

WESTERN AUSTRALIA.

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REPORT

OF THE

DEPARTMENT OF MINES

FOR THE YEAR

1909.

1910.

WESTERN AUSTRALIA.

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# REPORT

OF THE

# DEPARTMENT OF MINES

FOR THE YEAR

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

PERTH:

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

1910.



Hon. H. Gregory, M.L.A.  
Minister for Mines  
1910

# MAP OF WESTERN AUSTRALIA

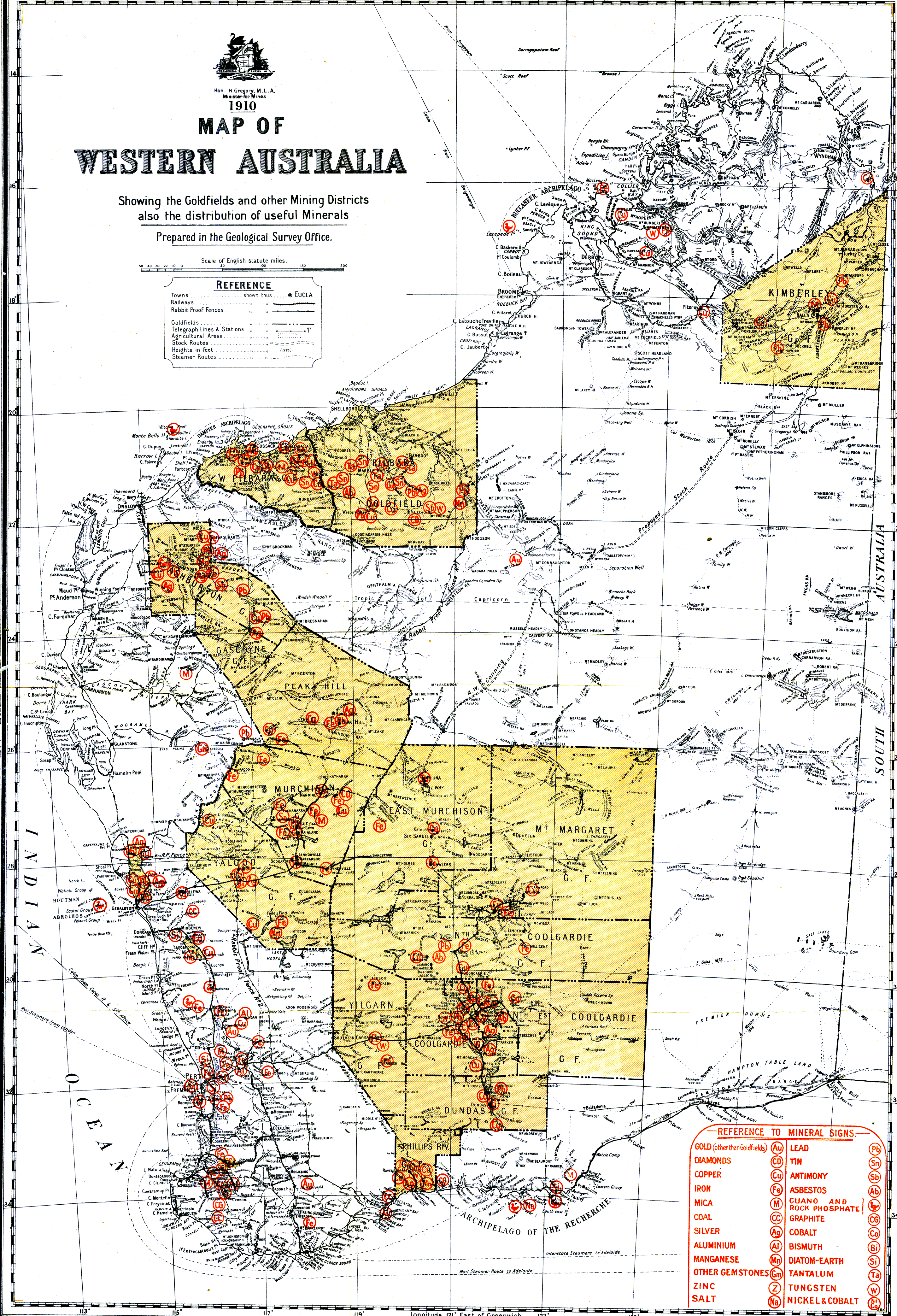
Showing the Goldfields and other Mining Districts  
also the distribution of useful Minerals

Prepared in the Geological Survey Office.

Scale of English statute miles.

## REFERENCE

- Towns ..... shown thus ..... ● EUCLA
- Railways ..... ————
- Rabbit Proof Fences ..... ————
- Goldfields ..... ————
- Telegraph lines & Stations ..... ————
- Agricultural Areas ..... ————
- Stock Routes ..... ————
- Heights in feet ..... (1000)
- 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	CC	GRAPHITE	Cg
SILVER	Ag	COBALT	Co
ALUMINIUM	Al	BISMUTH	Bi
MANGANESE	Mn	DIAMON-EARTH	Di
OTHER GEMSTONES	Gm	TANTALUM	Ta
ZINC	Z	TUNGSTEN	W
SALT	Na	NICKEL & COBALT	Ni Co

# ANNUAL REPORT OF THE DEPARTMENT OF MINES, WESTERN AUSTRALIA, 1909.

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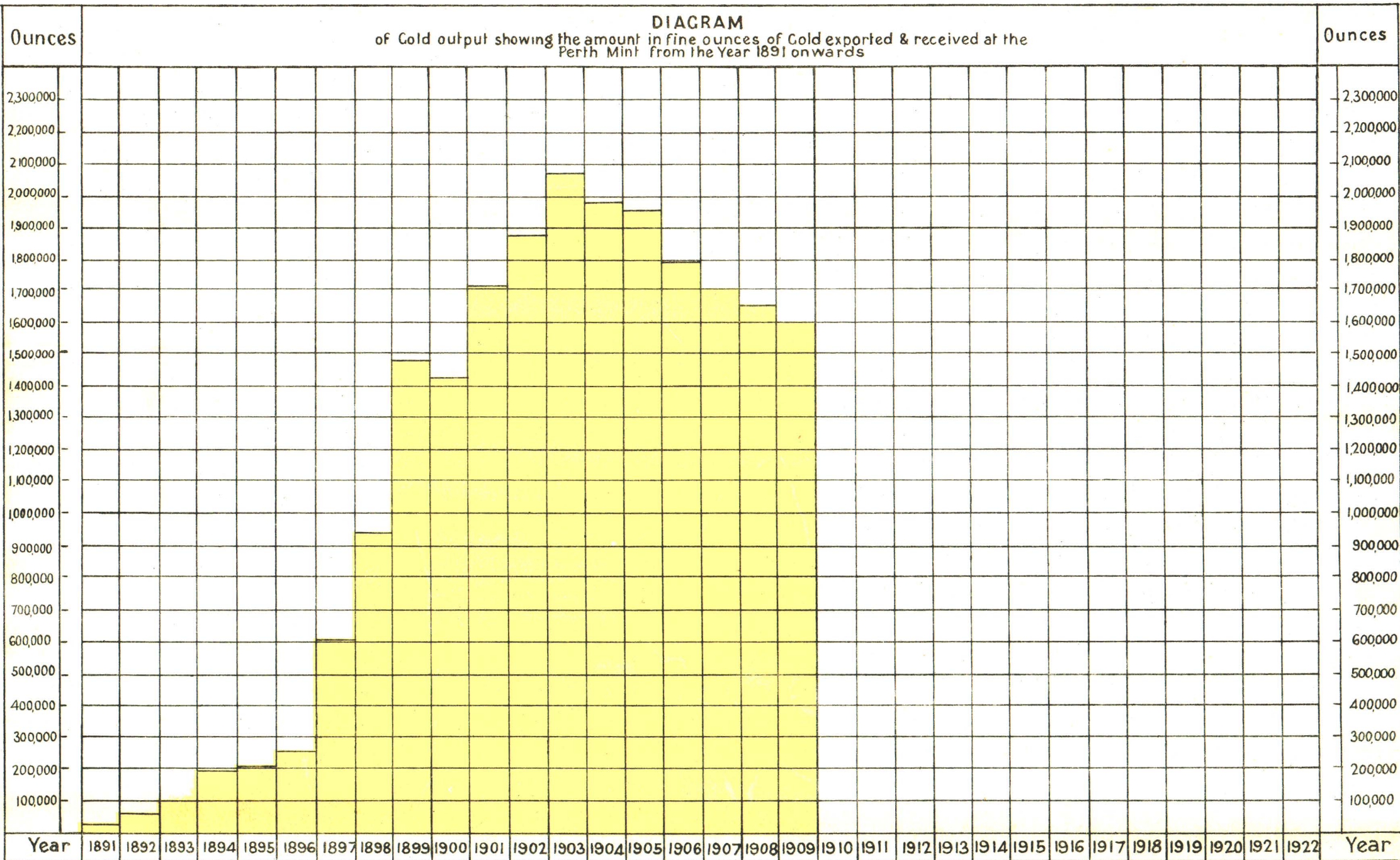
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COMMONWEALTH OF AUSTRALIA.

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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 1909.**

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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 1909, 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, 1910

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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 1909 was £7,059,052, being £185,951 less than that for the previous year. The principal decreases were in gold and tin. Gold fell off to the extent of £223,608, and tin £17,636.

The principal increases were in copper and coal, the former by £47,553 and the latter by £15,271. It will be noted that in Table I. the figures quoted for 1908 differ in some instances from those given in that year's report in the same Table. The reason is that the Customs, from whom these data are obtained, revised their figures after the Report had gone to press. The value of the gold yield was £6,776,274, being 95.99 per cent. of the total output. The value of the copper output was £104,644, and of tin £65,959. The low price ruling for the latter metal is accountable for the falling off. The dividends paid during the year by mining companies amounted to £1,359,115, a decrease of £128,202 as compared with the preceding year. To the end of 1909 the value of the total mineral production was £94,941,161, the total gold production was £91,780,565, while the dividends amounted to £20,323,010.

