. The investigation of the milling properties of the wheats grown by farmers, and the aid thereby afforded in the selection of improved varieties of wheat have been matters receiving a great deal of attention in America, Canada, and other countries outside of Australia, while the special work in this direction done by Mr. F. B. Guthrie, in conjunction with the late Mr. W. Farrer, in New South Wales, is of world wide repute. The matter has also been taken up by the Queensland Government, and has been lately receiving attention in South Australia. Its importance cannot be over-estimated, as it is said that the work of Mr. Farrer alone has added one bushel per acre to the general yield in New South Wales.

During the past year, on my recommendation, the Government obtained a small experimental mill of the latest pattern, which has now been installed in the basement of my Laboratory, and the work of wheat testing has been begun. For the first few months, of course, the work was necessarily of an experimental nature to obtain complete mastery of the possibilities of the machine, and a grasp of the practical milling problems involved.

The work was begun by my Assistant, Mr. R. E. Cowles, but towards the end of the year his services were unfortunately lost to the Department, and it has now been taken up very satisfactorily by Mr. W. H. J. Clarke. This change has naturally caused some delay in the progress of the work, but the preliminary tests may now be considered as concluded, and I hope to be able to issue in the future regular reports on wheat samples.

Throughout the trials I have had the very great advantage of the personal advice and co-operation of Mr. Harvey, the head miller of the Perth Roller Flour Mills, who has most courteously and kindly given a great deal of time and thought to the methods of milling to be used, and I cannot too strongly express my sense of obligation to that gentleman for the valuable assistance thus rendered; without such assistance from a practical miller the work would not be possible. I have now in hand some samples of wheat which have been selected and bred by Mr. Berthoud and Mr. Correll, in Western Australia, and the result of the examination of these will be of great local interest, and I trust of value.

## POTABLE SPIRITS.

The extensive work carried out in previous years in connection with the examination of potable spirits has been continued in connection with the Inspection of Liquors Department, and the Chief Inspector, Mr.



Durham, informs me that it has had a far-reaching effect upon the quality of the spirits retailed in this market.

The work done during the year has comprised reports on brandies and wines, but the work on the latter and on bulk spirits is not yet completed.

#### SOILS, ETC.

The methods of analysing soils have been very carefully studied and developed, and the installation of various mechanical contrivances for expediting this work, and rendering it of a more uniform character has done much to improve the character of the results, and to make the data obtained of some practical value to the farmer as an index to the fertility of his soil, and as a guide to the manurial treatment to be followed.

An electrically driven centrifugal machine for the mechanical analysis of soils, and a large electrically driven "end-over-end" shaker for Hall's modification of Dyer's method of estimating the availability of plant food, are the two principal mechanical appliances which have been introduced, and are doing excellent work.

In connection with my work as Agricultural Chemist, I have also made reports on the following subjects of more than ordinary importance:—

1. The organisation and methods of a Soil Survey for Western Australia.
2. On the utilisation of the Semi-Arid Districts of the State for Agricultural Purposes.
3. On the Reclamation of "Sand Plain," and the application of Green Manuring.
4. On the Utilisation of Lime Deposits in the State, and their Value for Agricultural Purposes.
5. On the soils of the Stirling Estate.

#### SUPERPHOSPHATE BAGS.

Great loss is annually incurred by the loss of superphosphate, owing to the destruction of the bags in which this fertiliser is shipped and stored. The bags become destroyed by the free acid in the manure and repeated re-bagging, and the use of double bags to guard against this loss has become a heavy tax upon the farmer.

Experiments were made during the year to see if a method could be devised to avoid this waste, and bags treated in various ways were submitted to practical test. One bag which had been treated with a strong solution of Red Gum Kino gave very satisfactory results. It was filled with a very acid superphosphate (which had completely rotted the double bags in which it had been imported), and was stored for six months, surrounded and covered by other bags containing the same manure. At the end of six months, the bags by which it was surrounded had rotted and given away in all directions, but the bag treated with kino came out as strong and intact as when it was put into the store.

This test was so satisfactory that many of those interested in the superphosphate trade are applying the method of treatment on a large scale, and there is every reason to hope that this simple and inexpensive method of preserving the bags will be effective.

#### POISON PLANTS.

The antidotal treatment for stock poisoned by our local poison plants, which was inaugurated as the re-

sult of the special investigations carried out in this Laboratory, is proving very successful.

Reports of the saving of stock are frequently received, while applications come in in large numbers every week for supplies of the antidote. Over 6,000 doses have now been distributed to various parts of the State free of charge, and as its use becomes more widely known, there is evidence that the farmers are recognising it as a valuable aid to them in fighting their difficulties in the poison lands of the State.

#### FINANCES AND STAFF.

The revenue and expenditure of this Department for the past three years have been as follows:—

	1905	1906	1907
	£	£	£
Revenue ..	4,004	3,299	3,287
Expenditure ..	4,617	3,868	4,150

The staff under my control comprises the following officers:—

Travelling Inspector *	..	1
Acting Travelling Inspector	..	1
Analysts .. .. .	..	8
Clerks .. .. .	..	3
Magazine Keepers .. .. .	..	2
Watchmen .. .. .	..	4
		—
		18
		—

In addition to the above there are four honorary Sub-Inspectors of Explosives in country districts.

The permanent loss of two officers, Mr. Cowles and Mr. Hillman, and the extended furlough of Mr. Guest, have greatly reduced the apparent strength of the staff. Temporary assistants have had to be employed to make up the above numbers, and their want of experience compared with the older officers whom they have replaced has made it more difficult to cope with the demands made upon us. The whole staff, however, has worked zealously and well, and I must again express my appreciation of their loyalty and energy.

I think it may be claimed that the work of this Department, more varied as it is, probably, than that of any other Laboratory in Australia, is nevertheless carried out with a staff of workers and at an annual cost which compare very favourably with the Government Laboratories elsewhere, and if the work of the officers is to be turned to the best account, provision must be made, not only for the routine work, but also for the carrying out of such research investigations as from time to time crop up, and which were the subject of remarks in my last Annual Report. These researches are not only of direct value themselves, but are, in many cases, necessary for the more complete and efficient carrying out of the ordinary work of the Laboratory.

I beg to acknowledge the valuable assistance rendered me again during this year by the officers under the Commissioner of Police, and by the Inspectors of Mines under the State Mining Engineer.

I have, etc.,

E. A. MANN,

Chief Inspector of Explosives, Government Analyst, and Agricultural Chemist.

\* At present absent on sick furlough.

## APPENDIX No. I.

*Prosecutions which have taken place during 1907.*

	Date.	Place.	Offence.	Penalty.
1	11-1-07	Perth ... ..	Carrying Explosives without providing sufficient protection	Fined 2s. and £1 3s. costs.
2	19-4-07	Leonora ... ..	Overstocking Explosives on licensed premises ...	Fined 1s. and 4s. 6d. costs.
3	9-5-07	Guildford ... ..	do. do. do. do. ...	Fined £2 10s. and 12s. 6d. costs.
4	9-5-07	Do. ... ..	do. do. do. do. ...	Fined £2 10s. and 12s. 6d. costs.
5	27-7-07	Fremantle ... ..	Having Explosives containing an unauthorised ingredient	Fined £100 and £31 10s. costs.
6	19-7-08	Do. ... ..	do. do. do. do. ...	do. do.
7	19-8-07	Do. ... ..	do. do. do. do. ...	do. do.

## APPENDIX No. II.

*Methods of Analysis employed for the Detection of Mercury in Nitro-Glycerine Compounds.*

Two hundred grammes of the explosive were ground up with 400 grammes of French chalk, and 250 ccs. of water added, the whole allowed to stand for 24 hours. The solution was then filtered, slightly acidified with  $H_2SO_4$ , subjected to an electrical current of 1.5 amperes, and the mercury deposited on a gold cathode using a platinum anode.

The electrolysis was conducted for three to six hours. The cathode was detached, washed with water, alcohol, and ether, carefully dried at a low temperature, and weighed, the increase of weight being taken as  $Hg_2$ .

The cathode was then placed in a test tube and heated to redness, keeping the upper part of the tube cool. The mercury was volatilised and deposited on the tube. The sublimate which was often invisible to

the eye, was made discernible by the addition of a small grain of iodine and gentle warming. The iodine vapour after filling the tube subsides, leaving a red deposit of  $HgI_2$ .

As over two hundred tests were to be made, the following more simple and rapid qualitative method was devised:—

Two hundred grains of the explosive were ground with 400 grains of French chalk, and placed in a large tube, which had suspended from the cork a piece of silver foil. The tube was heated in a bath at 71 deg. C. for two hours.

After cooling, the foil was removed to a test tube and heated strongly. The consequent sublimate of mercury in the upper part of the tube was detected by the use of iodine vapour as described above.

WESTERN AUSTRALIA.

## MINING STATISTICS

*To 31st December, 1907.*

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LETTER OF TRANSMITTAL.

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Department of Mines,  
Statistical Branch,  
Perth, 30th April, 1908.

*The Secretary for Mines.*

Sir,—

I have the honour to transmit herewith the Mining Statistics for the year 1907.

With regard to the gold output it is interesting to note that while an increase is shown in the amount of low-grade ore treated, the quality of the metal produced (as shown by the receipts at the Royal Mint) was finer than in the preceding year; the average value during 1906 having been £3 10s. 1d. an ounce, while that for 1907 was £3 11s. 3d.

I have the honour to be,  
Sir,  
Your obedient servant,

JAMES WALLACE,  
Statist.

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## MINING STATISTICS TO 31st DECEMBER, 1907.

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## EXPLANATIONS OF SIGNS AND ABBREVIATIONS.

Gf. Goldfield.	E.A.C. Extended Alluvial Claim.
Mf. Mineral field.	L.C. Lode Claim.
D. District.	R.C. Reward Claim.
G.M.L. Gold Mining Lease.	M.A. Machinery Area.
M.L. Mineral Lease.	P.A. Prospecting Area.
P.P.C. Private Property Claim.	T.A. Tailings Area.
P.P.L. Private Property Lease.	W.R. Water Right.
R.L. Reward Lease.	cy. Cyanide process.
A.T.M. Authority to mine.	¶ Extras (magnettings, plates, skimmings, slags, etc.).
A.C. Alluvial Claim.	V. Vacuum Filter Presses.
A.Q.C. Amalgamated Quartz Claim.	

WESTERN AUSTRALIA.

SUMMARY OF MINERAL PRODUCTS.

GOLD AND OTHER MINERALS PRODUCED DURING 1907, AND THE ESTIMATED VALUE THEREOF, TOGETHER WITH A COMPARISON FOR PREVIOUS YEARS, AND THE TOTAL PRODUCTION TO DATE.

DESCRIPTION OF MINERAL.	1907.		1906.		1905.		1904.		1903.		PREVIOUS TO 1903.		TOTAL TO DATE.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
ANTIMONY ... .. (Exported) statute tons	25	£ 630	...	£ ...	...	£ ...	...	£ ...	22	£ 230	...	£ ...	47	£ 860
GOLD (Exported and † Minted) fine ounces	1,697,554	7,210,749	1,794,547	7,622,749	1,955,316	8,305,654	1,983,230	8,424,226	2,064,801	8,770,719	8,868,339	37,670,312	18,363,787	78,004,409
BLACK TIN ... .. (Raised) statute tons	1,624	158,648	1,495	157,644	1,079	86,840	855	58,817	817	55,890	4,178	232,282	10,048	750,121
TANTALITE ... .. (Raised) do.	...	...	15	2,644	73	10,515	...	...	...	...	...	...	88	13,159
COPPER ORE ... .. (Raised) do.	18,978	180,387	7,430	50,337	2,389	16,266	3,969	25,180	20,527	56,541	28,387	212,871	81,680	541,582
IRONSTONE ... .. (Raised) do.	1,094	438	1,280	512	3,213	1,285	1,441	577	220	88	50,572	33,783	57,820	36,683
LEAD {	Ore ... .. (Exported) do.	120	1,292	...	...	...	...	...	...	...	33,644	364,756	33,764	366,048
	Silver-Lead Ore (Raised) do.	...	...	...	...	...	...	...	...	...	57	429	57	429
	Pig ... .. (Exported) do.	313	6,087	2,681	44,460	2,730	34,471	5,352	63,170	...	...	684	13,306	11,760
SILVER ... .. (Exported) fine ounces	189,265	25,382	282,145	37,612	359,744	44,278	399,190	45,912	168,113	19,153	172,911	20,393	1,571,368	192,730
ASBESTOS ... .. (Exported) statute tons	...	...	...	...	...	...	...	...	†	10	†	1	...	11
COAL ... .. (Raised) do.	142,373	55,158	149,755	57,998	127,364	55,312	138,550	67,174	133,427	69,128	434,974	237,296	1,126,443	542,066
COBALT ORE ... (Exported) do.	...	...	...	...	...	...	...	...	...	...	2	41	2	41
LIMESTONE ... .. (Raised) do.	3,602	1,382	9,472	1,691	9,145	1,220	13,397	1,699	1,280	178	56,810	12,120	93,706	18,290
MICA ... .. (Exported) do.	...	...	...	...	...	...	...	...	...	...	†	294	...	294
PLUMBAGO ORE ... (Exported) do.	...	...	...	...	...	...	†	2	...	...	1	6	...	8
PRECIOUS STONES ... (Raised) carats	...	...	...	...	...	...	...	...	...	...	†	24	...	24
TOTAL VALUES ... ..	... £	7,640,153	...	£7,975,647	... £	8,555,841	... £	8,686,757	... £	8,971,987	...	£38,797,914	...	£80,628,249

† Since May, 1899. † Weight not stated. † 25 small diamonds raised, weight not stated. † 4 cwts. † 1 cwt.

## 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 1907.

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	1,697,554	£ 7,210,749	247,363	£ 1,050,730	466,476	£ 1,981,461	695,576	£ 2,954,617	65,354	£ 277,607	8,617	£ 36,602	477,311	£ 2,027,490
Copper ... .. statute tons			10,098	727,774	12,756	1,028,179	38	2,356	4† 9,035	869,666	7,959	691,888	...	...
Copper Ore ... .. do	18,978	180,387	19,768	374,182	5,158	75,330	...	...	...	...	810	22,637	56	595
Lead (Pig, etc.) ... .. do	4 383	7,379	...	...	1,116	4,464	...	...	...	...	...	...	5	26
Manganese ... .. do	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Platinum ... .. fine ounces	...	...	276	1,014	...	...	...	...	...	...	...	...	...	...
Silver ... .. do	189,265	25,382	2,043,887	257,314	921,497	112,540	31,681	4,355	...	...	...	...	1,562,603	169,484
Silver Ore, etc. ... statute tons	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Silver-Lead Ore etc. do	...	...	434,079	3,658,632	...	...	...	...	89,763	572,560	1,434	15,164	...	...
Tin ... .. do	...	...	1,914	293,305	5,140	496,766	...	...	...	...	...	...	...	...
Black Tin ... .. do	1,624	158,648	...	...	...	...	...	...	...	...	...	...	...	...
Tin Ore ... .. do	...	...	...	...	...	...	100	10,275	4,343	501,681	422	44,176	1	101
Tantalite ... .. do	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Wolfram ... .. do	...	...	207	26,235	615	89,767	...	...	41	4,411	79	11,296	...	...
Zinc Spelter ... .. do	...	...	237,219	536,620	...	...	...	...	...	...	...	...	...	...
Antimony (Metal and Ore) ... .. do	25	630	1,752	46,278	522	7,863	4,500	13,290	...	...	...	...	98	2,118
Bismuth ... .. do	...	...	16	5,268	6	1,806	...	...	† 27	...	...	...	...	...
Alunite ... .. do	...	...	2,088	5,115	...	...	...	...	...	...	...	...	...	...
Coal ... .. do	142,373	55,158	8,657,924	2,922,419	683,272	222,135	138,634	79,731	58,891	50,057	...	...	128,950	114,737
Coke ... .. do	...	...	254,609	159,316	...	...	...	...	...	...	...	...	...	...
Shale (Oil) ... .. do	...	...	47,331	32,055	...	...	...	...	...	...	...	...	...	...
Cobalt Ore ... .. do	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Gypsum ... .. do	...	...	...	...	...	...	1,036	259	...	...	...	...	...	...
Iron ... .. do	...	...	29,902	178,632	...	...	...	...	...	...	...	...	...	...
Iron Oxide ... .. do	...	...	1,595	1,961	...	...	...	...	...	...	...	...	...	...
Ironstone ... .. do	1,094	438	10,659	7,707	35,856	24,327	...	...	3,000	1,150	84,600	38,100	...	...
Lime ... .. do	...	...	23,587	19,458	...	...	...	...	...	...	...	...	...	...
Limestone ... .. do	3,602	1,382	41,667	16,162	89,978	35,808	...	...	...	...	31,100	5,800	...	...
Molybdenite ... .. do	...	...	22	3,564	67	8,442	...	...	...	...	...	...	...	...
Plumbago Ore ... .. do	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Precious Stones ... .. carats	...	...	...	† 81,056	...	† 43,500	...	...	...	...	...	...	...	...
Unenumerated ... ..	...	...	...	172,581	...	2,298	...	1,702	...	...	...	48,200	...	34,685
<b>Total Values ... ..</b>	<b>£ 7,640,153</b>	<b>£ 10,577,378</b>	<b>£ 4,134,686</b>	<b>£ 3,066,585</b>	<b>£ 22,277,159</b>	<b>£ 913,863</b>	<b>£ 2,349,236</b>							

\* Including Northern Territory. †† Includes Noble Opal, valued at £79,000. †† Includes Opal, valued at £3,000. †† 3½ cwts. †† Includes 8,247 tons of Blister Copper, valued at £832,691.









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 1907.

GOLDFIELD.	DISTRICT.	WARDEN'S OFFICE.	DATE OF PROCLAMATION OF GOLDFIELD.				AREA IN SQUARE MILES.		LEASES IN FORCE.		PARTICULARS OF PLANT.					AVERAGE NUMBER OF MEN ENGAGED IN GOLD MINING.			
			Proclamation gazetted.	To take effect from	Latest Amendment of Boundaries gazetted.	To take effect from	Goldfield.	District.	No.	Area in Acres.	Milling.		Cyaniding.			Men employed.		Diggers	
											Stamps.	Other Mills.	Leaching Vats.	Agitating Vats.	Filter Presses.	Above Ground.	Under Ground.		
Kimberley	..	Hall's Creek	20-5-86	20-5-86	31-10-02	1-11-02	33,833	..	2	13	50	1	..	..	..	..	..	..	9
Pilbara	{ Marble Bar Nullagine }	Marble Bar	1-10-88	1-10-88	1-3-07	1-3-07	32,696	{ 25,809 6,887	14	192	55	..	18	..	..	..	25	20	31
West Pilbara	..	Roebourne	20-9-95	1-11-95	1-3-07	1-3-07	10,843	..	9	132	20	1	..	..	..	..	7	4	49
Ashburton	..	Onslow	11-12-90	11-12-90	18-10-01	18-10-01	14,230	..	..	..	..	..	..	..	..	..	..	..	5
Gascoyne	..	Carnarvon	25-6-97	15-4-97	..	..	5,313	..	..	..	..	..	..	..	..	..	..	..	..
Peak Hill	..	Peak Hill	19-3-97	1-4-97	..	..	24,732	..	40	337	50	..	..	..	..	..	..	..	..
East Murchison	{ Lawlers Black Range Cue }	Lawlers	28-6-95	28-6-95	1-3-07	1-3-07	25,447	{ 19,875 5,572	136	2,009	245	3	108	3	9	..	62	62	8
Murchison	{ Nannine Day Dawn Mt. Magnet }	Cue	24-9-91	24-9-91	1-3-07	1-3-07	20,650	{ 8,970 7,050 895	111	1,386	85	1	45	..	..	..	381	453	130
Yalgoo	..	Mt. Magnet	8-2-95	28-1-95	..	..	18,833	{ 3,735 52	84	832	155	..	50	6	9	..	166	302	16
Mt Margaret	{ Mt. Morgans Mt. Malcolm Mt. Margaret }	Mt Morgans	12-3-97	1-4-97	1-3-07	1-3-07	44,860	{ 1,637 3,330 39,893	52	772	160	..	80	..	3	..	44	41	31
North Coolgardie	{ Menzies Ularriang Niagara Yerilla }	Menzies	28-6-95	28-6-95	1-3-07	1-3-07	32,858	{ 11,267 5,373 688	107	2,070	270	2	122	7	4	..	182	202	44
Broad Arrow	..	Broad Arrow	17-11-96	20-11-96	8-6-06	1-7-06	1,038	{ 39,893 11,267	104	1,753	178	5	65	8	6	..	464	568	50
North-East Coolgardie	{ Kanowna Bulong Kurnalpi }	Kalgoorlie	20-3-96	15-4-96	1-3-07	1-3-07	21,594	{ 5,373 688	69	992	105	..	70	..	3	..	380	345	40
East Coolgardie	..	Kalgoorlie	21-9-94	1-10-94	1-3-07	1-3-07	810	{ 15,530 42	57	737	75	..	87	..	2	..	231	318	3
Coolgardie	{ Coolgardie Kunanalling }	Coolgardie	6-4-94	6-4-94	1-3-07	1-3-07	11,702	{ 688 57	69	992	105	..	70	..	3	..	124	282	43
Yilgarn	..	Southern Cross	1-10-88	1-10-88	1-3-07	1-3-07	13,685	{ 15,530 42	42	694	60	3	46	..	..	..	130	169	36
Dundas	..	Norseman	31-8-93	31-8-93	1-3-07	1-3-07	11,430	{ 63 789	195	3	73	..	73	..	..	..	117	168	74
Phillips River	..	Ravensthorpe	21-9-00	14-9-00	1-3-07	1-3-07	5,572	{ 1,094 88	88	1,054	133	4	69	..	2	..	182	347	82
Donnybrook	..	Greenbushes	17-11-99	27-11-99	1-3-07	1-3-07	100	{ 990 19,510	28	376	55	2	6	..	..	..	38	62	106
State generally	..	Perth	..	..	..	..	..	{ 5 206	5	54	5	2	..	..	..	..	25	23	21
Total	..	..	..	..	..	..	330,226	{ 2,031 27,587	2,031	27,587	3,908	157	1,690	201	196	7,113	8,945	1,179	



TABLE IV.

PRODUCTION OF GOLD AND SILVER FROM ALL SOURCES, SHOWING IN FINE OUNCES THE OUTPUT AS REPORTED TO THE MINES DEPARTMENT DURING 1907, AND THE TOTAL PRODUCTION TO DATE.

Kimberley Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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. Dockrell ..	..	Voided leases .. .. .	..	..	..	..	..	..	..	..	44.00	435.93	..	
Ruby Creek ..	61	Ruby Queen.. .. .	a. r. p. 6 2 0	..	..	400.00	157.14	..	..	..	9,548.00	6,157.51	..	
Do. ..	..	Voided leases .. .. .	..	..	..	..	..	..	..	..	2,955.50	3,218.91	..	
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 .. .. .				179.43	..	..	..	..	..	1,950.92	..	..	..	..
<b>Total</b> .. .. .				<b>179.43</b>	..	<b>400.00</b>	<b>157.14</b>	..	..	<b>1,950.92</b>	..	<b>17,467.50</b>	<b>14,068.54</b>	..

Pilbara Goldfield.

MARBLE BAR DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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 ..	161	(Bamboo Consolidated G.M. Co.)	..	..	..	..	..	..	..	..	1,579.50	2,995.85	..
Do. ..	161	(Bulletin) .. .. .	..	..	..	..	..	..	..	..	1,965.00	3,427.92	..
Do. ..	161, 653	Bulletin leases .. .. .	30	..	..	150.00	324.67	..	..	..	150.00	324.67	..
Do. ..	..	Voided leases .. .. .	..	..	..	..	..	..	..	..	7,202.75	10,818.50	..
Do. ..	..	Sundry claims .. .. .	..	..	..	..	..	..	..	158.54	144.00	454.40	..
Boodalyerrie ..	..	Voided leases .. .. .	..	..	..	..	..	..	..	148.85	120.25	587.86	..
Breen's Find ..	..	Voided leases .. .. .	..	..	..	..	..	..	..	..	14.00	66.82	..
Elsie ..	625	Elsie Abandoned .. .. .	6	..	..	..	..	..	..	..	135.00	316.31	..
Lallarookh ..	..	Voided leases .. .. .	..	..	..	..	..	..	..	..	224.50	2,186.65	574.01
Do. ..	..	Sundry claims .. .. .	..	..	..	..	..	..	..	..	6,308.00	5,530.86	..
Marble Bar ..	615	British Exploration of Australasia, Ltd.	24	..	..	38.00	11.96	..	..	..	250.20	390.14	..
Do. ..	641	Franklin .. .. .	6	..	..	80.00	122.32	..	..	64.08	269.01	375.17	..
Do. ..	648	Marvel Loch .. .. .	Surr.	..	..	..	..	..	..	..	12.00	13.01	..

Do.	..	..	..	..	..	..	..	..	..	71.26	7,943.40	13,678.95	..
Do.	..	..	..	..	..	..	..	..	..	35.57	850.98	1,200.95	..
North Pole	..	..	..	..	..	5.50	6.75	..	8.94	416.00	416.00	277.02	..
North Shaw	..	..	..	..	..	..	..	..	..	..	..	..	..
Do.	..	..	..	..	..	..	..	..	7.53	..	351.45	674.72	..
Shark's	..	..	..	..	..	..	..	..	..	567.06	..	..	..
Shaw River	..	..	..	..	..	..	..	..	145.08	19.37	6.00	33.00	..
Talga Talga	616	..	..	..	..	..	..	..	..	..	101.00	49.63	..
Do.	..	..	..	..	..	..	..	..	..	..	83.83	3.00	..
Do.	..	..	..	..	..	..	..	..	..	..	571.50	975.14	..
Tambourah	..	..	..	..	..	..	..	..	50.26	68.99	204.65	520.25	..
Do.	..	..	..	..	..	..	..	..	..	..	1,438.50	1,739.44	..
Warrawoona	505	..	..	..	..	..	..	..	..	64.65	639.25	797.44	..
Do.	..	..	..	..	..	..	..	..	..	..	483.70	753.59	..
Do.	483	505	..	..	..	..	..	..	..	..	1,413.00	1,112.85	..
Do.	483	..	..	..	..	..	..	..	..	..	1,128.30	3,124.40	..
Do.	483	..	..	..	..	..	..	..	..	..	161.00	207.86	..
Do.	604	..	..	..	..	..	..	..	..	..	561.69	1,178.56	..
Do.	650	..	..	..	..	..	..	..	..	..	..	..	..
Do.	627	..	..	..	..	..	8.33	..	..	..	8.33	75.75	185.20
Do.	..	..	..	..	..	..	..	..	..	..	4.86	2,981.11	8,306.82
Do.	..	..	..	..	..	..	..	..	..	..	875.04	1,862.72	..
Western Shaw	..	..	..	..	..	..	..	..	..	..	1,221.00	930.73	..
Do.	..	..	..	..	..	..	..	..	..	..	4.77	..	..
Wyman's Well	624	..	..	..	..	..	..	..	..	..	33.55	89.04	439.20
Do.	..	..	..	..	..	..	..	..	..	..	16.72	210.86	444.61
Yandicoogina	639	..	..	..	..	..	..	..	..	..	..	24.00	33.81
Do.	494	..	..	..	..	..	..	..	..	..	..	16.48	1,380.30
Do.	..	..	..	..	..	..	..	..	..	..	124.28	2,097.80	4,183.88
Do.	..	..	..	..	..	..	..	..	..	..	232.60	103.75	120.34
<i>From District generally:—</i>													
Sundry parcels treated at:—													
Ironclad Works .. .. . 25.19 .. .. . 40.60													
Various Works .. .. . 237.95 .. .. . 1,105.36													
Reported by Banks and Gold Dealers .. .. . 634.19 .. .. . 6,552.91													
Understated previous to 1897 .. .. . 4,655.75 .. .. . 4,149.49													
<b>Total .. .. . 634.19 49.76 5,160.25 5,172.49 .. 6,809.02 2,274.13 47,762.38 76,995.86 574.01</b>													

NULLAGINE DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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.	
Elsie	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Do.	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Middle Creek	106L	..	..	..	..	..	..	..	..	..	..	..	..	..
Do.	164L	..	..	..	..	..	..	..	..	..	..	..	..	..
Do.	172L	..	..	..	..	..	..	..	..	..	..	..	..	..
Do.	173L	..	..	..	..	..	..	..	..	..	..	..	..	..

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Pilbara Goldfield—continued.

NULLAGINE DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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.	
Middle Creek	136L .. ..	Little Wonder .. ..	6	..	..	19.00	44.74	..	..	..	751.00	3,215.58	..	
Do.	138L .. ..	Little Wonder West .. ..	10	..	..	20.00	147.28	..	..	..	191.50	465.89	..	
Do.	168L .. ..	Yes-No .. ..	5	..	..	98.50	120.74	..	..	..	98.50	120.74	..	
Do.	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	..	34.00	40.51	..	
Do.	.. ..	Sundry claims .. ..	..	..	..	..	cy. 25.82	..	..	..	..	25.82	..	
Mosquito Creek	143L .. ..	Ard Patrick .. ..	12	..	..	144.50	533.49	..	..	..	458.50	1,631.97	..	
Do.	95L, 109L (125L, 131L, 135L)	(Bell Exploration Co., Ltd.) .. ..	..	..	..	..	..	..	..	..	..	..	..	
Do.	169L .. ..	Dream .. ..	Ftd.	..	..	12.00	11.15	..	..	..	41.50	61.86	..	
Do.	109L .. ..	(Federal) .. ..	..	..	..	..	..	..	..	..	48.00	56.46	..	
Do.	79L .. ..	(Galtee More) .. ..	..	..	..	..	..	..	..	..	586.00	1,648.33	..	
Do.	79L, 145L .. ..	Galtee More leases .. ..	18	..	..	360.00	747.03	..	..	..	870.00	1,704.96	..	
Do.	159L .. ..	Lands End .. ..	6	1.07	..	48.00	113.41	..	1.07	..	68.70	283.58	..	
Do.	144L .. ..	Off Chance .. ..	Surr.	..	..	..	..	..	..	..	221.00	331.03	..	
Do.	95L .. ..	(Parnell) .. ..	..	..	..	..	..	..	..	..	357.35	366.08	..	
Do.	95L .. ..	Parnell .. ..	12	..	..	196.50	87.75	..	..	..	196.50	87.75	..	
Do.	95L, 109L (125L, 131L, 135L)	(Parnell leases) .. ..	..	..	..	..	..	..	..	..	1,815.00	1,736.09	..	
Do.	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	..	827.50	1,473.12	..	
Do.	.. ..	Sundry claims .. ..	..	..	..	153.50	110.66	..	..	166.47	1,778.94	2,511.46	..	
Nullagine	119L, 120L, 121L, 122L	British Exploration of Australasia, Ltd. .. ..	96	..	..	..	..	..	..	..	777.00	88.93	..	
Do.	122L .. ..	(Grant's Hill) .. ..	..	..	..	..	..	..	..	..	1,658.00	701.61	..	
Do.	156L .. ..	Mundalla .. ..	6	..	..	..	..	..	..	..	17.50	231.89	..	
Do.	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	13.96	4,681.50	8,986.76	..	
Do.	.. ..	Sundry claims .. ..	..	6.26	..	85.00	124.57	..	104.70	97.49	3,697.75	7,787.32	..	
2-Mile Sandy	167L .. ..	Mountain Maid .. ..	12	..	..	26.00	99.71	..	..	..	107.00	268.70	..	
Do.	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	..	375.95	480.77	..	
Do.	.. ..	Sundry claims .. ..	..	..	..	194.50	244.06	..	..	14.36	1,607.65	2,787.45	..	
<i>From District generally:—</i>														
Sundry parcels treated at:—														
Royer's Public Crushing Syndicate .. ..														
State Battery—20-Mile Sandy .. ..														
Various Works .. ..														
Reported by Banks and Gold Dealers .. ..														
Understated previous to 1897 .. ..														
<b>Total</b> .. ..				<b>220.94</b>	<b>6.26</b>	<b>1,984.25</b>	<b>3,959.32</b>	..	<b>4,227.66</b>	<b>314.78</b>	<b>25,709.49</b>	<b>46,585.53</b>	..	

## West Pilbara Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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	9.00	3.15	..	
Lower Nicol ..	106, 109	Ninety-nine leases .. .. .	12	..	..	10.00	15.33	..	..	..	535.25	307.83	..	
Do. ..	134	Three Prodigals .. .. .	12	..	..	10.35	19.22	..	..	..	10.35	19.22	..	
Do. ..	..	Voided leases .. .. .	..	..	..	..	..	..	..	..	30.50	31.64	..	
Do. ..	..	Sundry claims .. .. .	..	..	..	..	..	..	..	10.44	10.00	11.51	..	
Mallina ..	..	Voided leases .. .. .	..	..	..	..	..	..	..	..	103.60	102.83	..	
Pilbara ..	..	Voided leases .. .. .	..	..	..	..	..	..	..	..	148.00	293.42	..	
Station Peak ..	117	Pilgrim's Rest .. .. .	24	..	..	245.00	134.12	..	..	..	395.00	208.27	..	
Do. ..	117. (118)	(Pilgrim's Rest leases)	..	..	..	..	..	..	..	..	9,598.00	9,151.73	..	
Do. ..	..	Sundry claims .. .. .	..	..	..	37.50	48.19	..	..	..	37.50	48.19	..	
Towranna ..	..	Voided leases .. .. .	..	..	..	..	..	..	..	..	1,934.80	2,088.26	..	
Weerianna ..	..	Voided leases .. .. .	..	..	..	..	..	..	..	..	25.25	220.30	..	
Do. ..	..	Sundry claims .. .. .	..	..	..	..	..	..	..	..	4.00	25.30	..	
<i>From Goldfield generally:—</i>														
Reported by Banks and Gold Dealers .. .. .				197.78	49.44	..	..	..	..	3,421.45	49.44	..	6.38	..
<b>Total .. .. .</b>				<b>197.78</b>	<b>49.44</b>	<b>302.85</b>	<b>216.86</b>	<b>..</b>	<b>..</b>	<b>3,453.29</b>	<b>52.56</b>	<b>13,180.25</b>	<b>12,965.92</b>	<b>..</b>

## Ashburton Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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	..	..	
<i>From Goldfield generally:—</i>														
Reported by Banks and Gold Dealers .. .. .				143.01	..	..	..	..	..	7,054.31	..	..	..	
<b>Total .. .. .</b>				<b>143.01</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>7,408.68</b>	<b>315.64</b>	<b>..</b>	<b>..</b>	



TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Gascoyne Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD PRODUCTION.				
				Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.
				Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.
Bangemall	.. ..	Voided leases .. .. .	..	..	..	..	..	..	6.22	236.70	218.49	..	
Do.	.. ..	Sundry claims .. .. .	..	..	..	..	..	12.29	..	..	..	..	
		<i>From Goldfield generally:—</i>											
		Reported by Banks and Gold Dealers .. .. .	..	..	..	..	..	..	268.27	..	..	..	
		<b>Total .. .. .</b>	..	..	..	..	..	..	<b>268.27</b>	<b>18.51</b>	<b>236.70</b>	<b>218.49</b>	..

Peak Hill Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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.
Horseshoe	44P .. ..	(Brilliant) .. .. .	Ftd.	..	..	..	..	..	277.19	254.58	965.96	..	
Do.	44P .. ..	Brilliant .. .. .	Ftd.	..	..	5.00	20.25	..	62.48	301.00	237.51	..	
Do.	44P .. ..	(Horseshoe (Peak Hill) Goldfield, Ltd.)	Ftd.	..	..	..	..	..	..	137.00	605.30	2.00	
Do.	314P .. ..	Millionaire .. .. .	Ftd.	..	..	9.00	11.12	..	..	9.00	11.12	..	
Do.	.. ..	Voided leases .. .. .	..	..	..	..	..	..	411.77	10.76	64.13	..	
Do.	.. ..	Sundry claims .. .. .	..	75.19	..	5.05	33.45	..	393.01	16.05	45.14	..	
Mt. Fraser	317P .. ..	Mt. Fraser .. .. .	9	..	..	76.00	82.33	..	..	76.00	82.33	..	
Do.	.. ..	Voided leases .. .. .	..	..	..	..	..	..	..	247.00	172.27	..	
Do.	.. ..	Sundry claims .. .. .	..	..	..	..	..	..	..	80.00	55.41	..	
Peak Hill	3P .. ..	(Atlantic No. 1 North: Peak Hill Goldfield, Ltd.)	a. r. p. 6 3 10	..	..	112.26	38.03	..	..	..	355.51	455.13	..
Do.	1P .. ..	North Star .. .. .	..	..	..	..	..	..	162.32	..	..	..	
Do.	310P .. ..	Oversight .. .. .	6	..	..	130.50	117.44	..	3.11	764.00	377.59	..	
Do.	1P, 2P, 4P, 5P, 6P, 8P, 9P, 13P, 15P, 16P, 26P, 27P, 28P, 29P, 35P, 36P, 43P, 53P, 54P, 63P, 146P, 152P, 190P, 222P, 239P, 248P, 252P, 262P, 274P, 306P, 313P, R.C. 1P, Q.Cs. 13P, 14P, T.A. 1P	Peak Hill Goldfield, Ltd.	a. r. p. 251 3 25	..	..	50,210.00	7,375.53	417.32	..	191.46	331,141.35	203,664.90	1,485.10
Do.	315P .. ..	Undersight .. .. .	Surr.	..	..	..	..	..	28.24	20.00	54.84	..	
Do.	319P .. ..	Undersight .. .. .	..	..	..	114.00	76.44	..	..	114.00	76.44	..	



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.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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.
Lawlers .. ..	37, 58, 62, 70, 155/8, 376/7, 381, 385, 399, 426/7, 459, 474, 500, 508/12, 552, 562/3, 573, 811, 840, T.L. 8	(East Murchison United, Ltd.) .. ..	..	..	..	..	..	..	..	291,797.00	155,594.26	900.48	
Do. .. ..	949 .. ..	Empire South .. ..	..	..	30.00	13.24	..	..	..	30.00	13.24	..	
Do. .. ..	115 .. ..	Glasgow Lass .. ..	Surr.	..	30.00	3.48	..	..	..	3,116.00	2,380.68	..	
Do. .. ..	22 .. ..	(Gorrie's May Be) .. ..	..	..	..	..	..	..	..	282.00	268.09	..	
Do. .. ..	887 .. ..	Hilden Secret .. ..	Surr.	..	57.00	157.02	..	..	..	231.00	480.29	..	
Do. .. ..	948 .. ..	Joker .. ..	5	..	28.00	21.11	..	..	..	28.00	21.11	..	
Do. .. ..	922 .. ..	King Edward .. ..	Wdn.	..	21.50	19.59	..	..	..	96.00	85.57	..	
Do. .. ..	846 .. ..	Leviathan .. ..	Ftd.	..	25.00	6.13	..	..	..	76.00	21.41	..	
Do. .. ..	936 .. ..	Lillian Lass .. ..	6	..	56.50	41.88	..	..	..	56.50	41.88	..	
Do. .. ..	58 .. ..	(London and Western Australian Explor- ation Co., Ltd.) .. ..	..	..	..	..	..	..	..	2,438.50	2,755.45	..	
Do. .. ..	37, 58, 62, 70, 155/8, 376/7, 381, 385, 399, 426/7, 459, 474, 500, 508/12, 552, 562/3, 573, 811, 840, T.Ls. 6, 7, 8, 10	(London and Western Australian Explor- ation Co., Ltd.) .. ..	..	..	30,673.00	6,028.86	360.32	..	..	179,563.00	40,438.14	2,560.31	
Do. .. ..	381 .. ..	(Never Can Tell) .. ..	..	..	..	..	..	..	..	610.00	847.81	..	
Do. .. ..	373 .. ..	New Holland .. ..	12	..	252.00	59.08	..	..	..	4,337.25	2,169.29	..	
Do. .. ..	858 .. ..	New Woman .. ..	18	..	60.00	75.18	..	..	..	402.50	390.48	..	
Do. .. ..	22, 37, 58, 62, 70, 155/8, 376/7, 381, 385, 399, 426/7, 459, 474, 500, 508/12, 552, 562/3, 573, 811, 840, 918, 929, 947, T.Ls. 6, 7, 8, 10	Northern Mines, Ltd. .. ..	a. r. p. 585 1 3	..	..	63,942.00	12,301.04	1,149.41	..	..	63,942.00	12,301.04	1,149.41
Do. .. ..	459 .. ..	Quartz Hill .. ..	..	..	..	..	..	..	..	119.50	92.47	..	
Do. .. ..	385 .. ..	(Queen) .. ..	..	..	..	..	..	..	..	1,252.00	623.25	..	
Do. .. ..	889 .. ..	(Rajah) .. ..	..	..	..	..	..	..	..	867.00	229.59	..	
Do. .. ..	889, 895 .. ..	Rajah leases .. ..	12	..	409.00	159.57	..	..	..	1,325.00	686.72	..	
Do. .. ..	910 .. ..	Sunrise .. ..	5	..	792.00	552.17	..	..	..	1,158.00	1,095.20	..	
Do. .. ..	521 .. ..	(Vivien) .. ..	..	..	..	..	..	..	..	45.50	21.75	..	





Do.	468B	Bullion	Wdn.	17.00	5.61			17.00	5.61	
Do.	382B	(Bull Oak)		725.00	956.77			725.00	956.77	
Do.	369B, 379B, 382B	Comrades leases	47	1,094.00	930.12			1,094.00	930.12	
Do.	432B	Diver	1	30.00	22.12			30.00	22.12	
Do.	381B	Dreamland	24	43.50	244.37			43.50	244.37	
Do.	211B	Eclipse	12	184.00	123.43			184.00	123.43	
Do.	(19B), 49B	(Fingall and Abundance leases)								
Do.	337B	Freedom	18	332.00	520.18			332.00	520.18	
Do.	263B	Golden Acre	Ftd.					40.75	29.64	
Do.	364B	Golden Ball Extended	5	38.00	44.00		8.14	38.00	44.00	
Do.	22B	(Koinoor)						27.75	14.21	
Do.	330B	Koinoor North	18	78.00	13.38			38.00	44.00	
Do.	139B	(Lady Ellen)						331.25	1,122.39	
Do.	139B, 234B	Lady Ellen leases	15	100.00	138.39	11.00		78.00	13.38	
Do.	286B	Late Seddon (late Battler)	9	64.50	63.58			219.75	458.96	
Do.	383B	Maid Marion	5	373.00	490.40			100.00	138.39	11.00
Do.	285B	Missing Link	18	239.50	382.57			122.50	102.03	
Do.	365B	(New Sensation)						373.00	490.40	
Do.	365B, 366B	New Sensation leases	48	163.00	380.89			239.50	382.57	
Do.	205B	Nunngarra	24	126.00	135.77			163.00	380.89	
Do.	397B	Poseidon	1	123.00	36.19			126.00	135.77	
Do.	329B	Royal Flush	12	30.00	119.31			123.00	36.19	
Do.	173B, 182B, 183B	Sandstone Development G.M. Co., N.L.	42	153.50	210.85			30.00	119.31	
Do.	300B	(Sceptic)						153.50	210.85	
Do.	121B	Squib	5	680.00	134.18			680.00	134.18	
Do.	47B	(Welcome)	Surr.	274.00	422.27			3.75		
Do.	395B	Welcome	12	31.00	6.57			398.25	526.79	1.22
Do.	182B	(Wirraminna Central)						182.50	208.91	
Do.	183B	(Wirraminna South)						31.00	6.57	
Do.	18B	(Worker)	Surr.					407.25	183.91	
Do.	378B	Worker	24	348.00	505.81		1.01	50.75	36.59	
Do.	18B, 47B	Worker leases	Surr.	157.00	116.38			447.25	495.92	
Do.		Voided leases						348.00	505.81	
Do.		Sundry claims						157.00	116.38	
Sandstone	4B	(Adelaide)		292.50	210.22		25.94	173.25	1,621.29	2.33
Do.	4B, 5B, 11B, 17B, 26B, 70B, 140B, 150B	(Adelaide leases)		13,019.50	16,179.26		46.67	627.02	1,348.65	
Do.								7,443.00	12,675.94	
Do.								21,010.00	30,255.28	
Do.	298B	Aruncourt	18	43.00	33.16			43.00	33.16	
Do.	5B	(Black Range)						38.14		
Do.	4B, 5B, 9B, 11B, 17B, 26B, 70B, 140B, 150B, 256B	Black Range Mining Co., N.L.	160	1,488.00	2,165.30			152.68	637.00	5.60
Do.								1,488.00	2,165.30	
Do.	325B	Eileen	6	41.00	13.59					
Do.	233B	(Floater)						41.00	13.59	
Do.	149B	(Golden Gate)						51.25	36.14	
Do.	151B	(Golden Key)						113.75	62.98	
Do.	391B	Great Surprise	Wdn.					883.00	1,412.75	
Do.	16B	(Kingoonya)								
Do.	293B	Lady Maude	Ftd.							
Do.	6B, 10B, 16B, 74B, 81B, 114B, 149B, 151B, 189B, 193B, 206B, 216B, 238B	Oroya Black Range, Ltd.	152	19,521.00	13,059.26			1,406.00	1,850.40	
Do.								23.00	15.67	
Do.								21,167.00	14,976.26	
Do.	187B	Sandridge : Sandstone Development G.M. Co., N.L.	18	226.00	91.19			226.00	91.19	
Do.	6B	(Sand Stone)								
Do.	10B	(Undaunted)						1,439.50	1,938.54	
Do.	74B	(Undaunted East)						80.00	46.04	
Do.	114B	(Undaunted East Extended)						648.25	619.82	
Do.	251B	Venus : Sandstone Development G.M. Co., N.L.	24	36.00	3.27			276.00	181.34	
Do.								36.00	3.27	

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.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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	8B	Wanderie	10	..	..	622.00	386.20	..	..	..	2,020.00	2,114.81	..	
Do.	161B	Wanderie No. 1 North	6	..	..	87.00	34.23	..	..	..	660.00	540.74	..	
Do.	23B	Wanderie No. 1 West	12	..	..	397.00	143.25	..	..	..	1,662.50	1,049.08	..	
Do.	174B	(Wonoka)	..	..	..	..	..	..	..	..	68.50	36.35	..	
Do.	174B	Wonoka: Sandstone Development G.M. Co., N.L.	24	..	..	165.00	156.12	..	..	..	165.00	156.12	..	
Do.	..	Voided leases	..	..	..	..	..	..	..	..	1,121.38	1,527.49	..	
Do.	..	Sundry claims	..	..	..	86.50	50.65	..	..	..	177.50	106.34	..	
<i>From District generally:—</i>														
Sundry parcels treated at:—														
El Dorado Custom Mill				..	..	..	cy.307.87	..	..	..	..	..	307.87	..
Maninga Marley Works				..	..	..	cy.407.97	..	..	..	..	..	407.97	..
Reply Battery				..	..	..	cy.971.63	..	..	..	..	..	1,180.04	..
State Battery—Nunngarra				..	..	18.00	1,538.84	29.53	..	..	18.00	4,392.72	29.53	
Various Works				..	..	..	..	..	..	..	..	772.24	..	
Reported by Banks and Gold Dealers				248.03	..	..	..	..	1,043.73	..	..	..	..	
<b>Total</b>				<b>248.03</b>	<b>65.47</b>	<b>55,451.70</b>	<b>57,633.02</b>	<b>40.53</b>	<b>1,116.34</b>	<b>1,735.08</b>	<b>94,609.71</b>	<b>119,482.88</b>	<b>49.68</b>	

Murchison Goldfield.

CUE DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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, 1459, 1484, 1486, 1560	Barrambie Ranges. G.M. Co., N.L.	55	..	..	5,172.33	5,683.13	..	..	..	5,172.33	5,683.13	..
Do.	1467	(Dawn of Hope)	..	..	..	..	..	..	9.99	5.09	29.70	..	
Do.	1492	General Kuropatkin	18	..	..	15.00	7.52	..	..	15.00	7.52	..	
Do.	1458	(Golden Treasure)	..	..	..	..	..	..	6.54	..	..	..	
Do.	1508	Queen	Ftd.	..	..	55.00	52.27	..	..	55.00	52.27	..	
Do.	..	Voided leases	..	..	..	..	..	..	5.96	..	..	..	
Cuddingwarra	1525	Blue Bell	Ftd.	..	..	..	..	..	..	32.50	86.64	..	
Do.	1618	Coodardy Reef	Ftd.	..	..	90.00	37.65	..	..	157.00	65.96	..	











Do.	617N	Lady Mary line of reef	5	233.00	91.88	233.00	91.88	233.00	91.88	..			
Do.	681N	Merry England	Ftd.	41.00	7.03	41.00	7.03	41.00	7.03	..			
Do.	16N, 25N, 166N	Mt. Hall, Royalist Consolidated and Nannine leases	33	829.00	863.82	829.00	863.82	11,941.60	15,489.50	127.60			
Do.	249N	Mt. Yagahong G.M. and Exploration Co., Ltd.	Ftd.	..	..	..	..	2,805.50	1,334.92	6.30			
Do.	697N	New Year	Ftd.	12.00	4.27	12.00	4.27	12.00	4.27	..			
Do.	752N	Queen of the Lake	18	32.00	22.29	32.00	22.29	32.00	22.29	..			
Do.	25N	(Royalist Consolidated)	..	..	..	..	..	19.18	762.53	3,500.70			
Do.	682N	Shamrock	9	21.20	8.14	21.20	8.14	21.20	8.14	..			
Do.	726N	Siberia	Wdn.	15.25	1.49	15.25	1.49	15.25	1.49	..			
Do.	..	Voided leases	..	..	..	..	..	34.02	116.76	50,477.50			
Do.	..	Sundry claims	..	179.00	125.01	179.00	125.01	7.63	987.50	29,706.16			
Quinns	716N	Ethel May	24	118.50	100.72	118.50	100.72	118.50	100.72	33.55			
Do.	646N	Favourite One	Ftd.	..	..	..	..	62.48	..	..			
Do.	703N	Lily	Ftd.	..	..	..	..	..	3.00	14.43			
Do.	616N	Lucknow	Ftd.	..	..	..	..	38.30	3.50	10.06			
Do.	622N	Phoenix	12	851.00	292.65	851.00	292.65	1,500.00	561.37	..			
Do.	..	Voided leases	..	..	..	..	..	7.30	169.54	2,135.75			
Do.	..	Sundry claims	..	21.00	4.99	21.00	4.99	228.04	39.00	11.63			
Stake Well	622N	Bushman's	12	44.05	70.00	44.05	70.00	44.05	97.00	58.12			
Do.	667N	Castlemaine United	12	86.75	7.00	86.75	7.00	143.68	47.00	49.94			
Do.	599N	Gladstone	6	..	..	..	..	..	203.00	83.86			
Do.	566N	Kohinoor	12	161.00	48.23	161.00	48.23	..	1,014.00	443.36			
Do.	691N	Kohinoor Extended	12	42.00	14.80	42.00	14.80	..	42.00	14.80			
Do.	593N	(Koh-i-Noor South)	12	..	..	..	..	..	2,714.50	991.63			
Do.	..	Voided leases	..	..	..	..	..	..	930.00	659.71			
Do.	..	Sundry claims	..	21.00	12.72	21.00	12.72	6.70	57.00	46.07			
Star of the East	174N	Star of the East, Ltd.	25	..	..	..	..	..	27,019.00	20,122.53			
Do.	..	Voided leases	..	..	..	..	..	..	225.00	182.87			
<i>From District generally:—</i>													
Sundry parcels treated at:—													
Brown and Lefroy's Works				..		cy. 14.50	..	..	..	14.50	..		
Finney Bros. Works				..		cy. 355.60	45.80	..	..	355.60	45.80		
State Battery—Meekatharra				..		cy. 737.13	..	..	..	737.13	..		
State Battery—Nannine				..		cy. 133.07	..	..	..	133.07	..		
Various Works				..		..	..	..	153.75	1,531.02	..		
Reported by Banks and Gold Dealers				255.25		..	..	6,246.70	..	..	..		
<b>Total</b>				<b>255.25</b>	<b>180.26</b>	<b>39,993.44</b>	<b>31,356.90</b>	<b>64.79</b>	<b>6,707.99</b>	<b>4,460.41</b>	<b>262,880.55</b>	<b>230,023.14</b>	<b>720.91</b>

DAY DAWN DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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)	..	..	..	95.00	107.00	..	..	..	150.00	175.18	..
Do.	339D, 421D, 422D	Creme d'Or leases	23	..	..	100.00	109.47	..	..	..	100.00	109.47	..
Do.	14D	(Croesus)	..	..	..	..	..	..	..	1,138.00	1,640.41	..	
Do.	179D, (342D)	(Cue Gold Mining and Exploration Co., Ltd.)	..	..	..	..	..	..	..	1,773.00	594.33	..	
Do.	398D	Day Dawn	Surr.	..	..	..	..	..	5.41	90.00	253.18	..	

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Murchison Goldfield—continued.

DAY DAWN DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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.	
Day Dawn	26D, 264D, 265D, 319D, 323D, 344D, 352D, 411D	East Fingall G.Ms., Ltd.	90	..	..	..	cy.64.10	..	..	..	..	1,208.00	773.29	..
Do.	26D	(Eureka No. 5)	..	..	..	..	..	..	..	..	..	1,280.25	1,292.49	..
Do.	416D	Golden Ridge	Ftd.	..	..	12.00	2.39	..	..	..	..	12.00	2.39	..
Do.	332D	Great Fingall Associated, No. 2	Ftd.	..	..	..	..	..	..	..	..	30.00	4.00	..
Do.	1d, 2d, 86D, 87D, 99D, 119D, 129D, 158D, 159D, 170D, 179D, 185D, 186D, 187D, 189D, 190D, 191D, 209D, 210D, 211D, 212D, 213D, 222D, 224D, 225D, 249D, 424D, 433D, 435/42D	Great Fingall Consolidated, Ltd.	372 10 11	..	..	233,055.00	99,253.43	16,269.03	..	..	..	1,037,909.00	848,699.35	98,571.05
Do.	179D	(Kinsella)	..	..	..	..	..	..	..	2.97	106.50	153.39	..	
Do.	179D	(Kinsella)	..	..	..	..	..	..	..	..	92.00	51.15	..	
Do.	179D, (342D)	(Kinsella leases)	..	..	..	..	..	..	..	..	3,365.00	862.00	..	
Do.	413D	Ironclad	Ftd.	..	..	..	..	..	..	..	47.00	4.33	..	
Do.	412D	Ironclad North	Ftd.	..	..	..	..	..	..	..	50.00	36.22	..	
Do.	404D	Mikado	Ftd.	..	..	..	..	..	..	..	28.50	19.54	..	
Do.	320D	Mount Fingall	12	..	..	..	cy.71.24	..	..	..	1,735.00	1,070.73	..	
Do.	14D, 138D, 166/7D, 180D, 254/6D, 260D, 337/9D, 340/LD	Murchison Associated G.Ms., Ltd.	84	..	..	..	..	..	..	..	3,503.50	2,216.61	..	
Do.	394D	New Ballarat	Ftd.	..	..	..	..	..	..	..	..	124.00	116.90	..
Do.	321D	Richmond	5	..	..	..	..	..	..	4.12	..	..	..	
Do.	181D	Royal Charter	Ftd.	..	..	..	..	..	..	52.42	317.00	269.62	..	
Do.	119D	(West Fingall No. 6)	..	..	..	..	..	..	..	..	43.00	15.32	..	
Do.	..	Voided leases	..	..	..	..	..	..	123.81	249.28	21,054.95	15,726.90	..	
Do.	..	Sundry claims	..	..	20.00	34.30	..	..	..	47.96	632.25	716.00	..	
Island	9D	(Eureka)	..	..	..	..	..	..	..	..	143.20	482.56	..	
Do.	9D	(Eureka)	..	..	..	..	..	..	..	..	60.00	62.32	..	
Do.	407D	First Chip	12	..	4.05	67.21	..	..	..	124.68	9.05	86.71	..	
Do.	5D, 9D, 142D, (230D)	(Island Eureka G.M., Co., N.L.)	..	..	..	..	..	..	411.66	50.51	13,911.20	17,629.61	..	
Do.	5D, 9D, 142D	Island Queen leases	16 2 25	..	..	52.00	230.39	..	..	..	542.00	686.12	..	
Do.	11D	Von Moltke	Surr.	..	..	..	..	..	..	38.84	57.76	..	..	
Do.	..	Voided leases	..	..	..	..	..	..	..	5.93	180.03	14,146.60	24,509.99	..
Do.	..	Sundry claims	..	..	7.65	..	..	..	..	17.74	7.65	..	..	









TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Yalgoo Goldfield—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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.		
Rothsay .. ..	538 .. ..	Lady Mary .. ..	Surr.	..	..	..	..	..	..	..	..	5.00	2.05	..	
Do. .. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	..	..	8,966.00	3,298.02	..	
Wadgingarra ..	515 .. ..	Wadgingarra Main Reef .. ..	12	..	..	..	..	..	..	..	..	15.00	9.70	..	
Do. .. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	..	..	485.11	576.94	..	
Do. .. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	..	..	..	..	71.50	38.21	..	
Yalgoo .. ..	495 .. ..	(Ivanhoe) .. ..	..	..	..	..	..	..	..	..	..	6.00	5.98	..	
Do. .. ..	495 .. ..	Ivanhoe: Ivanhoe G.M. Co., N.L., Yalgoo .. ..	12	..	..	139.00	31.75	..	..	..	..	468.00	105.47	..	
Do. .. ..	518 .. ..	Ivanhoe Extended: Ivanhoe G.M. Co., N.L., Yalgoo .. ..	6	..	..	8.00	3.75	..	..	..	..	123.00	41.69	..	
Do. .. ..	550 .. ..	Royal Bean .. ..	6	..	..	18.00	5.62	..	..	..	..	18.00	5.62	..	
Do. .. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	..	..	4,617.00	9,349.10	..	
Do. .. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	..	..	..	..	216.70	101.56	..	
Yuin .. ..	409, 469, 470 .. ..	Royal Standard leases .. ..	15	..	..	4,590.00	1,902.68	..	..	..	..	19,074.50	10,848.23	..	
Do. .. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	..	..	..	..	60.00	17.89	..	
<i>From Goldfield generally:—</i>															
Sundry parcels treated at:—															
Gloster's Mill .. ..				..	..	..	cy. 7.04	..	..	..	..	..	..	7.04	..
Ivanhoe Battery .. ..				9.42	..	..	..	..	9.42	..	..	..	..	..	..
Various Works .. ..				..	..	..	..	..	..	..	..	664.00	954.82	..	
Reported by Banks and Gold Dealers .. ..				11.24	..	..	..	..	29.22	..	..	..	..	..	
<b>Total .. ..</b>				<b>463'51</b>	<b>9'64</b>	<b>7,230'00</b>	<b>3,898'23</b>	<b>..</b>	<b>493'04</b>	<b>290'19</b>	<b>92,119'18</b>	<b>63,550'26</b>	<b>3'30</b>	<b>..</b>	

Mount Margaret Goldfield.

MOUNT MORGANS DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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.	
Australia United ..	216F .. ..	Australia United .. ..	Ftd.	..	..	..	cy. 215.58	..	..	..	..	..	215.58	..
Do. .. ..	244F .. ..	Bow Bells .. ..	5	..	..	9.00	22.96	..	..	..	..	39.66	97.54	..
Do. .. ..	234F .. ..	Brilliant .. ..	4	..	39.20	16.25	47.69	..	..	182.34	..	27.25	86.28	..
Do. .. ..	187F .. ..	Central .. ..	10	..	..	169.25	229.23	..	..	..	..	291.75	312.27	..
Do. .. ..	183F .. ..	Imperial .. ..	Ftd.	..	..	..	..	..	..	..	..	64.50	163.56	..
Do. .. ..	245F .. ..	Lady Agnes .. ..	Ftd.	..	..	8.00	26.39	..	..	..	..	8.00	26.39	..
Do. .. ..	167F .. ..	Lady Florence .. ..	Ftd.	..	..	..	..	..	..	..	..	37.00	89.69	..
Do. .. ..	231F .. ..	Lady Mary .. ..	Ftd.	..	..	..	..	..	..	..	..	26.00	10.77	..
Do. .. ..	95F .. ..	Lurline .. ..	12	..	11.99	..	..	..	..	11.99	..	197.53	598.19	..
Do. .. ..	1F .. ..	(Princess Iris) .. ..	..	..	..	..	..	..	..	3.33	..	516.00	1,246.92	..







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.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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 parcel treated at:—													
		Davis Cyanide Works .. .. .					cy. 16.80					48.66			
		Drew and Mason's Cyanide Works .. .. .					cy. 29.78					29.78			
		Fremantle Smelter, Ltd. .. .. .					19.20					19.20			
		King of the Hills Battery .. .. .				19.00	6.13			19.00		6.13			
		Lang's Cyanide Works .. .. .					cy. 493.80					658.02			
		Mt. Clifford Battery .. .. .					cy. 295.37					295.37			
		State Battery—Leonora .. .. .				10.00	780.54			33.50		4,027.52	72.90		
		State Battery—Pig Well .. .. .				9.00	291.96			9.00		1,064.80			
		Various Works .. .. .								330.50		1,382.14			
		Reported by Banks and Gold Dealers .. .. .								1,417.00	81.00				
		<b>Total .. .. .</b>				<b>32'94</b>	<b>44'89</b>	<b>180,496'76</b>	<b>81,631'17</b>	<b>4,336'88</b>	<b>1,474'94</b>	<b>3,575'95</b>	<b>1,193,995'00</b>	<b>741,182'00</b>	<b>17,147'91</b>

**MOUNT MARGARET DISTRICT.**

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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 .. .. .	1041T .. .. .	(Away from Home) .. .. .									68.26	570.50	1,829.72	
Do. .. .. .	1041T, 1087T .. .. .	Away from Home leases .. .. .	22							2.34	1,167.50	2,231.69		
Do. .. .. .	1637T, 1639T .. .. .	Belvidere G.M. Co., N.L. .. .. .	Ftd.	2.34		68.50	86.32				180.00	42.27		
Do. .. .. .	1019T .. .. .	Bond's Find .. .. .	Ftd.			46.00	60.23				1,340.00	2,197.52		
Do. .. .. .	1597T .. .. .	Brothers .. .. .	Surr.			20.00	24.64				228.00	298.50		
Do. .. .. .	944T .. .. .	(Carib) .. .. .									382.00	356.68		
Do. .. .. .	1751T .. .. .	Clinker .. .. .	18			137.00	204.38				137.00	204.38		
Do. .. .. .	1770T .. .. .	Dog Star .. .. .	12			10.00	2.21				10.00	2.21		
Do. .. .. .	1553T .. .. .	Golden Bell .. .. .	24			166.00	233.51				1,558.50	4,823.38		
Do. .. .. .	1566T .. .. .	Golden Bell North .. .. .	Ftd.			8.00	9.73				493.25	1,025.89		
Do. .. .. .	1676T .. .. .	Golden Bird .. .. .	Ftd.								43.00	56.27		
Do. .. .. .	1754T .. .. .	Great Westralia .. .. .	24			128.00	160.87				128.00	160.87		
Do. .. .. .	1657T .. .. .	Just in Time .. .. .	Ftd.							.98		74.71		
Do. .. .. .	1010T .. .. .	Karridale .. .. .	12			927.00	4,305.52				3,013.08	10,343.18	200.00	
Do. .. .. .	1655T .. .. .	Karridale South .. .. .	12								17.00	17.20		
Do. .. .. .	944T, 1375T .. .. .	Leviathan G.M. Ltd. .. .. .	24			17.00	15.93				470.75	325.15		
Do. .. .. .	1048T .. .. .	Maori Chief .. .. .	Ftd.			36.00	65.93				457.60	1,917.48		



TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Mount Margaret Goldfield—continued.

MOUNT MARGARET DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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.
Laverton .. ..	1767T .. ..	British Flag .. ..	24	..	70.00	54.41	..	..	..	70.00	54.41	..	
Do. .. ..	1711T .. ..	Brothers United .. ..	Ftd.	..	..	..	..	..	..	20.00	81.51	..	
Do. .. ..	1663T .. ..	Cock of the Walk .. ..	Ftd.	..	..	..	..	..	..	102.00	43.50	..	
Do. .. ..	1601T .. ..	Cornucopia .. ..	Surr.	..	22.00	4.38	..	..	..	37.00	43.46	..	
Do. .. ..	(592T, 693T, 830T), 840T, (1094T)	Craiggiemore Proprietary, Ltd.	12	..	..	65.91	..	..	..	105,702.00	35,402.76	..	
Do. .. ..	838T .. ..	(General Wabash)	..	..	..	..	..	..	..	100.00	288.72	..	
Do. .. ..	371T, (1249T) ..	(Golden Rhine G.Ms. (W.A.), Ltd.)	..	..	..	..	..	..	..	15,497.50	11,031.75	..	
Do. .. ..	1602T, 1603T ..	Great Bedford leases	Ftd.	..	..	..	..	..	..	112.00	28.98	..	
Do. .. ..	829T .. ..	(Ida H.)	..	..	..	..	..	..	..	111.00	285.13	..	
Do. .. ..	1632T .. ..	Ida H. Consols .. ..	Ftd.	..	..	..	..	..	..	35.00	7.77	..	
Do. .. ..	829T, 838T, 846T, 1219T, 1310T, 1671T	Ida H. G.M. Co., Ltd.	120	..	15,130.00	9,426.02	801.98	..	..	89,207.00	71,049.36	3,235.46	
Do. .. ..	1733T, 1784T ..	Just in Time G.M., Co. N.L.	36	..	469.00	180.50	..	..	..	469.00	180.50	..	
Do. .. ..	715T, 806T, 1206/7T, 1483T, 1523/5T, 1542T, 1544T, 1548T	(Lancefield G.M. Co., Ltd.)	..	..	..	..	..	..	..	102,179.78	39,402.81	..	
Do. .. ..	715T, 806T, 1206/7T, 1483T, 1523/5T, 1542T, 1544T, 1548T	Lancefield G.M. Co., Ltd.	188	..	61,906.00	25,993.20	3,420.32	..	..	115,545.00	44,382.24	4,070.25	
Do. .. ..	1606T .. ..	Mary Alice .. ..	Ftd.	..	11.00	6.58	..	..	315.47	70.00	167.64	..	
Do. .. ..	1752T .. ..	Sunshine .. ..	12	..	11.00	9.21	..	..	..	25.50	43.96	..	
Do. .. ..	1697T .. ..	Wheel of Fortune .. ..	12	..	5.00	35.47	..	..	138.44	5.00	35.47	..	
Do. .. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	542.00	5,126.50	4,234.99	..	
Do. .. ..	.. ..	Sundry claims .. ..	..	..	2.71	244.50	115.79	..	43.56	1,801.50	1,253.53	..	
Do. .. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	652.00	359.12	..	
Mt. Barnicoat	.. ..	Sundry claims .. ..	..	..	..	..	..	..	..	23.00	23.37	..	
Do. .. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	10.00	3.86	..	
Quartz Hill	.. ..	.. ..	..	..	..	..	..	..	..	..	..	..	
<i>From District generally:—</i>													
Sundry parcels treated at:													
State Battery—Burtville .. ..													
State Battery—Duketon .. ..													
State Battery—Laverton .. ..													
Various Works .. ..													
Reported by Banks and Gold Dealers .. ..													
<b>Total</b> .. ..				..	<b>17118</b>	<b>103,005'05</b>	<b>58,830'71</b>	<b>4,222'30</b>	<b>1,233'60</b>	<b>1,675'34</b>	<b>608,232'16</b>	<b>367,417'21</b>	<b>7,514'01</b>







Do.	3048z	Warrior	16	924.00	921.32				2,102.00	1,790.38	5.00		
Do.	3048z	(Warrior Menzies G.M. Co., N.L.)							1,165.00	731.48			
Do.	5299z	White Rock	12	71.00	338.67				71.00	338.67			
Do.		Voided leases						31.01	17,518.55	20,627.60	30.18		
Do.		Sundry claims		2.81	10.39			6.69	4,368.25	3,137.04			
Mt. Ida	5307z	(Copperfield)		120.00	24.89				120.00	24.89			
Do.	5306z, 5307z	Copperfield leases	48	158.00	89.34				158.00	89.34			
Do.	5035z	Federation	12	98.00	196.63				1,609.00	4,186.47			
Do.	5250z	Forest Belle	10	443.00	319.06				831.00	581.81			
Do.	5239z	Main Lode	Ftd.	129.00	64.82				607.00	302.98			
Do.	4525z, 4549z, 4582z, 4583z	Mt. Ida Consols, Ltd.	Ftd.						9,355.83	15,786.96	23.74		
Do.	5243z	Mt. Ida Meteor	12	1,242.00	1,260.44				1,796.00	1,884.08			
Do.	5282z	Rio Tinto	Ftd.	111.00	122.73				202.00	249.07			
Do.	5301z	Sandstone	Surr.	37.00	34.19				105.00	137.57			
Do.	5305z	Surprise	Wdn.	7.00	5.18				7.00	5.18			
Do.	5177z	Unexpected	12	395.00	1,486.31				858.00	2,837.69			
Do.	5222z	Unexpected North	Ftd.	32.00	37.8)				202.00	321.01			
Do.	5290z	Unexpected South	12	535.00	1,756.28	9.10			629.00	1,970.51	9.10		
Do.	5292z	Wild Rose	8	98.00	50.85				110.00	54.22			
Do.		Voided leases						77.07	11,943.75	10,659.13			
Do.		Sundry claims		172.50	117.23			9.57	2,305.50	1,484.15			
<i>From District generally:—</i>													
Sundry parcels treated at:													
		Coonega Battery		30.50	351.46				49.50	354.96			
		Fremantle Smelter, Ltd.			171.99	103.80				192.88	122.93		
		Heart's Content South Battery		22.00	9.82				22.00	9.82			
		Kalgoorlie Gold Recovery Works			126.72					26.72			
		Maranora Battery			cy. 11.48					11.48			
		Menzies Mining and Exploration Corporation Battery		40.00	19.34				489.50	599.05			
		Mt. Ida Cyanide Plant			cy. 607.36					1,753.59			
		Seddon Syndicate Works		40.00	7.70				40.00	7.70			
		State Battery—Menzies		159.00	798.46				728.50	3,253.14			
		State Battery—Mt. Ida		47.00	31.09				1,553.25	1,531.40			
		Walleroo Cyanide Plant			cy. 13.32					13.32			
		Various Works							661.05	1,754.76			
		Reported by Banks and Gold Dealers		.21				881.60	195.48				
		<b>Total</b>		<b>3'02</b>	<b>153'86</b>	<b>48,761'75</b>	<b>36,896'36</b>	<b>1,295'34</b>	<b>962'58</b>	<b>1,732'85</b>	<b>489,517'82</b>	<b>520,534'45</b>	<b>8,097'33</b>

### ULARRING DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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.
Davyhurst	866U	Birchmont	18			18.00	3.92				18.00	3.92	
Do.	860U	Callion G.M. Syndicate, N.L.	18			307.00	109.01				307.00	109.01	
Do.	824U	Emperor	Ftd.								35.00	30.05	
Do.	459U	(Golden Pole)									34.00	47.51	
Do.	459U, 461U, 468U, 484U (741U), 786U	Golden Pole G.Ms., Ltd.	78			11,929.00	6,891.09				53,466.00	56,313.09	
Do.	459U, 461U, 468U, 484U, (741U)	(Golden Pole G.Ms., N.L.)									970.00	2,321.69	
Do.	613U	(Great Ophir)									161.00	96.79	



Mulwarrie	831U	Great Winara	Ftd.	..	..	..	..	..	..	77.50	17.06	..
Do.	851U	Mulwarrie	Ftd.	..	..	72.50	78.59	..	..	72.50	78.59	..
Do.	494U	Mulwarrie Main Reef	12	..	..	150.00	157.94	..	..	1,271.00	2,696.27	20.81
Do.	856U	Oakley	12	..	9.43	320.50	323.17	..	..	320.50	323.17	..
Do.	852U	Surprise	Ftd.	..	..	7.00	4.16	..	..	36.00	32.32	..
Do.	855U	Ularring Westralia	12	..	..	470.00	271.73	..	..	529.00	292.64	..
Do.	..	Voided leases	..	..	..	..	..	..	25.60	12,888.89	19,975.87	5.49
Do.	..	Sundry claims	..	..	..	..	..	..	5.01	561.25	312.46	..
Ularring	780U	Drusilla	Ftd.	..	..	132.00	45.04	..	..	180.00	357.19	..
Do.	89U (92U)	London and Coolgardie Explorers, Ltd.	18	..	..	105.50	77.69	..	..	2,342.10	4,042.24	..
Do.	766U	Off Chance	12	..	..	198.00	196.10	..	..	873.00	1,135.12	..
Do.	888U	Sha-rocket	20	..	..	35.00	41.83	..	..	35.00	41.83	..
Do.	..	Voided leases	..	..	..	..	..	..	1.86	3,864.25	5,285.90	..
Do.	..	Sundry claims	..	..	..	87.50	82.59	..	..	100.50	89.43	..
<i>From District generally:—</i>												
Sundry parcels treated at:												
State Battery—Mulline .. .. . cy. 425.67												
State Battery—Mulwarrie .. .. . cy. 340.70												
Various Works .. .. . 15.82												
Reported by Banks and Gold Dealers .. .. . 1.69												
<b>Total</b> .. .. . <b>9'69</b> <b>25,644'50</b> <b>19,063'04</b> <b>1,148'11</b> <b>4'62</b> <b>436'03</b> <b>188,415'01</b> <b>197,944'55</b> <b>5,417'44</b>												

### NIAGARA DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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.
Armidale	673G	Desdemona	18	..	..	1,842.00	1,882.53	..	..	1,842.00	1,882.53	..	
Do.	685G	Othello	18	..	4.68	55.00	32.60	..	..	55.00	32.60	..	
Do.	664G	Rising Sun	12	..	..	37.50	31.49	..	..	37.50	31.49	..	
Do.	..	Sundry claims	..	..	8.99	196.00	123.01	..	..	196.00	123.01	..	
Kookynie	27G	Altona: Cosmopolitan Proprietary, Ltd.	12	..	..	153.50	144.00	..	..	4,251.00	3,960.52	..	
Do.	27G, 28G	(Altona leases: Cosmopolitan Proprietary, Ltd.)	..	..	..	..	..	..	..	538.00	423.30	..	
Do.	427G	Altona North Extended: Cosmopolitan Proprietary, Ltd.	24	..	..	..	..	..	..	1,037.50	1,031.15	..	
Do.	246G	Altona North-West: Cosmopolitan Proprietary, Ltd.	6	..	..	..	..	..	..	58.50	99.49	..	
Do.	31G	Altona No. 1 North: Cosmopolitan Proprietary, Ltd.	12	..	..	119.50	91.79	..	..	565.50	409.45	..	
Do.	28G	Altona No. 1 South: Cosmopolitan Proprietary, Ltd.	12	..	..	150.00	189.14	..	..	4,583.00	4,368.14	..	
Do.	677G	Axe	9	..	..	84.50	21.98	..	..	84.50	21.98	..	
Do.	265G, 269G	Battery leases: Cosmopolitan Proprietary, Ltd.	24	..	..	..	..	..	..	..	47.50	..	
Do.	666G	Britisher	Ftd.	..	..	..	..	..	..	50.00	19.53	..	
Do.	316G	Canadian: Cosmopolitan Proprietary, Ltd.	12	..	..	..	..	..	..	41.20	62.63	..	
Do.	320G	Champion	12	..	..	1,187.00	872.71	..	..	1,187.00	872.71	..	
Do.	320G	(Champion: Guthrie & Co., Ltd.)	..	..	..	..	..	..	..	2,705.00	1,556.16	..	
Do.	320G, 335G, 347G	(Champion leases)	..	..	..	..	..	..	..	2,157.50	2,554.15	..	
Do.	320G	(Champion Proprietary, Ltd.)	..	..	..	..	..	..	..	36,310.00	18,381.09	425.32	
Do.	672G	Champion South	Surr.	..	..	6.00	9.39	..	..	6.00	9.39	..	