#### GOLD.

The gold yield, as in the previous year, again shows a decrease, the output being 52,642 fine ounces less than that for 1908; while the output for that year was 49,643 ounces less than that for 1907. The average value per ton of ore treated in the State as a whole has fallen from 43.58 shillings in 1908 to 42.60 shillings in 1909, and in the East Coolgardie field, from which comes over 50 per cent. of the State's yield, from 44.94 shillings to 43.76 shillings. Comparing the tonnages of ore treated in the years 1908 and 1909, there is an increase of 23,180 tons in the latter year, during which 3,105,004 tons were treated. The largest in-

creases were in the East Coolgardie and Peak Hill Goldfields, the excess of ore treated over the previous year being in the case of the former 64,553 tons, and in the latter 18,963 tons. Murchison, Coolgardie, and North Coolgardie show the largest decreases, viz., 54,294, 11,831, and 11,799 tons respectively. As in previous years, the fall in the gold production of some of the fields is attributable to a decline in one or two mines; as an example the decrease of 24,742 ounces in the Murchison field is exceeded by the difference in production from the Great Fingall Mine for the years 1908 and 1909, viz., 40,315 ounces. Eight fields show an increase over the previous year's figures, viz., Ashburton, Dundas, East Coolgardie, East Murchison, Mount Margaret, Phillips River, West Pilbara, and Yalgoo. In the others the yield has declined, the most marked decreases being in the Murchison, North Coolgardie, and Coolgardie fields.

The area held under mining lease for all minerals increased from 58,140 acres in 1908 to 59,245 acres in 1909. The area held for gold mining is greater by 2,112 acres than in 1908, but for minerals the area has decreased by 1,007 acres. The acreage held under prospecting areas is 25,645 acres, including 14,180 acres for coal and oil. This shows a decrease on the area held in 1908 of 10,986 acres.

The number of men engaged in all classes of mining is 18,336, an increase of 1,070 as compared with the previous year. The number of men engaged in mining for minerals other than gold increased by 118, principally in copper and coal mines, tin mines showing a decrease. In gold mining there was an increase of 952. The average value of gold produced per man employed on gold mines has decreased from £443.80 in 1908 to £413.17 in 1909. The average tonnage raised per man was 193.98 tons, and in the preceding year 203.69 tons. Throughout the East Murchison Goldfield there has been steady progress, and the commencement of operations at the State Battery at Youanme has resulted in great benefit to the prospectors. A State plant is in course of erection at Mount Sir Samuel, and it is felt that this course will be amply justified. The completion of the railway from Magnet to Sandstone will also do much to promote the mining industry in the district. The output of this goldfield was greater than in the previous year by 11,117 ounces.

In the Murchison Goldfield the Cue and Day Dawn centres showed decreases totalling 43,406 ounces, but the Nannine and Mt. Magnet centres showed increases of 12,172 and 6,492 ounces respectively, the former being largely due to the continued prosperity of Meekatharra. The decrease in the Day Dawn District is principally attributable to the lessened output from the Great Fingall Mine.

The production of the Mount Margaret field is greater than the preceding year by 2,268 fine ounces, and the Lancefield Mine having resumed operations

it is anticipated that an increased output will be recorded in the coming year. The Coolgardie goldfield again shows a decrease in output amounting to 5,894 ounces, which is almost entirely attributable to the closing down of the Westralia East Extension Mine at Bonnievale, but it is hoped and anticipated that operations will be shortly resumed. The various centres of this field give promise of a brighter future.

The North Coolgardie field, which in 1908 showed an increase over the preceding year, this year shows a decrease of 11,853 ounces, the greatest falling off being in the Ularring district. Notwithstanding this falling off the outlook in most of the centres is promising.

The North-East Coolgardie goldfield again shows a decrease, the production being 1,611 ounces less than in 1908. No developments of any note transpired during the year.

The Broad Arrow goldfield shows a decrease of 1,308 ounces as compared with 1908. In the older centres of the field matters have been very quiet, little or no development work having been done. In the Siberia centre, on the other hand, vigorous prospecting has been pursued and developments are most promising. From Lease No. 1345W (formerly prospecting area No. 251W), the owners in the month of September recovered 1,225 ounces from 65 tons of ore. In the previous year a very rich crushing from the same property was chronicled. The future of this portion of the field is most promising.

In the East Coolgardie goldfield the number of men engaged in mining was 6,114; and in 1908, 5,677. This goldfield gave employment to about 35 per cent. of the number of men employed in gold mining in the State, and produced during the year 1909 899,289 fine ounces, about 57 per cent. of the reported yield. The tonnage treated during the year was 1,740,779 tons, being greater than in 1908 by 64,553 tons. The average grade of the ore fell from 44.94 shillings in 1908, to 43.76 shillings in 1909, but the output shows an increase of 8,516 ounces as compared with the production for 1908. This increase would have been larger, but for a disastrous fire which destroyed most of the plant on the Great Boulder Perseverance Mine in the month of November, and caused a considerable depreciation in the monthly output. Splendid developments in depth at some of the large mines were recorded, and the prospects of the field are as good as ever.

The output of the Yilgarn field shows a decrease on the preceding year of 1,254 ounces, but vigorous prospecting has been pursued throughout the whole field, with results that justify predictions of a brighter future.

The Dundas goldfield again shows an increase in production, the figures for 1909 being 905 ounces greater than for 1908. Improvements in development and contemplated additions to plant are expected to result in increased prosperity to this field.

The Phillips River field, as in 1908, shows an increased gold output, the yield for the year being 2,309 ounces greater than in the preceding one. The output of copper also increased by 5,315 tons, valued at £20,582. The completion of the railway from Hopetoun early in the year has effected a considerable reduction in the costs of mining and smelting with resultant prosperity.

In the Northern goldfields, Kimberley, Pilbara, West Pilbara, Ashburton, and Gasecoyne, nothing of any importance transpired. The railway from Port Hedland to Marble Bar is now in course of construction, and the coming year should consequently see an improvement in the Pilbara field.

#### TIN.

The quantity of tin exported was less than in 1908 by 395 tons, valued at £17,636. The Greenbushes Mineral Field was the largest producer, with the Pilbara goldfield next, but both produced less than in 1908.

#### TANTALITE.

About £327 worth of this mineral was reported as having been raised in the Greenbushes and Pilbara fields, but none was exported consequent on the entire absence of any market.

#### COPPER.

The value of copper exported was greater than in 1908 by 4,810 tons, valued at £47,553. The greatest increase was in the West Pilbara field, which produced 7,136 tons, valued at £62,447, an excess of 5,650 tons, valued at £44,756, over the preceding year. The output from Phillips River was 7,331 tons, valued at £29,815, being greater than in 1908 by 5,315 tons, valued at £20,582. Other fields producing were the Nannine district of the Murchison goldfield, 608 tons, valued at £2,823, and the Ashburton goldfield, 11 tons, valued at £259. The average number of men engaged in copper mining was 497, and in 1908, 283.

#### COAL.

Six collieries are working on the Collie coalfield, and the output for the year was 214,302 tons, being 39,054 tons greater than the preceding year, and the record output to date. The continued increase in the output is attributable to the improved bunkering trade and also in a measure to the regrettable strike in the coal mines of New South Wales. The number of men employed, 394, is greater by 114 than in 1908, and the output per man was, 1908, 626 tons, 1909, 544 tons.

#### OTHER MINERALS.

The quantity of silver obtained as a bye-product and exported was 176,843 ounces, valued at £18,778, and for the preceding year 168,455 ounces, valued at £18,877. No ironstone or limestone was mined during the year. Three tons of asbestos, valued at £154, were raised in the Pilbara field.

#### MINING GENERALLY.

As in the previous year, Western Australia is not the only Australian State recording a reduced gold output. Excepting the territory of Papua, all the others report a falling off. Notwithstanding this the mines on the whole are looking well. The year under review witnessed considerable improvement in some, and a brightening in the prospects of others. The reverse was the case in very few instances. Large payable ore bodies, which were undiscovered twelve months ago, are now being opened up in several of the principal mines, and prospecting at greater depth has proved that the lodes live and maintain their values. There is every justification for regarding the future with confidence,

and for recording the conviction that with fair encouragement in the work of development an even more prosperous era than the industry has yet experienced is dawning. Practically no outside capital to assist mining operations has been introduced for several years past, which naturally militates against any very rapid development, as the limited population of this State can scarcely be expected to find sufficient capital for the proper exploitation of such an immense metalliferous territory. The enormous land settlement which is taking place is doubtless responsible for diverting a good deal of attention from mining. Every effort is made to render encouragement and assistance to the bona fide prospector by the loans of equipment and means

of transport, and the area held under Prospecting Areas for gold and minerals, viz., 12,465 acres, is an indication that prospectors are not idle. The liberal assistance rendered under the provisions of the Mining Development Act, which is detailed in the report of the State Mining Engineer, and which aims at assisting the development of partly opened up mines principally by their equipment with machinery is further proof of the desire of the Government to assist the industry. Considerable portions of the old and easily accessible fields are still unprospected, whilst the small amount of prospecting that has taken place in remote and practically inaccessible portions of the State leaves room for great possibilities.

## PART II.—MINERALS RAISED.

TABLE I.