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.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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 .. ..	20G, 87G, 94G, 338G, 438G, 533G, 534G	(Cumberland Niagara G.Ms., Ltd.) ..	..	..	..	..	..	..	53,770.00	26,609.77	..		
Do. .. ..	20G, 87G, 94G, 338G, 438G, 533G, 534G	(Cumberland Niagara G.Ms., Ltd.) ..	..	..	..	..	..	11,082.00	5,179.17	..			
Do. .. ..	194G .. ..	(Diamontina) .. ..	..	..	..	..	..	117.05	118.02	..			
Do. .. ..	194G .. ..	Diamontina: Cosmopolitan Proprietary, Ltd.	24	..	..	..	..	83.50	84.65	..			
Do. .. ..	615G .. ..	(Dow's Batavia and Papuan United)	Surr.	..	..	..	..	57.00	85.98	..			
Do. .. ..	26G .. ..	Englishman: Cosmopolitan Proprietary, Ltd.	12	..	30,235.00	7,758.74	572.56	..	520,477.62	246,170.99	4,779.81		
Do. .. ..	647G .. ..	(Happy-go-Lucky)	..	..	..	..	..	106.50	57.78	..			
Do. .. ..	24G .. ..	Irishman: Cosmopolitan Proprietary, Ltd.	12	..	35.00	38.50	..	35.00	38.50	..			
Do. .. ..	669G .. ..	Lubra .. ..	24	..	1,040.50	380.28	..	1,152.50	428.35	..			
Do. .. ..	662G .. ..	May-be .. ..	24	..	831.00	337.74	..	2,170.00	752.34	..			
Do. .. ..	647G .. ..	Mulwarrie Exploration Co., Ltd.	12	..	582.00	285.29	..	582.00	285.29	..			
Do. .. ..	388G, 615G	Papuan leases .. ..	Ftd.	..	10.00	2.22	..	373.50	311.39	..			
Do. .. ..	658G .. ..	Pearly Button .. ..	Ftd.	..	195.00	26.59	..	314.00	86.36	..			
Do. .. ..	25G .. ..	Scotchman: Cosmopolitan Proprietary, Ltd.	12	..	..	..	..	480.50	227.41	..			
Do. .. ..	656G .. ..	Treasure .. ..	Surr.	..	..	..	..	345.50	294.07	..			
Do. .. ..	663G .. ..	Victoria .. ..	6	..	48.00	50.87	..	92.50	120.06	..			
Do. .. ..	22G .. ..	Welshman: Cosmopolitan Proprietary, Ltd.	12	..	79.00	80.14	..	202.50	179.54	..			
Do. .. ..	23G .. ..	Welshman No. 1: Cosmopolitan Proprietary, Ltd.	12	..	..	..	..	50.50	78.12	..			
Do. .. ..	469G .. ..	Whale .. ..	12	..	7.44	286.50	124.41	..	189.33	1,923.00	2,579.78		
Do. .. ..	.. ..	Voided leases .. ..	..	..	..	..	..	67.15	34,902.60	34,374.61	..		
Do. .. ..	.. ..	Sundry claims .. ..	..	18.69	99	851.50	556.48	..	18.69	74.79	2,437.75	1,684.12	
Niagara .. ..	671G .. ..	Big Tom .. ..	Ftd.	..	40.00	14.57	..	..	..	40.00	14.57		
Do. .. ..	686G .. ..	Big Tom .. ..	5	..	20.00	11.90	..	..	..	20.00	11.90		
Do. .. ..	586G .. ..	Challenge .. ..	a. r. p. 20 2 8	..	76.00	61.62	..	..	..	892.00	695.10		
Do. .. ..	518G, 529G, 577G	Eagle Hawk Heather Co., N.L. ..	40	..	1,077.00	180.27	..	..	..	6,054.00	2,189.81		
Do. .. ..	391G .. ..	(Euroa Extended) .. ..	Ftd.	..	..	..	..	..	..	77.50	70.23		
Do. .. ..	362G, 391G	(Euroa leases) .. ..	Ftd.	..	..	..	..	..	..	279.50	450.07		
Do. .. ..	419G, 461G	Hannans Main Reef G.M. Co., Ltd.	24	..	50.00	1,200.95	..	..	..	10,463.00	5,375.16		
Do. .. ..	651G .. ..	Justice .. ..	12	..	207.00	78.61	..	..	..	264.00	144.90		
Do. .. ..	653G .. ..	Lady Betty North .. ..	Ftd.	..	..	..	..	..	..	185.50	70.67		
Do. .. ..	678G .. ..	Latrobe .. ..	12	..	107.50	71.34	..	..	..	107.50	71.34		
Do. .. ..	314G .. ..	Lily .. ..	5	3.83	41.00	18.08	..	13.90	..	559.00	1,191.43		
Do. .. ..	571G .. ..	May .. ..	5	..	419.50	286.25	..	..	..	1,275.00	1,163.35		
Do. .. ..	442G .. ..	Mikado .. ..	6	..	..	..	..	..	..	191.00	258.26		
Do. .. ..	518G .. ..	(Missing Link) .. ..	..	..	..	..	..	23.93	..	431.00	563.27		
Do. .. ..	419G .. ..	(Opal) .. ..	..	..	..	..	..	..	..	552.50	490.53		
Do. .. ..	419G .. ..	(Opal: Hannans Main Reef G.M. Co., Ltd.)	..	..	..	..	..	..	..	119.00	70.99		

Do.	461g	(Pearl—Hannans Main Reef G.M. Co., Ltd.)								398.00	224.38			
Do.	674g	Pine Lodge	5		153.00	116.01				153.00	116.01			
Do.	445g	(Try Again)								653.50	536.15			
Do.	445g, 581g	Try Again leases	8		45.00	33.28				159.00	295.41			
Do.	606g	Waratah	5		75.50	222.29				297.00	519.85			
Do.	505g, 611g	W. E. G. leases	17		578.00	321.85				4,978.00	4,574.28			
Do.	611g	(W. E. G. Extended)								85.00	51.32			
Do.	613g	White Cross	5	2.64	345.00	163.38			2.64	671.50	362.09			
Do.		Voided leases							50.43	15,070.00	10,752.30			
Do.		Sundry claims		1.19	592.50	286.56			25.30	4,207.75	2,645.56			
Tampa	278g	(Fortuna)								109.00	187.42			
Do.	278g, 349g	Fortuna leases	18		121.00	89.80				1,101.50	1,466.72			
Do.	349g	(Grafter)								1,751.00	2,487.00			
Do.	682g	Lady Helen		.94	162.00	93.02			.94	162.00	93.02			
Do.	664g	Rising Sun	12							209.00	112.32			
Do.		Voided leases							13.92	13,328.05	8,735.51			
Do.		Sundry claims			224.50	145.87				1,515.50	1,026.36			
From District generally:—														
Sundry parcels treated at:—														
		Challenge Cyanide Works				cy. 53.56					443.52			
		Champion Slimes Plant				cy. 41.36					41.36			
		Cosmopolitan Proprietary, Ltd., Works				16.17					6.17			
		Cumberland Niagara Cyanide Works				cy. 316.25				53.00	494.91			
		Eagle Hawk Heather Works			34.00	586.14				128.00	832.63			
		Fremantle Smelter, Ltd.				136.71	41.17				36.71	41.17		
		Grafter Public Battery			30.00	95.69				82.00	124.65			
		State Battery—Niagara			65.50	1,083.98				486.50	3,659.22			
		Tampa Cyanide Works				83.23					1,342.73			
		Various Works								283.00	2,827.39			
		Reported by Banks and Gold Dealers		79.66	14.25				880.23	775.74				
		<b>Total</b>			<b>98'35</b>	<b>44'95</b>	<b>42,488'50</b>	<b>18,738'64</b>	<b>613'73</b>	<b>898'92</b>	<b>1,251'74</b>	<b>753,852'52</b>	<b>412,459'69</b>	<b>5,246'30</b>

#### YERILLA DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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	497R	(Gawler)										130.00	173.15	
Do.	847R	Jack Wren	6			105.50	111.05					178.50	159.38	
Do.	401R	(Neta)										4,280.50	5,466.29	
Do.	418R	(Neta Extended)										1,182.50	1,421.81	
Do.	401R, 418R, 497R, 500R	Neta leases	84			540.00	1,181.85					4,787.00	9,338.94	34.58
Do.	872R	Old Edjudina	24			24.00	13.73					24.00	13.73	
Do.	539R	Senate	24			560.00	1,253.93					2,825.00	5,838.89	
Do.	841R	Turn of the Tide	Ftd.								3.65	122.00	99.15	
Do.		Voided leases										7,629.25	6,546.31	2.21
Do.		Sundry claims				16.00	32.05					1,112.00	956.21	1.00
Eucalyptus		Voided leases								2,864.77		1,351.35	3,020.68	
Do.		Sundry claims								367.50		170.50	194.49	
Linden	861R	Lady Ethel	12		8.12	21.50	35.31			8.12		21.50	35.31	
Do.	869R	Rock	5		5.63					5.63				
Do.		Voided leases								453.65		6,214.40	10,095.36	
Do.		Sundry claims				19.00	33.16			17.98		352.00	339.50	



Do.		Voided leases							3,065.18	3,128.46	2,024.10		
Do.		Sundry claims		2.35	58.00	66.15		19.30	8.98	1,307.50	725.55		
Yilganie	854R	Mt. Yilganie	24		15.00	7.25				15.00	7.25		
Do.		Voided leases								203.75	288.20		
Do.		Sundry claims			10.50	2.62		121.67	19.14	25.50	46.17		
Yundamindera	825R	E. I. C.	12		14.00	15.80				33.00	37.16		
Do.	457R, 479R, 493R	(London and Hamburg Gold Recovery Co., Ltd.)								1,942.00	943.02		
Do.	541R	(Maori Queen)	24		155.00	186.86				1,063.00	1,569.26		
Do.	450R, 456R	(Mt. Margaret Reward Claim, Ltd.)								10,833.00	6,875.91		
Do.	450R	(Potosi)								76.00	152.80		
Do.	450R, 456R, 457R, 466R, 479R, 493R, 567R	Potosi Consolidated, Ltd.)	120		1,342.00	1,525.25				39,791.85	20,219.95		
Do.	466R	(Queen of the May)								1,810.60	1,719.92		
Do.	821R	Rose of Italy	Ftd.							24.00	9.96		
Do.	889R	Success	20		28.00	28.78				28.00	28.78		
Do.		Voided leases							71.37	5,401.65	7,600.47		
Do.		Sundry claims			567.00	315.40			1.37	1,511.00	1,237.84		
<i>From District generally:—</i>													
Sundry parcels treated at:—													
		Fremantle Smelter, Ltd.				92.87					16.51		
		Pauley and McCoy's Battery			83.00	110.82				285.25	284.63		
		State Battery—Pinjin			47.50	220.58				109.00	543.66		
		State Battery—Yarri			86.50	500.16				197.00	1,271.44	3.50	
		State Battery—Yerilla		2.17		cv 16.56		2.17		72.00	121.19		
		Various Works								375.60	2,878.19		
		Reported by Banks and Gold Dealers						870.49	154.74				
<b>Total</b>				<b>217</b>	<b>69'27</b>	<b>14,157'50</b>	<b>11,711'32</b>		<b>1,019'93</b>	<b>7,190'63</b>	<b>129,621'28</b>	<b>114,766'78</b>	<b>52'65</b>

### Broad Arrow Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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	1278w	Baien Powell	24			312.50	407.62				391.50	551.50	
Do.	1329w	Dulcie Maud	12				cy. 94.50					94.50	
Do.	1330w	Dulcie Maud Extended	Ftd.			55.50	33.41				55.50	33.41	
Do.	1224w	Eureka	Ftd.							29.66	339.00	457.02	
Do.	1186w, 1187w	Excelsior leases	Ftd.								4,448.50	2,639.72	
Do.	1318w	Howden	Ftd.				cy. 82.89					82.89	
Do.	1337w	Howden	24				cy. 192.83					192.83	
Do.	1232w	Lancashire Hero	Ftd.		7.34	28.50	44.22			7.34	323.00	880.08	
Do.	959w, 968w (970w), 1045w (1048w, 1233w)	New Slug Hill G.M. Co., Ltd.	46			5,911.00	4,850.42	105.36			12,650.97	9,033.60	105.36
Do.	1327w	Pearl	12			198.00	53.85				198.00	53.85	
Do.	959w, 968w (970w), 1045w (1048w, 1233w)	(Slug Hill (Pride of the Hill) G.M. Co., Ltd.)								60.24	13,265.00	10,632.96	98.24
Do.	1270w	(Windanya)	12								108.00	37.48	
Do.	1190w	Wycheproof	24			19.50	40.81				539.25	758.03	





Do.	1287w	Invincible Extended	Ftd.								64.50	11.72		
Do.	1289w, 1308w	Lady Evelyn leases	24			805.00	645.14				805.00	645.14		
Do.	1322w	Lone Hand	24		20.66	128.00	73.86			20.66	128.00	73.86		
Do.	1323w	Maid of the Valley	Ftd.								32.00	15.57		
Do.	1293w	Mexico	13			49.00	154.97				124.00	277.65		
Do.	1291w	Missouri	12			200.00	64.35			4.84	392.00	134.61		
Do.	1335w	Ora Banda Boulder	18			8.00	1.77				8.00	1.77		
Do.	1310w	Ora Banda Extended	Ftd.			250.00	70.26				250.00	70.26		
Do.	1288w, 1303w	Orabanda leases	24			6,098.00	1,404.46				6,468.00	1,526.23		
Do.	1295w	Ora Banda Nellie	12			468.00	131.01				468.00	131.01		
Do.	1294w	Palmerston	12		8.64					24.20				
Do.	1299w	Palmerston North	18			68.00	5.75				68.00	5.75		
Do.	1300w	Pole	12			90.00	431.05				90.00	431.05		
Do.	1306w	Port Arthur	12								37.50	19.66		
Do.	1336w	Slippery Gimblet	24			603.50	333.31				603.50	333.31		
Do.	1332w	Try Again	6		32.23					32.23				
Do.	1283w	Waverley	9			147.00	108.68				370.00	156.99		
Do.		Sundry claims		9.38	2.01	1,058.25	956.76		35.48	2.01	1,190.75	1,162.77		
Smithfield		Voided leases									1,027.00	200.90		
Do.		Sundry claims									20.00	9.54		
From Goldfield generally:—														
Sundry parcels treated at:—														
		Braybrook's Cyanide Works					cy. 225.26					225.26		
		Carter's Venture Mill					cy. 489.20					960.22		
		Fremantle Smelter, Ltd.					132.83					44.50	7.09	
		Hacke's Treatment Works					cy. 18.58					18.58		
		Lady Bountiful Battery					cy. 12.95				8.50	62.72		
		Milne's Battery					cy. 14.95					14.95		
		New Arrow Proprietary Battery					cy. 47.67		299.35		5,229.08	4,209.07		
		Ora Banda Battery				77.00	142.17				77.00	142.17		
		Orotava Works—Kalgoorlie					cy. 66.24					70.68		
		Paddington Cyanide Works					cy. 814.08					5,091.46		
		Regan's Battery					cy. 42.33					42.33		
		Zoroastrian Battery				18.00	.43				18.00	.43		
		Various Works												
		Reported by Banks and Gold Dealers			529.26					1,970.91	11,280.35	10,829.90		
										6,160.28				
		Total			659.72	170.68	37,190.26	21,076.78	105.36	16,450.20	1,604.77	404,655.25	289,062.51	245.50

**North-East Coolgardie Goldfield.**  
KANOWNA DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD PRODUCTION.					
				Alluvial.	Dolled and Specimens.	Ora Treated.	Gold therefrom.	Silver.	Alluvial.	Dolled and Specimens.	Ora 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	434x, 878x	Voided leases (Atlas G.Ms., Ltd.)										160.00	141.76	
Gambier	1187x	Brilliant (Camelia)	Ftd.			175.00	59.09					8,007.00	3,378.99	
Do.	434x	Camelia	24			426.00	276.70				3.53	242.50	325.82	
Do.	434x	Camelia	12			153.00	162.90					1,340.00	903.69	
Do.	878x	Camellia Extended	Ftd.			45.00	8.21				.25	236.00	244.24	
Do.	1149x	Gambia	6			95.50	105.93					219.00	78.67	
Do.	1181x	Gem	6									122.50	139.60	

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.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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.	
Gambier	1188x	North Brilliant	12	..	..	143.00	76.85	..	..	..	143.00	76.85	..	..
Do.	..	Voided leases	..	..	..	..	..	..	..	34.95	567.00	569.22	..	..07
Do.	..	Sundry claims	..	..	62.93	386.50	187.11	..	24.70	245.94	858.75	662.21	..	..
Gindalbie	1047x	Eclipse	6	..	..	..	..	..	..	..	423.00	469.25	..	..
Do.	1123x	Gindalbie	12	..	..	..	..	..	..	..	70.00	22.89	..	..
Do.	1212x	Jack's Dream	Wdn.	..	..	70.00	38.40	..	..	..	70.00	38.40	..	..
Do.	1191x	Jubilee	12	..	..	91.00	21.52	..	..	..	141.00	45.26	..	..
Do.	1184x	May Flower	Ftd.	..	..	10.00	3.97	..	..	..	41.00	32.49	..	..
Do.	1127x	Monkland	18	..	..	..	..	..	..	..	436.00	319.01	..	..
Do.	1192x	Occidental	18	..	..	64.50	116.33	..	..	..	81.50	212.29	..	..
Do.	392x, 394x, 396x, 1048x, 1207x	Queen Margaret G.M. Co., Ltd.	100	..	..	5,375.00	6,060.95	..	..	..	20,216.25	21,318.46	..	..
Do.	1185x	Red and White	Ftd.	..	..	..	..	..	..	..	13.00	14.98	..	..
Do.	392x, 394x, 396x	(South Gippsland leases)	..	..	..	..	..	..	..	..	3,697.00	3,805.05	..	..
Do.	1174x	United	9	..	..	233.00	436.14	..	..	..	388.00	1,103.66	..	..
Do.	..	Voided leases	..	..	..	..	..	..	..	19.94	2,343.55	2,371.91	..	..
Do.	..	Sundry claims	..	..	..	55.00	38.75	..	..	674.82	624.75	761.31	..	..
Gordon	891x	Sirdar	12	..	15.55	..	cy.5.28	..	..	32.60	106.50	1,172.42	..	..
Do.	..	Voided leases	..	..	..	..	..	..	..	205.17	1,145.80	932.67	..	..
Do.	..	Sundry claims	..	..	..	..	..	..	..	54.65	586.50	525.61	..	..
Kanowna	35x, 64x, 345x	Ballarat and Prince Oscar Co., Ltd.	40	3.59	..	1,433.50	280.15	23.57	3.59	35.42	5,181.00	1,846.99	204.84	..
Do.	35x, 64x, 345x	(Ballarat and Prince Oscar Syndicate, Ltd.)	..	..	..	..	..	..	..	47.79	5,497.00	2,926.09	..	..
Do.	1211x	Blue Duck	Surr.	..	18.29	5.00	16.42	..	..	18.29	5.00	16.42	..	..
Do.	1193x	Budgerie	9	..	..	..	..	..	..	33.15	13.50	37.42	..	..
Do.	1160x	Bulong United	6	..	14.69	136.00	147.56	..	..	14.69	145.00	188.43	..	..
Do.	1172x	Chance	Surr.	..	..	18.00	21.55	..	..	65.97	33.00	48.30	..	..
Do.	367x, (1036x, 1042x)	(Commonwealth G.Ms., Ltd.)	..	..	..	..	..	..	..	..	4,266.00	1,685.13	..	..
Do.	1205x	Cricket	Surr.	..	1.76	163.00	49.13	..	..	1.76	163.00	49.13	..	..
Do.	1128x	Dalmanutha	Ftd.	..	..	60.00	14.55	..	..	..	139.00	48.74	..	..
Do.	1151x	Evelyn Amalgamated	1	..	1.97	88.00	27.27	..	..	9.99	1,459.00	252.28	..	..
Do.	1206x	Gentle Annie	12	..	1.58	..	..	..	..	1.58	..	..	..	..
Do.	1062x	Gentle Polly	a. r. p. 3 2 0	..	14.54	1,387.50	3,245.70	145.00	..	22.51	2,648.25	7,955.10	266.00	..
Do.	83x, 180x, 200/1x	(Golden Cement claims)	..	..	..	..	..	..	..	..	5,848.00	2,570.51	..	..
Do.	55x	Golden Crown	14	..	17.42	643.00	541.45	..	..	290.71	1,328.25	1,088.13	..	..
Do.	367x (1036x, 1042x)	(Golden Valley leases)	..	..	..	..	..	..	..	..	213.00	80.31	..	..

Do.	367x, (1036x, 1042x)	(Golden Valley Mines of W.A., Ltd.)	..	..	..	..	..	..	7,602.00	4,688.97	..
Do.	1139x	Golden Wonder	10	1.21	152.00	58.30	..	7.94	671.50	477.21	..
Do.	1024x	Havilah	12	53	144.00	32.50	..	5.54	649.00	297.79	..
Do.	1179x	Home Reefs	Ftd.	..	15.00	4.94	..	..	15.00	4.94	..
Do.	1186x	Home Signal	12	10.41	..	..	..	91.85	..	..	..
Do.	1019x	Kanowna	7	..	477.00	562.09	..	561.91	3,463.00	6,833.36	..
Do.	153x, (807x)	(Kanowna Acquisition Syndicate, Ltd.)	..	..	..	..	..	..	3,326.50	1,469.83	..
Do.	153x, (807x)	(Kanowna Consolidated G.Ms., Ltd.)	..	..	..	..	..	..	1,164.00	784.38	..
Do.	1194x	Kanowna Low Grade	12	..	318.00	39.33	..	..	441.00	48.03	..
Do.	1175x	Kanowna Mystery	Ftd.	..	61.00	11.12	..	..	266.00	48.61	..
Do.	1055x	Kintore	12	..	395.50	459.02	..	..	984.75	1,697.26	..
Do.	52x, (68x, 185x, 213x)	Lake View South G.Ms., (W.A.), Ltd.	18	..	3,926.00	1,143.65	..	..	22,242.65	9,490.91	24.33
Do.	18x, 19x	(Lily Australis G.Ms., Ltd.)	..	..	..	..	..	..	197.00	119.18	..
Do.	187x, 456x	London and Coolgardie Explorers, Ltd.	29	..	141.00	47.74	..	17.69	25,160.66	9,317.66	..
Do.	1076x	Madame Melba	5	..	371.00	360.99	18.00	1.44	1,227.50	2,285.39	18.00
Do.	1154x	Minerva	3	26.01	120.50	36.98	..	26.01	966.50	223.34	..
Do.	1202x	Monte Christo	5	5.56	134.00	103.29	..	5.56	134.00	103.29	..
Do.	55x	(New Standard Exploration Co., Ltd.)	..	..	..	..	..	11.49	2,128.50	2,740.13	..
Do.	1196x	North Lead Lode	8	..	235.00	48.95	..	..	235.00	48.95	..
Do.	1152x	North Lead Lode Consols	10	.94	501.00	103.06	..	5.64	1,353.50	256.11	..
Do.	3x, 18x, 19x, 46x, 60x, 81x, 938x, 974x, 1035x, 1132x, (1134x), 1135x	North White Feather G.Ms., Ltd.	a. r. p. 115 2 8	..	23,472.00	7,852.14	..	..	91,361.75	52,468.93	159.19
Do.	153x	Q.E.D.	18	2.19	281.00	94.98	..	12.21	1,018.50	450.00	..
Do.	1209x	Red Streak	6	41.09	202.00	64.91	..	41.09	202.00	64.91	..
Do.	52x, (68x, 185x, 213x)	(Robinson G.Ms., Ltd.)	..	..	..	..	..	..	16,478.75	16,213.33	..
Do.	1214x	Rollo's Reward	48	..	2.00	.44	..	..	2.00	.44	..
Do.	1159x	Rollo's Reward G.M. Co., N.L.	Ftd.	..	25.00	4.51	..	..	25.00	4.51	..
Do.	1083x	Scotia	12	..	..	..	..	..	59.00	9.90	..
Do.	1208x	Signal No. 3	9	..	45.00	16.94	..	..	45.00	16.94	..
Do.	1121x	Sunbeam	a. r. p. 19 2 33	..	451.00	346.19	..	..	991.00	983.77	..
Do.	1169x	Surprise No. 1	Ftd.	..	55.50	19.10	..	..	149.50	74.75	..
Do.	153x	(Waldons Find G.M., Ltd.)	..	..	..	..	..	..	1,076.05	904.43	..
Do.	1183x	Wattle Bird	Ftd.	6.08	33.00	17.29	..	21.59	60.00	43.02	..
Do.	9x, 10x, 12/5x, 72x, 83x, 180x, 200/1x, 431x, 835x, 1001x, 1012x, 1103x, 1107/9x	White Feather Main Reefs (1906), Ltd.	a. r. p. 237 3 38	..	8,590.00	1,960.05	..	..	8,590.00	1,960.05	..
Do.	12x, 13x, 14x, 15x, 855x, 1001x, 1012x, 1107/9x	(White Feather Main Reefs, Ltd.)	..	..	..	..	..	..	123,327.56	82,334.52	1,675.68
Do.	9x, 10x, 72x, 83x, 180x, 200x, 201x, 431x	(White Feather Reward, Ltd.)	..	..	247.50	85.46	..	..	42,767.75	22,255.23	14.80
Do.	367x	Wood's Find	24	..	1,217.00	692.71	..	..	1,446.50	738.32	..
Do.	..	Voided leases	..	..	..	..	..	480.78	26,375.60	17,806.84	..
Do.	..	Sundry claims	..	55.38	481.00	175.88	..	88.57	326.33	8,624.36	4,412.58

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.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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.	
Mulgarrie	1168x .. ..	Band of Hope G.M. Co., N.L.	Ftd.	..	..	..	..	..	..	..	..	..	..	..
Do.	149x .. ..	Hit or Miss South	Ftd.	..	..	..	..	..	2.00	..	449.00	127.15	..	..
Do.	74x, 149x, 165x	(Phoenix G.Ms., Ltd.)	Ftd.	..	..	..	..	..	975.20	..	20.00	75.37	..	..
Do.	..	Voided leases	..	..	..	..	..	..	..	..	2,392.00	1,273.17	..	..
Do.	..	Sundry claims	..	..	..	..	..	..	..	..	141.50	185.74	..	..
Do.	..	Sundry claims	..	..	13.29	..	..	..	..	..	13.29	106.00	160.20	..
Six-Mile	..	Voided leases	..	..	..	..	..	..	1,590.37	..	559.00	767.72	..	..
Do.	..	Sundry claims	..	..	..	..	..	..	31.44	..	105.50	83.08	..	..
<i>From District generally:—</i>														
Sundry parcels treated at:—														
		Fremantle Smelter, Ltd.		..	..	..	15.63	..	..	..	..	5.63	..	..
		Kalgoorlie Gold Recovery Works		..	..	..	138.47	..	..	..	..	38.47	..	..
		Last Chance Cyanide Works		..	..	..	cy.72.00	..	..	..	..	72.00	..	..
		Middleton's Cyanide Works		..	..	..	cy.522.10	..	..	..	..	1,539.89	..	..
		Moss Cyanide Works		..	..	..	cy.270.08	..	..	..	..	270.08	..	..
		Mudlark Works		..	..	..	cy.16.32	..	..	..	..	16.32	..	..
		Old Cement Works		..	..	..	1277.38	..	..	..	..	1,546.48	..	..
		Orotava Works—Kalgoorlie		..	..	..	cy.16.73	..	..	..	..	97.06	..	..
		Riedel and Norton's Works		..	..	..	13.44	..	..	..	..	3.44	..	..
		Robinson Works		..	..	..	166.59	..	..	..	..	5,156.49	..	..
		Rollo's Works		..	..	1.00	1.03	..	..	..	1.00	1.03	..	..
		Venture Cyanide Syndicate Works		..	..	..	cy.291.80	..	..	..	..	291.80	..	..
		Various Works		..	..	..	..	..	25.01	..	902.10	7,524.18	..	..
<b>TOTAL FOR LEASES AND QUARTZ CLAIMS</b>				3.59	311.67	53,355.50	27,866.04	186.57	141.87	6,043.08	468,898.08	319,431.89	2,362.91	..
<i>Cement from Alluvial Claims:—</i>														
Reported by owners				..	..	687.50	99.56	..	305.41	864.33	24,998.40	12,477.28	..	..
Treated locally (not reported by owners) at:—														
		Cresus South Works		..	..	42.00	60.38	..	..	..	42.00	60.38	..	..
		Old Cement Works		..	..	554.00	138.28	..	..	..	5,210.50	2,259.77	..	..
		Riedel and Norton's Works		..	..	1,080.50	145.90	..	..	..	1,080.50	145.90	..	..
		Robinson Works		..	..	665.00	54.31	..	..	..	2,330.00	310.60	..	..
		White Feather Main Reefs Works		..	..	27.00	5.64	..	..	..	27.00	5.64	..	..
		Various Works		..	..	..	..	..	..	..	74,691.21	54,519.20	..	..
Treated outside District (not reported by owners)				..	..	..	..	..	..	..	27,804.55	36,711.17	..	..
Reported by Banks and Gold Dealers				559.62	..	..	..	..	103,213.01	.86	..	84.69	..	..
<b>Total</b>				563'21	311'67	56,411'50	28,370'11	186'57	103,660'29	6,908'27	605,082'24	426,006'52	2,362'91	..



TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

North-East Coolgardie Goldfield—continued.

BULONG DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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.	
Taurus .. ..	1014Y .. ..	Raub .. ..	Surr.	..	..	..	..	..	..	3.70	19.60	73.02	..	
Do. .. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	2.06	..	1,653.55	687.81	..	
Do. .. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	..	112.69	..	260.00	346.86	..	
Woodline .. ..	1005Y .. ..	Unknown .. ..	24	..	..	563.00	331.79	..	..	..	772.75	592.70	..	
Do. .. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	..	..	..	39.33	61.57	..	
<i>From District generally:—</i>														
Sundry parcels treated at:—														
Green Harp Mill .. ..				..	..	20.00	14.00	..	..	..	20.00	14.00	..	
Middleton's Works .. ..				..	..	..	cy.82.40	..	..	..	..	99.99	..	
Various Works .. ..				..	..	..	..	..	..	5,985.05	5,462.78	..		
Reported by Banks and Gold Dealers .. ..				298.30	..	..	..	..	24,341.21	50.99	..	..		
<b>Total .. ..</b>				<b>360'48</b>	<b>121'60</b>	<b>5,860'65</b>	<b>3,450'25</b>	..	<b>26,407'40</b>	<b>13,567'85</b>	<b>107,826'98</b>	<b>106,724'87</b>	..	

KURNALPI DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD PRODUCTION.					
				Alluvial.	Dollied and Specimens.	Ore Treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	
				Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	
Jubilee .. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	145.13	1,810.50	1,400.54	..	
Do. .. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	..	18.87	..	46.00	28.91	..	
Kurnalpi .. ..	314K .. ..	Lady of the Lake .. ..	18	202.13	..	..	..	..	355.20	..	..	..	1.27	
Do. .. ..	310K .. ..	Sheba .. ..	Ftd.	..	..	..	..	..	..	..	42.00	7.82	..	
Do. .. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	8.66	2,633.05	1,618.94	5.00	
Do. .. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	..	217.92	33.81	53.50	53.61	..	
Mulgabbie .. ..	263K .. ..	Cables .. ..	6	..	269.29	.50	175.13	..	..	309.79	1.00	274.11	..	
Do. .. ..	303K .. ..	Hope .. ..	a. r. p. 5 2 4	..	80.51	4.00	749.85	..	..	111.52	7.00	867.82	..	
Do. .. ..	312K .. ..	Mulgabbie Perseverance .. ..	12	..	..	2.00	109.14	..	..	..	5.80	294.54	..	
Do. .. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	50.67	7.00	629.67	..	
Do. .. ..	.. ..	Sundry claims .. ..	..	..	3.26	1.00	32.20	..	6.50	1,357.97	80.75	612.38	..	
<i>From District generally:—</i>														
Sundry parcels treated at:														
Glover's Works .. ..				..	..	1.50	12.88	..	..	..	1.50	12.88	..	
Various Works .. ..				..	..	..	..	..	..	..	55.00	174.51	..	
Reported by Banks and Gold Dealers .. ..				305.87	..	..	..	..	9,928.71	..	..	..	..	
<b>Total .. ..</b>				<b>508'00</b>	<b>365'77</b>	<b>9'00</b>	<b>1,079'20</b>	..	<b>10,527'20</b>	<b>2,017'55</b>	<b>4,743'10</b>	<b>5,975'73</b>	<b>6'27</b>	

# East Coolgardie Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD PRODUCTION.					
				Alluvial.	Dollied and Specimens.	Ore Treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	
				Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	
Binduli	.. ..	Voided leases .. .. .	..	..	..	..	..	..	..	120.00	76.93	..	..	..
Do.	.. ..	Sundry claims .. .. .	..	..	..	..	..	..	..	25.00	24.60	..	..	..
Boorara	.. ..	Crown Jewel .. .. .	Ftd.	..	..	..	..	..	..	730.00	39.88	..	..	..
Do.	.. ..	Golden Ridge .. .. .	24	..	..	..	..	..	..	120.00	6.29	..	..	..
Do.	.. ..	Golden Ridge G.M. Co., N.L.	96	..	..	14,035.00	9,089.91	..	..	18,238.00	11,282.62	..	..	..
Do.	.. ..	(Golden Ridge Proprietary leases)	Surr.	..	..	..	..	..	..	49.70	54,409.00	30,071.23	..	..
Do.	.. ..	(Golden Ridge, W.A. Proprietary, Ltd.)	Surr.	..	..	..	..	..	..	..	322.78	552.78	..	..
Do.	.. ..	Reclaimed .. .. .	Surr.	..	1.50	..	..	..	..	1.50	..	..	..	..
Do.	.. ..	Reclaimed .. .. .	24	..	54.35	..	..	..	..	54.35	..	..	..	..
Do.	.. ..	(Waterfall leases)	..	..	..	..	..	..	..	..	2,849.00	2,389.48	..	..
Do.	.. ..	Voided leases .. .. .	..	..	..	..	..	..	..	9.73	..	..	..	..
Boulder	.. ..	(Acrobat: Paringa Consolidated Mines, Ltd.)	..	..	..	..	..	..	..	..	10.25	37.15	..	..
Do.	.. ..	Associated G.Ms. of W.A., Ltd.	a. r. p. 75 3 24	..	..	105,898.00	56,023.31	316.51	..	.25	668,520.70	578,265.46	22,631.57	..
Do.	.. ..	Associated Northern Blocks (W.A.), Ltd.	24	..	..	39,393.80	38,829.85	139.95	..	524.18	172,735.12	309,004.30	139.95	..
Do.	.. ..	Boulder Deep Levels, Ltd.	96	..	..	211.00	48.46	..	..	..	2,734.00	1,736.70	26.71	..
Do.	.. ..	(Brookman Bros. Boulder G.M. Co., Ltd.)	..	..	..	..	..	..	..	..	8,655.00	8,417.00	..	..
Do.	.. ..	(Brown Hill Central G.Ms., Ltd.)	..	..	..	..	..	..	..	..	2,957.50	2,071.92	..	..
Do.	.. ..	Brown Hill Extended, Ltd.	60	..	..	8,523.00	3,348.41	..	..	..	22,428.75	39,757.78	..	..
Do.	.. ..	Central and West Boulder G.Ms., Ltd.	54	..	..	1,132.00	362.06	..	..	..	28,671.70	17,784.93	..	..
Do.	.. ..	(Chaffers G.M. Co., Ltd.)	..	..	..	..	..	..	..	..	4,256.00	1,999.03	161.50	..
Do.	.. ..	Chaffers G.M. Co., Ltd.	12	..	..	874.00	342.96	..	..	..	884.00	344.89	..	..
Do.	.. ..	Confidence .. .. .	12	..	8.20	..	..	..	..	8.20	..	..	..	..
Do.	.. ..	Crossus Central	Surr.	..	..	17.00	1.77	..	..	..	367.00	51.93	..	..
Do.	.. ..	Crossus North No. 1, Ltd.	9	..	..	573.00	137.68	..	..	..	10,495.25	3,997.24	..	..
Do.	.. ..	(Crossus Proprietary G.M. Co.)	..	..	..	..	..	..	..	..	79.00	45.87	..	..
Do.	.. ..	Crossus South G.Ms., Ltd.	a. r. p. 35 0 34	..	..	7,654.00	2,770.49	..	..	..	41,322.00	17,726.53	..	..
Do.	.. ..	Deep Levels Extended G.M. Co., N.L.	Ftd.	..	..	..	..	..	..	..	10.00	1.02	..	..
Do.	.. ..	Deep Levels South	Ftd.	..	..	..	..	..	..	879.18	357.00	947.60	..	..
Do.	.. ..	Golden Horseshoe Estates Co., Ltd.	a. r. p. 86 3 24	..	..	247,020.00	147,744.38	32,965.17	..	..	1,393,489.00	1,427,642.81	99,479.49	..
Do.	.. ..	(Golden Link Consolidated G.Ms., Ltd.)	..	..	..	..	..	..	..	..	10,729.00	6,096.80	..	..
Do.	.. ..	(Golden Link Consolidated G.Ms., Ltd.)	..	..	..	..	..	..	..	..	1,525.00	733.48	..	..
Do.	.. ..	Golden Links, Ltd.	30	..	..	3,243.00	1,784.78	..	..	..	48,475.00	23,184.90	..	..



TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

East Coolgardie Goldfield—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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	947E, 1294E, 3469E	Golden Pike and Lake View East Mines, Ltd.	a. r. p. 37 1 15	..	..	45.00	6.13	..	..	..	450.50	125.18	..
Do.	873E .. ..	Great Boulder Main Reef, Ltd.	24 3 0	..	..	18,844.00	5,580.86	28.10	..	..	139,760.89	118,762.67	761.98
Do.	50E .. ..	Great Boulder No. 1, Ltd.	24	..	..	2,471.00	3,172.70	..	..	..	7,364.50	6,305.01	..
Do.	66E .. ..	Great Boulder Perseverance G.M. Co., Ltd.	24	..	..	178,533.00	80,927.16	9,917.51	..	..	1,088,484.23	991,309.72	60,823.31
Do.	16E, 51E, 61E, 102E, 280E, 1109E	Great Boulder Proprietary G.Ms., Ltd.	97	..	..	152,118.00	132,793.33	15,909.53	..	..	1,048,881.00	1,320,689.72	67,944.66
Do.	902E, 1124E ..	(Great Boulder South G.M. Co., Ltd.)	..	..	..	..	..	..	..	..	437.00	122.11	..
Do.	3643E .. ..	Hannant G.Ms., Ltd.	20	..	..	46,805.00	16,106.00	113.30	..	..	210,210.70	86,632.52	113.30
Do.	6E .. ..	(Hannans Block 45, Ltd.)	..	..	..	..	..	..	..	..	2,343.55	3,226.69	..
Do.	131E, 245E, 269E, 743E, 794E, 969E	(Hannans Central G.M. Ltd.)	..	..	..	..	..	..	..	..	6,098.00	3,360.33	..
Do.	739E .. ..	(Hannans' Croesus G.M. Co., Ltd.)	..	..	..	..	..	..	..	..	4,256.75	4,416.90	..
Do.	755E .. ..	(Hannans' Excelsior G.M. Ltd.)	Ftd.	..	..	..	..	..	..	..	103.50	49.58	..
Do.	1294E .. ..	(Hannans' Golden Pike G.M., Ltd.)	..	..	..	..	..	..	..	..	25.00	15.15	..
Do.	1004E .. ..	(Hannans' North Croesus G.M. Co., Ltd.)	..	..	..	..	..	..	..	..	50.00	13.21	..
Do.	15E, 60E, 1116E	(Hannans' Star G.Ms., Ltd.)	..	..	..	..	..	..	..	..	85,652.75	40,438.85	2,142.59
Do.	15E, 60E, 1116E, 4227E .. ..	Hannans' Star, Ltd.	a. r. p. 38 1 0	..	..	4,640.00	1,719.40	48.75	..	..	9,140.00	3,742.64	191.22
Do.	189E, 220E, 4066E	Hill End Consols (late Queensland)	11	..	..	4,324.00	8,138.79	..	91.48	..	5,058.00	9,110.30	..
Do.	946E .. ..	Idaho leases	24	..	383.78	130.00	515.77	..	..	315.50	470.00	2,160.83	..
Do.	946E .. ..	(Ironsides North G.M. Co., N.L.)	..	..	..	..	..	..	..	..	1,348.00	807.48	..
Do.	31E, 1357E, 1412E, 1413E	Ivanhoe Gold Corporation, Ltd.	a. r. p. 75 1 0	..	..	206,292.00	123,118.25	23,972.26	..	..	1,284,504.00	1,113,965.88	127,676.94
Do.	1507E, 2899E, 3712E, 3713E	Ivanhoe Junction G.M. Co., N.L.	43 3 8	..	..	1,256.00	38.20	..	..	..	1,764.00	121.43	..
Do.	6E, 131E, (244E), 245E, 269E, 301E, 739E, 743E (755E), 794E, 969E	(Kalgoorlie Amalgamated, Ltd.)	..	..	..	922.00	191.17	..	..	..	32,589.00	8,859.95	..
Do.	6E, 131E, (244E), 245E, 269E, 301E, 739E, 743E, (755E), 794E, 969E	Kalgoorlie Amalgamated (new), Ltd.	98	..	..	7,523.00	1,964.41	..	..	..	7,523.00	1,964.41	..
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.	24	..	..	292.00	70.94	..	..	..	3,020.00	1,762.00	..
Do.	73E, (74E) ..	(Kalgoorlie Mint and Iron King G.Ms., Ltd.)	..	..	..	..	..	..	..	..	3,647.00	7,454.80	..
Do.	22E, 34E .. ..	Kalgurli G.Ms., Ltd.	18	..	..	107,234.50	81,832.80	..	..	..	457,571.98	391,833.63	..
Do.	1004E .. ..	Kalgurli Golden Eagle	12	..	..	648.00	191.90	..	..	..	2,759.50	757.04	..
Do.	25E, 32E, 2325E, 2326E	Lake View Consols, Ltd.	72	..	..	122,253.00	38,436.04	3,443.38	..	..	918,830.85	920,676.48	12,310.86

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Do.	75E, M.A. 35E	Lake View South G.M. (W.A.), Ltd.	20	1,244.00	340.85			10,175.48	11,261.39	
Do.	4234E	London	Ftd.				5.40	.25	10.40	
Do.	4209E	Lucey	24	102.00	8.30			333.00	44.07	
Do.	4257E	Never be forgotten	10	1,521.00	392.14			1,614.00	407.50	
Do.	4264E	Never Despair	6	489.00	103.65			489.00	103.65	
Do.	189E, 220E	(New Standard Exploration Co., Ltd.)						108.00	73.36	
Do.	33E, 35E, 975E	(North Boulder G.M. Co., Ltd.)						33,549.15	+7,532.52	
Do.	33E, 35E, 975E	North Boulder G.Ms., Ltd.	31	1,711.00	1,059.93			3,199.00	2,756.32	.63
Do.	244E	(North Croesus G.M., Ltd.)	Ftd.				16.97			
Do.	52E, 53E, 263E	Northern Blocks Syndicate, Ltd.	54	91.00	11.64			1,148.00	209.99	
Do.	281E, 287E, 444E	North Kalgurli Co., Ltd.	48	4,786.00	1,014.36		43.99	7,578.55	8,539.90	7,147.23
Do.	890E, 912E	(North Western Associated G.Ms. (W.A.), Ltd.)						459.00	264.55	
Do.	890E, 912E	North Western Associated G.Ms. (W.A.), Ltd.	42	267.50	61.11			1,571.50	847.96	
Do.	410E, 448E, 532E, 578E, 698E, 944E, 1395E, 3031E, 4180E	Oroya Brownhill Co., Ltd.	a. r. p. 133 0 18	133,395.00	101,709.79	9,359.21		777,707.80	1,033,776.87	51,017.73
Do.	4211E	Oroya East (Hannans) G.M., Ltd.	24	41.00	11.57			625.00	288.39	
Do.	4E, (501E, 1591E, 2988E)	(Paringa Consolidated Mines, Ltd.)						216.00	157.80	
Do.	4E, 392E, (501E, 1591E, 2988E)	Paringa Mines, Ltd.	33	4,520.00	1,640.21			14,929.98	12,288.55	
Do.	1208E, 3612E	South Kalgurli G.Ms., Ltd.	a. r. p. 14 1 27	88,662.00	32,401.01	915.53		291,445.00	163,615.83	7,423.16
Do.	4074E	Star of Abadare	21	558.00	161.67			1,154.00	532.73	
Do.	4261E	Star of Hope	Ftd.	50.00	27.07		4.48	60.00	29.35	
Do.	3031E	(Tratagar G.M. (W.A.), Ltd.)						189.95	56.84	
Do.	4269E	Tramway	24	178.00	40.50			178.00	40.50	
Do.	4187E	Trurant	12	2,521.50	1,924.48		640.28	3,709.50	2,790.85	
Do.	4066E	(Wendouree)					2,127.12	137.00	370.20	
Do.	946E	West Queen of the West	a. r. p. 24 3 20	900.00	322.70			2,494.00	839.65	
Do.		Voided leases					107.70	12,030.00	7,425.01	
Do.		Sundry claims					18.34	519.00	762.53	
Feysville	Block 48	Hampton Plains Estate, Ltd.			19.89	4,565.62		20,562.00	2,371.95	
Do.	Block 50	Hampton Plains Estate (1906), Ltd.		25.00	38.63			25.00	38.63	
Do.	Block 50	Hampton Properties, Ltd.		65.00	82.86		7.26	6,348.00	3,956.22	
Do.	4221E	Western Star	Ftd.					30.50	23.86	
Do.		Voided leases					22.86	184.35	83.02	
Kalgoorlie	1101E, 4051E, 4070E, 4230E, 4275E, 4281E, 4302E	A.W.A. United leases	a. r. p. 66 3 13	15,988.00	2,735.01			38,476.00	8,854.96	8.57
Do.	4070E	(Badra)						30.00	10.15	
Do.	4235E	Blue Mountain	a. r. p. 13 0 33	67.00	5.70			67.00	5.70	
Do.	796E, 1228E	Bonnie Lass leases	27	1,098.00	1,631.42		160.69	3,576.00	3,692.71	
Do.	4088E	Bonnie Play	a. r. p. 9 0 21					6.00	3.01	
Do.	552E, 4022E, 4098E	Brown Hill Consols leases	Surr.	2,601.00	1,014.35			20,306.00	20,683.51	370.07
Do.	1101E	(Brown Hill Junction G.M. Co., N.L.)						1,122.00	327.15	
Do.	552E, (922E)	(Brown Hill Proprietary G.Ms., Ltd.)	Surr.					379.00	505.38	
Do.	4220E	Colleen Bawn	Ftd.					136.00	17.53	
Do.	4127E	Darky's Venture	Ftd.				71.25	89.00	13.06	

TABLE IV.—*Production of Gold and Silver from all sources, etc.*—continued.

**East Coolgardie Goldfield**—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD PRODUCTION.					
				Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	
				Fine oss.	Fine oss.	Tons (2,240lbs.)	Fine oss.	Fine oss.	Fine oss.	Fine oss.	Tons (2,240lbs.)	Fine oss.	Fine oss.	
Kalgoorlie ..	3880E, 4146E ..	(Devon Consols leases) .. ..	..	..	..	..	..	..	36.73	26,777.00	11,650.19	..	..	..
Do. ..	4037E, 4039E, 4054E ..	(Devon Consols South Extended leases)	..	..	..	..	..	..	..	2,251.00	1,400.94	..	..	..
Do. ..	3770E ..	Eagle Hawk United ..	8	101.26	231.00	265.67	..	..	467.92	866.00	1,209.24	..	..	..
Do. ..	4052E, 4063E ..	Fair Play leases ..	16	..	358.00	273.26	..	..	4.77	1,102.35	1,574.96	..	..	..
Do. ..	1694E ..	(Golden Zone) ..	..	..	..	..	..	..	..	5,614.50	2,639.52	..	..	..
Do. ..	1694E ..	Golden Zone ..	22	301.71	419.00	315.63	..	..	301.71	419.00	315.63	..	..	..
Do. ..	4124E ..	Great Secret ..	a. r. p. 2 3 20	..	..	6.00	..24	..	..	..	26.00	1.94	..	..
Do. ..	14CE, 415E, 1163E ..	Hannan's Consols leases ..	21	..	220.00	59.77	..	..	..	220.00	59.77	..	..	..
Do. ..	14CE, 415E, 1163E ..	(Hannan's Consols Ltd.) ..	..	..	188.00	61.36	..	..	..	6,584.00	3,806.65	..	..	..
Do. ..	4056E ..	Hannan's Find ..	6	..	319.00	70.58	..	..	..	826.00	187.41	..	..	..
Do. ..	983E ..	(Hannan's Golden Group, Ltd.) ..	..	..	..	..	..	..	..	6.00	17.27	..	..	..
Do. ..	4046E ..	Hannan's Hope ..	Ftd.	..	..	..	..	..	..	15.00	1.24	..	..	..
Do. ..	12E, 229E, 248E ..	Hannan's North G.Ms., Ltd. ..	Surr.	..	494.00	276.41	..	..	..	18,219.00	12,416.89	..	..	..
Do. ..	4273E, 4274E ..	Hannan's North G.Ms., Ltd. ..	18	..	719.00	225.85	..	..	..	719.00	225.85	..	..	..
Do. ..	943E, (4010E) ..	(Hannan's Proprietary Development Co., Ltd.)	..	..	..	..	..	..	..	26,965.50	11,440.78	208.00	..	..
Do. ..	943E, (4010E), 4222E, 4223E, 4224E, 4225E, 4226E ..	Hannan's Proprietary, Ltd. ..	a. r. p. 106 1 30	..	3,128.00	323.96	..	..	12.10	6,275.00	1,094.59	..	..	..
Do. ..	97E, 160E, 211/3E, 1653E ..	Hannan's Reward and Mt. Charlotte, Ltd.	94 0 37	..	28,613.00	4,719.45	..	..	2.58	92,972.10	44,053.44	..	..	..
Do. ..	796E, 1226E ..	(Hannan's Reward North G.M. Co., N.L.)	..	..	..	..	..	..	16.87	334.00	247.34	..	..	..
Do. ..	4276E ..	Herlichite ..	Surr.	..	17.00	5.31	..	..	..	17.00	5.31	..	..	..
Do. ..	4113E ..	Hidden Fortune ..	Surr.	..	6.00	3.00	..	..	..	48.00	27.71	..	..	..
Do. ..	4001E, 4035/6E ..	Hidden Secret leases ..	18	..	913.66	1,517.21	197.98	..	..	2,050.80	11,920.93	42,514.26	..	..
Do. ..	3991E ..	Hird's lease ..	12	..	151.00	237.62	..	..	42.85	603.50	904.61	..	..	..
Do. ..	4256E ..	Homeward Bound ..	a. r. p. 8 3 18	..	456.00	103.20	..	..	..	456.00	103.20	..	..	..
Do. ..	983E ..	Isabel ..	24	..	244.00	88.96	..	..	98.63	2,090.00	598.90	..	..	..
Do. ..	12E, 229E ..	(Kalgoorlie Star Syndicate, Ltd.)	Surr.	..	..	..	..	..	5.05	1,597.29	888.34	..	..	..
Do. ..	4097E ..	Kapai ..	Ftd.	..	..	..	..	..	..	1,317.00	263.52	..	..	..
Do. ..	4216E ..	Lady Alice ..	12	..	45.00	23.97	..	..	12.55	72.00	33.66	..	..	..
Do. ..	4295E ..	Lady Wallace ..	15	..	114.00	6.41	..	..	..	114.00	6.41	..	..	..
Do. ..	4103E ..	(Lucknow) ..	..	..	..	..	..	..	1.38	324.00	84.41	..	..	..
Do. ..	4103E ..	Lucknow G.M., Co., N.L. ..	12	..	..	..	..	..	..	17.50	2.61	..	..	..
Do. ..	2E, 279E ..	Maritana G.M. Co., N.L. ..	15	1.90	504.00	350.61	..	..	5.15	3,816.50	3,035.21	..	..	..
Do. ..	4293E ..	Milanesa ..	24	..	248.00	44.25	..	..	..	248.00	44.25	..	..	..
Do. ..	4174E ..	Mullingar South ..	Ftd.	..	..	..	..	..	..	4.00	1.10	..	..	..
Do. ..	4025E ..	Napoleon ..	12	..	725.00	287.26	..	..	..	2,132.00	997.61	..	..	..
Do. ..	1694E ..	(New Golden Zone Co., N.L.) ..	..	..	344.00	175.61	..	..	..	344.00	175.61	..	..	..
Do. ..	4284E ..	New Reefers ..	12	..	121.00	31.99	..	..	..	121.00	31.99	..	..	..
Do. ..	983E ..	(New Standard Exploration Co., Ltd.) ..	..	..	..	..	..	..	..	213.00	86.76	..	..	..

Do.	4192E	Nil Desperandum	Ftd.	..	..	..	..	..	..	82.00	28.19	..		
Do.	4037E, 4039E, 4054E	(North End Mines, Ltd.)	..	..	..	..	..	..	..	5,876.00	2,425.03	4.00		
Do.	4037E, 4039E, 4054E	North End Mines, Ltd.	22	..	..	33.00	299.67	..	..	1,770.00	813.69	..		
Do.	4282E	Northern Promise	10	..	..	72.00	26.00	..	..	72.00	26.00	..		
Do.	535E	Octagon Explorers, Ltd.	12	..	..	93.00	22.69	..	..	3,123.00	1,055.60	..		
Do.	4232E	Off Chance	Surr.	..	..	..	..	..	31.99	239.00	147.53	..		
Do.	4277E	Off Chance	7	32.28	..	105.00	46.70	..	32.28	105.00	46.70	..		
Do.	4280E	Poseidon	Surr.	..	..	38.00	238.64	..	..	38.00	238.64	..		
Do.	4164E	Pride of the Hills North	Ftd.	..	..	..	..	..	33.91	8.00	5.17	..		
Do.	1114E, 3789E	(Reefers Eureka G.M. Co., N.L.)	Ftd.	..	..	..	..	..	..	2,032.40	1,312.30	..		
Do.	1114E, 3789E	Reefers Eureka leases	Ftd.	..	..	30.00	2.30	..	..	312.00	94.51	..		
Do.	4039E	(Rising Sun)	..	..	..	..	..	..	..	170.00	28.50	..		
Do.	4121E	Royal	a. r. p.	6	0	36	..	..	..	10.00	2.80	..		
Do.	4303E	Sir John Forrest	16	2	31	3.22	43.00	..	3.22	43.00	16.53	..		
Do.	3771E	Sons of Gwalia, Kalgoorlie	12	..	..	285.00	268.94	..	..	970.00	608.48	..		
Do.	4213E	Surprise	Ftd.	..	..	..	..	..	..	14.00	2.51	..		
Do.	4218E	Sylvia	Ftd.	..	..	..	..	..	..	13.00	.35	..		
Do.	4188E	Triumph	12	..	..	10.00	2.65	..	..	30.00	5.39	..		
Do.	4289E	Union Club	17	..	..	395.00	146.69	..	..	395.00	146.69	..		
Do.	3880E, 4146E	Westralian Machinery Corporation, Ltd.	a. r. p.	46	3	35	..	142.00	54.53	..	54.53	..		
Do.	[985Y], 4239E	Voided leases	12	..	..	47.61	6.68	..	4.21	274.40	8,978.85	4,911.62		
Do.	[985Y], 4239E	Black Cat	12	..	..	..	27.92	..	..	312.37	13.68	34.25		
Do.	[1024Y], 4241E	Champion	Surr.	..	..	15.35	7.57	..	..	72.35	22.73	..		
Do.	[1040Y], 4249E	Chance	Ftd.	..	..	..	..	..	..	66.00	19.16	..		
Do.	[591Y], 4263E	Gippsland	Surr.	..	..	..	..	..	..	34.00	7.34	..		
Do.	[948Y], 4238E	Inverness	24	..	..	909.00	338.69	..	..	1,044.00	388.38	..		
Do.	[1027Y], 4242E	Inverness Extended	Ftd.	..	..	..	..	..	..	80.00	23.21	..		
Do.	[368Y], 4255E	Just in Time	24	..	..	190.00	100.59	..	..	325.00	172.06	..		
Do.	4254E	Kalgoorlie and Boulder Firewood Co., Ltd.	24	..	..	560.50	223.59	..	..	693.50	268.89	..		
Do.	4294E	Knight St. George	24	..	..	30.00	5.97	..	..	30.00	5.97	..		
Do.	[1042Y], 4251E	Progress	Ftd.	..	..	..	..	..	..	14.55	3.37	..		
Do.	[1041Y], 4250E	Royal Oak	Ftd.	..	..	98.00	40.08	..	..	245.00	97.82	..		
Do.	[1044Y], 4252E	Tamerlane	Ftd.	..	..	..	25.00	7.45	..	123.00	31.57	..		
From Goldfields generally:-														
	Sundry claims			..	3,569.62	260.00	461.00	261.85	..	8,200.04	306.11	3,209.00	1,056.73	..
Sundry parcels treated at:-														
	Barnes' Works			..	..	..	..	cy. 291.99	..	..	..	..	291.99	..
	Bonnie Lass Works			..	..	..	..	cy. 290.26	..	..	..	..	375.20	..
	Boulder Pudding Works			..	..	..	..	cy. 23.14	..	..	..	..	61.48	..
	Brown Hill Consols Works			..	..	..	..	cy. 6,465.10	..	..	161.00	..	11,241.99	..
	Cresus South Works			..	..	..	..	cy. 1,716.83	..	..	9,230.35	..	8,837.63	..
	Eureka Works			..	..	..	..	cy. 2,260.39	161.74	..	..	..	2,366.31	161.74
	Glenartney Works			..	..	..	..	cy. 27.38	..	..	..	..	27.38	..
	Hacke's Works			..	..	5.00	..	..	..	..	..	5.00	..	..
	Hannan's Central Works			..	..	..	..	cy. 2,764.94	..	..	..	..	4,248.72	..
	Hannan's North Works			..	..	..	..	cy. 68.35	..	..	..	..	1,536.29	..
	Hannan's Proprietary Works			..	..	..	..	cy. 229.55	..	..	..	..	229.55	..
	Ironsides North Works			..	..	..	..	cy. 219.32	..	..	..	..	219.32	..
	Ortava Works			..	..	..	..	cy. 289.17	..	..	..	..	1,304.55	..
	Rasmussen's Works			..	..	..	..	12.12	..	..	..	..	2.12	..
	South Boulder Metallurgical Works			..	..	..	..	cy. 11.85	..	..	..	..	11.85	..
	Trurant Works			..	..	..	..	cy. 143.55	..	..	..	..	143.55	..
	Venture Syndicate Works			..	..	..	..	cy. 1,989.40	..	..	..	..	7,955.19	24.33
	West Queen of the West Works			..	..	..	23.00	..	..	..	..	23.00	1,283.40	..
	Various Works			..	..	..	..	..	..	..	..	29,472.55	27,195.62	..
	Reported by Banks and Gold Dealers			..	88.85	..	..	..	..	365.33	15.15	..	4.57	..
	Total			..	3,658.47	1,836.09	1,586,178.49	931,744.05	97,488.92	20,239.17	17,637.64	9,391,633.53	9,077,977.63	503,283.80

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

**Coolgardie Goldfield.**  
COOLGARDIE DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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	3847/8, 4096	Bendigo and Coolgardie Proprietary Co., N.L.	Ftd.	..	..	..	..	..	..	..	..	3,891.00	3,411.86	..
Do.	4177	Black Cat	12	..	..	..	..	..	..	..	..	61.00	35.62	..
Do.	595, 1405, 1741	Gem leases	a. r. p.	..	..	..	..	..	..	..	..	7,289.00	5,616.58	..
Do.	1741	(Golden Drop)	41 3 11	..	..	690.00	159.75	..	..	..	..	283.50	240.83	..
Do.	595, 1405, 1741	(New Victoria Consols G.M. Co., N.L.)	..	..	..	..	..	..	..	..	..	12,725.50	5,096.84	..
Do.	1552, 3947	Vale of Coolgardie G.Ms., Ltd.	..	..	..	2,019.00	481.49	..	..	..	..	71,813.00	37,729.21	..
Do.	144, 1151, 1639, 2146, 2266, 3572, 4012, 4099, 4113, (4114), 4314	Westralia and East Extension Mines, Ltd.	195	..	..	33,014.00	12,374.58	..	..	..	..	215,840.65	110,174.79	..
Do.	..	Voided leases	..	..	..	..	..	..	..	..	2.26	15,983.70	14,251.03	..
Do.	..	Sundry claims	..	..	..	80.50	46.91	..	..	..	..	317.00	186.14	..
Bulla Bulling	..	Voided leases	..	..	..	..	..	..	..	..	..	426.50	281.51	..
Do.	..	Sundry claims	..	..	..	..	..	..	..	12.82	..	213.00	163.37	..
Burbanks	4324	Another Try	12	..	..	25.00	36.32	..	..	..	..	25.00	36.32	..
Do.	4029	Boshter	6	..	..	111.00	56.53	..	..	..	..	1,054.50	652.60	..
Do.	134/6, 1527, 1705, 2761, 3571, 3661, 3806, 3996, 4025, 4032	(Burbanks Birthday Gift G.M., Ltd.)	..	..	..	..	..	..	..	..	..	132,706.00	126,351.59	..
Do.	134/6, 1527, 1705, 2761, 3571, 3661, 3806, 3996, 4025, 4032	Burbanks Birthday G.Ms., Ltd.	122	..	..	5,526.50	5,892.27	149.60	..	..	..	25,064.00	17,308.95	165.38
Do.	3929, 3959	Burbanks Junction G.M. Co. N.L.	Ftd.	..	..	102.00	32.44	..	..	..	..	1,110.00	747.54	..
Do.	2985/6, 3444, 3870, 4059	(Burbanks Main Lode, Ltd.)	..	..	..	..	..	..	..	..	..	3,209.00	1,671.63	..
Do.	2985/6, 3444, 3870, 4059	(Burbanks Main Lode (1902), Ltd.)	..	..	..	..	..	..	..	..	..	4,824.00	3,214.50	..
Do.	2985/6, 3444, 3870, 4059	Burbanks Main Lode (1904), Ltd.	84	..	..	13,951.70	8,112.41	..	..	..	..	28,418.70	17,886.49	..
Do.	1705	(Burbanks North G.M., Ltd.)	..	..	..	..	..	..	..	..	..	22.50	7.70	..
Do.	3959	(Coronation No. 2)	Ftd.	..	..	..	..	..	..	..	..	12.00	5.67	..
Do.	4168	Glenloth South	10	..	51.35	71.00	135.45	..	..	79.67	..	178.50	305.13	..
Do.	4225	Gold Reef	Ftd.	..	..	..	..	..	..	..	..	27.13	14.91	80.73
Do.	4310	Grosmont	5	..	..	215.00	70.84	..	..	..	..	215.00	70.84	..
Do.	2169	(Lady Robinson)	..	..	..	..	..	..	..	..	..	5,315.40	3,327.12	..
Do.	2169, 3950, 4125	Lady Robinson G.M. Co., N.L.	25	..	..	3,348.00	1,186.17	..	..	..	..	15,069.50	7,301.21	..
Do.	4241	(Lord Bobs)	..	..	..	809.00	2,189.29	..	..	..	..	1,264.00	2,829.90	..
Do.	4241, 4286, 4287	Lord Bobs G.M. Syndicate	38	..	..	652.00	1,037.45	..	..	..	..	652.00	1,037.45	..
Do.	4290	Lord Bobs North	Surr.	..	..	51.00	21.57	..	..	..	..	51.00	21.57	..
Do.	4242	Lord Bobs No. 1 North	Ftd.	..	..	..	..	..	..	..	..	25.00	23.84	..
Do.	4204	Maniopoto	Surr.	..	..	..	..	..	..	..	..	63.00	30.02	..

Do.	3939	..	Shamrock Ale	..	5	6.88	93.00	166.69	..	40.81	656.00	603.07
Do.	4228	..	Sovereign	..	Ftd.	..	61.00	16.15	..	..	124.00	36.64
Do.	4235	..	Tartan	..	Ftd.	..	8.00	4.19	..	..	85.00	37.30
Do.	3920	..	(Try Again)	..	Ftd.	..	..	..	..	..	157.00	338.15
Do.	3920, 3950	..	(Try Again leases)	..	Ftd.	..	..	..	..	..	860.00	646.02
Do.	..	..	Voided leases	..	..	..	..	..	13.36	64.43	10,297.75	10,577.74
Do.	..	..	Sundry claims	..	..	..	267.00	110.78	..	42.60	734.75	342.63
Coolgardie	133, 139, 142	..	(Bayley's G.Ms., Ltd)	..	..	..	..	..	882.14	89.41	76,402.97	99,179.62
Do.	133, 139, 142	..	Bayley's leases	..	a. r. p. 71 2 25	..	1,067.00	3,994.43	..	..	1,067.00	3,994.43
Do.	133, 139, 142	..	(Bayley's Mines, Ltd.)	..	..	..	167.00	91.56	15.10	10.59	2,319.74	2,323.66
Do.	4278	..	Bayley's No. 2 South	..	Ftd.	..	..	cy. 30.41	..	..	..	30.41
Do.	4230	..	Bayley's Sulphide Lode	..	15	..	57.00	12.53	..	8.56	102.00	29.57
Do.	4261	..	Big Blow	..	12	..	445.00	199.33	..	..	722.00	275.69
Do.	3972	..	Brilliant	..	18	..	222.00	206.75	..	..	865.00	1,384.38
Do.	3918	..	Coolgardie Redemption	..	18	..	22.00	2.44	..	1,257.62	4,419.00	3,747.28
Do.	4094	..	Coolgardie Redemption Extended	..	12	..	..	..	..	..	174.00	131.26
Do.	4305	..	Coolgardie Surprise	..	14	..	86.00	140.58	..	..	86.00	140.58
Do.	4209	..	Daisy	..	Ftd.	..	135.00	67.71	..	..	288.00	118.60
Do.	1865	..	Empress of Coolgardie	..	18	..	396.50	143.06	..	..	796.50	364.36
Do.	1865	..	(Empress of Coolgardie G.M. 1896, Ltd.)	..	..	..	..	..	..	..	2,868.00	950.53
Do.	1604	..	Ethel	..	6	..	118.00	76.79	..	..	118.00	76.79
Do.	1604, (1605)	..	(Flagstaff G.Ms., Ltd.)	..	..	..	..	..	..	..	10,846.50	4,565.56
Do.	284, 745	..	(Forrest King of Coolgardie, Ltd.)	..	Ftd.	..	..	..	..	..	857.50	526.40
Do.	4056	..	Gambier	..	12	..	58.00	24.10	..	17.89	151.00	47.83
Do.	4189	..	(Garden Gully)	..	..	..	..	..	..	..	129.00	24.89
Do.	4189, 4197	..	Garden Gully G.M. Co., N.L.	..	24	..	44.00	4.56	..	..	44.00	4.56
Do.	4189, 4197	..	(Garden Gully leases)	..	..	..	50.00	10.71	..	..	428.00	90.95
Do.	3827	..	Garfield	..	12	46.00	40.00	22.89	..	368.42	691.00	1,097.40
Do.	4267	..	Glueck Auf	..	12	103.71	55.00	32.45	..	103.71	65.00	33.19
Do.	4192	..	Golden Bar	..	5	..	341.00	171.62	..	..	457.00	305.56
Do.	3319, 3624	..	Great Hanover: Central Corporation, 1904, Ltd.	..	29	..	..	..	..	..	230.00	110.66
Do.	4177	..	Great Porphyry	..	12	..	22.00	12.97	..	..	22.00	12.97
Do.	1604	..	(Greenmount Mines, N.L.)	..	..	..	268.00	210.40	..	..	963.00	455.34
Do.	73, 1902, 3556, 3701, 3811, 3813, 3998	..	Griffith's leases	..	a. r. p. 69 3 24	..	4,491.00	1,222.47	..	..	26,130.00	11,853.92
Do.	Block 53	..	Hampton Plains Estate, Ltd.	..	..	..	..	..	..	358.42	67.00	112.49
Do.	Block 59	..	Hampton Plains Estate, Ltd.	..	..	..	726.00	847.36	..	..	4,575.00	4,727.94
Do.	4234	..	Hettie May	..	16	2.79	121.00	50.93	..	2.79	141.50	63.29
Do.	4262	..	Homeward Bound	..	Ftd.	..	..	..	..	..	84.00	16.68
Do.	4288, 4294	..	Indicator leases	..	18	77.49	38.00	50.68	..	77.49	38.00	50.68
Do.	4122	..	(King's Cross)	..	..	..	..	..	..	..	792.00	561.39
Do.	4297	..	King Solomon	..	11	..	42.00	33.14	..	..	42.00	33.14
Do.	(4221), 4222	..	(King Solomon leases)	..	..	..	..	..	..	..	275.00	215.37
Do.	4222	..	King Solomon South	..	12	24.76	1,849.00	557.13	..	24.76	1,849.00	557.13
Do.	284, 336, 745	..	(Lady Loch G.Ms., Ltd.)	..	Ftd.	..	..	..	..	..	24,711.00	20,061.38
Do.	284, 336, 745	..	Lady Loch Mines, Ltd.	..	Ftd.	..	..	..	..	..	3,923.00	2,904.99
Do.	4307	..	Lady May	..	5	1.58	110.00	22.24	..	1.58	110.00	22.24
Do.	4202	..	Lady Olive	..	a. r. p. 6 1 0	..	90.00	55.12	..	..	136.00	91.72
Do.	4232	..	Last Chance	..	Ftd.	..	..	..	..	..	24.10	16.51
Do.	3556	..	(Lily)	..	..	..	..	..	..	..	342.75	217.64
Do.	4182	..	Lizard Extended	..	12	..	..	..	..	..	55.00	103.99
Do.	3701	..	(Morning Star South)	..	..	..	..	..	..	..	250.00	30.63
Do.	4277	..	Mystery	..	Ftd.	..	15.00	2.68	..	..	15.00	2.68
Do.	4306	..	New Australasian	..	6	..	29.00	71.97	..	..	29.00	71.97
Do.	3319	..	(New Central Investment Corporation, Ltd)	..	..	..	..	..	..	..	944.00	571.65
Do.	4318	..	New Hopeful	..	10	..	90.00	45.71	..	..	90.00	45.71
Do.	4196	..	Oyama	..	Ftd.	..	42.00	19.73	..	..	118.00	132.12
Do.	3416	..	Perseverance Gold Mines, Ltd.	..	Ftd.	..	118.00	200.72	..	..	4,117.00	3,267.62
Do.	1865	..	(Phoenix G.Ms., Ltd.)	..	..	..	..	..	..	..	12,028.50	4,524.96



Widgiemooltha	4258	Cleator	Ftd.	1.15				1.15						
Do.	4028	Flinders	12	11.02	27.00	184.86		23.11	232.00	1,147.50				
Do.	4282	Independence	10		259.00	88.46			269.00	88.46				
Do.	4259	Lady of the Lake	Ftd.		23.00	6.29			35.00	17.17				
Do.	4317	Last Shot	5		22.00	40.00			22.00	40.00				
Do.	3906	Yorkshire Lass	8		246.50	174.17			1,248.75	768.06				
Do.		Voided leases						378.71	5,940.90	1,947.85			17	
Do.		Sundry claims			168.50	83.98		2.88	710.15	346.36				
								1.22						
<i>From District generally:—</i>														
Sundry parcels treated at:—														
		Burbanks Main Lode Battery		2.77	15.50	10.13		2.77	15.50	10.13				
		Highgate Works			22.00	12.65			100.00	212.12				
		Moss Cyanide Works				cy. 612.83				1,334.38				
		Perseverance Battery (F.B. Trude's Works)				cy. 275.26				275.26				
		State Battery—Coolgardie			63.00	211.64			606.00	737.66				
		State Battery—Widgiemooltha			38.50	123.07			38.50	123.07				
		Various Works						4.98	3,657.11	9,889.55			108.89	
		Reported by Banks and Gold Dealers		216.98				4,084.52	543.04					
<b>Total</b>					<b>219.75</b>	<b>865.33</b>	<b>101,028.70</b>	<b>51,944.36</b>	<b>193.89</b>	<b>5,393.23</b>	<b>6,342.97</b>	<b>1,060,323.54</b>	<b>718,445.64</b>	<b>399.46</b>

KUNANALLING DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD PRODUCTION.						
				Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.		
				Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.		
Balgarrie	622s	(Balgarrie G.M. Co., N.L.)										1.64	340.00	81.43	
Do.	622s	United Australia	6		8.53	149.50	93.16					8.53	491.50	281.88	
Do.	565s	Zuleika	12			83.00	35.73			10.94	65.31	2,902.25	2,262.94		1.38
Do.		Voided leases									18.57	836.25	335.23		
Do.		Sundry claims										285.00	175.90		
Carbine	764s	Bullion	Ftd.												
Do.	33s	Carbine	a. r. p.	22		2,924.00	1,338.62				687.98	9,607.50	4,596.89		
Do.	758s	(Carbine South)		24								22.00	10.29		
Do.	776s	Spearmint		24		114.00	180.36					114.00	180.36		
Do.		Voided leases										1,368.00	1,801.12		
Do.		Sundry claims				23.00	15.34					39.00	21.87		
Carnage		Voided leases							176.04	659.31	2,402.00	2,170.67			
Do.		Sundry claims									61.00	27.50			
Cashman's	607s [1284w]	Denver City							22.41	310.94	4.00	40.67			
Do.	716s [1289w]	Lady Evelyn									241.75	479.81			
Do.	715s [1288w]	Orabanda									689.50	333.75			
Do.	739s [1295w]	Ora Banda Nellie									101.00	56.46			
Do.		Voided leases							45.10	482.50	6,393.40	5,964.45			
Do.		Sundry claims									6.16	67.61			
Dunnsville	17s	(New Standard Exploration Co., Ltd.)										13,681.00	5,788.52		
Do.	17s	North Coolgardie G.Ms. Ltd.	24			256.50	347.45					319.50	497.33		
Do.	785s	Sarmatia	Surr.		4.18						4.18				
Do.	17s	(Wealth of Nations)										1,695.00	513.11		
Do.	782s	Wealth of Nations South	5			37.00	23.61					37.00	23.61		
Do.		Voided leases								173.96	1,053.50	683.94			
Do.		Sundry claims				53.00	40.35					228.58	179.85		
Jourdie Hills	789s	Derry's Own	18			264.00	109.01					264.00	109.01		