*Quantity and Value of all the Minerals produced during 1908 and 1909.*

Description of Minerals.	1908.		1909.		Increase or Decrease for Year compared with 1908.			
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.		
1. Asbestos (raised), statute tons ... ..	40	£ 1,600	3	£ 154	-	37	-	1,446
2. Coal (raised) do. ... ..	175,248	75,694	214,302	90,965	+	39,054	+	15,271
3. Copper { Ore (exported), statute tons ...	2,503	29,272	6,959	59,541	+	4,456	+	30,269
{ Ingot, Matte, etc. (exported), statute tons	479	27,819	833	45,103	+	354	+	17,284
4. Gold (exported and minted), fine ounces...	1,647,911	6,999,882	1,595,269	6,776,274	-	52,642	-	223,608
5. Mica (exported), statute tons ... ..	...	10	...	...	-	...	-	10
6. Silver (exported), fine ounces ... ..	168,455	18,877	176,843	18,778	+	8,388	-	99
7. Silver Lead Ore (exported), statute tons	518	5,006	211	1,199	-	307	-	3,807
8. Tantalite (exported), statute tons ...	...	400	...	...	-	...	-	400
9. Tin, Ore and Ingot (exported), statute tons	1,093	83,595	698	65,959	-	395	-	17,636
10. Wolfram (exported), statute tons ... ..	...	...	1	100	+	1	+	100
11. Zinc, Spelter, etc. (exported), statute tons	11	98	19	244	+	8	+	146
Unenumerated (exported) ... ..	...	2,750	...	735	-	...	-	2,015
Total Values ... .. £	...	7,245,003	...	7,059,052	...	...	-	185,951

Some of the figures in this table for 1908 differ from the corresponding ones published in last year's Report, for the reason that the Customs, from whom

these data are obtained, revised their figures after our Annual Report had gone to press.

**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 1909.**

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

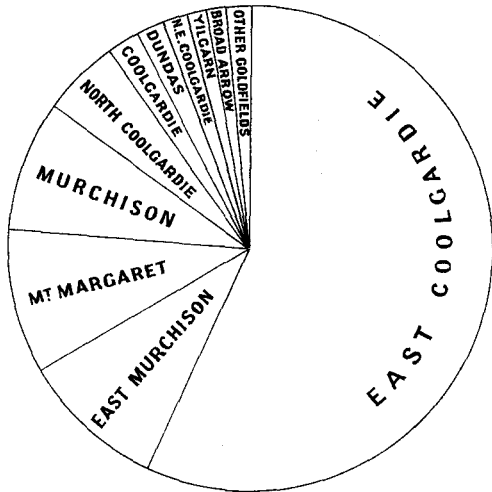


Fig. 2 Gold produced from various Goldfields as given by the Export and Mint Returns.

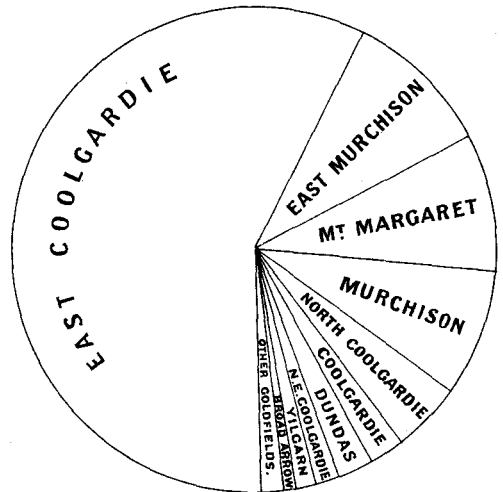


Fig. 3 Value of Gold and other Minerals.

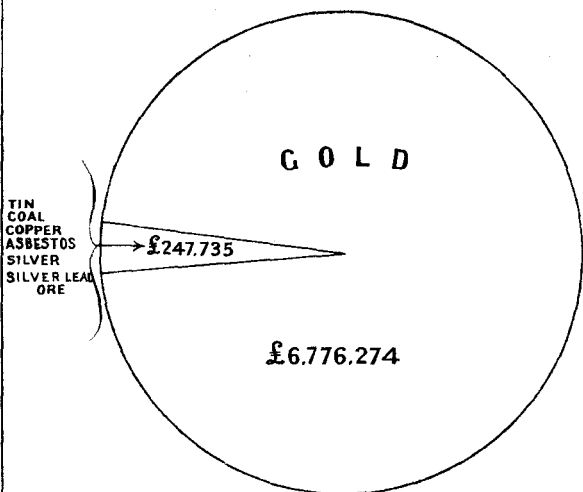


Fig. 4 Value of Minerals other than Gold.

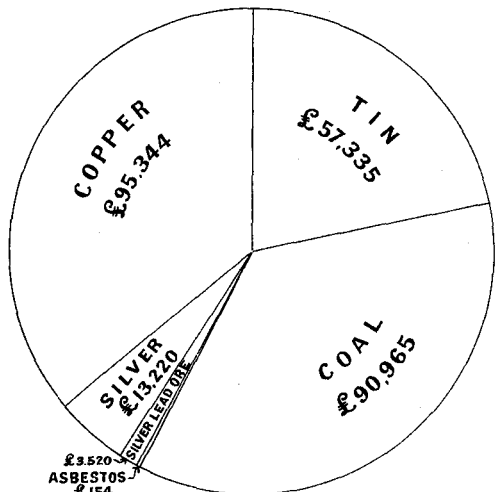


Fig. 5 Areas of Land leased for Goldmining on various Goldfields.

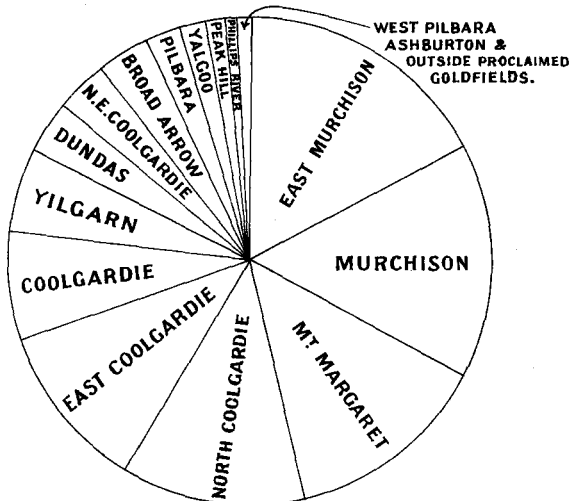


Fig. 6 Output of Gold in the States of Australia and the Colony of New Zealand.

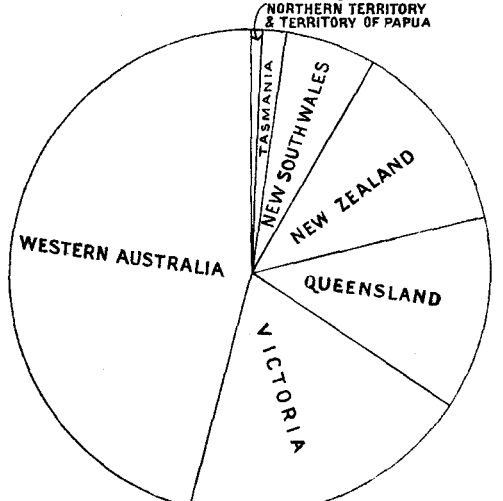


TABLE 2.

Summary of Gold Exported and received at the Perth Branch of the Royal Mint during 1908 and 1909, 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.					
	1908.	1909.	1908.	1909.	Percentage for each Goldfield.		Average Value of Gold per ton of Ore treated.	
					1908.	1909.	1908.	1909.
	fine ozs.	fine ozs.	fine ozs.	fine ozs.			shillings.	shillings.
1. Kimberley ... ..	338	169	150	135	·01	·01	38·37	...
2. Pilbara ... ..	8,172	5,529	6,966	6,764	·43	·43	155·66	134·33
3. West Pilbara ... ..	1,077	1,396	1,006	1,540	·06	·10	35·07	...
4. Ashburton ... ..	46	228	162	436	·01	·03	...	...
5. Gascoyne ... ..	32	7	...	...	...	...	...	...
6. Peak Hill ... ..	9,864	7,322	7,980	7,919	·50	·51	13·17	9·25
7. East Murchison ... ..	147,729	148,237	144,792	155,909	9·07	9·89	37·88	39·30
8. Murchison ... ..	157,024	131,850	157,848	133,106	9·89	8·45	41·38	41·81
9. Yalgoo ... ..	457	627	551	1,805	·03	·12	32·70	44·29
10. Mt. Margaret ... ..	167,204	160,038	153,597	155,865	9·62	9·89	38·53	38·30
11. North Coolgardie ... ..	83,402	73,021	91,251	79,399	5·72	5·04	64·36	61·95
12. Broad Arrow ... ..	11,560	11,575	18,480	17,122	1·15	1·09	57·72	40·80
13. North-East Coolgardie ... ..	24,827	26,341	27,073	25,462	1·70	1·62	41·65	38·97
14. East Coolgardie ... ..	925,686	927,074	890,773	899,289	55·81	57·05	44·94	43·76
15. Coolgardie ... ..	41,854	36,663	40,029	34,135	2·51	2·11	46·12	46·95
16. Yilgarn ... ..	20,866	21,163	22,163	20,909	1·39	1·3	34·82	40·01
17. Dundas ... ..	41,203	35,895	28,644	29,549	1·80	1·88	57·71	49·74
18. Phillips River ... ..	4,600	7,632	4,405	6,714	·28	·43	55·95	88·34
State generally ... ..	1,970	502	271	348	·02	·02	...	...
Totals and averages ...	1,647,911	1,595,269	1,596,091	1,576,406	100·00	100·00	43·58	42·60

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 Ashburton, Dundas, East Coolgardie, East Murchison, Mount Margaret, Phillips River, West Pilbara, and Yalgoo fields each show an increase; the others decreases. The average value per ton of ore treated is 42.60 shillings as against 43.58 shillings in 1908.

TABLE 3.

Number of Gold-producing Mines in the several Goldfields and Districts during 1908 and 1909.

Goldfield.	District.	1908.		1909.		Increase or Decrease.
		District.	Goldfield.	District.	Goldfield.	
Kimberley ... ..	...	...	1	...	...	- 1
Pilbara ... ..	Marble Bar ... ..	12	25	10	29	+ 4
	Nullagine ... ..	13		19		
West Pilbara ... ..	...	...	6	...	5	- 1
Ashburton ... ..	...	...	...	...	...	...
Gascoyne ... ..	...	...	...	...	...	...
Peak Hill ... ..	...	...	9	...	9	=
East Murchison ... ..	Lawlers ... ..	49	102	46	119	+ 17
	Black Range ... ..	53		73		
	Cue ... ..	67		62		
Murchison ... ..	Nannine ... ..	66	188	80	200	+ 12
	Day Dawn ... ..	10		12		
	Mt. Magnet ... ..	45		46		
Yalgoo ... ..	...	...	10	...	14	+ 4
Mt. Margaret ... ..	Mt. Morgans ... ..	21	116	18	110	- 6
	Mt. Malcolm ... ..	48		49		
	Mt. Margaret ... ..	47		43		
North Coolgardie ... ..	Menzies ... ..	59	170	54	167	- 3
	Ularring ... ..	32		39		
	Niagara ... ..	31		30		
	Yerilla ... ..	48		44		
Broad Arrow ... ..	...	...	52	...	48	- 4
North-East Coolgardie ... ..	Kanowna ... ..	45	49	47	53	+ 4
	Kurnalpi ... ..	4		6		
East Coolgardie ... ..	East Coolgardie ... ..	99	114	94	112	- 2
	Bulong ... ..	15		18		
Coolgardie ... ..	Coolgardie ... ..	67	90	67	89	- 1
	Kunanalling ... ..	23		22		
Yilgarn ... ..	...	...	39	...	48	+ 9
Dundas ... ..	...	...	37	...	44	+ 7
Phillips River ... ..	...	...	26	...	25	- 1
Totals ... ..	...	...	1,034	...	1,072	+ 8

TABLE 4.

Increase or Decrease in Output of certain producing Gold Mines in 1909, as compared with 1908.

Goldfield.	District.	Name of Mine.	Production.		Increase or Decrease for Year, compared with 1908.
			1908.	1909.	
Peak Hill	...	1. Peak Hill Goldfield, Ltd.	Fine ozs. 7,199-77	Fine ozs. 7,097-70	Fine ozs. - 102-07
East Murchison	Lawlers	2. Bellevue, Ltd.	6,715-13	11,835-78	+ 5,120-65
Do.	do.	3. Gwalia Consolidated, Ltd.	17,213-85	21,994-46	+ 4,780-61
Do.	do.	4. Northern Mines, Ltd.	18,802-94	21,600-98	+ 2,798-04
Do.	do.	5. Vivien G.M. Co., Ltd.	12,996-22	10,602-10	- 2,394-12
Do.	Black Range	6. Black Range Kohinoor G.M. Co., (N.L.	2,581-83	1,078-73	- 1,503-10
Do.	do.	7. Black Range Mining Co., N.L.	19,850-06	22,054-45	+ 2,204-39
Do.	do.	8. Havilah G.M. Co., N.L.	6,129-96	4,965-23	- 1,164-73
Do.	do.	9. Oroya Black Range, Ltd.	30,460-95	31,932-37	+ 1,521-42
Do.	do.	10. Juno: Sandstone Development G.M. Co., N.L.	2,829-82	4,232-12	+ 1,402-30
Murchison	Cue	11. Barrambie Ranges G.M. Co., N.L.	2,885-62	3,256-08	+ 370-46
Do.	do.	12. Princess Royal leases	706-92	3,078-04	+ 2,371-12
Do.	Nannine	13. Fenian	6,265-25	14,510-05	+ 8,244-80
Do.	do.	14. Ingliston Extended G.Ms., Ltd.	6,338-64	4,025-94	- 2,312-70
Do.	do.	15. Marmont	6,065-94	7,015-98	+ 950-04
Do.	do.	16. Kohinoor South G.M. Co., Ltd.	...	2,357-60	+ 2,357-60
Do.	do.	17. Karangahaki	1,174-21	3,963-87	+ 2,789-66
Do.	Day Dawn	18. Great Fingall Consolidated, Ltd.	81,584-63	41,269-16	- 40,315-46
Do.	Mt. Magnet	19. Great Boulder No. 1, Ltd.	4,201-46	6,123-80	+ 1,922-34
Mt. Margaret	Mt. Morgans	20. Mt. Morgans Transvaal G.Ms., Ltd.	1,099-89	33-59	- 1,066-31
Do.	do.	21. Westralia Mt. Morgans G.Ms. Co., Ltd.	16,316-63	14,993-18	- 1,323-45
Do.	do.	22. Proprietary Extended leases	4,403-36	5,402-49	+ 999-13
Do.	Mt. Malcolm	23. Malcolm Prospecting Co., N.L.	2,159-17	3,186-15	+ 1,026-98
Do.	do.	24. Sons of Gwalia, Ltd.	55,587-04	61,266-25	+ 5,679-21
Do.	do.	25. Sons of Gwalia South G.Ms., Ltd.	14,377-10	11,534-51	- 2,842-59
Do.	Mt. Margaret	26. Ida H. G.M. Co., Ltd.	7,662-68	8,447-25	+ 784-57
Do.	do.	27. Lancefield G.M. Co., Ltd.	14,460-23	19,458-08	+ 4,997-85
Do.	do.	28. Mikado G.M. Co., Ltd.	2,355-22	...	- 2,355-22
North Coolgardie	Menzies	29. Menzies Consolidated G.Ms., Ltd.	10,691-98	10,875-70	+ 183-72
Do.	do.	30. Menzies G.M. leases	3,162-97	2,325-91	- 837-06
Do.	do.	31. Mt Ida Meteor	2,435-10	669-14	- 1,765-96
Do.	Ularring	32. Golden Pole G.Ms., Ltd.	7,873-58	5,914-41	- 1,959-17
Do.	do.	33. Lady Gladys G.M. Co., N.L.	1,770-69	2,438-47	+ 667-78
Do.	do.	34. Westralia Waihi G.Ms., N.L.	3,124-12	424-95	- 1,699-17
Do.	Niagara	35. Englishman: Cosmopolitan Proprietary, Ltd.	10,336-36	5,592-54	- 4,743-82
Do.	do.	36. Orion Mines, Ltd.	2,535-61	3,859-96	+ 1,324-35
Broad Arrow	...	37. Siberia Consols	...	1,134-59	+ 1,134-59
Do.	...	38. Slippery Gimblet	832-93	2,675-40	+ 1,842-47
N.E. Coolgardie	Kanowna	39. Gentle Polly	2,044-34	1,606-83	- 437-51
Do.	do.	40. North White Feather G.Ms., Ltd.	9,775-89	9,874-68	+ 98-79
Do.	do.	41. (Queen Margaret G.M. Co., Ltd.) Melton G.M. Co., N.L.	2,929-60	880-45	- 2,049-15
Do.	do.	42. White Feather Main Reef (1906), Ltd.	2,174-71	2,144-75	- 29-96
East Coolgardie	East Coolgardie	43. Associated G.Ms. of W.A., Ltd.	60,480-63	58,967-87	- 1,512-76
Do.	do.	44. Associated Northern Blocks (W.A.), Ltd.	25,015-49	17,187-65	- 7,827-84
Do.	do.	45. Golden Horseshoe Estates Co., Ltd.	145,469-75	142,872-93	- 2,596-82
Do.	do.	46. Golden Ridge G.M. Co., N.L.	14,424-45	16,126-59	+ 1,702-14
Do.	do.	47. Great Boulder Perseverance G.M. Co., Ltd.	71,025-63	70,680-87	- 344-76
Do.	do.	48. Great Boulder Proprietary G.Ms., Ltd.	136,579-03	140,828-78	+ 4,249-75
Do.	do.	49. Hainault G.Ms., Ltd.	19,084-60	20,206-90	+ 1,122-30
Do.	do.	50. Ivanhoe Gold Corporation, Ltd.	117,855-76	117,589-26	- 266-50
Do.	do.	51. Kalgurli G.Ms., Ltd.	81,970-70	78,936-74	- 3,033-96
Do.	do.	52. Lake View Consols, Ltd.	36,115-51	39,167-53	+ 3,052-02
Do.	do.	53. Oroya Brownhill Co., Ltd.	45,194-41	61,425-63	+ 16,231-22
Do.	do.	54. South Kalgurli G.Ms., Ltd.	34,948-38	35,401-70	+ 453-32
Do.	do.	55. Golden Zone leases	7,380-86	13,730-49	+ 6,349-63
Do.	do.	56. Hannan's Reward, Ltd.	3,149-81	6,380-61	+ 3,230-80
Coolgardie	Coolgardie	57. Burbanks Birthday G.Ms., Ltd.	3,110-81	1,725-87	- 1,384-94
Do.	do.	58. Burbanks Main Lode (1904), Ltd.	7,987-57	6,676-30	- 1,311-27
Do.	do.	59. Redhill Westralia G.Ms., Ltd.	2,575-25	1,266-15	- 1,309-10
Do.	do.	60. Westralia and East Extension Mines, Ltd.	5,353-19	526-87	- 4,826-32
Do.	do.	61. Bayley's leases	761-66	1,432-30	+ 670-64
Do.	do.	62. Tindal's Coolgardie G.M. Co. N.L.	2,448-12	4,332-27	+ 1,884-15
Do.	Kunanalling	63. Carbine	1,657-26	531-00	- 1,126-26
Yilgarn	...	64. British and Foreign Development Syndicate, Ltd.	4,550-19	5,332-55	+ 782-36
Do.	...	65. Never Never	4,369-94	2,161-76	- 2,208-18
Do.	...	66. Greenmount Mines, N.L.	3,131-39	1,490-94	- 1,640-45
Dundas	...	67. Cumberland G.M. Co., N.L.	7,137-61	3,428-91	- 3,708-70
Do.	...	68. Mararoa G.M. Co., N.L.	8,188-08	12,749-79	+ 4,561-71
Do.	...	69. Princess Royal G.M. Co., N.L.	3,221-58	2,164-47	- 1,057-11
Phillips River	...	70. Flag Gold and Copper Mining Co., Ltd.	1,127-82	2,060-69	+ 932-87
Totals			1,266,427-87	1,263,167-13	- 3,260-74

Of the above 70 gold mines, 33 produced 104,056-52 fine ounces less, and 37 produced 100,795-78 fine ounces more than in 1908, being a net decrease of fine ounces 3,260-74.