TABLE IV.—*Production of Gold and Silver from all sources, etc.—continued.*

**Coolgardie Goldfield—continued.**

**KUNANALLING DISTRICT—continued.**

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LESSEE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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.
Jourdie Mills	774s ..	Jaurdie Central ..	Ftd. ..	..	..	31.00	12.14	..	..	..	66.00	24.70	..
Do.	530s ..	Jourdie ..	Ftd. ..	..	..	..	..	..	..	..	415.00	159.19	..
Do.	793s ..	Jourdie Enterprise Extended ..	24 ..	..	..	115.00	135.36	..	..	..	115.00	135.36	..
Do.	773s. 786s ..	Jourdie Enterprise leases ..	36 ..	..	..	837.00	452.24	..	..	..	837.00	452.24	..
Do.	786s ..	(Jourdie Enterprise South)	..	..	..	91.00	39.42	..	..	..	91.00	39.42	..
Do.	369s. 661s ..	(Jourdie Hills G.M. Co., Ltd.)	..	..	..	192.00	447.59	..	..	..	9,635.00	7,868.08	..
Do.	369s. 661s ..	Jourdie United G.M. Co., Ltd.	24 ..	..	..	40.00	128.44	..	..	..	40.00	128.44	..
Do.	798s ..	O.K. ..	12 ..	..	..	64.00	18.63	..	..	..	64.00	18.63	..
Do.	514s ..	Pride of Jaudie North ..	12 ..	..	..	179.00	63.59	..	..	..	1,270.50	731.68	..
Do.	369s ..	(Pride of the Jourdies)	..	..	..	..	..	..	..	..	410.74	465.47	..
Do.	..	Sundry claims ..	..	..	..	..	..	..	..	..	490.00	254.96	..
Do.	..	Voided leases ..	..	..	..	..	..	..	..	..	465.00	68.12	..
Kandana	..	..	..	..	..	..	..	..	..	..	..	..	..
Kintore	734s. 735s ..	Great Cement Proprietary, Ltd.	Ftd. ..	..	..	84.50	127.86	..	..	..	116.25	743.63	..
Do.	721s ..	Hands Across the Sea ..	Ftd. ..	..	..	19.00	15.07	..	..	..	111.50	85.79	..
Do.	740s ..	London ..	12 ..	..	..	171.00	482.40	..	..	..	542.00	793.81	..
Do.	603s ..	Sydney Mint ..	12 ..	47.10	..	247.00	218.67	..	..	110.29	541.75	1,681.60	..
Do.	..	Voided leases ..	..	..	..	..	..	..	..	143.66	41,338.06	29,084.58	..
Do.	..	Sundry claims ..	..	..	..	54.00	24.69	..	..	..	627.50	695.48	..
Siberia	753s [1305w] ..	Bonnie Doon ..	Ftd. ..	..	..	..	..	..	..	..	23.00	4.90	..
Do.	674s [1286w] ..	Golden ..	..	..	..	..	..	..	..	82.17	22.40	120.37	..
Do.	720s [1292w] ..	Invincible ..	..	..	..	..	..	..	..	..	185.00	368.63	..
Do.	717s [1290w] ..	Invincible Consols ..	Ftd. ..	..	..	..	..	..	..	..	70.00	15.00	..
Do.	706s [1287w] ..	Invincible Extended ..	Ftd. ..	..	..	..	..	..	..	501.33	..	..	..
Do.	747s [1301w] ..	Lady Frida West ..	Ftd. ..	..	..	..	..	..	..	..	10.00	3.04	..
Do.	728s [1293w] ..	Mexico ..	..	..	..	..	..	..	..	..	216.50	427.07	..
Do.	718s [1291w] ..	Missouri ..	..	..	..	..	..	..	..	..	196.00	79.88	..
Do.	736s [1294w] ..	Palmerston ..	..	..	..	..	..	..	..	1.84	159.00	25.10	..
Do.	746s [1300w] ..	Pole ..	..	..	..	..	..	..	..	..	100.00	79.87	..
Do.	754s [1306w] ..	Port Arthur ..	..	..	..	..	..	..	..	..	29.00	24.31	..
Do.	124s [1283w] ..	Waverley ..	..	..	..	..	..	..	..	496.67	1,466.80	1,873.81	..
Do.	..	Voided leases ..	..	..	..	..	..	..	..	1.07	475.80	5,739.15	7,508.16
Do.	..	Sundry claims ..	..	..	..	..	..	..	..	30.91	196.00	135.15	..
Do.	..	(Blue Bell)	..	..	..	..	..	..	..	..	8.05	697.00	429.47
25-Mile	696s ..	(Blue Bell Extended)	..	..	..	..	..	..	..	..	113.00	71.32	..
Do.	727s ..	Blue Bell leases ..	12 ..	..	..	235.00	322.15	..	..	..	867.00	669.81	..
Do.	696s. 727s ..	(Bow's leases)	Surr. ..	..	..	..	..	..	..	..	1,697.50	405.66	..
Do.	646s. 656s ..	Bow's Mine No. 1 ..	10 ..	..	..	638.59	182.76	..	..	..	638.59	182.76	..
Do.	777s ..	(Emu) ..	Ftd. ..	..	..	..	..	..	..	..	143.00	167.01	..
Do.	111s ..	Emu ..	Ftd. ..	..	..	..	..	..	..	..	133.35	34.95	..
Do.	111s ..	Great Northern Star ..	Ftd. ..	..	..	..	..	..	..	..	65.00	17.58	..
Do.	751s ..	Hopeful ..	18 ..	..	..	105.00	60.87	..	..	..	105.00	60.87	..
Do.	783s ..	Inkermann ..	12 ..	..	..	430.00	1,022.17	..	..	..	633.00	1,250.31	..
Do.	757s ..	Lochiel ..	Ftd. ..	..	..	..	..	..	..	94.30	51.00	74.49	..
Do.	673s [1285w] ..	Premier ..	24 ..	..	..	10.00	5.03	..	..	..	10.00	5.03	..
Do.	79s ..	(Premier G.M. Co., N.L.)	..	..	..	112.00	185.66	..	..	..	62,214.00	46,930.06	18.84
Do.	79s ..	Premier West ..	Ftd. ..	..	..	67.00	48.32	..	..	..	125.50	110.07	..
Do.	767s ..	Shamrock leases ..	18 ..	..	..	491.05	627.29	..	192.12	..	2,588.35	2,956.34	..
Do.	586s. 602s ..	Star of Fremantle ..	5 ..	..	..	169.00	71.21	..	..	..	4,253.00	2,720.31	..
Do.	645s ..	Voided leases ..	..	..	..	..	..	..	..	156.76	12,471.00	8,682.73	..
Do.	..	Sundry claims ..	..	..	..	333.50	316.64	..	..	85.45	2,021.85	1,051.91	..

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From District generally:—													
Sundry parcels treated at:													
Allsop and Howell's Works—Kalgoorlie				..	..	..	..	..	..	..			
Bow's Battery				..	..	5.00	17.91	..	..	7.91			
Orotava Works—Kalgoorlie				..	..	..	25.13	..	2.18	200.00			
Pride of Jaudie North Battery				..	..	18.00	15.01	..	..	65.22			
Shamrock Battery				..	..	..	134.30	..	..	34.69			
Stanley Battery				..	..	52.50	74.45	..	..	15.01			
Various Works				..	..	..	..	..	..	134.30			
Reported by Banks and Gold Dealers				..	..	..	..	14.86	..	107.98			
				..	..	..	..	19.14	1.10	880.95			
				..	..	..	..	..	..	..			
<b>Total</b>				..	..	<b>59 81</b>	<b>9 185 14</b>	<b>7 721 12</b>	<b>322 65</b>	<b>4 768 62</b>	<b>199 874 18</b>	<b>149 621 39</b>	<b>20 22</b>

**Yilgarn Goldfield.**

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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.
Blackbourne	671	Blackbourne	Ftd.	..	..	..	..	..	..	..	492.00	142.37	..
Do.	696	Blackbourne South	Ftd.	..	..	..	..	..	..	..	92.00	32.93	..
Do.	..	Voided leases	..	..	..	..	..	..	..	..	212.00	51.58	..
Golden Valley	740	Last Try	10	..	..	7.00	2.44	..	..	..	7.00	2.44	..
Do.	..	Voided leases	..	..	..	..	..	..	..	..	130.00	218.32	..
Greenmount	756	Golden Fleece	18	..	..	225.00	45.52	..	..	..	225.00	45.52	..
Do.	713	Great Surprise	6	..	..	..	..	..	31.99	3.38	..	..	..
Do.	503, 535, 555	(Greenmount G.Ms., Ltd.)	..	..	..	..	..	..	..	..	5.00	2.11	..
Do.	503, 535, 555, 757	Greenmount Mines, N.L.	55	..	..	18,398.00	4,035.60	240.60	..	..	40,476.00	9,776.13	306.67
Do.	565	(Royal George)	..	..	..	..	..	..	..	..	1,806.00	602.41	..
Do.	744	Southern Cross Boulder	Wdn.	..	..	60.00	10.89	..	..	..	214.00	69.76	..
Do.	550	(Sunbeam)	..	..	..	900.00	265.64	..	14.00	..	4,472.00	1,427.25	..
Do.	550, 565	Sunbeam leases	21	..	..	1,248.00	381.25	..	..	..	1,248.00	381.25	..
Do.	536	Transvaal	24	..	..	7,061.00	2,371.05	..	..	..	29,423.00	6,911.11	358.08
Do.	503	(United Australia)	..	..	..	..	..	..	..	..	410.00	120.15	..
Do.	..	Voided leases	..	..	..	..	..	..	..	18.24	3,223.00	796.66	..
Do.	..	Sundry claims	..	..	..	114.00	71.40	..	..	..	177.00	87.92	..
Hope's Hill	703	Mellor's Hill	Ftd.	..	..	..	..	..	..	..	90.00	53.14	..
Do.	..	Voided leases	..	..	..	..	..	..	..	..	125,156.35	31,737.69	..
Do.	..	Sundry claims	..	..	..	..	..	..	..	..	57.00	13.37	..
Jacoeletti	656	Christmas Gift	Ftd.	..	..	..	..	..	..	..	452.00	325.83	..
Do.	768	Donovan's Find	24	..	..	335.00	519.71	..	..	..	335.00	519.71	..
Do.	717	Eveless Eden	18	..	..	..	..	..	..	..	622.00	349.17	..
Do.	753	Exhibition	18	..	..	416.00	103.47	..	..	..	416.00	103.47	..
Do.	779	Frances Furness	24	..	..	42.00	35.91	..	..	..	42.00	35.91	..
Do.	490, 517, 558, (559)	Jacoeletti G.Ms., Ltd.	24	..	..	728.00	271.70	..	..	..	728.00	405.71	..
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	Marvel Loch G.M. Co., N.L.	24	..	..	861.00	642.42	25.87	..	..	861.00	642.42	25.87
Do.	490, 517	(Turnbull leases)	..	..	..	..	..	..	..	..	2,143.00	1,481.72	..
Do.	..	Sundry claims	..	..	4.48	418.25	252.06	..	..	15.78	620.25	329.22	..

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.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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.	
Kennyville	776 .. ..	Cornishman .. ..	12	..	..	32.00	59.29	..	..	..	..	32.00	59.29	..
Do.	570 .. ..	(Great Leviathan) .. ..	..	..	..	..	..	..	..	..	..	3,821.85	2,948.67	..
Do.	683 .. ..	New Chum .. ..	Ftd.	..	..	..	..	..	..	..	..	67.00	6.74	..
Do.	570 .. ..	Northern Blocks Syndicate, Ltd.	24	..	..	4,325.00	963.69	..	..	..	..	10,705.00	2,974.64	..
Do.	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	5.58	..	158.00	71.82	.09
Do.	.. ..	Sundry claims .. ..	..	..	..	24.00	26.57	..	..	..	..	24.00	26.57	..
Koolyanobbing	641 .. ..	Chadwick's Reward .. ..	24	..	..	..	..	..	..	..	..	6.00	2.65	..
Mt. Jackson	212, 217, 397	(Mt. Jackson G.Ms., Ltd.) .. ..	..	..	..	..	..	..	..	..	..	15,054.00	9,806.22	2,045.50
Do.	212, 217, 397, 658, 659	Mt. Jackson G.Ms., Ltd.	a. r. p. 79 3 15	..	..	2,514.00	2,251.26	259.78	..	..	..	4,506.00	3,297.25	259.78
Do.	212, 217, 397	(Mt. Jackson G.Ms., Ltd., 1897)	..	..	..	..	..	..	..	..	..	9,537.00	6,210.61	..
Do.	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	..	..	801.50	224.71	..
Mt. Rankin	.. ..	Voided leases .. ..	..	..	..	..	..	..	3.84	5.20	..	252.00	69.50	..
Parker's Range	508 .. ..	Australia .. ..	18	..	..	575.00	157.77	..	..	..	..	1,948.00	1,276.15	..
Do.	771 .. ..	Battler's Hill .. ..	24	..	..	6.00	5.97	..	..	..	..	6.00	5.97	..
Do.	520 .. ..	Blue Hill .. ..	18	..	..	..	..	..	..	..	..	1,071.00	1,627.94	..
Do.	746 .. ..	Dulcie Jean .. ..	12	..	..	59.75	117.29	..	..	..	..	59.75	117.29	..
Do.	751 .. ..	Ell Ess Dee .. ..	12	..	..	..	..	..	..	..	..	26.00	28.61	..
Do.	736 .. ..	Garibaldi .. ..	16	..	..	70.50	38.98	..	..	..	..	70.50	38.98	..
Do.	707 .. ..	Golden Cube .. ..	12	..	12.85	333.00	155.97	..	..	12.85	..	996.00	368.81	..
Do.	698 .. ..	Golden Mile G.M. Co., Ltd.	Ref.	..	..	33.00	3.75	..	..	..	..	33.00	3.75	..
Do.	761 .. ..	Golden Rod .. ..	12	..	..	137.00	62.10	..	..	..	..	137.00	62.10	..
Do.	668 .. ..	Gordon Highlander .. ..	12	..	..	117.00	30.05	..	..	14.37	..	117.00	30.05	..
Do.	719 .. ..	Great Victoria .. ..	12	..	..	580.00	138.20	..	..	..	..	916.00	176.76	..
Do.	665 .. ..	Never Never .. ..	24	..	..	2,650.00	762.49	..	..	..	..	2,650.00	762.49	..
Do.	769 .. ..	Piemonte .. ..	12	..	..	129.50	19.81	..	..	..	..	129.50	19.81	..
Do.	724 .. ..	Spring Hill .. ..	5	..	..	294.00	78.61	..	..	..	..	294.00	78.61	..
Do.	760 .. ..	Spring Hill North .. ..	12	..	..	20.00	5.56	..	..	..	..	20.00	5.56	..
Do.	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	19.12	..	2,553.00	2,237.09	..
Do.	.. ..	Sundry claims .. ..	..	..	..	327.75	97.42	..	..	..	..	327.75	97.42	..
Southern Cross	12, 29, 279, 505, 506	British and Foreign Development Syndicate, Ltd.	122	..	..	7,579.75	4,642.53	94.57	..	..	..	67,471.75	49,653.90	94.57
Do.	738 .. ..	Brown Hill .. ..	Ftd.	..	..	..	..	..	..	..	..	176.00	38.62	..
Do.	279 .. ..	(Central) .. ..	..	..	..	..	..	..	..	..	..	44,958.00	19,702.85	..
Do.	749 .. ..	Central Extended .. ..	3	..	..	15.07	126.55	..	..	20.54	..	37.07	163.18	..
Do.	697 .. ..	Excelsior .. ..	Ftd.	..	..	..	..	..	..	..	..	788.00	465.82	..
Do.	13 .. ..	(Fraser's G.M. Co., N.L.) .. ..	..	..	..	..	..	..	..	..	..	151,771.00	67,870.33	..
Do.	256, 554	Fraser South Extended G.M. Co., Ltd.	Ftd.	..	..	..	..	..	..	..	..	43,747.68	18,433.55	..
Do.	29 .. ..	(Fraser's South G.M. Co., N.L.) .. ..	..	..	..	..	..	..	..	..	..	48,233.00	20,013.23	..
Do.	552 .. ..	(Haddon) .. ..	..	..	..	..	..	..	..	..	..	680.00	145.01	..
Do.	552, (611)	(Haddon leases) .. ..	..	..	..	..	..	..	..	..	..	7,178.00	1,396.90	..
Do.	737 .. ..	Reward .. ..	12	..	10.59	36.00	22.02	..	..	10.59	..	46.00	53.51	..
Do.	611 .. ..	(Takedown) .. ..	Ftd.	..	..	..	..	..	..	..	..	16.00	13.79	..
Do.	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	..	..	35,430.70	12,500.19	.06
Do.	.. ..	Sundry claims .. ..	..	..	..	162.00	43.53	..	3.73	592.81	..	853.25	215.75	..

From Goldfield generally :-

Sundry parcels treated at:—													
Fraser's South Extended Works .. .. .					cy. 179.53					179.53			
Fremantle Smelter, Ltd .. .. .					73.99	22.44			21.28	538.09			
Haddon Battery .. .. .					cy. 70.07					70.07			
Hope's Hill Slimes Plant .. .. .					cy. 80.60					1,901.21			
Layther's Cyanide Works .. .. .					cy. 40.57					40.57			
Orotava Works—Kalgoorlie .. .. .					cy. .49					64.61			
Various Works .. .. .									59.00	2,639.02			
Reported by Banks and Gold Dealers .. .. .				.34				17.01					
<b>Total .. .. .</b>				<b>.34</b>	<b>27'92</b>	<b>50,833'57</b>	<b>19,263'72</b>	<b>643'26</b>	<b>70'57</b>	<b>891'32</b>	<b>674,511'18</b>	<b>286,391'88</b>	<b>3,124'52</b>

## Dundas Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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	969	Ajax North	Ftd.								26.50	22.52	
Do	965	Pathway	Ftd.								31.00	7.06	
Do		Voided leases									440.05	475.37	
Do		Sundry claims									88.00	74.05	
Dundas		Voided leases									4,531.23	2,202.21	
Do		Sundry claims									385.37	64.00	37.80
Killaloe		Voided leases									20.65	6.88	
Norseman	39, 97	(All Nations G. Ms., Ltd.)									290.00	47.74	
Do	904	Alphatar	Ftd.								101.04		
Do	999	Austral Mararoa	18			60.00	23.54				60.00	23.54	
Do	42, 43, 53, 579, 690, 889, 898	Cumberland G.M. Co., N.L.	a. r. p. 87 0 6			7,718.00	7,159.55				28,596.10	30,972.69	
Do	897	Cumberland West	Ftd.								21.50	10.66	
Do	963	Desirable	Ftd.								354.00	148.82	
Do	966	Esperanza No. 2	12			89.50	103.78				268.00	455.06	
Do	1003	Glory	12			79.00	37.55				79.00	37.55	
Do	938, 945, 988	Hampton Plains Estate (1906), Ltd.	51			4,392.00	963.51				4,392.00	963.51	
Do	863	Hit or Miss	3			22.50	19.84				18.53	120.50	93.54
Do	1005	Hopetoun	18			44.00	20.65				44.00	20.65	
Do	908	Iris	12								70.00	23.14	
Do	1008	Iron King	18			131.50	31.53				131.50	31.53	
Do	53	(John Bull)									314.00	281.93	
Do	1010	Kemballey Grant	12			11.50	112.73				11.50	112.73	
Do	956	Kirkpatrick West	4		2.11	93.00	124.75			3.68	187.00	280.05	
Do	1002	Lady Gladys Gwendolen	15			72.50	33.43				72.50	33.43	
Do	757	Lady Jean	Ftd.								122.50	72.04	
Do	757, 800	(Lady Jean leases)	Ftd.							5.14	1,597.00	2,226.15	17.66
Do	864, (938, 945), 961, (988)	Lady Mary G.M. Co., N.L.	36			40.00	18.02				6,593.00	2,757.63	10.00
Do	945	(Lady Miller South)									17.00	4.36	
Do	978	Little Gladys	5			7.50	40.63			81.63	13.00	63.13	
Do	984	Lucky Call No. 2	12			1.22	16.50			1.22	76.00	32.20	

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Dundas Goldfield—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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.	
Norseman .. ..	852 .. ..	(Mararoa)	..	..	..	4,070.00	1,725.75	..	..	..	9,167.00	4,484.90	..	
Do. .. ..	992 .. ..	Mararoa Extended	24	..	..	115.00	15.83	..	..	..	115.00	15.83	..	
Do. .. ..	852, 912, 977, 979, 980, 985	Mararoa G.M. Co., N.L.	69	..	..	4,958.50	2,606.09	..	..	..	4,958.50	2,606.09	..	
Do. .. ..	991 .. ..	Mararoa North No. 1	6	..	..	17.00	13.35	..	..	..	17.00	13.35	..	
Do. .. ..	53 .. ..	(Midas G.M. Co., N.L.)	..	..	..	..	..	..	..	..	416.00	204.15	..	
Do. .. ..	42, 43, 53	(Mt. Benson G.M. Co., N.L.)	..	..	..	..	..	..	..	..	4,797.40	4,181.00	..	
Do. .. ..	964 .. ..	New Moon	18	..	..	236.00	275.12	32.21	..	..	606.00	609.77	32.21	
Do. .. ..	821 .. ..	Northern Star	12	..	..	55.50	125.39	..	..	355.36	659.00	1,033.01	..	
Do. .. ..	903 .. ..	O.K.	6	..	3.22	67.50	61.53	..	..	21.23	727.75	824.15	..	
Do. .. ..	935 .. ..	O.K. East	Surr.	..	..	85.50	106.49	..	..	..	561.50	612.33	..	
Do. .. ..	995 .. ..	O.K. Extended	12	..	..	152.00	185.06	..	..	..	152.00	185.06	..	
Do. .. ..	914 .. ..	Oversight	12	..	..	118.50	117.23	..	..	..	327.50	479.78	..	
Do. .. ..	106, 187, 587, 840, 972	Princess Royal G.M. Co., N.L.	3. r. p. 83 0 4	..	..	7,227.00	2,756.77	488.19	..	..	143,592.50	132,821.48	8,586.70	
Do. .. ..	634, 687, 745	Princess Royal North G.M. Co., N.L.	26 2 22	..	..	1,256.00	1,320.40	27.00	..	..	2,150.00	1,629.68	27.00	
Do. .. ..	187 .. ..	(Princess Royal South)	..	..	..	..	..	..	..	..	358.00	568.05	..	
Do. .. ..	849 .. ..	St. Patrick	6	..	..	..	..	..	..	160.91	710.50	1,799.24	..	
Do. .. ..	989 .. ..	Surprise	12	..	..	93.50	88.93	..	..	..	110.00	107.61	..	
Do. .. ..	997 .. ..	Up and Down	18	..	..	67.00	34.57	..	..	..	67.00	34.57	..	
Do. .. ..	1016 .. ..	Valkyrie	12	..	..	32.00	215.67	4.90	..	..	32.00	215.67	4.90	
Do. .. ..	936 .. ..	Valkyrie Consolidated	18	..	..	33.50	106.79	..	..	..	209.00	448.02	..	
Do. .. ..	949 .. ..	Venture No. 2	Surr.	..	..	..	..	..	..	..	228.00	233.28	..	
Do. .. ..	990 .. ..	Viking No. 1	18	..	..	668.50	1,380.57	..	..	..	697.00	1,472.56	..	
Do. .. ..	986 .. ..	Vini Vidi Vici	9	..	..	6.00	14.69	..	..	..	61.03	9.00	..	
Do. .. ..	907 .. ..	Zeigler's Find	Ftd.	..	..	..	..	..	..	..	82.16	92.00	..	
Do. .. ..	.. ..	Voided leases	..	..	..	..	..	..	..	4.23	2,291.08	136,953.35	98,006.16	
Do. .. ..	.. ..	Sundry claims	..	..	38.27	942.00	420.76	..	..	992.11	273.41	6,833.40	3,566.07	
Do. .. ..	.. ..	Voided leases	..	..	..	..	..	..	..	..	17.61	7,764.00	4,705.10	
Peninsula .. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	
		<i>From Goldfield generally:—</i>												
		Sundry parcels treated at:—												
		Amalgamated Tailings Syndicate Works	..	..	..	..	cy. 201.12	..	..	..	..	68.00	586.92	..
		Little Wonder Cyanide Works	..	..	..	..	cy. 62.95	..	..	..	..	..	62.95	..
		Mararoa Crushing and Cyanide Works	..	..	..	80.00	270.00	..	..	..	..	80.00	270.00	..
		Royal Tailings Syndicate Works	..	..	..	..	cy. 346.45	200.00	..	..	..	..	533.57	200.00
		State Battery—Norseman	..	..	..	..	cy. 2,302.62	685.94	..	..	..	..	225.50	885.41
		Various Works	..	..	..	..	..	..	..	54.52	..	187.50	3,587.86	446.45
		Reported by Banks and Gold Dealers	..	..	..	73.19	..	..	..	865.22	..	..	..	..
		<b>Total</b>	..	..	..	<b>7319</b>	<b>79'60</b>	<b>33,058'50</b>	<b>23,449'44</b>	<b>1,438'24</b>	<b>1,861'56</b>	<b>3,913'92</b>	<b>371,322'93</b>	<b>313,445'53</b>

# Phillips River Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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	130	Alice	10			17.00	9.97				17.00	9.97	
Do.	99	Alice Mary	5			2) 00	3.31				20.00	3.83	
Do.	107	Ard Patrick	18			121.5)	117.41				131.50	131.89	
Do.	M.L. 184	Christmas Gift	15			287.00	134.83				566.00	329.20	
Do.	126	Finniss Gold Mine	Surr.			.05	19.77				.05	19.77	
Do.	M.L. 60	Flag Gold and Copper Mining Co., Ltd.	50			665.00	442.66				665.00	442.66	
Do.	65	(Gem)									687.50	613.34	
Do.	65, 79	Gem leases	34			843.35	399.22				843.35	399.22	
Do.	M.L. 294	Great Britain	20			13.00	5.93				13.00	5.93	
Do.	M.Ls. 52, 94	(Harbour View leases)							379.83		3,619.25	1,560.86	61.41
Do.	M.Ls. 52, 94	Harbour View leases	70			500.00	93.33				500.00	93.33	
Do.	81	Harbour View North	12			50.00	27.00				81.00	47.75	
Do.	98	Hillsborough	10			224.09	363.66				285.09	462.76	
Do.	78	Kundip	Ftd.								50.00	20.74	
Do.	133	Kundip	20			161.00	43.82				161.00	43.82	
Do.	104	Lilly	15			167.00	42.46				217.00	74.42	
Do.	M.L. 242	Lone Star	Surr.									.12	
Do.	66	Medic	5			242.00	232.02			6.85	619.90	556.51	
Do.	M.L. 237	Mosaic	Ftd.									1.19	69.94
Do.	M.L. 291	Mosaic	40				*3.61	*164.62				3.61	164.62
Do.	M.L. 108	Mt. Stennett	39				*1.87			3.74		20.94	
Do.	73	Omaha	Ftd.			10.00	32.67				103.94	293.51	
Do.	85	Persic	Ftd.								16.00	7.13	
Do.	95	Persic Extended	Ftd.								20.50	19.28	
Do.	129	Queen of the Earth	a. r. p. 6 3 10		11.00					11.00			
Do.	M.Ls. 52, 94	(Ravensthorpe G.M. Syndicate, N.L.)					*1.90				1,124.00	433.94	164.98
Do.	M.L. 60	(Red, White and Blue)					*195.25				1,005.60	1,087.79	107.29
Do.	106	Stowaway	5	9.26		14.00	13.65		9.26		14.00	13.65	
Do.	114	Third Call	Ftd.								8.75	10.10	
Do.	120	Try Again	Surr.								9.50	7.10	
Do.	74	Two Boys	20			8.12	44.38			3.90	388.12	1,004.33	
Do.	80	Western Gem	8								70.00	58.33	
Do.		Voided leases								91.12	447.00	238.71	1,457.30
Do.		Sundry claims			2.74	47.00	66.60		41.93	15.50	92.54	125.46	
Mt. Desmond	M.L. 203	(British Flag)										7.76	
Do.	M.L. 208	(Desmond)										.77	
Do.	M.L. 275	Ironclad	30				*.60					.60	
Do.	M.L. 95	(Elverdton: Phillips River Options Syndicate, N.L.)										9.63	
Do.	M.L. 95	Elverdton: Phillips River Gold and Copper Co., Ltd.	40				*12.92					12.92	
Do.	M.L. 109	(Mt. Desmond)										36.97	
Do.	M.L. 109	Mt. Desmond: Phillips River Gold and Copper Co., Ltd.	52				*60.56	14.10		1.40		123.98	14.10
Do.	M.L. 199	P.L.P.	10				*3.63					10.91	
Do.	M.L. 257	Thistle and Shamrock	20				*.86					.86	
Do.		Voided leases									9.00	17.61	
Do.		Sundry claims					*.56					.56	
Mt. Purchas	121	Eleonor Frances	Ftd.								.05	18.56	
Do.	89	Mt. Agnes Reward	24			90.00	40.74				174.00	128.76	

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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.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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. Purchas	92	Mt. Mary	Ftd.							17.00	11.89			
Do.		Voided leases							4.38					
Do.		Sundry claims								4.75	4.68			
Ravensthorpe	M.L. 207	Andante	40			17.00	6.60			17.00	6.60			
Do.	M.L. 259	Birthday	48				*.31				.31			
Do.	115	Bobby Dazzler	12			9.00	12.60			18.00	38.59			
Do.	M.L. 196	Contest	20				*.21				.21			
Do.	93	Ellen Tommy	Ftd.							34.00	14.26			
Do.	82	Gilbert G.M., Ltd.	12			140.00	59.60			236.00	148.47			
Do.	M.L. 202	Grafter	24				*12.67				14.43			
Do.	75	Jubilee	Surr.							64.00	32.66			
Do.	M.L. 116	Last Chance	20								5.31			
Do.	M.L. 16	(Marion Martin)									20.09			
Do.	M.L. 7	Mary	35								9.47			
Do.	M.L. 175	(Mt. Benson)									287.88			
Do.	M.L. 175	Mt. Benson: Phillips River Gold and Copper Co., Ltd.	40				*174.74	36.48			215.64	36.48		
Do.	M.L. 195	Mt. Benson Extended	10				*10.60				11.88			
Do.	M.L. 15	(Mt. Cattlin)							.49	200.00	85.50			
Do.	M.L. 15	Mt. Cattlin: Mt. Cattlin Copper Mining Co., Ltd.	50				*1,483.37	12.15			1,483.37	12.15		
Do.	M.L. 15	(Mt. Cattlin: Phillips River Gold and Copper Co., Ltd.)									387.33			
Do.	88	Mount Eliza	Ftd.			21.50	8.61			101.50	76.28			
Do.	119	New Maori Queen	Ftd.			2.44	51.59			2.44	51.59			
Do.	M.L. 204	New Moon	10				*.70				.70			
Do.	M.L. 16	Marion Martin: Phillips River Gold and Copper Co., Ltd.	5				*35.80				35.80			
Do.	M.L. 219	Mount Cattlin West	20				*.59				.59			
Do.	76	Planet	Surr.								87.00	13.46		
Do.		Voided leases							114.35	19,828.50	16,371.81			
Do.		Sundry claims				20.00	6.78		134.79	123.00	82.21	4.15		
West River	M.L. 252	Pick and Shovel	20				*.21				.21			
Do.		Sundry claims					*1.69	3.44			1.69	3.44		
From Goldfield generally:—														
Sundry parcels treated at:														
Phillips River Smelter														
Various Works														
Reported by Banks and Gold Dealers														
<b>Total</b>				<b>33'00</b>		<b>3,690'05</b>	<b>4,290'87</b>	<b>230'79</b>	<b>308'88</b>	<b>621'59</b>	<b>32,692'83</b>	<b>27,937'76</b>	<b>2,095'86</b>	

## Donnybrook Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD 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 Do.	..	Voided leases .. Sundry claims ..	..	..	..	..	..	..	..	..	23.24	..	1,613.30	816.23	..
		<b>Total</b>									<b>23.24</b>		<b>1,653.30</b>	<b>818.52</b>	

## State Generally.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	Area in Acres.	TOTAL FOR 1907.					TOTAL GOLD PRODUCTION.						
				Alluvial.	Dollied and Specimens.	Ore Treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Silver.		
				Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.		
		Sundry parcels treated at:—													
		Fremantle Smelter, Ltd.					1 329.66	120.05						1,107.06	481.77
		Hack's Works—Kalgoorlie					cy. 6.54	..						6.54	..
		Orotava Works—Kalgoorlie					cy. 58.52	..						121.21	..
		Rasmussen's Works—Kalgoorlie					1 548.17	..						961.01	..
		Star of Abadare Works—Kalgoorlie					1 351.57	..						351.57	..
		Sunbeam Battery—Yilgarn				7.00	4.06	..			7.00			4.06	..
		Trurant Works—Kalgoorlie					1 66.31	..						66.31	..
		Various Works					..	..			10.00			1,174.16	..
		Sundry specimens					..	..			2.87			..	..
		Reported by Banks and Gold Dealers					..	..			124.89		153.03	..	..
		<b>Total</b>									<b>124.89</b>		<b>155.90</b>	<b>17.00</b>	<b>3,791.92</b>



TOTAL OUTPUT OF GOLD BULLION ENTERED FOR EXPORT, AND RECEIVED AT THE PERTH BRANCH OF THE QUANTITY OBTAINED EACH YEAR FROM THE RESPECTIVE

Table with columns for Year, Kimberley (Export, Mint, Total), Pilbara (Export, Mint, Total), West Pilbara (Export, Mint, Total), and Ashburton (Export, Mint, Total). Rows include years 1886-1906 and totals.

Table with columns for Year, d Yalgoo, e Mt. Margaret, e North Coolgardie, and f Broad Arrow. Rows include years 1886-1906 and totals.

Table with columns for Year, h Dundas, i Phillips River, j Donnybrook, and State Generally. Rows include years 1886-1906 and totals.

a Prior to 1st May, 1893, included with Pilbara. d Prior to 1st April, 1897, included with Murchison. e From 1st August, 1897. e Prior to 1st May, 1896, included with Coolgardie. f From 1st September, 1897. h Prior to 1893 included with Yalgoo. i Prior to 1902 included in State generally. j From 1st March, 1899.