TABLE 5.

*Averages of Gold Ore raised and treated, and Gold produced therefrom, per man employed on the several Goldfields of the State, during 1908 and 1909.*

Goldfield.	1908.				1909.			
	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 ... ..	...	130'00	...	58'71	...	...	...	...
2. Pilbara ... ..	49'43	22'40	90'57	41'04	43'16	20'49	68'24	32'39
3. West Pilbara ... ..	68'36	35'81	28'22	14'78	123'30	21'38	504'42	84'07
4. Ashburton ... ..	...	...	...	...	...	...	...	...
5. Gascoyne ... ..	...	...	...	...	...	...	...	...
6. Peak Hill ... ..	944'14	392'76	146'31	60'87	2,001'71	680'58	217'85	74'07
7. East Murchison ... ..	356'00	190'92	158'72	85'12	314'38	174'97	145'44	80'94
8. Murchison ... ..	375'34	201'70	182'80	98'24	266'66	153'57	131'22	75'57
9. Yalgoo ... ..	38'93	18'79	14'98	7'23	114'04	55'05	59'45	28'70
10. Mt. Margaret ... ..	319'45	176'67	144'85	80'11	314'89	177'38	141'99	79'97
11. North Coolgardie ... ..	124'74	73'61	94'50	55'77	115'81	66'85	84'45	48'75
12. Broad Arrow ... ..	201'74	111'79	137'07	75'95	184'56	115'76	88'63	55'59
13. North-East Coolgardie ... ..	168'54	109'32	82'63	53'60	186'97	116'91	85'76	53'62
14. East Coolgardie ... ..	536'91	295'32	284'04	156'24	511'09	288'26	263'27	148'48
15. Coolgardie ... ..	130'40	80'70	70'80	43'81	132'18	73'61	73'05	40'68
16. Yilgarn ... ..	337'80	154'87	138'43	63'46	187'87	96'39	88'47	45'39
17. Dundas ... ..	229'62	131'32	155'97	89'20	213'98	127'25	125'27	74'49
18. Phillips River ... ..	181'11	10'03	119'29	66'07	123'49	67'59	128'40	70'28
Total Averages ... ..	366'75	203'69	188'12	104'48	343'70	193'98	172'36	97'27

The average value of gold produced per man employed above and underground was £443.80 in 1908 and £413.18 in 1909. The average tonnage of ore raised shows a decrease from 203.69 tons to 193.98 tons. The average tonnage raised per man is, as

in the preceding year, highest in the Peak Hill and East Coolgardie goldfields, viz., 680.58 tons, average value £315 in the former, and 288.26 tons, average value £631 in the latter.

TABLE 6.

*Output of Gold from the several States of Australia, the Territory of Papua, and the Dominion of New Zealand during 1909.*

State.	Output of Gold.	Value.	Percentage of total Output of Australasia.
1. Western Australia ... ..	Fine ozs. 1,595,269	£ 6,776,274	46.28
2. Victoria ... ..	654,222	2,778,956	18.98
3. Queensland ... ..	455,577	1,935,168	13.21
4. New South Wales ... ..	204,709	869,546	5.94
5. Tasmania ... ..	44,777	190,201	1.30
6. South Australia and Northern Territory ... ..	7,111	30,206	.21
7. Territory of Papua ... ..	12,941	54,969	.37
8. New Zealand ... ..	472,464	2,006,900	13.71
Total ... ..	3,447,070	14,642,220	100.00





TABLE 8.

Quantity and Value of Minerals, other than Gold and Coal, reported to the Mines Department during 1909.

Goldfield, District, or Mineral Field.	Quantity.	Value.	Increase or Decrease for Year compared with 1908.	
			Quantity.	Value.
	tons.	£	tons.	£
<b>BLACK TIN.</b>				
Pilbara Goldfield (Marble Bar District) ...	293.96	22,431	- 109.07	- 8,205
Murchison Goldfield (Cue District) ...	1.52	118	+ 1.52	+ 118
Greenbushes Mineral Field ...	458.75	34,786	- 117.58	- 6,260
<b>Total</b> ...	<b>754.23</b>	<b>57,335</b>	<b>- 225.13</b>	<b>- 14,347</b>
<b>COPPER ORE.</b>				
West Pilbara Goldfield ...	7,135.50	62,417	+ 5,649.50	+ 44,756
Ashburton Goldfield ...	10.75	259	- 177.25	- 2,052
East Murchison Goldfield (Lawlers District) ...	...	...	- 6.77	- 69
Murchison Goldfield (Nannine District) ...	608.00	2,823	+ 608.00	+ 2,823
Yalgoo Goldfield ...	...	...	- 9.50	- 97
Yandanooka Mineral Field ...	...	...	- 133.55	- 1,482
Mt. Margaret Goldfield (Mt. Morgans District) ...	...	...	- 4,404.10	- 20,221
East Coolgardie Goldfield (East Coolgardie District) ...	...	...	- 50.67	- 330
Phillips River Goldfield ...	7,330.70	29,815	+ 5,314.99	+ 20,582
<b>Total</b> ...	<b>15,084.95</b>	<b>95,344</b>	<b>+ 6,790.65</b>	<b>+ 43,910</b>
<b>TANTALITE.</b>				
Pilbarra Goldfield (Marble Bar District) ...	.45	113	+ .45	+ 113
Greenbushes Mineral Field ...	.85	214	+ .85	+ 214
<b>Total</b> ...	<b>1.30</b>	<b>327</b>	<b>+ 1.30</b>	<b>+ 327</b>
<b>LEAD ORE.</b>				
Northampton Mineral Field ...	...	...	- 57.00	- 461
<b>SILVER LEAD ORE.</b>				
Ashburton Goldfield ...	440.00	3,520	- 287.25	- 2,394
<b>WOLFRAM.</b>				
State generally ...	5.00	90	+ 5.00	+ 90
<b>ASBESTOS.</b>				
Pilbara Goldfield (Marble Bar District) ...	2.83	154	- 37.17	- 1,446

The output of black tin shows a decrease, but copper an increase of 6,790 tons valued at £43,910.

The principal production was in the West Pilbara and Phillips River fields and from the Nannine District of the Murchison field, which did not produce any the preceding year. £113 worth of tantalite was produced in the Pilbara field and £214 worth at Greenbushes.

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

TABLE 9.

*Quantity of Coal raised during 1908 and 1909, 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 ... ..	1908	tons. 175,248	£ 75,694	76	204	tons. 859	tons. 626
	1909	214,302	90,965	93	301	609	544

The number of men employed at collieries has increased by 114, and the output by 39,054 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, 1908 and 1909.*

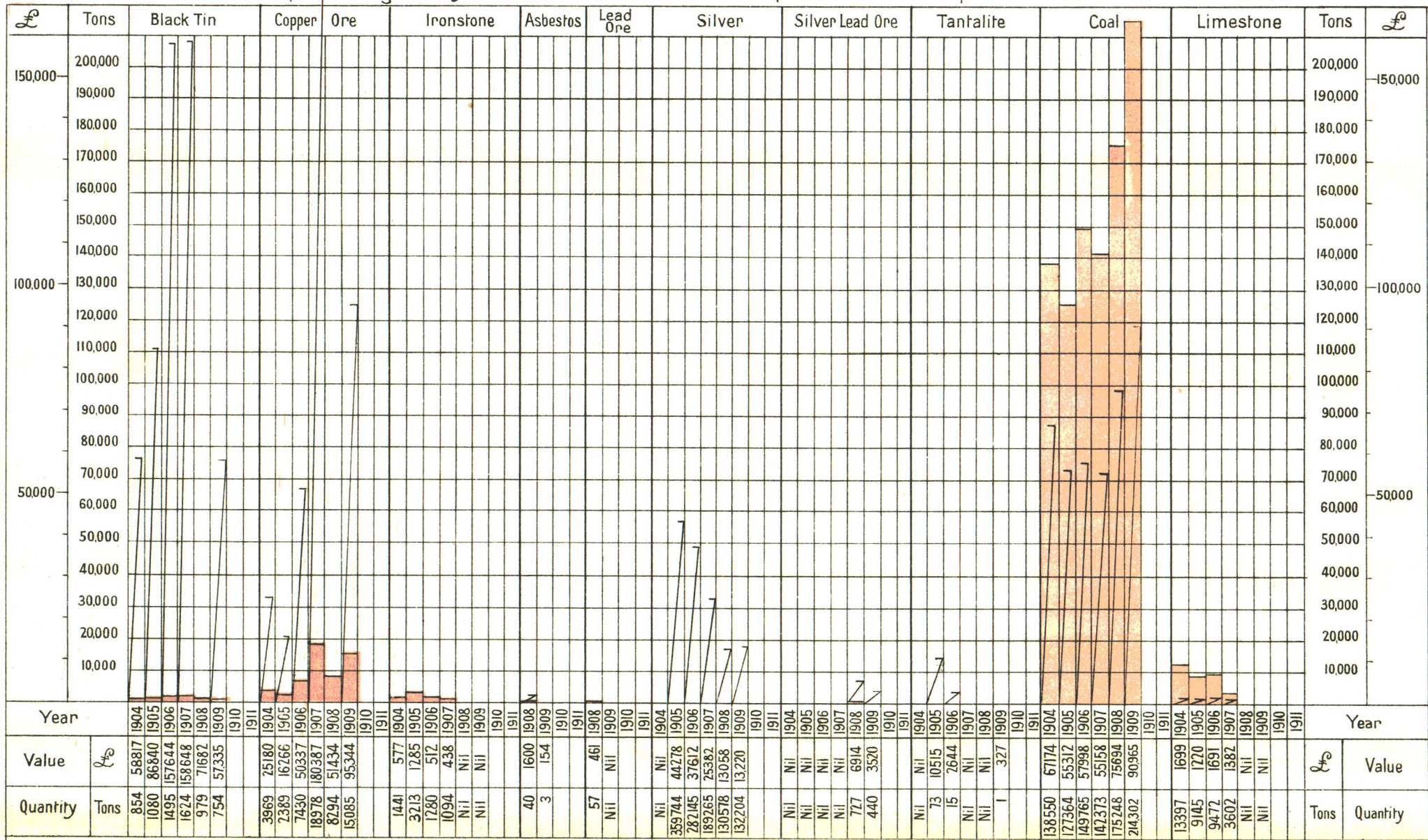
Description of Leases.	1908.		1909.	
	No.	Acreage.	No.	Acreage.
Gold mining leases on Crown land ... ..	1,972	26,665	2,105	28,919
"    "    " private property ... ..	7	142	...	...
Mineral leases on Crown land ... ..	326	31,263	297	30,256
"    "    " private property ... ..	3	70	3	70
	2,308	58,140	2,405	59,245

The total number of leases held for mining has increased by 97 as compared with 1908, and the acreage by 1,105 acres. Leases for gold mining have increased in number by 126 and in area by 2,112 acres.

The acreage held under mineral leases has decreased by 1,007 acres, and the number of leases by 29. The number of leases for mining on private property has decreased by 7, and the area by 142 acres.

## DIAGRAM

of the Mineral Output, showing Quantity & Value of Minerals other than Gold, reported to the Mines Department from the Year -1904-onwards



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

(07s.  
07s.  
07s.  
07s.)

Previous to 1904 the Quantity & Value of the various Minerals exported amounted to

Black Tin	4995 Tons	£ 288172	Silver Lead Ore	57 Tons	£ 479
Copper Ore	48914	269412	Coal	568400	306424
Ironstone	50792	33671	Limestone	58089	12296
Lead Ore	351	1445	<b>Total Value</b>	<b>912051</b>	

TABLE 11.

Number and Acreage of Gold Mining Leases in force each year for the Five Years ending the 31st December, 1909.

GOLDFIELDS.		DISTRICTS.		1905.		1906.		1907.		1908.		1909.		Percentage of Total Acreage.		Increase or Decrease for 1909 compared with 1908.		GOLDFIELDS.				
Name.	Proclaimed.	Name.	Proclaimed.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	1908.	1909.	Increase.	Decrease.					
Kimberley	20-5-86	...	...	2	13	2	13	2	13	2	13	...	...	·04	...	acres.	acres.	Kimberley				
Yilgarn	1-10-08	...	...	61	924	64	1,017	60	924	60	1,011	101	1,562	3·73	5·40	551	...	Yilgarn				
Pilbara	1-10-88	Marble Bar	6-11-96	22	267	19	204	14	192	14	180	35	426	1·66	2·34	246	13	Pilbara				
Ashburton	11-12-90	Nullagine	6-11-96	30	322	29	320	23	257	24	265	22	252					·02	17	42	...	Ashburton
Murchison	24-9-91	Cue	10-1-96	110	1,152	111	1,294	111	1,386	99	1,152	99	1,059	13·89	15·70	797	...	Murchison				
		Nannine	7-12-94	119	1,291	131	1,560	125	1,466	126	1,491	177	2,288									
		Day Dawn	10-1-96	98	1,035	87	890	84	832	65	639	58	541									
Dundas	31-8-93	Mount Magnet	7-12-94	66	532	54	443	52	484	47	444	59	622	3·87	3·45	178	...	Dundas				
Coolgardie	6-4-94	Coolgardie	1-9-97	84	956	59	732	59	740	78	1,038	74	997									Coolgardie
		Kunanalling	1-9-97	173	2,273	148	1,949	134	1,709	136	1,760	115	1,525	8·50	6·78	...	235					
East Coolgardie	21-9-94	...	...	55	679	35	475	38	464	42	521	35	436									East Coolgardie
Yalgoo	23-1-95	Bulong	13-11-96	258	3,708	243	3,570	206	2,967	208	2,994	209	2,948	12·23	11·04	...	46	Yalgoo				
		...	...	64	944	41	518	28	376	23	287	19	245									
North Coolgardie	28-6-95	Menzies	20-3-96	32	344	37	435	32	365	39	467	44	494	1·74	1·71	27	...					
		Ularring	23-9-96	106	1,335	108	1,403	86	1,185	79	1,055	78	1,115									
		Yerilla	20-3-96	83	1,016	63	824	57	737	58	759	65	815	13·05	12·70	56	181	North Coolgardie				
		Niagara	12-3-97	86	1,366	66	1,135	42	694	62	965	55	784									
East Murchison	28-6-95	Lawlers	1-7-04	88	1,090	69	875	69	902	55	721	70	960	15·43	17·82	671	...	East Murchison				
		Black Range	1-7-04	155	2,144	111	1,664	136	2,009	137	2,085	183	2,756									
West Pilbara	20-9-95	...	...	118	1,486	117	1,581	179	2,564	151	2,152	157	2,397	·58	·44	23	...	West Pilbara				
North-East Coolgardie	20-3-96	Kanowna	13-11-96	6	102	7	102	9	132	12	156	10	128									
		Kurnalpi	13-11-96	89	1,151	97	1,240	88	1,054	77	885	74	908	3·52	3·30	...	12	North-East Coolgardie				
Broad Arrow	17-11-96	...	...	11	198	6	66	5	54	6	60	5	48									
Peak Hill	19-3-97	...	...	76	943	84	1,039	63	789	57	683	71	939	2·54	3·25	256	...	Broad Arrow				
		Mount Margaret	12-3-97	47	492	42	370	40	337	42	352	46	402									Peak Hill
Mount Margaret	12-3-97	Mount Malcolm	12-3-97	172	2,676	118	1,953	104	1,753	85	1,407	75	1,307	15·65	13·59	...	100	Mount Margaret				
		Mount Morgans	2-4-02	144	2,467	117	2,095	107	2,070	113	2,036	113	2,030									
		...	...	74	1,152	68	1,015	52	772	49	754	35	593									
Gascoyne	25-6-97	...	...	4	54	...	...	...	...	...	...	...	...	1·13	·83	...	...	Gascoyne				
Phillips River	21-9-00	...	...	13	149	43	480	22	264	24	303	17	240									Phillips River
Greenbushes	...	...	...	...	...	...	...	...	...	...	...	...	...					Greenbushes				
Newcastle	...	Private Property	...	...	...	...	...	...	...	...	...	...	...					Newcastle				
Other Localities	...	...	...	...	...	4	96	4	96	1	24	1	24	·08	·09	...	...					
Murray	...	Private Property	...	...	...	...	...	...	...	6	118	...	...									Murray
West Pilbara	...	Private Property	...	...	...	...	...	...	...	1	24	...	...	·08	...	...	24	West Pilbara				
Totals	...	...	...	2,447	32,273	2,181	29,370	2,031	27,587	1,979	26,807	2,105	28,919					100·00	100·00	3,441	1,329	

126 Leases : 2,112 acres increase for 1909.

TABLE 12.

Number and Acreage of Mineral Leases in force 31st December each year, for the Five Years ending 31st December, 1909.