**V.**  
**ROYAL MINT, FROM 1ST JANUARY, 1886, TO 31ST DECEMBER, 1907, 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	...	...	...	...	...	...	...	...	...	...	1,846'83	1,846'83
1892	...	...	...	...	...	...	...	...	...	21,789'19	...	21,789'19
1893	...	...	...	...	...	...	...	...	...	18,974'77	...	18,974'77
1894	...	...	...	...	...	...	...	...	...	47,365'54	...	47,365'54
1895	...	...	...	...	...	...	...	...	...	58,575'66	...	58,575'66
1896	...	...	...	...	...	...	...	...	...	63,769'17	...	63,769'17
1897	...	...	...	4,571'38	...	4,571'38	8,157'34	...	8,157'34	74,154'67	...	74,154'67
1898	...	...	...	12,288'93	...	12,288'93	35,393'19	...	35,393'19	83,791'22	...	83,791'22
1899	297'96	76'63	374'59	14,064'24	14,558'64	28,622'88	33,826'08	3,361'95	37,188'03	61,586'09	22,074'71	83,660'80
1900	...	77'02	77'02	16,119'79	...	25,647'93	23,545'54	28,671'55	52,217'09	53,815'70	43,423'77	97,239'47
1901	6'59	16'82	23'41	231'85	19,352'44	19,584'29	29,780'63	40,557'07	70,337'70	92,149'56	38,996'10	131,145'66
1902	...	107'29	107'29	85'93	28,044'55	28,130'18	25,450'63	53,583'10	79,033'73	141,731'91	54,926'08	182,657'99
1903	...	30'76	30'76	203'60	29,395'32	29,598'92	21,878'06	65,331'05	87,212'11	154,012'88	54,348'53	208,361'41
1904	...	10'95	10'95	17,475'33	17,475'33	21,878'06	21,878'06	61,550'36	85,847'21	165,232'67	52,683'16	217,915'83
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	92,742'05	224,398'41
1906	...	78'73	78'73	2,038'62	2,038'62	140'68	95,168'89	95,309'57	95,309'57	79,172'69	109,936'80	189,109'49
Total ...	304'55	419'54	724'09	41,099'08	140,356'44	181,455'52	201,130'68	440,476'90	641,607'58	1,249,627'91	455,131'20	1,704,759'11
1907	...	8'44	8'44	...	5,918'75	5,918'75	2,891'66	117,735'69	120,627'35	54,811'74	115,497'50	170,309'24
Total ...	304'55	427'98	732'53	41,099'08	146,275'19	187,374'27	204,022'34	553,212'59	762,234'93	1,304,439'65	570,628'70	1,875,068'35

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	...	...	...	...	...	...	...	...	...	1,662'61	...	1,662'61
1890	...	...	...	...	...	...	...	...	...	2,036'99	...	2,036'99
1891	...	...	...	...	...	...	...	...	...	11,480'61	...	11,480'61
1892	...	...	...	...	...	...	...	...	...	18,973'91	...	18,973'91
1893	...	...	...	...	...	...	...	...	...	67,760'73	...	67,760'73
1894	...	...	...	...	...	...	...	94,227'58	94,227'58	28,178'31	...	28,178'31
1895	...	...	...	...	...	...	...	111,919'21	111,919'21	17,666'25	...	17,666'25
1896	3,679'63	...	3,679'63	76,297'42	...	76,297'42	61,848'03	...	61,848'03	14,819'20	...	14,819'20
1897	29,437'40	...	29,437'40	268,411'95	...	268,411'95	93,312'00	...	93,312'00	16,037'78	...	16,037'78
1898	112,039'58	...	112,039'58	402,847'31	...	402,847'31	113,816'75	...	113,816'75	10,463'85	...	10,463'85
1899	57,674'82	14,940'55	72,615'37	796,696'63	29,567'58	826,264'21	101,589'22	24,700'89	126,290'11	6,919'11	8,114'60	15,033'71
1900	10,400'57	36,233'90	46,634'47	600,328'29	125,105'24	725,433'53	64,988'33	46,167'62	107,155'95	683'47	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	46,346'67	46,895'74	460,462'26	546,964'08	1,007,426'94	2,872'61	80,887'55	83,760'46	3'31	22,232'80	22,236'11
1903	4,308'99	36,145'75	40,454'74	570,447'27	580,790'97	1,151,238'24	7,318'63	69,681'38	77,000'01	...	22,761'00	22,761'00
1904	55'09	33,262'10	33,317'19	555,016'13	584,579'88	1,139,596'36	1,100'07	61,073'11	62,173'18	28'87	29,965'37	29,994'24
1905	2,187'11	40,220'19	42,407'30	479,254'37	613,163'20	1,092,357'57	177'80	62,066'34	62,244'14	...	25,291'11	25,291'11
1906	1,590'31	30,943'82	32,534'13	454,645'84	612,546'81	1,067,192'65	103'78	60,474'81	60,578'59	...	25,570'77	25,570'77
Total ...	228,721'13	277,087'16	505,808'29	5,362,450'38	3,331,499'29	8,693,949'67	658,858'36	475,772'21	1,134,630'57	196,828'65	186,242'33	383,070'98
1907	3,132'98	25,399'75	28,532'58	323,550'05	643,139'11	966,689'16	1,050'88	61,670'65	62,721'53	...	23,311'41	23,311'41
Total ...	231,853'96	302,486'91	534,340'87	5,686,000'43	3,974,638'40	9,660,638'83	659,909'24	537,442'86	1,197,352'10	196,828'65	209,553'74	406,382'39

Year.	GRAND TOTAL.			
	Export.	Mint.	Total.	Value.
	fine ozs.	fine ozs.	fine ozs.	£ s. d.
1886	270'17	...	270'17	1,147 12 2 1/2
1887	4,359'37	...	4,359'37	18,517 8 6 1/2
1888	3,124'82	...	3,124'82	13,273 7 10
1889	13,859'52	...	13,859'52	58,871 9 11 1/2
1890	20,402'42	...	20,402'42	86,663 19 5 1/2
1891	27,116'14	...	27,116'14	115,182 0 10
1892	53,271'65	...	53,271'65	226,283 11 8 1/2
1893	99,202'50	...	99,202'50	421,385 8 8 1/2
1894	185,298'73	...	185,298'73	787,098 19 6
1895	207,110'20	...	207,110'20	879,748 4 2 1/2
1896	251,618'69	...	251,618'69	1,068,808 5 2
1897	603,846'44	...	603,846'44	2,564,976 12 9 1/2
1898	939,489'49	...	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	894,887'27	519,973'59	1,414,860'86	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	1,163,997'69	1,871,037'44	7,935,653 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	1,172,614'93	1,983,230'97	8,424,225 17 3 1/2
1905	655,089'84	1,370,226'00	1,955,315'88	8,305,653 18 5 1/2
1906	562,25'59	1,232,296'01	1,794,546'60	7,622,749 8 7
Total	9,079,086'66	7,587,146'82	16,666,233'48	70,793,659 18 9 1/2
1907	431,803'14	1,265,750'45	1,697,553'59	7,210,749 6 2 1/2
TOTAL	9,510,889'80	8,852,897'27	18,363,787'07	78,004,409 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 VI.

RETURN OF GOLD BULLION RECEIVED AT THE PERTH BRANCH OF THE ROYAL MINT FROM MAY, 1899, TO THE 31ST DECEMBER, 1907, 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 ... ..	ozs. 308·45	ozs. 529·80	ozs. ...	ozs. 281·80	ozs. 85·65	ozs. 16,274·00	ozs. 3,758·07	ozs. 24,675·64	ozs. 5,190·05	ozs. 16,911·54	ozs. 44,779·38	ozs. 8,503·50	ozs. 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	47,628·18	5,116·94	144,663·12	182,543·06	15,903·42	53,901·58
1903 ... ..	511·75	14,217·53	6,481·58	135·30	36·29	34,684·27	77,089·29	64,127·18	1,687·99	148,006·49	197,229·08	21,528·20	42,649·25
1904 ... ..	37·69	8,293·58	5,170·06	150·73	13·10	20,909·99	77,237·31	63,037·71	3,345·82	143,453·51	166,939·82	24,721·53	39,799·55
1905 ... ..	656·34	16,053·42	1,400·46	50·54	25·65	16,075·36	107,295·17	111,493·34	5,469·06	184,178·87	175,057·14	18,394·17	48,352·22
1906 ... ..	785·23	6,007·79	915·63	168·30	95·43	2,471·21	115,363·22	133,264·79	5,919·37	166,097·63	130,784·60	20,415·43	37,509·91
1907 ... ..	431·72	4,924·97	396·22	49·89	10·06	7,057·22	140,382·15	137,713·43	3,815·06	183,693·29	86,685·09	16,228·85	30,285·39
<b>Total ... ..</b>	<b>4,478·50</b>	<b>79,506·93</b>	<b>18,180·63</b>	<b>1,366·24</b>	<b>495·70</b>	<b>169,479·97</b>	<b>660,279·81</b>	<b>673,505·04</b>	<b>48,586·82</b>	<b>1,181,456·81</b>	<b>1,208,199·62</b>	<b>158,900·33</b>	<b>352,757·55</b>

Year.	East Coolgardie.	Coolgardie.	Yilgarn.	Dundas.	* Phillips River.	Donnybrook.	State generally.	TOTAL.				GRAND TOTAL.							
								Western Australia.		Other Countries.		Quantity.	Actual Value.						
								Quantity.	Actual Value.	Quantity.	Actual Value.								
1899 ... ..	ozs. 33,051·33	ozs. 27,611·24	ozs. 9,070·70	ozs. 473·63	ozs. ...	ozs. 196·17	ozs. 904·39	ozs. 209,306·24	£ 762,546	s. 11	d. 6	ozs. 103·46	£ 336	s. 18	d. 3	ozs. 209,409·70	£ 762,883	s. 9	d. 9
1900 ... ..	139,845·60	51,607·26	28,648·51	31,583·20	...	265·55	1,620·93	581,182·91	2,096,212	14	2	17·49	44	15	7	581,200·40	2,096,257	9	9
1901 ... ..	263,514·75	78,026·07	29,433·84	32,825·75	...	4·64	1,667·79	860,280·69	3,033,311	0	4	92·25	297	5	8	860,372·94	3,033,608	6	0
1902 ... ..	636,536·52	94,134·17	25,873·68	31,088·91	5,146·80	67·08	2,461·98	1,354,615·78	4,791,303	18	1	16·27	38	10	2	1,354,632·05	4,791,342	8	3
1903 ... ..	685,289·82	82,218·79	26,856·28	40,006·39	6,420·79	97·52	3,350·32	1,452,624·11	5,139,852	11	9	294·78	703	14	10	1,452,918·89	5,140,556	6	7
1904 ... ..	699,475·35	73,076·66	35,854·87	37,508·11	2,450·03	...	1,608·47	1,403,083·89	4,955,870	9	0	263·05	614	11	9	1,403,346·94	4,956,485	0	9
1905 ... ..	737,065·14	74,615·36	30,404·65	32,953·56	1,753·32	...	1,821·99	1,563,115·76	5,475,841	2	10	525·80	1,491	0	7	1,563,641·56	5,477,332	3	5
1906 ... ..	742,525·99	73,307·24	30,996·76	24,484·65	1,744·38	...	925·10	1,493,732·66	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
<b>Total ... ..</b>	<b>4,704,151·33</b>	<b>628,129·78</b>	<b>244,934·64</b>	<b>258,146·41</b>	<b>19,321·62</b>	<b>630·96</b>	<b>14,701·36</b>	<b>10,427,209·45</b>	<b>37,001,996</b>	<b>0</b>	<b>4</b>	<b>2,367·47</b>	<b>6,164</b>	<b>17</b>	<b>1</b>	<b>10,429,576·92</b>	<b>37,008,160</b>	<b>17</b>	<b>5</b>

\* Prior to 1902 included in State generally.

TABLE VII.

COMPARATIVE RETURN OF GOLD BULLION ENTERED FOR EXPORT AND RECEIVED AT THE PERTH BRANCH OF THE ROYAL MINT, FROM 1ST JANUARY, 1905, TO 31ST DECEMBER, 1907, SHOWING IN FINE OUNCES THE QUANTITY RECORDED EACH MONTH, AND ITS VALUE.

MONTHS AND QUARTERS.	1905.				1906.				1907.			
	EXPORT.	MINT.	TOTAL.	VALUE.	EXPORT.	MINT.	TOTAL.	VALUE.	EXPORT.	MINT.	TOTAL.	VALUE.
JANUARY ... ..	fine ozs. 67,945·50	fine ozs. 97,506·90	fine ozs. 165,452·40	£ s. d. 702,797 2 5½	fine ozs. 40,909·09	fine ozs. 113,455·95	fine ozs. 154,365·04	£ s. d. 655,701 0 2½	fine ozs. 45,337·32	fine ozs. 116,900·96	fine ozs. 162,238·28	£ s. d. 689,144 8 2½
FEBRUARY ... ..	57,212·61	96,820·25	154,032·86	654,290 0 0	49,456·20	92,970·40	142,426·60	604,989 14 10	34,538·33	99,654·82	134,193·15	570,016 5 4½
MARCH ... ..	52,275·84	108,641·80	160,917·64	683,534 13 8¾	59,373·43	96,201·19	155,574·62	660,838 19 7¼	33,663·00	96,062·63	129,725·63	551,039 9 0
<i>1st January to 31st March ...</i>	177,433·95	302,968·95	480,402·90	2,040,621 16 2½	149,738·72	302,627·54	452,366·26	1,921,529 14 8	113,538·65	312,618·41	426,157·06	1,810,200 2 6¾
APRIL ... ..	64,553·14	107,583·01	172,136·15	731,187 17 9¼	47,759·22	104,457·26	152,216·48	646,574 10 2	38,768·04	91,317·91	130,085·95	552,569 19 10
MAY ... ..	47,413·38	110,271·90	157,685·28	669,804 9 10¾	47,621·59	109,399·52	157,021·11	666,983 5 7	40,448·34	105,042·78	145,491·12	618,006 19 11
JUNE ... ..	48,850·54	106,299·29	155,149·83	659,034 11 9	39,893·26	103,366·30	143,259·56	608,527 18 7½	39,721·27	96,800·61	136,521·88	579,908 1 8½
<i>1st January to 30th June ...</i>	338,251·01	627,123·15	965,374·16	4,100,648 15 7¼	285,012·79	619,850·62	904,863·41	3,843,615 9 0½	232,476·30	605,779·71	838,256·01	3,560,685 4 0¼
JULY ... ..	57,415·76	108,585·09	166,000·85	705,126 15 9¾	43,764·18	106,098·07	149,862·25	636,574 7 6	26,848·64	101,706·68	128,555·32	546,068 5 9½
AUGUST ... ..	55,370·49	119,310·65	174,681·14	741,998 6 4½	64,657·27	92,253·07	156,910·34	666,512 15 2	41,090·45	98,051·65	139,142·10	591,038 1 5½
SEPTEMBER ... ..	52,589·55	110,707·86	163,297·41	693,643 6 1¾	50,893·24	83,127·13	134,020·37	569,282 6 11¼	27,560·29	113,642·71	141,203·00	599,792 4 4¾
<i>1st January to 30th September ...</i>	503,626·81	965,726·75	1,469,353·56	6,241,417 3 11¼	444,327·48	901,328·89	1,345,656·37	5,715,984 18 7¾	327,975·68	919,180·75	1,247,156·43	5,297,583 15 7¾
OCTOBER ... ..	47,313·32	113,309·36	160,622·68	682,281 15 6½	45,208·56	111,326·85	156,535·41	664,920 3 1¾	37,367·25	112,749·57	150,116·82	637,655 14 4¾
NOVEMBER ... ..	57,745·00	105,503·80	163,248·80	693,436 16 6	36,244·52	109,913·58	146,158·10	620,840 2 11	25,171·43	120,653·60	145,825·03	619,425 7 1
DECEMBER ... ..	46,404·75	115,686·09	162,090·84	688,518 2 5¾	36,470·03	109,726·69	146,196·72	621,004 3 10½	41,288·78	113,166·53	154,455·31	656,084 9 1
<b>Total ... ..</b>	<b>655,089·88</b>	<b>1,300,226·00</b>	<b>1,955,315·88</b>	<b>8,305,653 18 5½</b>	<b>562,250·59</b>	<b>1,232,296·01</b>	<b>1,794,546·60</b>	<b>7,622,749 8 7</b>	<b>431,803·14</b>	<b>1,265,750·45</b>	<b>1,697,553·59</b>	<b>7,210,749 6 2½</b>

TABLE VIII.

MONTHLY RETURN OF GOLD, CONTAINED IN BULLION, ORE, AND FURNACE PRODUCTS, ENTERED FOR EXPORT DURING 1907.

MONTH.	VICTORIA.			UNITED KINGDOM.			GERMANY.			TOTALS.			Minted Gold Exported.*
	Bullion.	Ore.	Furnace Products.	Bullion.	Ore.	Furnace Products.	Bullion.	Ore.	Furnace Products.	Bullion.	Ore.	Furnace Products.	
1907.	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 ...	1,486.21	...	...	42,069.70	2.83	1,778.58	...	...	...	43,555.91	2.83	1,778.58	7,122.52
February ...	1,699.02	...	...	32,434.47	...	404.84	...	...	...	34,133.49	...	404.84	10,667.10
March ...	623.87	...	...	32,398.88	...	640.25	...	...	...	33,022.75	...	640.25	14,246.85
April ...	1,045.73	...	...	36,991.60	4.38	726.33	...	...	...	38,037.33	4.38	726.33	11,289.11 + 13.75
May ...	1,372.49	...	...	32,945.13	336.25	5,794.47	...	...	...	34,317.62	336.25	5,794.47	10,679.86 + 112.00
June ...	1,737.41	...	...	37,501.81	...	482.05	...	...	...	39,239.22	...	482.05	3,550.31
July ...	895.70	...	...	25,253.63	...	699.31	...	...	...	26,149.33	...	699.31	9,489.48
August ...	1,453.72	...	...	38,435.91	324.24	874.03	...	...	2.55	39,889.63	324.24	876.58	7,110.38
September ...	1,352.02	...	...	25,835.60	...	372.67	...	...	...	27,187.62	...	372.67	10,057.56 + 111.00
October ...	2,083.46	...	...	33,715.37	720.89	718.18	...	...	129.35	35,798.83	720.89	847.53	10,664.17
November ...	1,656.65	...	...	21,709.70	493.48	1,211.60	...	...	100.00	23,366.35	493.48	1,311.60	4,744.14
December ...	1,177.81	...	...	39,286.63	824.34	...	...	...	...	40,464.44	824.34	...	+ 101.00
TOTALS ...	16,584.09	...	...	398,578.43	2,706.41	13,702.31	...	...	231.90	415,162.52	2,706.41	13,934.21	99,959.23

\* When considering the total production of gold for the 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.

## 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 1907, AND PREVIOUS YEARS.

Period.	BLACK TIN.											
	MARBLE BAR DISTRICT.				GREENBUSHES MINERAL FIELD.				TOTAL.			
	Quantity.			Value.	Quantity.			Value.	Quantity.			Value.
	Lode.	Stream.	Total.		Lode.	Stream.	Total.		Lode.	Stream.	Total.	
Previous to 1899	...	...	75.45	4,419	...	...	1,590.33	66,108	...	...	1,665.78	70,527
1899	...	...	57.50	3,612	...	...	277.32	21,658	...	...	334.82	25,270
1900	...	...	387.87	27,174	...	...	435.62	29,528	...	...	823.49	56,702
1901	...	...	412.98	21,148	...	...	321.34	18,852	...	...	734.32	40,000
1902	...	...	216.35	15,103	...	...	403.21	24,680	...	...	619.56	39,783
1903	...	...	292.11	21,528	...	...	524.94	34,362	...	...	817.05	55,890
1904	...	...	320.86	24,355	...	...	533.64	34,462	...	...	854.50	58,817
1905	...	...	435.74	33,880	...	...	643.52	52,960	...	...	1,079.26	86,840
1906	36.59	675.06	711.65	78,449	26.18	757.10	783.28	79,195	62.77	1,432.16	1,494.93	157,644
1907	104.13	749.56	853.69	85,603	40.40	729.60	770.00	73,045	141.53	1,479.16	1,623.69	158,648
<b>Total</b>	<b>140.72</b>	<b>1,424.62</b>	<b>3,764.20</b>	<b>315,271</b>	<b>66.58</b>	<b>1,486.70</b>	<b>6,283.20</b>	<b>434,850</b>	<b>207.30</b>	<b>2,911.32</b>	<b>10,047.40</b>	<b>750,121</b>

Period.	TANTALITE.											
	MARBLE BAR DISTRICT.				GREENBUSHES MINERAL FIELD.				TOTAL.			
	Quantity.			Total.	Quantity.			Value.	Quantity.			Value.
	Lode.	Stream.	Total.		Lode.	Stream.	Total.		Lode.	Stream.	Total.	
Previous to 1899	...	...	...	...	...	...	...	...	...	...	...	...
1899	...	...	...	...	...	...	...	...	...	...	...	...
1900	...	...	...	...	...	...	...	...	...	...	...	...
1901	...	...	...	...	...	...	...	...	...	...	...	...
1902	...	...	...	...	...	...	...	...	...	...	...	...
1903	...	...	...	...	...	...	...	...	...	...	...	...
1904	...	...	...	...	...	...	...	...	...	...	...	...
1905	...	...	70.95	8,925	...	...	2.34	1,590	...	...	73.29	10,515
1906	1.80	12.85	14.65	2,644	...	...	...	...	1.80	12.85	14.65	2,644
1907	...	...	...	...	...	...	...	...	...	...	...	...
<b>Total</b>	<b>1.80</b>	<b>12.85</b>	<b>85.60</b>	<b>11,569</b>	...	...	<b>2.34</b>	<b>1,590</b>	<b>1.80</b>	<b>12.85</b>	<b>87.94</b>	<b>13,159</b>

Period.	COPPER ORE.											
	PILBARA GOLDFIELD.		WEST PILBARA GOLDFIELD.		MURCHISON GOLDFIELD.				YALGOO GOLDFIELD.		NORTHAMPTON MINERAL FIELD.	
	Marble Bar District.		Quantity.	Value.	Nannine District.		Day Dawn District.		Quantity.	Value.	Quantity.	Value.
	Quantity.	Value.			Quantity.	Value.	Quantity.	Value.				
Previous to 1899	...	...	7,018.00	55,270	...	...	...	...	...	...	...	
1899	...	...	2,555.00	29,478	...	...	...	...	...	136.00	2,122	
1900	...	...	1,605.00	12,139	...	...	5.15	91	...	...	...	
1901	...	...	1,162.00	15,891	...	...	10.50	76	...	...	38.50	
1902	...	...	...	...	...	...	...	...	...	...	...	
1903	...	...	...	...	...	...	...	...	...	...	...	
1904	...	...	...	...	...	...	...	...	...	...	...	
1905	...	...	...	...	...	...	...	...	...	...	...	
1906	...	...	...	...	133.50	2,816	...	...	31.91	91	...	
1907	7.77	190	3,365.50	63,548	...	...	31.71	274	10.00	130	...	
<b>Total</b>	<b>7.77</b>	<b>190</b>	<b>15,705.50</b>	<b>176,326</b>	<b>133.50</b>	<b>2,816</b>	<b>47.36</b>	<b>441</b>	<b>41.91</b>	<b>221</b>	<b>174.50</b>	<b>2,399</b>

TABLE IX.—Minerals other than Gold—continued.

Period.	COPPER ORE—continued.											TOTAL.		
	MT. MARGARET GOLDFIELD.				NORTH COOLGARDIE GOLDFIELD.		PHILLIPS RIVER GOLDFIELD.		STATE GENERALLY.					
	Mt. Morgans District.		Mt. Margaret District.		Menzies District.		Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	ons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£
Previous to 1899 ...	...	...	...	...	...	...	...	...	...	...	...	...	7,018·00	55,270
1899 ...	273·00	4,338	...	...	...	...	...	...	...	...	...	...	2,964·00	35,938
1900 ...	4,539·00	30,718	...	...	...	...	34·00	725	...	...	...	...	6,183·15	43,673
1901 ...	7,660·00	40,738	...	...	...	...	1,089·14	12,918	...	...	...	...	9,960·14	69,900
1902 ...	1,954·00	6,852	...	...	...	...	308·25	1,238	...	...	...	...	2,262·25	8,090
1903 ...	18,965·00	45,557	...	...	...	...	1,561·33	10,984	...	...	...	...	20,526·33	56,541
1904 ...	500·00	900	...	...	...	...	3,468·89	24,280	...	...	...	...	3,968·89	25,180
1905 ...	60·00	674	...	...	...	...	2,329·04	15,592	...	...	...	...	2,389·04	16,266
1906 ...	4,361·05	21,934	...	...	4·70	33	2,885·00	25,270	13·50	193	...	...	7,429·66	50,357
1907 ...	5,141·52	58,888	2·85	26	1·42	18	10,414·57	57,273	3·08	40	...	...	18,978·42	180,387
<b>Total</b> ...	<b>43,453·57</b>	<b>210,599</b>	<b>2·85</b>	<b>26</b>	<b>6·12</b>	<b>51</b>	<b>22,090·22</b>	<b>148,280</b>	<b>16·58</b>	<b>233</b>	<b>81,679·88</b>	<b>541,582</b>		

Period.	IRONSTONE.						LEAD ORE.		SILVER LEAD ORE.		COAL.	
	WEST PILBARA GOLDFIELD.		STATE GENERALLY.		TOTAL.		NORTHAMPTON MINERAL FIELD.		ASHBURTON GOLD-FIELD.		COLLIE RIVER COAL MF.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	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 ...	...	...	20,569·00	13,246	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
<b>Total</b> ...	<b>100·00</b>	<b>300</b>	<b>57,719·50</b>	<b>36,383</b>	<b>57,819·50</b>	<b>36,683</b>	<b>360·75</b>	<b>1,573</b>	<b>56·90</b>	<b>429</b>	<b>1,126,442·33</b>	<b>542,066</b>

Period.	LIMESTONE.								DIAMONDS.	
	MURCHISON GF.		YILGARN GOLDFIELD.		STATE GENERALLY.		TOTAL.		PILBARA GF.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£	carats.	£
Previous to 1899 ...	...	...	...	...	...	...	...	...	...	24
1899 ...	...	...	...	...	17,593·00	2,838	17,593·00	2,838	*	...
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	...	...
<b>Total</b> ...	<b>298·00</b>	<b>772</b>	<b>2,548·85</b>	<b>1,607</b>	<b>90,858·88</b>	<b>15,911</b>	<b>93,705·73</b>	<b>18,290</b>	...	<b>24</b>

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 XIX., pages 312-5. \* Weight unknown.

TABLE X.

QUANTITY AND VALUE OF BLACK TIN REPORTED TO THE MINES DEPARTMENT DURING 1907,  
AND THE TOTAL OUTPUT TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1907.				TOTAL TO DATE.			
			Quantity.			Value.	Quantity.			Value.
			Lode.	Stream.	Total.		Lode.	Stream.	Total.	
			tons.	tons.	tons.	£	tons.	tons.	tons.	£
<b>PILBARA GOLDFIELD.</b>										
<b>MARBLE BAR DISTRICT.</b>										
Cooglegong ..	..	Sundry claims .. .. .	..	154.45	154.45	14,739	..	1,061.89	1,061.89	83,202
Mills Find ..	..	Sundry claims .. .. .	..	..	..	..	..	.85	.85	69
Moolyella ..	..	Voided leases .. .. .	..	..	..	..	..	330.53	330.53	21,340
Do. ..	..	Sundry claims .. .. .	..	576.11	576.11	58,940	..	1,950.77	1,950.77	176,362
Old Shaw ..	..	Voided leases .. .. .	..	..	..	..	..	6.75	6.75	424
Do. ..	..	Sundry claims .. .. .	..	..	..	..	..	214.04	214.04	14,525
Wodgina ..	84	Mt. Cassiterite .. .. .	91.60	..	91.60	8,961	115.02	13.85	128.87	12,771
Do. ..	85	Commonwealth .. .. .	..	..	..	..	2.95	..	2.95	348
Do. ..	88	Chamberlain .. .. .	..	..	..	..	.35	..	.35	60
Do. ..	89	Tinstone .. .. .	8.35	..	8.35	810	11.95	..	11.95	1,170
Do. ..	93	Mt. Cassiterate North .. .. .	3.55	..	3.55	328	9.67	..	9.67	971
		Voided leases .. .. .	..	..	..	..	..	6.10	6.10	461
		Sundry claims .. .. .	.63	19.00	19.63	1,825	..	38.70	39.48	3,568
		<b>Total .. .. .</b>	<b>104.13</b>	<b>749.55</b>	<b>853.69</b>	<b>85,603</b>	<b>140.72</b>	<b>3,623.48</b>	<b>3,764.20</b>	<b>315,271</b>
<b>GREENBUSHES MINERAL FIELD.</b>										
Greenbushes ..	35	(Horan's) .. .. .	..	..	..	..	..	188.35	188.35	11,605
Do. ..	35, 169, 218, 272, 287, 295	(Westralian Stanneries, Ltd.) .. .. .	..	..	..	..	..	109.33	109.33	8,171
Do. ..	35, 169, 218, 272, 287, 292, 295, 296, 331, 375, 395, 421, 428, 432, 448, (453)	Greenbushes Development Co., Ltd.	..	143.08	143.08	12,875	..	150.37	150.37	13,667
Do. ..	73	(Nelson) .. .. .	..	..	..	..	..	22.40	22.40	1,675
Do. ..	73, 233	(Nelson leases) .. .. .	..	..	..	..	..	61.01	61.01	4,164
Do. ..	73, 233, 271	King Tin leases .. .. .	1.95	9.95	11.90	1,368	1.95	12.20	14.15	1,623
Do. ..	147	Haphazard .. .. .	..	.30	.30	18	.08	8.64	8.72	550
Do. ..	169	(Horan's No. 1 North) .. .. .	..	..	..	..	..	9.50	9.50	684
Do. ..	218	(W.A. Mt. Bischoff) .. .. .	..	..	..	..	..	5.38	5.38	342
Do. ..	244	(Mt. Pleasant) (Surr.) .. .. .	..	..	..	..	..	44.30	44.30	3,795
Do. ..	244	Nickel Kramer Tin Mining Co., Ltd. (Surr.) .. .. .	2.92	..	2.92	266	2.92	..	2.92	266
Do. ..	271	(Pioneer) .. .. .	..	..	..	..	..	1.84	1.84	117
Do. ..	296	(Central) .. .. .	..	..	..	..	..	100.16	100.16	9,728
Do. ..	300	South Cornwall (Ltd.) .. .. .	.30	.25	.55	51	4.55	15.09	19.64	1,564
Do. ..	331	(Lady Esther) .. .. .	..	..	..	..	..	10.00	10.00	744
Do. ..	337	Gladstone .. .. .	..	10.00	10.00	1,047	..	42.21	42.21	3,780
Do. ..	356	Cornwall .. .. .	9.70	..	9.70	984	15.08	13.63	28.71	2,637
Do. ..	357, 359, 360, 367	(Greenbushes Sluicing Co., Ltd.) .. .. .	..	..	..	..	..	25.33	25.33	2,234
Do. ..	357, 359, 360, 367, 408	(Consolidated Tin Sluicing and Mining Co., N.L.) .. .. .	..	.45	.45	35	..	36.85	36.85	3,429
Do. ..	357, 359, 360, 367, 408	Aurora leases .. .. .	..	1.90	1.90	228	..	1.90	1.90	228
Do. ..	361	Baronia .. .. .	..	5.45	5.45	514	..	16.87	16.87	1,558
Do. ..	369	Enterprise .. .. .	..	1.17	1.17	107	..	3.67	3.67	284
Do. ..	370	Wills .. .. .	2.52	2.10	4.62	378	2.52	2.10	4.62	378
Do. ..	374	Lost and Found .. .. .	1.30	..	1.30	110	6.85	.85	7.70	812
Do. ..	375	Glasgow .. .. .	..	..	..	..	..	.61	1.54	150
Do. ..	381, 435, 436, 472, 478	Westralian Gully Tin Co., Ltd.	..	10.60	10.60	846	..	10.60	10.60	846
Do. ..	382	Dreamland .. .. .	.61	..	.61	70	1.46	1.72	3.18	340
Do. ..	387	Stanhope (Surr.) .. .. .	..	..	..	..	..	6.53	6.53	704
Do. ..	388	Dixie .. .. .	6.50	..	6.50	653	8.42	.72	9.14	942
Do. ..	389	Esperance Hill (Ltd.) .. .. .	..	..	..	..	.15	..	.15	15
Do. ..	391, 454	Westralia and Legado leases .. .. .	..	5.97	5.97	550	..	5.97	5.97	550
Do. ..	454	(Legado) .. .. .	..	5.60	5.60	555	..	5.60	5.60	555
Do. ..	392	Westralia North .. .. .	..	1.77	1.77	155	..	1.77	1.77	155
Do. ..	393	Lost and Found North .. .. .	2.50	..	2.50	277	3.23	..	3.23	362
Do. ..	394	North Junction .. .. .	..	..	..	..	.10	.05	.15	17
Do. ..	396, 397, 460, 461, 479, 480	Norilup Tin Mining and Dredging Co., Ltd.	..	2.13	2.13	151	..	2.13	2.13	151
Do. ..	399	North Cornwall .. .. .	1.72	..	1.72	184	1.72	..	1.72	184



**TABLE X—continued.**  
Quantity and Value of **BLACK TIN**, etc.—continued.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1907.				TOTAL TO DATE.				
			Quantity.			Value.	Quantity.			Value.	
			Lode.	Stream.	Total.		Lode.	Stream.	Total.		
			tons.	tons.	tons.	£	tons.	tons.	tons.	£	
<b>GREENBUSHES MINERAL FIELD—continued.</b>											
Greenbushes ..	400 ..	Old Sport .. .. .	.90	..	.90	90	1.45	.05	1.50	150	
Do. ..	401 ..	Nil Desperandum .. ..	.57	..	.57	58	1.55	..	1.55	162	
Do. ..	410 ..	Tairua .. .. .	2.39	..	2.39	225	3.88	..	3.88	390	
Do. ..	413, 423, (424), 425, 470, 471	Nickel Kramer Tin Mining Co., Ltd.	..	1.60	1.60	95	..	1.60	1.60	95	
Do. ..	419 ..	Great Boulder .. .. .	.15	.25	.40	40	.15	.25	.40	40	
Do. ..	422 ..	Cornwall Extended .. ..	.25	..	.25	30	.50	..	.50	55	
Do. ..	450, 458, 485, 486, 487, 488, 489	Stanhope United leases (Spring Gully Dredge)	..	10.72	10.72	828	..	10.72	10.72	828	
Do. ..	456 ..	Ironclad .. .. .	.95	..	.95	82	.95	..	.95	82	
Do. ..	466 ..	Forget me not .. .. .	..	.40	.40	40	..	.40	.40	40	
Do. ..	469 ..	I.O.U. .. .. .	..	.55	.55	52	..	.55	.55	52	
Do. ..	Loc. 289, 290	Freehold ground (Clarth and others)	..	55.08	55.08	5,624	..	275.69	275.69	25,859	
Do. ..	..	Voided leases .. .. .	..	..	..	..	..	151.79	151.79	9,635	
Do. ..	..	Sundry claims .. .. .	5.17	460.28	465.45	44,459	8.14	4,857.89	4,866.03	318,456	
		<b>Total .. .. .</b>	<b>40.40</b>	<b>729.60</b>	<b>770.00</b>	<b>73,045</b>	<b>66.58</b>	<b>6,216.62</b>	<b>6,283.20</b>	<b>434,850</b>	
		<b>Grand Total .. .. .</b>	<b>144.53</b>	<b>1,479.16</b>	<b>1,623.69</b>	<b>158,648</b>	<b>207.30</b>	<b>9,840.10</b>	<b>10,047.40</b>	<b>750,121</b>	

**TABLE XI.**

QUANTITY AND VALUE OF TANTALITE REPORTED TO THE MINES DEPARTMENT DURING 1907, AND THE TOTAL OUTPUT TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1907.				TOTAL TO DATE.				
			Quantity.			Value.	Quantity.			Value.	
			Lode.	Stream.	Total.		Lode.	Stream.	Total.		
			tons.	tons.	tons.	£	tons.	tons.	tons.	£	
<b>PILBARA GOLDFIELD.</b>											
<b>MARBLE BAR DISTRICT.</b>											
Wodgina ...	86, 87	H.M. and Anchorite ... ..	..	..	..	..	1.80	32.80	34.10	5,445	
Do. ...	..	Sundry Claims .. .. .	..	..	..	..	..	50.60	50.60	6,030	
Do. ...	..	From District generally	..	..	..	..	..	.90	.90	94	
		<b>Total .. .. .</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>1.80</b>	<b>83.80</b>	<b>85.60</b>	<b>11,569</b>	
<b>GREENBUSHES MINERAL FIELD.</b>											
Greenbushes	369	Enterprise .. .. .	..	..	..	..	..	2.34	2.34	1,590	
		<b>Total .. .. .</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>2.34</b>	<b>2.34</b>	<b>1,590</b>	
		<b>Grand Total .. .. .</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>1.80</b>	<b>86.14</b>	<b>87.94</b>	<b>13,159</b>	

TABLE XII.

QUANTITY AND VALUE OF COPPER ORE REPORTED TO THE MINES DEPARTMENT DURING 1907,  
AND THE TOTAL OUTPUT TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1907.			TOTAL TO DATE.		REMARKS.
			Quantity.		Value.	Quantity (Ore).	Value.	
			Ore.	Metallic Copper.				
			tons.	tons.	£	tons.	£	
PILBARA GOLDFIELD.								
MARBLE BAR DISTRICT.								
North Shaw ..	147 ..	Roy Hill Copper Mine ..	7.77	1.90	190	7.77	190	
		<b>Total</b> ..	<b>7.77</b>	<b>1.90</b>	<b>190</b>	<b>7.77</b>	<b>190</b>	
WEST PILBARA GOLDFIELD.								
Croydon ..	31 ..	British Exploration of Australasia, Ltd.	24.00	5.00	300	477.00	5,893	
Do. ..	103 ..	Quamby .. .. .	15.00	4.05	275	15.00	275	
Do. ..	.. ..	Voided leases .. .. .	.. ..	.. ..	..	40.00	595	
Egina ..	91 ..	Egina .. .. .	12.00	1.20	72	12.00	72	
Do. ..	.. ..	Voided leases .. .. .	.. ..	.. ..	..	530.00	6,571	
Roebourne ..	65 ..	(Carlow Castle) .. .. .	6.00	1.00	100	6.00	100	
Do. ..	65 ..	Roebourne Copper and Gold Mines, Ltd.	81.00	19.88	1,415	81.00	1,415	
Do. ..	73 ..	Ena Extended .. .. .	6.50	.77	55	6.50	55	
Do. ..	77 ..	Lilly Blanche .. .. .	997.00	186.99	17,541	997.00	17,541	
Do. ..	.. ..	Voided leases .. .. .	.. ..	.. ..	..	181.00	2,746	
Whim Creek ..	34 ..	(Balla Balla Copper Mines, Ltd.)	.. ..	.. ..	..	2,009.00	12,036	
Do. ..	Loc. 71 ..	Whim Well Copper Mines, Ltd.	2,224.00	507.58	43,790	11,321.00	128,777	
Do. ..	.. ..	Voided leases .. .. .	.. ..	.. ..	..	30.00	250	
		<b>Total</b> ..	<b>3,365.50</b>	<b>726.47</b>	<b>63,548</b>	<b>15,705.50</b>	<b>176,326</b>	
MURCHISON GOLDFIELD.								
NANNINE DISTRICT.								
Gabanintha ..	4N ..	Lady Alma .. .. .	.. ..	.. ..	..	6.50	135	
Do. ..	379N, 504N 505N	Mountain View leases .. .. .	.. ..	.. ..	..	127.00	2,681	
		<b>Total</b> ..	.. ..	.. ..	..	<b>133.50</b>	<b>2,816</b>	
DAY DAWN DISTRICT.								
Day Dawn ..	G.M.L. 14D P.A., 65D	Murchison Associated G.Ms., Ltd. (Canning George C.) .. .. .	6.50	1.02	84	6.50	84	For the year 1906
Do. ..	.. ..	Voided leases .. .. .	25.21	2.50	190	25.21	190	
Do. ..	.. ..	.. .. .	.. ..	.. ..	..	15.65	167	
		<b>Total</b> ..	<b>31.71</b>	<b>3.52</b>	<b>274</b>	<b>47.36</b>	<b>441</b>	
YALGOO GOLDFIELD.								
Twin Peaks ..	P.A. 155 ..	(Summers, S. D.) .. .. .	10.00	2.00	130	10.00	130	
Wadgingarra ..	6 ..	Olive Queen .. .. .	.. ..	.. ..	..	31.91	91	
		<b>Total</b> ..	<b>10.00</b>	<b>2.00</b>	<b>130</b>	<b>41.91</b>	<b>221</b>	
NORTHAMPTON MINERAL FIELD.								
Geraldine ..	.. ..	Voided leases .. .. .	.. ..	.. ..	..	174.50	2,399	
		<b>Total</b> ..	.. ..	.. ..	..	<b>174.50</b>	<b>2,399</b>	
MOUNT MARGARET GOLDFIELD.								
MOUNT MORGANS DISTRICT.								
Eulaminnna ..	10c, 11c, (12c, 37c)	(Mt. Malcolm Copper Mine) .. .. .	.. ..	.. ..	..	13,516.00	70,754	
Do. ..	10c, 11c, (12c, 37c)	Murrin Copper Mines, Ltd. .. .. .	.. ..	.. ..	..	19,165.00	45,817	
Do. ..	(10c, 11c), 4f, 5f	(Mt. Malcolm Copper Mine) .. .. .	.. ..	.. ..	..	3,839.00	17,065	

TABLE XII.—Quantity and Value of COPPER ORE, etc.—continued.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1907.			TOTAL TO DATE.		REMARKS.
			Quantity.		Value.	Quantity (Ore).	Value.	
			Ore.	Meta'lic Copper.				
			tons.	tons.	£	tons.	£	
<b>MOUNT MARGARET GOLDFIELD—continued.</b>								
<b>MOUNT MORGANS DISTRICT—continued.</b>								
Eulaminna ..	4F, 5F, 11F, 12F	West Australian Copper Co., Ltd. ..	4,996.75	1,178.70	56,638	5,396.75	60,138	
Mt. Margaret ..	66F	Mt. Morven .. .. . (Butte City) .. .. . (Ftd.)	..	..	..	11.53	163	
Murrin Murrin	(6c)	Murrin Copper Mines, Ltd. .. (Ftd.)	..	..	..	910.00	11,892	
Do. ..	(6c)	Murrin Murrin Nanaroo leases	121.45	25.06	1,827	300.00	640	
Do. ..	(48c), 6F, 7F					291.97	3,707	
Do. ..	13F	Trafalgar .. .. .	15.20	6.10	267	15.20	267	
Do. ..	G.M.L. 207F	Bound to Win .. .. .	8.12	3.55	156	8.12	156	
		<b>Total</b> .. .. .	<b>5,141.52</b>	<b>1,213.41</b>	<b>58,888</b>	<b>43,453.57</b>	<b>210,599</b>	
<b>MOUNT MARGARET DISTRICT.</b>								
Burtville ..	16T	Dreadnought .. .. .	2.85	.29	26	2.85	26	
		<b>Total</b> .. .. .	<b>2.85</b>	<b>.29</b>	<b>26</b>	<b>2.85</b>	<b>26</b>	
<b>NORTH COOLGARDIE GOLDFIELD.</b>								
<b>MENZIES DISTRICT.</b>								
Goongarrie ..	13z	Providence Copper Mining Syndicate, Ltd.	..	..	..	4.79	33	
Do. ..	Unreg. P.A.	Holbourne & Summers .. ..	1.42	.40	18	1.42	18	
		<b>Total</b> .. .. .	<b>1.42</b>	<b>.40</b>	<b>18</b>	<b>6.12</b>	<b>51</b>	
<b>PHILLIPS RIVER GOLDFIELD.</b>								
Kundip ..	99	Alice Mary .. .. .	..	..	..	8.02	85	
Do. ..	184	Christmas Gift .. .. .	39.60	5.31	457	69.00	683	
Do. ..	60	Flag Gold and Copper Mining Co., Ltd.	40.06	2.76	139	40.06	139	
Do. ..	52, 94	(Harbour View leases) .. ..	..	..	..	604.36	4,524	
Do. ..	52, 94	Harbour View leases .. .. .	52.74	8.97	472	52.74	472	
Do. ..	81	Harbour View North .. .. .	1.48	.02	1	2.92	29	
Do. ..	(206)	(Hecla) .. .. . (Ftd.)	6.08	.32	32	24.94	278	
Do. ..	98	Hillsborough .. .. .	70.57	3.07	270	70.57	270	
Do. ..	(242)	(Lone Star) .. .. . (Surr.)	9.02	.68	66	12.92	98	
Do. ..	(237)	(Mosaic) .. .. . (Ftd.)	..	..	..	1.67	19	
Do. ..	291	Mosaic .. .. .	10.04	.96	51	10.04	51	
Do. ..	108	Mt. Stennett .. .. .	54.29	6.83	614	298.97	2,672	
Do. ..	52, 94	(Ravensthorpe G.M. Syndicate, N.L.)	4.88	.83	51	132.56	1,382	
Do. ..	60	(Red, White, and Blue) .. ..	216.42	17.32	1,372	449.44	3,032	
Do. ..	..	Voided leases .. .. .	..	..	..	79.90	547	
Do. ..	..	Sundry claims .. .. .	18.34	3.69	343	18.34	343	
Mt. Desmond ..	(232)	(Aldie) .. .. . (Ftd.)	..	..	..	5.13	95	
Do. ..	(238)	(Blue Spec) .. .. . (Ftd.)	..	..	..	11.83	97	
Do. ..	(255)	(Desmond Central) .. .. . (Ftd.)	3.01	.45	39	3.01	39	
Do. ..	168	(Elverton South) .. .. .	..	..	..	18.48	119	
Do. ..	266	Fairlie .. .. .	7.97	1.04	90	8.81	103	
Do. ..	275	Ironclad .. .. .	4.99	1.25	67	4.99	67	
Do. ..	109	(Mt. Desmond) .. .. .	..	..	..	198.87	1,640	
Do. ..	109	Mt. Desmond: Phillips River Gold and Copper Co., Ltd.	801.19	82.73	7,855	1,285.91	13,775	
Do. ..	95	(Elverton: Phillips River Options Syndicate, N.L.)	..	..	..	2,946.02	22,657	
Do. ..	95	(Elverton) .. .. .	130.00	5.70	570	130.00	570	
Do. ..	95	Elverton: Phillips River Gold and Copper Co., Ltd.	541.97	31.23	2,588	541.97	2,588	
Do. ..	199	P.L.P. .. .. .	68.69	8.50	741	179.54	2,013	
Do. ..	257	Thistle and Shamrock .. .. .	34.75	6.06	439	34.75	439	
Do. ..	..	Voided leases .. .. .	..	..	..	182.90	1,906	
Do. ..	..	Sundry claims .. .. .	4.42	1.02	64	34.10	433	

TABLE XII.—Quantity and Value of COPPER ORE, etc.—continued.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1907.			TOTAL TO DATE.		REMARKS.
			Quantity.		Value.	Quantity (Ore).	Value.	
			Ore.	Metallic Copper.				
			tons.	tons.	£	tons.	£	
PHILLIPS RIVER GOLDFIELD—continued.								
Ravensthorpe ..	205 ..	Ballarat .. .. .	65.50	5.74	640	120.31	1,384	
Do. ..	259 ..	Birthday .. .. .	1.69	.17	17	1.69	17	
Do. ..	196 ..	Contest .. .. .	10.57	1.24	100	15.69	129	
Do. ..	244 ..	Copper Horseshoe .. .. .	1.43	.04	4	1.43	4	
Do. ..	124 ..	Emily Hale .. .. .	..	..	..	132.27	1,192	
Do. ..	202 ..	Graiter .. .. .	59.56	1.42	138	68.35	182	
Do. ..	210 ..	Great Oversight .. .. .	30.94	2.07	203	73.28	524	
Do. ..	116 ..	Last Chance .. .. .	102.59	13.51	1,218	874.99	8,448	
Do. ..	(227) ..	(Last Chance Extended) .. (Ftd.)	..	..	..	2.55	27	
Do. ..	200 ..	Last Chance Proprietary ..	136.26	14.08	1,315	238.07	2,257	
Do. ..	16 ..	(Marion Martin) .. .. .	..	..	..	865.69	6,650	
Do. ..	16 ..	Marion Martin: Phillips River Gold and Copper Co., Ltd.	566.61	33.58	2,962	566.61	2,962	
Do. ..	7 ..	Mary .. .. .	27.32	2.20	135	795.74	5,627	
Do. ..	175 ..	(Mt. Benson) .. .. .	..	..	..	605.19	3,702	
Do. ..	175 ..	Mt. Benson: Phillips River Gold and Copper Co., Ltd.	633.30	33.35	2,718	717.80	3,594	
Do. ..	195 ..	Mt. Benson Extended .. .. .	20.22	1.30	109	22.77	130	
Do. ..	15 ..	(Mt. Cattlin) .. .. .	..	..	..	281.56	1,716	
Do. ..	15 ..	(Mt. Cattlin: Phillips River Gold and Copper Co., Ltd.)	..	..	..	1,263.76	7,646	
Do. ..	15 ..	Mt. Cattlin: Mt. Cattlin Copper Mining Co., Ltd.	6,357.67	322.35	28,167	6,357.67	28,167	
Do. ..	271 ..	Mt. Garrity .. .. .	6.93	1.20	62	6.93	62	
Do. ..	119 ..	(New Maori Queen) .. .. (Ftd.)	13.73	.18	14	13.73	14	
Do. ..	204 ..	New Moon .. .. .	21.80	3.09	268	45.51	499	
Do. ..	266 ..	Our Selection .. .. .	10.89	.98	80	10.89	80	
Do. ..	219 ..	(Puzzler) Mt. Cattlin West ..	22.78	2.25	216	35.22	310	
Do. ..	115 ..	Sunset .. .. .	29.68	2.23	208	507.44	3,317	
Do. ..	114 ..	Surprise .. .. .	70.39	6.94	606	466.46	3,553	
Do. ..	221 ..	Who Can Tell .. .. .	..	..	..	1.45	15	
Do. ..	..	Voided leases .. .. .	..	..	..	359.19	2,573	
Do. ..	..	Sundry claims .. .. .	11.43	1.02	55	67.95	428	
West River ..	252 ..	Pick and Shovel .. .. .	4.47	.68	68	4.47	68	
Do. ..	..	Sundry claims .. .. .	88.30	17.23	1,421	102.80	1,610	
Do. ..	..	From Goldfield generally .. ..	..	13.14	228	..	228	† Extras.
<b>Total .. .. .</b>			<b>10,414.57</b>	<b>658.73</b>	<b>57,273</b>	<b>22,090.22</b>	<b>148,280</b>	

## STATE GENERALLY.

Twin Peaks ..	P.A. 105H	(Tibbets, W. H.) .. .. .	..	..	..	13.50	193
Jerramungup ..	M.L. 59 ..	Netty Copper Mine .. .. .	3.08	1.26	40	3.08	40
<b>Total .. .. .</b>			<b>3'08</b>	<b>1'26</b>	<b>40</b>	<b>16'58</b>	<b>233</b>

TABLE XIII.

QUANTITY AND VALUE OF IRONSTONE REPORTED TO THE MINES DEPARTMENT DURING 1907, AND THE TOTAL OUTPUT TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1907.		TOTAL TO DATE.		REMARKS.
			Quantity.	Value.	Quantity.	Value.	
			tons.	£	tons.	£	
WEST PILBARA GOLDFIELD.							
Whim Creek.	...	Voided leases	...	...	100'00	300	
		<b>Total</b>	...	...	<b>100'00</b>	<b>300</b>	
EAST COOLGARDIE GOLDFIELD.							
Boulder	...	Voided leases	...	...	450'00	247	
		<b>Total</b>	...	...	<b>450'00</b>	<b>247</b>	
* STATE GENERALLY.							
Avon	...	...	...	...	22,223'00	16,241	
Clackline	...	...	1,093'53	438	18,253'50	8,789	
Coate's Paddock	...	...	...	...	4,712'00	3,277	
Greenbushes	...	...	...	...	7,481'00	4,629	
Werribee	...	...	...	...	4,600'00	3,200	
		<b>Total</b>	<b>1,093'53</b>	<b>438</b>	<b>57,269'50</b>	<b>36,136</b>	
		<b>Grand Total</b>	<b>1,093'53</b>	<b>438</b>	<b>57,819'50</b>	<b>36,683</b>	

\* Ore flux received by the Fremantle Smelter, Ltd.

TABLE XIV.

QUANTITY AND VALUE OF LEAD ORE REPORTED TO THE MINES DEPARTMENT DURING 1907, AND THE TOTAL OUTPUT TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1907.		TOTAL TO DATE.		REMARKS.
			Quantity.	Value.	Quantity.	Value.	
			tons.	£	tons.	£	
NORTHAMPTON MINERAL FIELD.							
Narra Tarra	...	From locality generally	...	...	225'00	185	
Northampton	M.L. 80	Ethel Maude	10'00	128	10'00	128	Lead 6'50 tons
Do.	...	Voided leases	...	...	106'75	1,048	
Victoria	...	Voided leases	...	...	19'00	212	
		<b>Total</b>	<b>10'00</b>	<b>128</b>	<b>360'75</b>	<b>1,573</b>	

TABLE XV.

QUANTITY AND VALUE OF SILVER-LEAD ORE REPORTED TO THE MINES DEPARTMENT DURING 1907, AND THE TOTAL OUTPUT TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1907.		TOTAL TO DATE.		REMARKS.
			Quantity.	Value.	Quantity.	Value.	
			tons.	£	tons.	£	
ASHBURTON GOLDFIELD.							
Ashburton	...	Voided leases	...	...	56'90	429	
		<b>Total</b>	...	...	<b>56'90</b>	<b>429</b>	

TABLE XVI.

QUANTITY AND VALUE OF COAL REPORTED TO THE MINES DEPARTMENT DURING 1907, AND THE TOTAL OUTPUT TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1907.		TOTAL TO DATE.		REMARKS.
			Quantity.	Value.	Quantity.	Value.	
			tons.	£	tons.	£	
COLLIE RIVER MINERAL FIELD.							
Collie ...	197, etc.	Cardiff Coal Mining Co., Ltd. ...	22,981·39	8,671	151,290·89	65,230	
Do. ...	151, etc.	(Collie-Boulder Coal Co., Ltd.) ...	...	...	71,512·70	26,139	
Do. ...	244, etc.	Collie Co-operative Collieries ...	29,193·65	11,308	76,606·44	31,242	
Do. ...	85-100	Collie Proprietary Coalfields of W.A., Ltd. (No. 2 Pit)	52,775·00	21,775	379,642·40	194,845	
Do. ...	88 (part of)	Collie Proprietary Coalfields of W.A., Ltd. (No. 1 Pit), late Westralian Wallsend Colliery	5,125·00	2,102	389,522·55	200,378	
Do. ...	151, etc.	Scottish Collieries of W.A., Ltd.	32,297·50	11,302	32,297·50	11,302	
Do. ...	...	Voided leases ... ..	...	...	25,569·85	12,930	
		Total ... ..	142,372·54	55,158	1,126,442·33	542,066	

TABLE XVII.

QUANTITY AND VALUE OF LIMESTONE REPORTED TO THE MINES DEPARTMENT DURING 1907, AND THE TOTAL OUTPUT TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1907.		TOTAL TO DATE.		REMARKS.
			Quantity.	Value.	Quantity.	Value.	
			tons.	£	tons.	£	
MURCHISON GOLDFIELD.							
CUE DISTRICT.							
Cuddingwarra	3	Linella ... ..	298·00	772	298·00	772	
		Total ... ..	298·00	772	298·00	772	
YILGARN GOLDFIELD.							
Southern Cross	...	Voided leases ... ..	...	...	2,548·85	1,607	
		Total ... ..	...	...	2,548·85	1,607	
* STATE GENERALLY.							
Fremantle ... ..	...	...	3,303·95	610	90,858·88	15,911	
		Total ... ..	3,303·95	610	90,858·88	15,911	
		Grand Total ... ..	3,601·95	1,382	93,705·73	18,290	

\* Ore flux received by the Fremantle Smelter, Limited.

TABLE XVIII.

QUANTITY AND VALUE OF DIAMONDS REPORTED TO THE MINES DEPARTMENT DURING 1907, AND THE TOTAL OUTPUT TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1907.		TOTAL TO DATE.		REMARKS.
			Quantity.	Value.	Quantity.	Value.	
			carats.	£	carats.	£	
PILBARA GOLDFIELD.							
NULLAGINE DISTRICT.							
Nullagine ...	M.E.C.6L	(Morgans, A. E.) ... ..	...	...	§	24	§230 tons conglomerate returned 25 small diamonds (weight unknown) and 77·70oz. gold.
		Total ... ..	...	...	...	24	

TABLE

RETURN OF ORE AND MINERALS OTHER THAN GOLD ENTERED FOR EXPORT FROM 1850-1907, INCLUSIVE, SHOWING

YEAR.	METALLIC									
	COPPER ORE.									
	West Pilbara Gf.		Northampton Mf.		Phillips River Gf.		State generally.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	
1850	...	...	...	...	...	...	...	...	...	...
1	...	...	...	...	...	...	...	...	...	...
2	...	...	...	...	...	...	...	...	...	...
3	...	...	†	7·50	...	...	...	...	...	7·50
4	...	...	...	...	...	...	...	...	...	...
5	...	...	2·05	26·45	...	...	...	...	2·05	26·45
6	...	...	57·00	1,017·90	...	...	...	...	57·00	1,017·90
7	...	...	80·00	1,920·00	...	...	...	...	80·00	1,920·00
8	...	...	433·25	9,531·50	...	...	...	...	433·25	9,531·50
9	...	...	941·50	14,122·50	...	...	...	...	941·50	14,122·50
1860	...	...	517·50	8,021·25	...	...	...	...	517·50	8,021·25
1	...	...	409·00	6,339·50	...	...	...	...	409·00	6,339·50
2	...	...	783·50	12,536·00	...	...	...	...	783·50	12,536·00
3	...	...	763·00	12,208·00	...	...	...	...	763·00	12,208·00
4	...	...	1,076·00	17,216·00	...	...	...	...	1,076·00	17,216·00
5	...	...	886·00	13,290·00	...	...	...	...	886·00	13,290·00
6	...	...	557·50	8,362·50	...	...	...	...	557·50	8,362·50
7	...	...	337·00	5,055·00	...	...	...	...	337·00	5,055·00
8	...	...	83·00	1,245·00	...	...	...	...	83·00	1,245·00
9	...	...	155·00	2,325·00	...	...	...	...	155·00	2,325·00
1870	...	...	6·00	90·00	...	...	...	...	6·00	90·00
1	...	...	...	...	...	...	...	...	...	...
2	...	...	...	...	...	...	...	...	...	...
3	...	...	56·50	847·50	...	...	...	...	56·50	847·50
4	...	...	66·50	997·50	...	...	...	...	66·50	997·50
5	...	...	204·75	3,071·25	...	...	...	...	204·75	3,071·25
6	...	...	279·00	4,185·00	...	...	...	...	279·00	4,185·00
7	...	...	53·50	802·50	...	...	...	...	53·50	802·50
8	...	...	9·00	135·00	...	...	...	...	9·00	135·00
9	...	...	...	...	...	...	...	...	...	...
1880	...	...	8·00	120·00	...	...	...	...	8·00	120·00
1	...	...	...	...	...	...	...	...	...	...
2	...	...	1·50	22·50	...	...	...	...	1·50	22·50
3	...	...	5·00	75·00	...	...	...	...	5·00	75·00
4	...	...	118·00	1,770·00	...	...	...	...	118·00	1,770·00
5	...	...	119·50	1,792·50	...	...	...	...	119·50	1,792·50
6	...	...	249·00	3,735·00	...	...	...	...	249·00	3,735·00
7	...	...	23·00	345·00	...	...	...	...	23·00	345·00
8	...	...	87·50	1,487·50	...	...	...	...	87·50	1,487·50
9	...	...	112·00	1,904·00	...	...	...	...	112·00	1,904·00
1890	...	...	8·00	136·00	...	...	...	...	8·00	136·00
1	262·50	4,462·50	...	...	...	...	...	...	262·50	4,462·50
2	† 412·00	6,318·80	155·00	2,377·20	...	...	...	...	567·00	8,696·00
3	50·00	606·00	...	...	...	...	...	...	50·00	606·00
4	...	...	...	...	...	...	...	...	...	...
5	802·00	12,832·00	24·00	120·00	...	...	...	...	826·00	12,952·00
6	6·30	100·00	...	...	...	...	...	...	6·30	100·00
7	64·85	731·25	21·15	302·00	...	...	...	...	86·00	1,033·25
8	280·87	3,334·00	74·53	931·50	...	...	...	...	355·40	4,265·50
9	1,404·50	31,973·50	586·55	9,473·25	...	...	...	...	1,991·05	41,451·75
1900	543·55	10,696·00	...	...	105·15	2,411·00	197·41	3,355·00	846·11	16,462·00
1	1,058·00	26,464·00	50	10·00	1,205·00	22,107·00	396·75	6,322·00	2,660·25	54,903·00
2	68·50	1,698·00	20·00	330·00	162·00	2,469·00	33·00	489·00	283·50	4,986·00
3	3·60	180·00	25·05	460·00	301·70	3,538·00	15·45	349·00	345·80	4,527·00
4	50·00	500·00	...	...	...	11·00	154·00	72·00	133·00	2,243·00
5	...	...	...	...	80·00	2,808·00	4·00	206·00	84·00	3,014·00
6	111·60	3,232·00	...	...	...	...	...	...	111·60	3,232·00
Total	5,118·27	103,133·05	9,394·83	148,744·30	1,864·85	33,487·00	718·61	12,310·00	17,096·56	297,674·35
1907	*	*	*	*	*	*	*	*	3,729·12	63,002·00
Total	...	...	...	...	...	...	...	...	20,825·68	360,676·35

\* The Commonwealth returns do not show the details necessary to complete the exports in these columns. Totals only dealt with. † See Woodward's

XIX.

THE QUANTITY OBTAINED FROM CERTAIN GOLDFIELDS AND MINERAL FIELDS, AND THE DECLARED VALUE THEREOF.

MINERALS.

LEAD ORE.		SILVER LEAD ORE.		BLACK TIN (Dressed Tin).						YEAR.
Northampton Mf.		Ashburton Gf.		Pilbarra Gf.		Greenbushes Mf.		Total.		
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	
tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	
5·00	55·00	...	...	...	...	...	...	...	...	1850
...	...	...	...	...	...	...	...	...	...	1
...	...	...	...	...	...	...	...	...	...	2
2†	4·00	...	...	...	...	...	...	...	...	3
...	...	...	...	...	...	...	...	...	...	4
25·00	250·00	...	...	...	...	...	...	...	...	5
...	...	...	...	...	...	...	...	...	...	6
...	...	...	...	...	...	...	...	...	...	7
...	...	...	...	...	...	...	...	...	...	8
13·50	135·00	...	...	...	...	...	...	...	...	9
98·50	985·00	...	...	...	...	...	...	...	...	1860
79·00	790·00	...	...	...	...	...	...	...	...	1
9·00	90·00	...	...	...	...	...	...	...	...	2
230·00	2,300·00	...	...	...	...	...	...	...	...	3
80·00	800·00	...	...	...	...	...	...	...	...	4
703·00	8,436·00	...	...	...	...	...	...	...	...	5
273·50	3,282·00	...	...	...	...	...	...	...	...	6
902·00	10,824·00	...	...	...	...	...	...	...	...	7
1,100·50	13,206·00	...	...	...	...	...	...	...	...	8
699·50	8,394·00	...	...	...	...	...	...	...	...	9
1,209·50	14,514·00	...	...	...	...	...	...	...	...	1870
420·00	5,040·00	...	...	...	...	...	...	...	...	1
364·00	4,368·00	...	...	...	...	...	...	...	...	2
965·50	11,586·00	...	...	...	...	...	...	...	...	3
2,143·75	25,725·00	...	...	...	...	...	...	...	...	4
2,289·00	27,468·00	...	...	...	...	...	...	...	...	5
2,191·50	26,298·00	...	...	...	...	...	...	...	...	6
3,955·50	47,466·00	...	...	...	...	...	...	...	...	7
3,617·50	43,410·00	...	...	...	...	...	...	...	...	8
2,775·00	33,300·00	...	...	...	...	...	...	...	...	9
1,921·00	15,368·00	...	...	...	...	...	...	...	...	1880
1,400·50	11,204·00	...	...	...	...	...	...	...	...	1
1,793·50	14,348·00	...	...	...	...	...	...	...	...	2
1,038·00	7,266·00	...	...	...	...	...	...	...	...	3
696·00	4,872·00	...	...	...	...	...	...	...	...	4
465·00	3,255·00	...	...	...	...	...	...	...	...	5
611·00	4,277·00	...	...	...	...	...	...	...	...	6
471·00	4,710·00	...	...	...	...	...	...	...	...	7
532·00	5,320·00	...	...	...	...	...	...	...	...	8
250·00	2,500·00	...	...	...	...	...	...	...	...	9
213·50	2,135·00	...	...	...	...	...	...	...	300·00	1890
25·00	250·00	...	...	...	...	204·00	10,200·00	204·00	10,200·00	1
29·75	150·00	...	...	...	...	265·49	13,843·00	265·49	13,843·00	2
...	...	...	...	56·45	3,470·00	171·50	7,664·00	227·95	11,134·00	3
...	...	...	...	19·00	949·00	371·25	14,325·00	390·25	15,274·00	4
...	...	...	...	...	...	277·15	9,703·00	277·15	9,703·00	5
...	...	...	...	...	...	137·25	4,338·00	137·25	4,338·00	6
2†	4·00	...	...	...	...	95·55	3,275·00	95·55	3,275·00	7
5·00	33·00	...	...	...	...	68·14	2,760·00	68·14	2,760·00	8
16·00	96·00	...	...	29·55	2,025·00	278·41	21,138·00	307·96	23,163·00	9
26·85	242·00	...	...	368·34	30,146·00	101·94	8,032·00	470·28	38,178·00	1900
...	...	...	...	439·00	34,600·00	67·50	4,895·00	506·50	39,495·00	1
...	...	...	...	248·00	19,698·00	31·00	2,870·00	279·00	22,568·00	2
...	...	...	...	267·00	20,988·00	24·70	1,868·00	291·70	22,856·00	3
...	...	...	...	64·00	4,932·00	24·00	1,389·00	88·00	6,321·00	4
...	...	...	...	188·00	16,853·00	119·00	8,177·00	307·00	25,030·00	5
...	...	...	...	328·70	28,375·00	444·50	46,254·00	773·20	74,629·00	6
33,643·85	364,756·00	...	...	2,008·04	162,036·00	2,681·38	160,731·00	4,761·92	328,467·00	Total
120·25	1,292·00	272·95	3,497·00	*	*	*	*	1,298·00	146,830·00	1907
33,764·10	356,018·00	272·95	3,497·00	...	...	...	...	6,059·92	475,297·00	Total

Mining Handbook, Perth: By Authority, 1895; page 123. † Declared; weight not stated. \* Probably the produce of the Greenbushes Tinfield.



TABLE XIX.—Return of Ore and Minerals, other than Gold,

YEAR.	NON-METALLIC MINERALS.						ORES NOT OTHERWISE ENUMERATED.	
	ASBESTOS.		COAL.		MICA.		Quantity.	Value.
	State generally.		Collie River Coal Mf.		State generally.			
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	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	...	...	...	...	2†	25-00	...	...
2	...	...	...	...	2†	4-00	...	...
3	...	...	...	...	...	...	...	...
4	...	...	...	...	2†	3-00	...	...
5	...	...	...	...	...	...	...	...
6	...	...	...	...	...	...	...	...
7	...	...	...	...	2†	209-00	...	...
8	...	...	1-00	1-00	...	...	...	...
9	...	2† 1-00	798-00	772-00	2†	50-00	...	...
1900	...	...	355-00	350-00	2†	3-00	5-00	85-00
1	...	...	970-75	969-00	...	...	2†	4-00
2	...	...	12-00	12-00	...	...	7† 3-00	47-00
3	...	20 10-00	...	...	...	...	8† 22-00	230-00
4	...	...	11-00	7-00	...	...	9† 05	2-00
5	...	...	108-00	87-00	...	...	10† 18-00	5,729-00
6	...	...	2-00	3-00	...	...	11† 7-00	178-00
	...	...	...	...	...	...	12† 7-70	994-00
Total	...	20 11-00	2,257-75	2,201-00	...	294-00	62-75	7,269-00
1907	...	...	11-00	10-00	...	...	13† 94-05	4,693-00
Total	...	20 11-00	2,268-75	2,211-00	...	294-00	156-80	11,962-00

2† Declared; weight not stated. 4† 13 packages; weight not stated. 5† Estimated; no tonnage given. 6† No tonnage given.  
9† 1 cwt. plumbago ore. 10† Unenumerated; principally tantalite. 11† Spelter, concentrates, dross, and ashes.  
Spelter, concentrates, dross and ashes, 41 tons, £3,302; n.e.i. 24-05 tons, £621. || Advantage has been taken of the series of years

entered for EXPORT from 1850-1907 inclusive—continued.

COMMERCIAL PRODUCTS.								YEAR.
COPPER INGOT.		SILVER.		TIN INGOT. (White tin.)		PIG LEAD.		
State generally.		State generally.		Greenbushes Mf.		State generally.		
Quantity.	Value.	Quantity.	Value	Quantity.	Value.	Quantity.	Value.	
tons.	£	ozs.	£	tons.	£	tons.	£	
...	...	...	...	...	...	...	...	1850
...	...	...	...	...	...	...	...	1
...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	55.00	1,200.00	3
...	...	...	...	...	...	122.00	2,440.00	4
...	...	...	...	...	...	133.75	2,675.00	5
...	...	...	...	...	...	60.00	1,200.00	6
...	...	...	...	...	...	120.50	2,410.00	7
...	...	...	...	...	...	61.00	1,220.00	8
...	...	...	...	...	...	24.75	495.00	9
...	...	...	...	...	...	...	...	1860
...	...	...	...	...	...	...	...	1
...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	...	...	3
...	...	...	...	...	...	...	...	4
...	...	...	...	...	...	...	...	5
...	...	...	...	...	...	...	...	6
...	...	...	...	...	...	543.00	50.00	7
...	...	...	...	...	...	...	...	8
...	...	...	...	...	...	...	...	9
...	...	...	...	...	...	...	...	1870
...	...	...	...	...	...	...	...	1
...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	...	...	3
...	...	...	...	...	...	...	...	4
...	...	...	...	...	...	4.25	89.25	5
...	...	...	...	...	...	57.00	155.00	6
...	...	...	...	...	...	51.00	15.00	7
...	...	...	...	...	...	...	...	8
...	...	...	...	...	...	...	...	9
...	...	...	...	...	...	55.00	89.00	1880
...	...	...	...	...	...	51.00	20.00	1
...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	...	...	3
...	...	...	...	...	...	...	...	4
...	...	...	...	...	...	...	...	5
...	...	...	...	...	...	...	...	6
...	...	...	...	...	...	56.00	120.00	7
...	...	...	...	...	...	52.00	40.00	8
...	...	...	...	...	...	...	...	9
...	...	...	...	...	...	...	...	1890
...	...	...	...	...	...	...	...	1
...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	...	...	3
...	...	...	...	...	...	...	...	4
...	...	...	...	...	...	...	...	5
...	...	...	...	...	...	...	...	6
...	...	...	...	...	...	...	...	7
...	...	...	...	...	...	54.50	11.00	8
...	...	...	...	...	...	...	...	9
...	...	...	...	...	...	77.00	1,077.00	1900
248.90	17,475.00	28,749.00	3,594.40	142.35	18,872.00	...	...	1
{ 439.40	{ 31,062.00	{ 60,869.00	{ 7,609.00	{ 96.50	{ 12,607.00	...	...	2
{ \$441.10	{ 24,804.00	{ 83,293.00	{ 9,190.00	{ 141.00	{ 16,380.00	...	...	3
{ \$175.00	{ 7,918.00	{ 168,113.00	{ 19,153.00	{ 235.35	{ 29,277.00	...	...	4
{ 51.45	{ 3,371.00	{ 399,190.00	{ 45,912.00	{ 129.00	{ 16,155.00	5,352.00	63,170.00	5
{ \$1,023.80	{ 29,917.00	{ 359,744.00	{ 44,278.00	...	...	<sup>12</sup> 2,730.00	34,471.00	6
{ 99.00	{ 3,676.00	{ 282,145.00	{ 37,612.00	44.90	8,653.00	<sup>12</sup> 2,681.00	44,460.00	7
{ \$791.00	{ 53,806.00	...	...	...	...	...	...	8
{ \$325.70	{ 28,919.00	...	...	...	...	...	...	9
3,595.35	200,948.00	1,382,103.00	167,348.00	789.10	101,944.00	11,446.75	155,407.25	Total
1,589.07	141,177.00	189,265.00	25,382.00	108.09	20,512.00	313.10	6,087.00	1907
5,184.42	342,125.00	1,571,368.00	192,730.00	897.19	122,456.00	11,759.85	161,494.25	Total.

6 packages estimated at 10 cwt. <sup>7</sup> 2 tons cobalt ore, value £41; 1 ton plumbago ore, value £6. <sup>8</sup> 22 tons Antimony ore, value £230.  
<sup>12</sup> Lead contained in bullion from the Fremantle Smelters, Ltd. <sup>13</sup> Antimony, 24.85 tons, £630; Scheelite ore, 4.15 tons, £140;  
covered by this table to show in detail the quantity of Commercial Products exported. § Copper matte. ¶ Unenumerated.





TABLE XX.—Milling and Cyaniding Plants erected in the respective Goldfields, Districts, etc.—continued.