MINING DISTRICTS.		SUB-DISTRICTS.		1905.		1906.		1907.		1908.		1909.		Increase or Decrease for 1909, compared with 1908.		DISTRICTS.
Name.	Proclaimed.	Name.	Pro-claimed.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Increase.	Decrease.	
Kimberley	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Kimberley
Ashburton	11-12-90	...	...	...	...	4	126	20	567	12	383	5	131	...	252	Ashburton
Murchison	24-9-91	Cue	7-12-94	...	...	...	...	2	58	...	...	1	3	3	...	Cue
		Nannine	7-12-94	...	...	3	80	7	193	4	126	2	30	...	96	Nannine
		Day Dawn	10-1-96	...	...	1	6	1	6	1	6	1	6	...	...	Day Dawn
		Mt. Magnet	7-12-94	...	...	...	...	...	...	...	...	...	1	5	5	...
Greenbushes	7-4-92	...	...	39	706	62	1,127	100	1,585	60	989	47	727	...	262	Greenbushes
Pilbara	16-6-92	Marble Bar	16-6-92	11	290	32	768	36	763	34	1,114	36	1,142	28	...	Marble Bar
		Nullagine	6-11-96	...	...	...	...	2	72	1	48	1	48	...	24	Nullagine
Yalgoo	23-1-95	...	...	...	...	1	24	5	168	3	96	2	72	...	...	Yalgoo
Yilgarn	22-3-95	...	...	1	3	...	...	...	...	...	...	2	96	96	...	Yilgarn
Coolgardie	22-3-95	Coolgardie	22-3-95	2	22	3	41	4	61	2	21	2	21	...	...	Coolgardie
		Kunanalling	1-9-97	...	...	...	...	...	...	...	...	...	...	...	...	...
East Coolgardie	22-3-95	...	...	10	55	5	20	8	116	7	49	6	50	1	...	East Coolgardie
East Murchison	28-6-95	Bulong	15-4-96	...	...	...	...	...	...	...	...	...	...	...	...	Bulong
		Lawlers	1-7-04	2	12	...	...	2	42	5	132	10	260	128	...	East Murchison
		Black Range	1-7-04	...	...	...	...	3	7	2	4	2	4	...	...	Black Range
North Coolgardie	16-8-95	Menzies	15-4-96	...	...	1	48	1	48	1	48	1	48	...	...	Menzies
		Ularring	15-4-96	1	4	...	...	1	48	...	...	...	...	...	...	Ularring
		Yerilla	15-4-96	...	...	...	...	...	...	...	...	...	...	...	...	Yerilla
		Niagara	1-3-97	...	...	...	...	...	...	...	...	...	...	...	...	...
West Pilbara	1-11-95	...	...	3	194	15	401	54	1,402	22	683	17	666	17	...	West Pilbara
Dundas	27-12-95	...	...	1	6	1	6	1	6	1	6	1	6	...	...	Dundas
Collie	21-2-96	...	...	74	22,894	74	22,895	80	24,815	80	24,815	79	24,495	...	320	Collie
North-East Coolgardie	15-4-96	Kanowna	15-4-96	...	...	...	...	...	...	...	...	...	...	...	...	Kanowna
		Kurnalpi	15-4-96	...	...	...	...	...	...	...	...	...	...	...	...	...
Broad Arrow	20-11-96	...	...	1	48	...	...	1	20	1	20	1	20	...	...	Broad Arrow
Northampton	1-1-97	Crown Lands	...	...	...	5	124	21	412	11	247	4	60	...	187	Northampton
		Private Property	...	...	...	...	...	...	1	20	1	20	1	20	...	...
Peak Hill	1-4-97	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Peak Hill
Mt. Margaret	1-4-97	Mt. Margaret	1-4-97	1	3	1	3	1	3	1	48	1	48	...	...	Mt. Margaret
		Mt. Malcolm	1-4-97	8	51	5	32	3	12	3	12	1	6	...	6	Mt. Malcolm
		Mt. Morgans	2-4-02	3	55	4	65	13	330	6	139	5	129	...	10	Mt. Morgans
Gascoyne	15-4-97	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Gascoyne
Yandanooka	1-12-97	Crown Lands	...	2	40	1	20	3	60	...	...	2	40	40	...	Yandanooka
		Private Property	...	2	50	2	50	2	50	2	50	2	50	...	...	Private Property
Phillips River	1-7-99	...	...	28	754	49	1,151	57	1,323	42	1,047	46	1,283	236	...	Phillips River
Other localities	...	Crown Lands	...	38	1,300	4	184	45	1,845	27	1,230	21	860	...	370	Other Localities
		Private Property	...	...	...	...	...	...	2	69	...	...	...	...	...	...
Totals	...	...	...	228	26,493	273	27,171	476	34,101	329	31,333	300	30,326	537	1,544	

Decrease for 1909: 29 leases, 1,007 acres.

In the Collie field the largest area is held, viz., principally for tin and asbestos; Greenbushes 727 acres 24,495 acres occupied entirely for coal mining, then principally for copper; Pilbarra 1,190 acres, prin- cially for tin and asbestos; West Pilbara 666 acres principally for copper.

Taking all the goldfields, the largest percentage of the area leased for gold mining is in the East Murchison, viz., 17.82, then Murchison, 11.40 respectively. Mount Margaret, North Coolgardie, and East Coolgardie, with percentages of 15.70, 13.59, 12.70, and



TABLE 13A.

Number and Acreage of Miscellaneous Leases in force 31st December, 1909.

LEASES.	COOLGARDIE.		EAST COOLGARDIE.		EAST MURCHISON.		DAY DAWN.		GREENBUSHES.		KANOWNA.		MT. MORGANS.		NORTH COOLGARDIE.		WEST PILBARA.		TOTAL.	
	No.	Acreage.	No.	Acreage.	No.	Acreage.	No.	Acreage.	No.	Acreage.	No.	Acreage.	No.	Acreage.	No.	Acreage.	No.	Acreage.	No.	Acreage.
Machinery ... ..	...	...	3	42	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	42
Residence ... ..	...	...	1	2	...	...	1	1	...	...	...	...	1	1	...	...	...	...	3	4
Tailings ... ..	...	...	13	280	1	22	...	...	...	...	...	...	...	...	...	...	...	...	14	302
Tramway ... ..	...	...	...	...	3	31	...	...	...	...	1	2	...	...	...	...	1	24	5	57
Water ... ..	3	93	2	47	...	...	...	...	1	10	...	...	...	...	2	7	...	..	8	157
	3	93	19	371	4	53	1	1	1	10	1	2	1	1	2	7	1	24	33	562

TABLE 14.

Claims and Authorised Holdings under "The Mining Act, 1904," and Regulations, existing on 31st December, 1908 and 1909.

Claims, etc.	Yalgoo.		Yilgarn.		Pilbara.				Ashburton.		Murchison.								Dundas.		Coolgardie.				East Coolgardie.				North Coolgardie.								Collie.	
	1908.	1909.	1908.	1909.	Marble Bar.		Nullagine.		1908.	1909.	Cue.		Day Dawn.		Nannine.		Mt. Magnet.		1908.	1909.	Coolgardie.		Kunanalling.		East Coolgardie.		Bulong.	Menzies.		Ularring.		Yerilla.		Niagara.		1908.	1909.	
					1908.	1909.	1908.	1909.			1908.	1909.	1908.	1909.	1908.	1909.	1908.	1909.			1908.	1909.	1908.	1909.	1908.	1909.		1908.	1909.	1908.	1909.	1908.	1909.	1908.	1909.			1908.
Water Rights	...	...	2	2	5	2	6	6	...	...	8	7	18	20	3	3	...	1	11	14	14	8	12	9	28	18	2	1	19	11	8	8	5	5	15	21	...	...
Area of Water Rights	...	...	16	15	19	11	10	10	...	...	20	18	28	30	5	5	...	1	133	133	41	33	55	51	639	73	22	12	43	35	32	28	11	9	36	36	...	...
Lode Claims	...	...	1	1	8	7	20	16	...	...	3	5	...	...	1	1	8	8	...	1	13	10	8	...	14	8	...	1	...	...	...	4	4	11	12	...	...	
Alluvial Claims	...	...	...	...	21	...	...	1	...	...	...	...	...	...	2	2	...	...	...	1	...	...	...	3	2	...	...	...	...	...	1	1	...	...	...	...		
Dredging Claims	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
Prospecting Areas	15	16	39	43	19	21	4	5	3	1	27	25	12	9	59	51	33	23	26	33	86	73	20	47	47	38	15	16	63	50	29	21	48	36	30	34	...	2
Area of Prospecting Areas	223	270	617	656	331	330	51	45	54	10	329	377	122	111	872	813	356	327	366	417	1,197	1,089	320	777	720	613	216	194	926	717	357	257	795	582	433	470	...	5,380
Residence Areas	5	10	1	1	8	5	5	8	1	...	19	19	13	13	46	51	5	7	...	3	47	3	2	2	90	72	24	22	3	2	...	...	3	3	2	2	...	...
Business Areas	18	18	20	18	36	24	5	5	...	...	13	12	...	...	22	22	7	8	...	3	8	5	5	4	14	14	4	4	12	14	4	4	29	28	18	19	...	...
Machinery Areas	2	2	2	3	4	1	4	3	...	...	2	2	...	...	1	1	1	1	5	6	5	6	5	4	2	3	1	1	3	1	1	1	2	2	3	3	...	...
Tailings Areas	2	2	3	33	2	1	3	2	...	...	3	3	1	1	6	6	2	2	...	1	2	2	...	7	8	2	2	2	2	...	...	2	1	2	2	...	...	
Garden Areas	3	3	3	3	13	12	4	4	...	...	2	2	6	6	7	8	8	9	...	1	9	2	...	30	31	...	...	6	7	1	1	...	...	13	13	...	...	
Washing Areas	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