Mining Centre and Lease or Area on which erected.	NAME OF MINE, COMPANY, OR WORKS.	MILLING.										CYANIDING.			Total Value of all Mining Machinery.	
		Batter-ies. Number of Heads of Stampers.	Other Mills.								Leaching Vats.	Agitating Vats.	Filter Presses.			
			Prospecting.	Ball.	Krupp.	Griffin.	Huntington.	Salford.	Tremain.	Flint.				Other Crushers.		Puddlers.
<b>MURCHISON GOLDFIELD—contd.</b>														£		
<b>NANNINE DISTRICT—continued.</b>																
<i>Jillawarra.</i> 455N	Jillawarra .. .. .	5										3				
<i>Meekatharra.</i> 398N, etc. 533N A9142	Ingliston Extended G.Ms., Ltd. ..	10										2	4			1
<i>Nannine.</i> 16N, 25N	Marmont .. .. .	10											3			
	State Battery .. .. .	10											3			
	Mt. Hall: Royalist Consolidated and Nannine leases	13														
A10254	State Battery .. .. .	5											3			
T.A. 14N Quinn's 622N	Nannine Cyanide Plant (Finney Bros.)												3			
<i>Stake Well.</i> 593N, etc.	Phoenix .. .. .	5											4			
<i>Star of the East.</i> 174N	Robinson South G.M. Co., Ltd. ..	10											12			
	Star of the East, Ltd. .. .. .	20											6			
	<b>Total</b> .. .. .	<b>157</b>										<b>2</b>	<b>64</b>			<b>1</b>
																<b>84,739</b>
<b>DAY DAWN DISTRICT.</b>																
<i>Day Dawn.</i> 389D, etc. 26D, etc. 1D, etc. (179D)	Crème d'Or leases .. .. .	5														
	East Fingall G.Ms., Ltd. .. .. .	5											3			
	Great Fingall Consolidated, Ltd. ..	190											24		6	{ 6 V.3 }
	Kinsella: Great Fingall Consolidated, Ltd.	20														
320D	Mt. Fingall .. .. .	5											4			
14D, etc. <i>Island.</i> 5D, etc. <i>Mainland.</i> 355D, etc. <i>Webb's Patch.</i> 370D, 391D	Murchison Associated G.Ms., Ltd. ..	10											4			
	Island Queen leases .. .. .	5											5			
	Mainland Consols leases .. .. .												5			
	Hill End leases .. .. .	5											5			
	<b>Total</b> .. .. .	<b>155</b>											<b>50</b>		<b>6</b>	<b>9</b>
																<b>271,482</b>
<b>MT. MAGNET DISTRICT.</b>																
<i>Lennonville.</i> (30M) (693M) A7499 (57M)	(Long Reef) .. .. .	20											4			
	(Piedmont) .. .. .	10														
	State Battery .. .. .	10											4			
	(Welcome) .. .. .								1							
<i>Mt. Magnet.</i> 314M, etc. 784M (M.A. 2M) 856M A9769 <i>Moyagee.</i> (766M)	Morning Star Quartz Co., N.L. ..	10											7			
	New Chum .. .. .	10														
	(New Chum Cyanide Works)												12			
	Paris .. .. .															
	State Battery .. .. .	10											7			
	Ophir .. .. .	5														
	<b>Total</b> .. .. .	<b>75</b>								<b>1</b>			<b>34</b>			<b>21,270</b>
<b>YALGOO GOLDFIELD.</b>																
<i>Field's Find.</i> 414, etc. <i>Gullewa.</i> 170/1, 174 34, etc. <i>Pinjalling.</i> 501, etc. P.A. 119 <i>Rothsay.</i> (192, etc.) <i>Yalgoo.</i> 495, etc. <i>Yuin.</i> 409, etc., M.A. 8 556	Reward G.Ms., Ltd. .. .. .	20														
	Monarch leases .. .. .	10											3			
	Phoenix G.Ms., Ltd. .. .. .	10											4			
	Baron Rothschild G.Ms., Ltd. ..	10											5			
	(Gloster, A.B.) .. .. .		1													
	(Woodley's G.Ms., Ltd.) .. .. .	20											4			
	Ivanhoe G. M. Co., N. L., Yalgoo ..	5														
	Royal Standard leases .. .. .	10														
	Standard Grade .. .. .	5														
	<b>Total</b> .. .. .	<b>90</b>	<b>1</b>										<b>16</b>		<b>23,890</b>	

TABLE XX.—*Milling and Cyaniding Plants erected in the respective Goldfields, Districts, etc.—continued.*

Mining Centre and Lease or Area on which erected.	NAME OF MINE, COMPANY, OR WORKS.	Batteries. Number of Heads of Stampers.	MILLING.										CYANIDING.			Total Value of all Mining Machinery.		
			Other Mills.										Leaching Vats.	Agitating Vats.	Filter Presses.			
			Prospecting.	Ball.	Krupp.	Griffin.	Huntington.	Salford.	Tremain.	Flint.	Other Crushers.	Puddlers.						
	MT. MARGARET GOLDFIELD.																	
Australia United. (216f) Korong. 140f	MT. MORGANS DISTRICT. (Australia United)												3					
Mt. Margaret. 66f	Alicia	10											4					
Mt. Morgans. (M.A. 3f) 8f	Mt. Morven												3					
97f, etc. 5f, etc. 7f	(Hamblin's Battery) Millionaire, Ltd. Ramornio leases Westralia Mt. Morgans G. M. Co., Ltd. Westralia Mt. Morgans G. M. Co., Ltd. (Guest's Battery)	5 5 5 60 24															3	
Murrin Murrin. 189f, etc. 200f 193f, etc.	Malcolm Mines, Ltd. Princess Alix Proprietary Extended leases	30 5 20											2 7 12					
	Total	160											80			3	213,552	
	MT. MALCOLM DISTRICT.																	
Dodger's Well. 1237c	Golden Champion Mining Co., Ltd.	5																
Diorite King. 1179c	King of the Hills	5											3					
Leonora. 218c/9c, etc. 1083c	Drew and Mason's Cyanide Works Great Tower Hill G.Ms., Ltd. Katie	40											4 12 3					
195c/6c 210c, etc. 190c, etc.	Leonora Gold Blocks leases Leonora Main Reefs, Ltd. Sons of Gwalia, Ltd.	10 10 50											5 5 16					
198c, etc. A7121 263c, etc. Malcolm	Sons of Gwalia South G.Ms., Ltd. State Battery Trump leases	10 10 10											6 5 4					
1175c 991c W.R. 84c	Davis' Cyanide Works Malcolm Prospecting Co., N.L. Richmond Gem (Hill and party)	10 10 10											4 4 4					
Mertondale. 638c, etc. (1040c)	Merton's Reward G. M. Co., Ltd. (Workman)	30 10								1			1 14	2	1			
Mt. Clifford M.A. 9c Pig Well. A9681	Mt. Clifford Battery State Battery	10 10											3 4					
Randwick. (987c) 978c	(Anglo-Saxon) Randwick	5 10											4 4					
Webster's Find. (65c, etc.) T.A. 4c	(Perseverance G.Ms., Ltd.) Lang's Cyanide Works	15											6 14					
Wilson's Patch. 1120c, etc.	Great Western leases	10											6					
	Total	270								1		1	122	7	4	148,977		
	MT. MARGARET DISTRICT.																	
Burtville. 943t, etc. 781t 1644t	Mikado G.M. Co., Ltd. Sailor Prince Specimen Hill	5 5 5											9 4					
A8914 1726t	State Battery Sunrise	10 8											3					
Erlistoun. 1738t 1509t 1046t	Caledonia Famous Blue Golden Spinnifex	5 5 5											4 5 4					
771t 1414t 1517t 1665t	Little Doris Mistake Mulga Queen Westralia Tasmania	5 10 10 5											4 3 4 2					
Euro. 1546t	Euro leases	10											4					
Laerton. 371t (592t) 829t, etc. 1783t, etc. 715t, etc. A8336	Augusta (Craggiemore Proprietary, Ltd.) Ida H. G.M. Co., Ltd. Just-in-Time G.M. Co., N.L. Lancefield G.M. Co., Ltd. State Battery	10 10 10 5 50 10											3 6 7 8 3			6		
	Total	178	1	4									65	8	6	200,669		

TABLE XX.—Milling and Cyaniding Plants erected in the respective Goldfields, Districts, etc.—continued.

Mining Centre and Lease or Area on which erected.	NAME OF MINE, COMPANY, OR WORKS,	MILLING.											CYANIDING.			Total Value of all Mining Machinery.		
		Batteries. Number of Heads of Stampers.	Other Mills.										Leaching Vats.	Agitating Vats.	Filter Presses.			
			Prospecting.	Ball.	Krupp.	Griffin.	Huntington.	Salford.	Tremain.	Flint.	Other Crushers.	Puddlers.						
<b>NORTH COOLGARDIE GOLDFIELD.</b>																		
<b>MENZIES DISTRICT.</b>																		
<i>Comet Vale.</i>																		
5148z	Coonega G.M. Co., Ltd.	10	..	..	..	..	..	..	..	..	..	..	..	8	..	..	..	..
5217z	Gladsome	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Menzies.</i>																		
5823z, etc.	Crusoe Gold Claims, Ltd.	10	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..
5017z, etc.	Crusoe Gold Claims, Ltd.	20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
2821z, etc.	Florence leases	10	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..
5304z	Heart's Content South	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5302z	Lady Harriet	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4895z, etc.	Maranoa leases	5	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..
4931z, etc.	Menzies Consolidated G.Ms., Ltd.	20	..	..	..	..	..	..	..	..	..	..	..	29	..	..	..	..
2820z, 3006z	Menzies Gold Mine leases	10	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..
2832z, etc.	Menzies Mining and Exploration Corporation, Ltd.	10	..	..	..	..	..	..	..	..	..	..	..	7	..	1	..	..
4855z, etc.	Goodenough leases: Queensland Menzies G.M. Co., N.L.	15	..	..	..	..	..	..	..	..	..	..	..	6	..	1	..	..
A10253	State Battery	10	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..
P.A. 3362.	(Lady Isobel)	3	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
<i>Mt. Ida.</i>																		
5243	Mt. Ida Meteor	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
P.A. 292z	(Seddon Syndicate)	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
A10173	State Battery	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Mt. Ida Cyanide Plant	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..
	<b>Total</b>	<b>161</b>	..	..	..	..	..	..	..	..	..	..	..	<b>69</b>	..	<b>3</b>	<b>72,731</b>	..
<b>ULARRING DISTRICT</b>																		
<i>Davyhurst.</i>																		
459u, etc.	Golden Pole G.Ms., Ltd.	20	..	..	..	..	..	..	..	..	..	..	..	13	..	..	1	..
613u, etc.	Great Ophir Gold Corporation, Ltd.	..	..	..	..	..	..	..	..	..	..	..	..	48	..	..	..	..
438u	Westralia Waihū G.Ms., N.L.	10	..	..	..	..	..	..	..	..	..	..	..	6	..	..	..	..
<i>Mulline.</i>																		
123u	Riverina	10	..	..	..	..	..	..	..	..	..	..	..	6	..	..	..	..
324u, etc.	Riverina South leases	5	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..
A7250	State Battery	20	..	..	..	..	..	..	..	..	..	..	..	5	..	1	..	..
<i>Mulwarrie.</i>																		
A8045	State Battery	10	..	..	..	..	..	..	..	..	..	..	..	6	..	..	..	..
	<b>Total</b>	<b>75</b>	..	..	..	..	..	..	..	..	..	..	..	<b>87</b>	..	<b>2</b>	<b>59,787</b>	..
<b>NIAGARA DISTRICT.</b>																		
<i>Armidale.</i>																		
673g	Desdemona	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Koolyynie.</i>																		
320g	Champion Sluicing Plant	..	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..
20g	Cumberland Cyanide Works	..	..	..	..	..	..	..	..	..	..	..	..	5	..	..	..	..
26g, etc.	Englishman: Cosmopolitan Proprietary, Ltd.	50	..	..	..	..	..	..	..	..	..	..	..	14	..	{	2	..
T.A. 46g	(Golden Hope)	..	..	..	..	..	..	..	..	..	..	..	..	4	..	V.1	..	..
(662g)	(May-be)	..	..	..	..	..	..	..	..	..	..	..	..	6	..	..	..	..
P.A. 206g	(Sovereign)	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Niagara.</i>																		
T.A. 50g	Challenge Cyanide Works	..	..	..	..	..	..	..	..	..	..	..	..	5	..	..	..	..
518g, etc.	Englishhawk Heather Co., Ltd.	10	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..
419g, etc.	Hannan's Main Reef G.M. Co., Ltd.	10	..	..	..	..	..	..	..	..	..	..	..	9	..	..	..	..
A7494	State Battery	10	..	..	..	..	..	..	..	..	..	..	..	6	..	..	..	..
505g, etc.	W.E.G. leases	10	..	..	..	..	..	..	..	..	..	..	..	6	..	..	..	..
<i>Tampa.</i>																		
278g, etc.	Fortuna leases	5	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..
M.A. 44g	Tampa Cyanide Works	..	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..
	<b>Total</b>	<b>105</b>	..	..	..	..	..	..	..	..	..	..	..	<b>70</b>	..	<b>3</b>	<b>74,237</b>	..
<b>YERILLA DISTRICT.</b>																		
<i>Edjudina.</i>																		
401r, etc.	Nera leases	5	..	..	..	..	..	..	..	..	..	..	..	6	..	..	..	..
M.A. 3r	Pauley and McCoy's Battery	10	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..
539r	Senate	5	..	..	..	..	..	..	..	..	..	..	..	6	..	..	..	..
<i>Linden.</i>																		
(406r)	(Great Carbine: Greenhills G.M. Co., Ltd.)	..	1	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..
<i>Pinjin.</i>																		
A10190	State Battery	5	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..
<i>Yarri.</i>																		
A10255	State Battery	10	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..
<i>Yerilla.</i>																		
P.A. 234r	(Clan Donachaich)	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
W.R. 28r	State Battery	5	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..
<i>Yundamindera.</i>																		
450r, etc.	Potosi Consolidated, Ltd.	20	..	..	..	..	..	..	..	..	..	..	..	12	..	..	..	..
A10204	State Battery	..	..	..	..	..	..	..	..	1	..	..	..	6	..	..	..	..
	<b>Total</b>	<b>60</b>	<b>1</b>	..	..	..	..	..	<b>1</b>	..	..	..	..	<b>46</b>	..	..	<b>37,198</b>	..

TABLE XX.—Milling and Cyaniding Plants erected in the respective Goldfields, Districts, etc.—continued.

Mining Centre and Lease or Area on which erected.	NAME OF MINE, COMPANY, OR WORKS.	MILLING.										CYANIDING.			Total Value of all Mining Machinery.			
		Batteries.	Other Mills.									Leaching Vats.	Agitating Vats.	Filter Presses.				
			Number of Heads of Stampers.	Prospecting.	Bell.	Krupp.	Griffin.	Huntington.	Salford.	Tremain.	Flint.					Other Crushers.	Paddlers.	
BROAD ARROW GOLDFIELD.																		
<i>Bardoc.</i> 1329w 1337w	Dulcie Maud .. .. .																	
959w, etc.	Howdon .. .. .	5																
1272w	New Slug Hill G.M. Co., Ltd.	20																
M.A. 21w	Zoroastrian, Ltd.	10																
<i>Black Flag.</i> (43w, etc.)	(Black Flag Proprietary Co., Ltd.)	49																
47w, etc.	Lady Bountiful G.M. Co., N.L.	10																
M.A. 19w	Milne's Battery .. .. .	5																
<i>Broad Arrow.</i> 56w, etc.	Broad Arrow Consols G.M. Co., N.L.	10																
3w, etc.	Claremont G.M., Ltd.	20																
<i>Carnage.</i> M.A. 22w	(Regan and party) .. .. .	10																
<i>Paddington.</i> T.A. 25w	Braybrook's Cyanide Works .. .. .																	
W.R. 68w	Carter's Venture Mill .. .. .	10																
45w	Mt. Corlic .. .. .	10																
M.A. 14w	New Arrow Proprietary Battery .. .. .	10																
53w, etc.	New Standard Exploration Co., Ltd.	10																
T.A. 13w	Paddington Cyanide Works .. .. .																	
<i>Siberia.</i> 1286w	Golden .. .. .		1															
M.A. 13w	Ora Banda Battery .. .. .	15																
1300w	Pole .. .. .	5																
near W.R. 4250	State Battery .. .. .	5										1						
	Total .. .. .	195	1					1				1		73			53,974	
NORTH EAST COOLGARDIE.																		
KANOWNA DISTRICT.																		
<i>Gambier.</i> M.A. 37x	Kalpini State Battery .. .. .	10																
(434x)																		
<i>Gindalbie.</i> 1047x	Elipse .. .. .	5																
1123x	Gindalbie .. .. .	10																
392x, etc.	Queen Margaret G.M. Co., Ltd.	15																
<i>Kanowna.</i> (918x)	Government Well .. .. .																	
187x, etc.	London and Coolgardie Explorers, Ltd.																	
	Last Chance Cyanide Works .. .. .																	
3x, etc.	North White Feather G.Ms., Ltd.	20																
	North White Feather Filter Press Plant .. .. .																2	
1214x	Rollo's Reward .. .. .	3																
9x, etc.	White Feather Main Reefs (1906), Ltd.	40																
L.C. 61x	Campbell's Works .. .. .																	
(M.A. 45x)	Donnan's Works .. .. .		1															
M.A. 43x	Monarch Works .. .. .																	
M.A. 39x	Mudlark Works .. .. .																	
M.A. 19x	Old Cement Works (Martin's) .. .. .	10																
	Middleton's Cyanide Works .. .. .																	
L.C. 57x	Riedel and Norton's .. .. .	10																
<i>Mulgarric.</i> (149x)	Middleton's Cyanide Works .. .. .																	
	(Hit or Miss South) .. .. .	10																
	Total .. .. .	133	1											3		69	2	76,947
BELONG DISTRICT.																		
<i>Bulong.</i> 1029y, etc.	Barton leases .. .. .																	
862y	Golden West .. .. .	5																
M.A. 65y	Green Harp Mill .. .. .																	
9y, etc.	Queen Margaret G.M. Co., Ltd.	20																
<i>Randalls.</i> W.R. 24y	Berry's Public Battery .. .. .	10																
A9535	State Battery .. .. .	10																
<i>Woodlinc.</i> 1005y	Unknown .. .. .	10																
	Total .. .. .	55						2						6				24,205
KURNALPI DISTRICT.																		
<i>Kurnalpi.</i> (280k)	(Billy Billy) .. .. .	5																
M.A. 2k	Lady of the Lake .. .. .																	
314k	Glover's Works .. .. .		1															
<i>Mulgabbie.</i> M.A. 3k																		
	Total .. .. .	5	1											1				1,395



TABLE XX. —Milling and Cyaniding Plants erected in the respective Goldfields, Districts, etc.—continued.

Mining Centre and Lease or Area on which erected.	NAME OF MINE, COMPANY, OR WORKS.	MILLING.										CYANIDING.			Total Value of all Mining Machinery.	
		Batteries. Number of Heads of Stampers.	Other Mills.									Leaching Vats.	Agitating Vats.	Filter Presses.		
			Prospecting.	Ball.	Krupp.	Griffin.	Huntington.	Salford.	Tremain.	Flint.	Other Crushers.					Puddlers.
<b>EAST COOLGARDIE GOLDFIELD.</b>														€		
Boorara. 4297E.	Golden Ridge .. .. .	.. .. .	.. .. .	.. .. .	.. .. .	1	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .		.. .. .	
3908E, etc.	Golden Ridge G.M. Co., N.L.	20	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .		.. .. .	
T.L. 36H Boulder. 38E, etc.	Barnes' Works .. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .		.. .. .	
49E	Associated G.Ms. of W.A., Ltd.	10	.. .. .	11	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	2	13	9		V.1 3	
S.L., 545/152 13E, etc.	Associated Northern Blocks (W.A.) Ltd	.. .. .	.. .. .	3	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	1	6	6		.. .. .	
90E	Boulder Puddling Works .. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .		.. .. .	
M.A. 50E	Croesus South G.Ms., Ltd.	20	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	8	8		V.2	
351E, etc.	Eureka Mining Co., Ltd.	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .		.. .. .	
750E, etc.	Glenartney Works .. .. .	10	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .		.. .. .	
873E	Golden Horseshoe Estates Co., Ltd.	150	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	10	1	24	22		20	
50E	Golden Links, Ltd.	.. .. .	.. .. .	1	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	6	.. .. .		.. .. .	
66E	Great Boulder Main Reef, Lt l.	.. .. .	.. .. .	3	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .		3	
16E, etc.	Great Boulder No. 1, Ltd.	10	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	1	15	.. .. .		.. .. .	
	Great Boulder Perseverance G.M. Co., Ltd.	.. .. .	.. .. .	.. .. .	16	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	1	24	.. .. .		13	
3643E	Great Boulder Proprietary G.Ms., Ltd.	.. .. .	.. .. .	3	12	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	4	22	13		V.10 2	
Mach. I. 4 M.A. 11E, etc.	Hainault G.Ms., Ltd.	40	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	1	40	.. .. .		.. .. .	
15E, etc.	Hannan's Central .. .. .	15	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	13	.. .. .		.. .. .	
4227E	Hannan's Public Crushing, Condensing, and Saw Mills Co. (W.A.) Ltd.	20	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	1	12	6		11	
189E, etc.	Hannan's Star, Ltd.	.. .. .	.. .. .	2	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	4		2	
31E, etc.	Hill End Consols .. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	1	.. .. .	.. .. .		.. .. .	
1507E, etc.	Idahi leases .. .. .	5	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .		.. .. .	
6E, etc.	Ivanhoe Gold Corporation, Ltd.	100	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	32	.. .. .		8	
22E, etc.	Ivanhoe Junction G.M. Co., N.L.	10	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	12	.. .. .		.. .. .	
25E, etc.	Kalgoorlie Amalgamated (new), Ltd.	5	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .		.. .. .	
4209E	Kalgoorlie G.Ms., Ltd.	.. .. .	.. .. .	9	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	20		7	
33E, etc.	Lake View Consols, Ltd.	75	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	6	1	8	14		13	
281E, etc.	Lucey .. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .		.. .. .	
410E, etc.	North Boulder G.Ms., Ltd.	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .		.. .. .	
	North Kalgurli Co., Ltd.	10	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	7	3		1	
	Oroya Brownhill Co., Ltd.	50	.. .. .	3	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	6	.. .. .	13	6		V.1	
	Rasmussen's Works .. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	2	.. .. .		.. .. .	
1208E, etc.	South Kalgurli G.Ms., Ltd.	.. .. .	.. .. .	3	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	5		7	
4187E, etc.	Truuant .. .. .	10	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .		.. .. .	
946E	West Queen of the West .. .. .	.. .. .	.. .. .	.. .. .	.. .. .	1	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	5	.. .. .		.. .. .	
Feysville. Block 50	Hampton Plains Estate (1906), Ltd.	5	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .		.. .. .	
1101E, etc.	A.W.A. United leases .. .. .	10	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	7	.. .. .		.. .. .	
796E, etc.	Bonnie Lass leases .. .. .	5	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	4	.. .. .		.. .. .	
Mach. I. 5 1694E	Brown Hill Consols, Ltd.	20	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	16	.. .. .		2	
4273E, etc.	Golden Zone .. .. .	5	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .		.. .. .	
943E, etc.	Hannan's North G.Ms., Ltd.	10	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .		.. .. .	
97E, etc.	Hannan's Proprietary, Ltd.	.. .. .	.. .. .	.. .. .	2	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	6	.. .. .		.. .. .	
4001E, etc.	Hannan's Reward and Mt. Charlotte Ltd.	30	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	20	.. .. .		.. .. .	
Mach. I. 2 4037E (64E)	Hidden Secret leases .. .. .	5	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .		.. .. .	
3880E, etc.	Kalgoorlie Gold Recovery Co., Ltd.	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	12	5		2	
	North End Mins., Ltd.	15	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	11	.. .. .		.. .. .	
	(Red Hill Extended)	10	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .		.. .. .	
	Western Machinery Corporation, Ltd.	20	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	12	.. .. .		.. .. .	
	<b>Total .. .. .</b>	<b>695</b>	<b>.. .. .</b>	<b>33</b>	<b>28</b>	<b>4</b>	<b>.. .. .</b>	<b>.. .. .</b>	<b>.. .. .</b>	<b>23</b>	<b>.. .. .</b>	<b>21</b>	<b>290</b>		<b>165</b>	<b>137</b>
	<b>COOLGARDIE GOLDFIELD.</b>															
	<b>COOLGARDIE DISTRICT.</b>															
Bonnievale. 595, etc.	Gem leases .. .. .	25	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .		.. .. .	
144, etc.	Vale of Coolgardie G.Ms., Ltd.	10	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	5	.. .. .		.. .. .	
	Westralia and East Extension Mines, Ltd.	40	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	30	4		2	
Burbanks. 134, etc.	Burbanks Birthday G.Ms., Ltd.	60	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	7	.. .. .		.. .. .	
2985, etc.	Burbanks Main Lode (1904), Ltd.	20	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	8	.. .. .		.. .. .	
2160	Lady Robinson G.M. Co., N.L.	10	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	9	.. .. .		.. .. .	
Coolgardie. 133, etc.	Bayley's leases .. .. .	10	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	6	.. .. .		.. .. .	
3918	Coolgardie Redemption .. .. .	10	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	7	.. .. .		.. .. .	
(1604)	(Flagstaff: Greenmount Mines, N.L.)	10	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .		.. .. .	
73, etc.	Griffiths leases .. .. .	10	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	5	.. .. .		.. .. .	
4222 (3415)	King Solomon leases .. .. .	20	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	3	.. .. .		.. .. .	
4152/3	(Perseverance G.Ms., Ltd.)	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	10	.. .. .		.. .. .	
A9435	Queen's Cross leases .. .. .	11	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .		.. .. .	
33, etc.	State Battery .. .. .	10	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	5	.. .. .		.. .. .	
	Tindal's Coolgardie G.M. Co., N.L.	10	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	8	.. .. .		.. .. .	

TABLE XX.—Milling and Cyaniding Plants erected in the respective Goldfields, Districts, etc.—continued.

Mining Centre and Lease or Area on which erected.	NAME OF MINE, COMPANY, OR WORKS.	MILLING.										CYANIDING.			Total Value of all Mining Machinery.		
		Batteries.	Other Mills.									Leaching Vats.	Agitating Vats.	Filter Presses.			
			Number of Heads of Stampers.	Prospecting.	Ball.	Krupp.	Griffin.	Huntington.	Salford.	Tremain.	Flint.					Other Crushers.	Puddlers.
	<b>COOLGARDIE GOLDFIELD—contd.</b>																
	COOLGARDIE DISTRICT—continued.																
<i>Gnarlbine.</i> (3838)	(Prince of Wales G.M. Co., Ltd.) ..	10													3		
<i>Higginsville.</i> 4184, etc.	Red Hill Westralia G.Ms., Ltd. ..	10															
<i>Red Hill.</i> 3404, etc.	Red Hill Westralia G.Ms., Ltd. ..	10													6		
<i>Widgiemooltha.</i> M.A. 63 A7497	Highgate Works .. ..	3													2		
	State Battery .. ..	10															
	Total .. ..	299													114	4	2
	134,588																
	<b>KUNANALLING DISTRICT.</b>																
<i>Balgarrrie.</i> M.A. 13s	Hepburn's Cyaniding Works ..	5													6		
<i>Carbine.</i> 33s	State Battery .. ..	10															
<i>Dunnsville.</i> 17s	Carbine .. ..	10															
<i>Jourdie Hills.</i> 369s, etc.	North Coolgardie G.Ms., Ltd. ..	10													4		
514s	Jourdie United G.Ms., Ltd. ..	10													10		
<i>Kintore.</i> M.A. 14s	Pride of Jourdie North .. ..	5															
M.A. 19s	(Berliner and Besta) .. ..	5															
25-Mile. 696s	(Great Cement Proprietary, Ltd.) ..	20													8		
M.A. 18s	Blue Bell .. ..	5													7		
586s	(Bow's Battery) .. ..	10															
645s	Shamrock .. ..	5													4		
	Star of Fremantle .. ..	10													5		
	Total .. ..	95													44		
	27,050																
	<b>YILGARN GOLDFIELD.</b>																
<i>Greenmount.</i> 503, etc.	Greenmount Mines, N.L. .. ..	10													6		
550, etc.	Sunbeam leases .. ..	5													2		
536	Transvaal .. ..	20													8		
<i>Jacoletti.</i> 490, etc.	Jacoletti G.Ms., Ltd. .. ..	10													4		
<i>Kennyville.</i> 570	Northern Blocks Syndicate, Ltd. ..	10															
<i>Mt. Jackson.</i> 212, etc.	Mt. Jackson G.Ms., Ltd. .. ..	10													7		
<i>Parker's Range.</i> T.A. 13	Andre's Cyanide Works .. ..	5													6		
508	Australia .. ..	5															
520	Blue Hill .. ..	10													4		
665	Never Never .. ..	10													10		
724	Spring Hill .. ..	5													4		
<i>Southern Cross.</i> 13, etc.	British and Foreign Development Syndicate, Ltd. .. ..	30													6		2
T.A. 15	Fraser's South Extended Tailings Works .. ..	10															1
552	Haddon .. ..	10													9		
▲8901	Layther's Cyanide Works .. ..	5													5		
	Total .. ..	130													71		3
	67,505																
	<b>DUNDAS GOLDFIELD.</b>																
<i>Buldanica.</i> T.A. 21 (M.A. 28)	Liquid Gem Cyaniding Works ..														3		
<i>Norseman.</i> (M.A. 30)	Pathway Battery .. ..																
42, etc.	Break-o'-Day Battery .. ..	10													4		
938, etc.	Cumberland G.M. Co., N. L. ..	10													12		
864, etc.	Hampton Plains Estate (1906), Ltd. ..	10															
M.A. 27	Lady Mary G.M. Co., N.L. ..	20													5		
852, etc.	Little Wonder Cyanide Works ..	10													2		
M.A. 18	Mararoa G.M. Co., N.L. .. ..	10													24		
106, etc.	Mararoa Crushing and Cyaniding Works .. ..	10													14		
634, etc.	Princess Royal G.M. Co., N.L. ..	30													10	3	2
A10257 (88)	Princess Royal North G.M. Co., N.L. .. ..	10													2		
	State Battery .. ..	10													5	2	1
	(Three Colonies) .. ..																
	Total .. ..	120													81	5	3
	63,077																

TABLE XX—Milling and Cyaniding Plants erected in the respective Goldfields, Districts, etc.—continued.

Mining Centre and Lease or Area on which erected.	NAME OF MINE, COMPANY, OR WORKS.	MILLING.										CYANIDING.			Total Value of all Mining Machinery.				
		Batteries.	Other Mills.									Leaching Vats.	Agitating Vats.	Filter Presses.					
			Number of Heads of Stampers.	Prospecting.	Ball.	Krupp.	Griffin.	Huntington.	Salford.	Tremain.	Flint.					Other Crushers.	Puddlers.		
<b>PHILLIPS RIVER GOLDFIELD.</b>																			
<i>Kandip.</i> M.L. 60	Flag Gold and Copper Mining Co., Ltd.	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
65, etc. T.A. 3	Gem leases .. .. .	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M.L. 52, etc.	Harbour View leases .. ..	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
74	Two Boys .. .. .	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Mt. Purchas.</i> W.R. 19.	Mt. Purchas Prospecting Plant ..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Ravensthorpe.</i> 82	Gilbert Gold Mines, Ltd. .. ..	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M.A. 1	Phillips River Gold Mining Co., Ltd.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Total .. .. .	40	1	..	..	..	..	..	..	..	..	..	..	..	5	..	..	..	49.51
	STATE GENERALLY .. .. .	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	58.00
<b>TIN.</b>																			
<b>GREENBUSHES TINFIELD.</b>																			
Claim 762	Agent General .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
484	Champion .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
Claim 670	Dew's .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
Claim 752	Dream .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
M.A. 22. T.A. 17	Greenbushes Co-operative Mines, Ltd.	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
Claim 315	Hash's .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
Claim 219A	Hille's .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
Claim 788	Kanowna .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
73, etc.	King Tin leases .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
Claim 730	Kretzmayer: Floyd's Gully .. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
Claim 765	Morning Star .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
Claim 775	Old Bunbury .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
Claim 818, M.A. 24	Rattray's Spring Gully .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..
381, etc.	Westralian Gully Tin Co., Ltd. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
	State Tin Dressing Plant (Bunbury end)	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	State Tin Dressing Plant (North on)	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
	Total .. .. .	5	..	..	..	..	..	..	..	..	..	..	..	..	5	12	..	..	20.36
<b>PILBARA GOLDFIELD.</b>																			
<b>MARBLE BAR DISTRICT.</b>														1,000					
	Total .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1,000
<b>COPPER.</b>																			
<b>WEST PILBARA GOLDFIELD</b> .. .. .														7,000					
<b>MT. MARGARET GOLDFIELD</b> .. .. .														8,819					
<b>NORTH COOLGARDIE GOLDFIELD.</b>																			
<b>MENZIES DISTRICT</b> .. .. .														500					
<b>PHILLIPS RIVER GOLDFIELD</b> .. .. .														18,711					
	Total .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	35,030
<b>COAL.</b>																			
<b>COLLIE RIVER COALFIELD</b> .. .. .														46,090					

## 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 are collected by the Mint.

Forms for use in connection with gold sent to the Mint by post or under Police escort can be obtained at the Mint.

*Charges for Assaying, Refining, and Coinage.*

Gross Weight of Deposit in ounces.	Mint Charge.	Gross Weight of Deposit in ounces.	Mint Charge.	Gross Weight of Deposit in ounces.	Mint Charge.
Up to and including—	£ s. d.	Up to and including	£ s. d.	Up to and including—	£ s. d.
24	0 5 0	400	4 3 4	1,300	10 4 2
30	0 6 3	410	4 5 5	1,400	10 16 8
40	0 8 4	420	4 7 6	1,500	11 9 2
50	0 10 5	430	4 9 7	1,600	12 1 8
60	0 12 6	440	4 11 8	1,700	12 14 2
70	0 14 7	450	4 13 9	1,800	13 6 8
80	0 16 8	460	4 15 10	1,900	13 19 2
90	0 18 9	470	4 17 11	2,000	14 11 8
100	1 0 10	480	5 0 0	2,100	15 4 2
110	1 2 11	490	5 2 1	2,200	15 16 8
120	1 5 0	500	5 4 2	2,300	16 9 2
130	1 7 1	520	5 6 8	2,400	17 1 8
140	1 9 2	540	5 9 2	2,500	17 14 2
150	1 11 3	560	5 11 8	2,600	18 6 8
160	1 13 4	580	5 14 2	2,700	18 19 2
170	1 15 5	600	5 16 8	2,800	19 11 8
180	1 17 6	620	5 19 2	2,900	20 4 2
190	1 19 7	640	6 1 8	3,000	20 16 8
200	2 1 8	660	6 4 2	3,100	21 9 2
210	2 3 9	680	6 6 8	3,200	22 1 8
220	2 5 10	700	6 9 2	3,300	22 14 2
230	2 7 11	720	6 11 8	3,400	23 6 8
240	2 10 0	740	6 14 2	3,500	23 19 2
250	2 12 1	760	6 16 8	3,600	24 11 8
260	2 14 2	780	6 19 2	3,700	25 4 2
270	2 16 3	800	7 1 8	3,800	25 16 8
280	2 18 4	820	7 4 2	3,900	26 9 2
290	3 0 5	840	7 6 8	4,000	27 1 8
300	3 2 6	860	7 9 2	4,100	27 14 2
310	3 4 7	880	7 11 8	4,200	28 6 8
320	3 6 8	900	7 14 2	4,300	28 19 2
330	3 8 9	920	7 16 8	4,400	29 11 8
340	3 10 10	940	7 19 2	4,500	30 4 2
350	3 12 11	960	8 1 8	4,600	30 16 8
360	3 15 0	980	8 4 2	4,700	31 9 2
370	3 17 1	1,000	8 6 8	4,800	32 1 8
380	3 19 2	1,100	8 19 2	4,900	32 14 2
390	4 1 3	1,200	9 11 8	5,000	33 6 8

For every additional 100ozs. the charge is increased by 12s. 6d.

NOTE.—Additional charges (see Regulation No. 6) are collected when base metals in a deposit exceed 2 per cent. of its weight.

The following table illustrates the operation of these charges in case of gold of the value of £3 17s. 10½d. an ounce:—

Weight of Deposit.	Rate of Charge per ounce.	Amount of Charge.	Net Value of Deposit.
ozs.	d.	£ s. d.	£ s. d.
50	2·5	0 10 5	194 3 4
100	2·5	1 0 10	388 6 8
600	2·3	5 16 8	2,330 8 4
1,000	2·0	8 6 8	3,885 8 4
5,000	1·6	33 6 8	19,435 8 4
10,000	1·55	64 11 8	38,872 18 4

NOTE.—A proportion of silver in deposits of gold is paid for by the Mint as follows:—

In deposits under 1,000ozs. gross: all silver in excess of 8 per cent. of the weight of the deposit after melting.

“ from 1,000 „ to 5,000 „ „ 6 „ „ „ „

“ „ 5,000 „ to 10,000 „ „ 5 „ „ „ „

“ „ 10,000 „ upwards „ „ 4 „ „ „ „

The rate at which payment for silver is made is liable to fluctuation.

GOLD ESCORT SERVICE.

Table of Rates fixed by the Commissioner of Police.

From	To	Period.	Rate per Ounce.	Remarks.
Abbotts ... ..	Nannine ... ..	Monthly ...	d. 1	
Australia United Mine ... ..	Malcolm ... ..	Do. ...	1½	
Burbanks ... ..	Coolgardie ... ..	Fortnightly	0½	
Burtville ... ..	Malcolm ... ..	Monthly ...	0½	Not less than 1,000ozs.
Do. ... ..	Laverton ... ..	Every two months	...	Actual cost: 19s. 3d.
Coolgardie ... ..	Perth ... ..	Fortnightly	0½	On all gold for the Mint.
Cork Tree ... ..	Lawlers ... ..	Monthly ...	1	Or if escort is specially provided, cost £4 6s. 6d.
Cosmopolitan Proprietary, Ltd. ...	Kalgoorlie ... ..	Do. ...	1	
Cue ... ..	Geraldton ... ..	Do. ...	1	
Field's Find ... ..	Yalgoo ... ..	Do. ...	3½	
Geraldton ... ..	Perth ... ..	Do. ...	2	
Kalgoorlie ... ..	Do. ... ..	Fortnightly	0½	Special for Mint only.
Kanowna ... ..	Kalgoorlie ... ..	Do. ...	0½	
Kathleen Valley ... ..	Lawlers ... ..	Monthly ...	0½	
King of the Hills ... ..	Kalgoorlie ... ..	Do. ...	2	
Laverton ... ..	Malcolm ... ..	Do. ...	0½	Not less than 2,900ozs.
Lawlers ... ..	Leonora or Malcolm	Do. ...	1½	4,000ozs. to 4,500ozs.
Do. ... ..	Do. do.	Do. ...	1½	Exceeding 4,500ozs.
Leinster G.M. Co. ... ..	Lawlers ... ..	Do. ...	...	Actual cost: £2 10s. 4d.
Mt. Sir Samuel ... ..	Do. ... ..	Do. ...	0½*	Not less than 1,600ozs. or actual cost if under minimum quantity.
Malcolm ... ..	Kalgoorlie ... ..	Do. ...	0½	Not less than 7,800ozs.
Morgans ... ..	Malcolm ... ..	Do. ...	0½	Not less than 4,300ozs.
Munara Gully ... ..	Nannine ... ..	Do. ...	0½	
Nannine ... ..	Cue ... ..	Do. ...	1	Under 2,000ozs.
Do. ... ..	Do. ... ..	Do. ...	0½	2,000ozs. to 3,000ozs.
Norseman ... ..	Coolgardie ... ..	Do. ...	2	
Peak Hill ... ..	Nannine ... ..	Do. ...	2½†	2,000ozs. and not exceeding 2,500ozs.
Do. ... ..	Do. ... ..	Do. ...	2 †	2,500ozs. and not exceeding 3,000ozs.
Do. ... ..	Do. ... ..	Do. ...	1½†	Over 3,000ozs.
Ravensthorpe ... ..	When quantity under minimum, actual cost charged.			
Do. ... ..	Hopetoun ... ..	Do. ...	...	Under 500ozs.: Actual cost.
Do. ... ..	Do. ... ..	Do. ...	1½	Not less than 500ozs.
Do. ... ..	Do. ... ..	Do. ...	0½	Not less than 1,000ozs.
Sandstone ... ..	Magnet ... ..	Do. ...	...	Actual cost.
Wiluna ... ..	Malcolm ... ..	Do. ...	3½	Not less than 2,000ozs.
Do. ... ..	Lawlers ... ..	Do. ...	...	Actual cost: £19 4s.
Yalgoo ... ..	Geraldton ... ..	Do. ...	0½	
Yerilla ... ..	Kalgoorlie ... ..	Do. ...	1½	

\* If gold conveyed by regular escort from Wiluna, the rate per hour of pay, etc., of constable in charge will be collected.  
 † When quantity under minimum actual cost charged.

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 100oz 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:—

474138190(.805)	.805 × £3 17s. 10½d. =
3792.8	.805 × £3.894
	.805
26200	
23705	19470
	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.

J. F. CAMPBELL,  
Deputy Master.

6th February, 1908.