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Claims, etc.	East Murchison.				West Pilbara.		North-East Coolgardie.				Broad Arrow.		Peak Hill.		Mount Margaret.						Green-bushes.		Phillips River.		Outside Goldfields.		TOTAL.		Increase or Decrease for 1909 compared with 1908.						
	East Murchison.		Black Range.		West Pilbara.		Kanowna.		Kurnalpi.		Broad Arrow.		Peak Hill.		Mount Margaret.		Mount Malcolm.		Mount Morgans.		Green-bushes.		Phillips River.		Outside Goldfields.		TOTAL.		Increase.	Decrease.					
	1908.	1909.	1908.	1909.	1908.	1909.	1908.	1909.	1908.	1909.	1908.	1909.	1908.	1909.	1908.	1909.	1908.	1909.	1908.	1909.	1908.	1909.	1908.	1909.	1908.	1909.	1908.	1909.	Increase.	Decrease.					
Water Rights	...	...	29	26	4	4	...	...	2	5	5	...	...	12	11	12	...	29	32	56	58	23	21	14	10	13	3	...	2	353	310	...	43		
Area of Water Rights	...	...	46	47	8	8	...	...	10	30	30	...	...	38	33	124	...	80	83	250	252	91	53	62	52	73	7	...	...	1,912	1,075	...	837		
Lode Claims	...	...	...	...	...	1	...	...	...	9	10	2	2	4	5	2	...	6	4	4	4	...	...	...	...	6	1	...	...	124	101	...	23		
Alluvial Claims	...	...	...	...	...	...	...	...	...	4	5	1	1	...	...	...	...	7	7	...	...	2	...	45	33	...	...	...	1	84	56	...	28		
Dredging Claims	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Prospecting Areas	...	...	52	41	49	41	9	5	23	31	6	2	46	37	6	7	43	31	66	62	30	25	...	...	38	14	19	5	962	845	...	117			
Area of Prospecting Areas	742	628	736	627	3,084	78	346	359	90	21	643	536	81	120	677	456	1,044	921	467	403	...	...	...	...	732	225	19,704	8,836	36,631	26,645	...	9,986			
Residence Areas	15	14	61	73	3	13	5	6	...	...	...	...	...	11	1	49	45	2	2	5	6	34	31	...	...	...	...	...	...	459	411	...	48		
Business Areas	3	3	35	35	8	6	5	5	2	2	9	9	2	...	...	46	52	12	12	20	5	6	6	2	1	...	...	...	...	367	338	...	29		
Machinery Areas	4	3	2	2	...	...	...	...	...	...	...	...	...	...	...	2	2	3	3	...	...	10	10	1	...	...	...	...	75	70	...	5			
Tailings Areas	2	2	1	1	...	...	...	...	...	...	...	...	...	...	...	5	5	4	5	...	...	3	3	2	3	...	...	...	...	67	89	22	...		
Garden Areas	18	14	10	11	3	3	2	3	...	...	...	...	...	...	...	15	16	15	18	...	...	3	3	5	6	11	...	...	191	182	...	9			
Washing Areas	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

\* 1908 including 8 for coal, area 19,400 acres.  
 \* 1909 ,, 5 ,, ,, 14,180 ,,



Last year the number of Prospecting Areas held was 962, the total acreage being 36,631 acres (which included 8 areas of an acreage of 19,400 acres for coal and oil). This year shows a decrease to 845; acreage 26,645 acres, including five areas of 14,180 acres for coal and oil.

TABLE 15.—*Miners' Rights issued during 1908 and 1909.*

PLACE OF ISSUE.	Miners' Rights.		Consolidated Miners' Rights.		PLACE OF ISSUE.	Miners' Rights.		Consolidated Miners' Rights.	
	1908.	1909.	1908.	1909.		1908.	1909.	1908.	1909.
Albany ...	...	1	...	...	Marble Bar ...	285	172	...	...
Ashburton ...	39	36	...	...	Meekatharra ...	169	190	...	...
Black Range ...	399	439	...	...	Menzies ...	259	263	...	...
Boulder ...	30	38	...	...	Mount Magnet ...	194	171	...	...
Bridgetown ...	1	1	...	...	Mount Malcolm ...	285	...	...	...
Broad Arrow ...	147	189	...	...	Mount Morgans ...	113	112	...	...
Broome ...	...	4	...	...	Mulline ...	2	37	...	...
Bulong ...	43	52	...	...	Nannine ...	298	240	...	...
Bunbury ...	2	2	...	...	Narrogin ...	11	...	...	...
Burtville ...	...	5	...	...	Newcastle ...	1	1	...	...
Busselton ...	3	1	...	...	Norseman ...	205	208	...	...
Carnarvon ...	7	5	...	...	Northampton ...	10	5	...	...
Collie ...	6	8	...	...	Northam ...	...	4	...	...
Coolgardie ...	435	441	...	...	Nullagine ...	101	105	...	...
Cue ...	334	362	...	...	Peak Hill ...	64	72	...	...
Davyhurst ...	96	96	...	...	Perth ...	97	92	...	...
Derby ...	15	29	...	1	Phillips River ...	144	115	...	...
Duketon ...	3	...	...	...	Pinjin ...	26	17	...	...
Esperance ...	1	1	...	...	Port Hedland ...	29	14	...	...
Geraldton ...	...	...	...	...	Roebourne ...	74	86	...	...
Greenbushes ...	179	112	3	...	Southern Cross ...	161	246	...	...
Kalgoorlie ...	1,462	703	...	...	Wagin ...	9	1	...	...
Kanowna ...	201	171	...	...	Waverley ...	48	57	...	...
Katanning ...	8	...	...	...	Williams ...	...	...	...	...
Kimberley ...	37	24	...	...	Wiluna ...	106	82	...	...
Kookynie ...	116	166	...	...	Wyndham ...	11	...	...	...
Kurnalpi ...	46	35	...	...	Yalgoo ...	84	70	...	...
Lake Darlot ...	52	26	...	...	Yarri ...	28	24	...	...
Laverton ...	207	201	...	...	York ...	7	2	...	...
Lawlers ...	122	157	...	...	Yundamindera ...	59	32	...	...
Leonora ...	140	271	...	...					
Linden ...	19	35	...	...					
						7,030	6,032	3	1

TABLE 16.

*Number and Acreage of Miners' Homestead Leases in force on 31st December, 1908 and 1909.*

Goldfield.	District.	1908.		1909.		Increase.		Decrease.	
		Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.
Greenbushes ...	...	6	600	6	611	...	11	...	...
Pilbara ...	Marble Bar ...	3	125	6	173	3	48	...	...
	Nullagine ...	1	20	1	20	...	...	...	...
Dundas ...	...	18	769	20	762	2	...	...	7
Broad Arrow ...	...	4	570	4	245	...	...	...	325
Yilgarn ...	...	9	252	9	252	...	...	...	...
Mt. Margaret ...	Mt. Morgans ...	8	240	5	180	...	...	3	60
	Mt. Malcolm ...	11	2,054	11	2,054	...	...	...	...
	Mt. Margaret ...	9	335	8	300	...	...	1	35
	Cue ...	8	829	10	1,329	2	500	...	...
Murchison ...	Day Dawn ...	13	153	14	163	1	10	...	...
	Nannine ...	18	1,982	18	2,112	...	130	...	...
	Mt. Magnet ...	2	40	2	40	...	...	...	...
Yalgoo ...	...	1	200	1	200	...	...	...	...
Coolgardie ...	...	46	4,706	50	6,193	4	1,487	...	...
	Kunanalling ...	1	20	1	20	...	...	...	...
East Coolgardie ...	...	92	4,133	110	4,661	18	528	...	...
Phillips River ...	...	120	8,888	122	11,882	2	2,994	...	...
Peak Hill ...	...	12	1,865	12	1,865	...	...	...	...
North-East Coolgardie	Kanowna ...	24	935	23	915	...	...	1	20
	Menzies ...	10	648	10	648	...	...	...	...
	Yerilla ...	2	20	2	20	...	...	...	...
North Coolgardie	Niagara ...	5	384	7	404	2	20	...	...
	Ularring ...	2	25	2	25	...	...	...	...
	...	7	1,119	7	1,119	...	...	...	...
East Murchison	Black Range ...	13	1,604	16	2,144	3	540	...	...
		445	32,516	477	38,337	37	6,268	5	447

As compared with the year 1908, there is an increase in the number of leases by 32, and in acreage by 5,821 acres.

## PART IV.—MEN EMPLOYED.

TABLE 17.

Average Number of Men engaged in Mining during 1908 and 1909.

Goldfield.	District.	Reef or Lode.		Alluvial.		Total.	
		1908.	1909.	1908.	1909.	1908.	1909.
1. Kimberley ...	...	1	...	6	9	7	9
2. Pilbara ...	Marble Bar ...	52	79	55	89	107	168
3. West Pilbara ...	Nullagine ...	76	79	26	17	102	96
4. Ashburton ...	...	21	12	27	41	48	53
5. Gascoyne ...	...	...	...	5	10	5	10
6. Peak Hill ...	...	125	100	9	10	134	110
7. East Murchison ...	Lawlers ...	892	1,000	42	28	934	1,028
	Black Range ...	803	901	62	67	865	968
	Cue ...	369	346	14	14	383	360
8. Murchison ...	Nannine ...	362	711	118	179	480	890
	Day Dawn ...	674	424	22	21	696	445
	Mt. Magnet ...	173	238	3	2	176	240
9. Yalgoo ...	...	29	58	2	2	31	60
	Mt. Morgans ...	381	361	42	34	423	395
10. Mt. Margaret ...	Mt. Malcolm ...	949	944	31	17	980	961
	Mt. Margaret ...	583	616	40	34	623	650
	Menzies ...	618	592	5	10	623	602
11. North Coolgardie ...	Ularring ...	353	322	39	32	392	354
	Niagara ...	299	324	21	24	320	348
	Yerilla ...	355	375	32	27	387	402
12. Broad Arrow ...	...	231	279	73	66	304	345
13. North-East Coolgardie ...	Kanowna ...	451	426	72	67	523	493
	Kurnalpi ...	30	25	19	17	49	42
14. East Coolgardie ...	East Coolgardie ...	5,627	5,951	50	50	5,677	6,001
	Bulong ...	49	88	48	25	97	113
15. Coolgardie ...	Coolgardie ...	710	626	32	63	742	689
	Kunanalling ...	190	200	37	55	227	255
16. Yilgarn ...	...	349	460	...	1	349	461
17. Dundas ...	...	313	375	10	9	323	384
18. Phillips River ...	...	65	95	3	...	68	95
State generally	...	...	...	...	...	...	...
Total—Gold Mining		15,130	16,007	945	1,020	16,075	17,027
MINERALS OTHER THAN GOLD.							
Tin ...	Greenbushes M.F. ...	...	...	*331	*220	331	220
	Cue D. ...	...	...	...	6	...	6
	Marble Bar D. ...	...	...	*283	*180	283	180
Tantalite ...	Greenbushes M.F. ...	...	1	...	...	...	1
	Marble Bar D. ...	...	1	...	...	...	1
	Mt. Morgans D. ...	38	...	...	...	38	...
	Phillips River G.F. ...	187	391	...	...	187	391
	Nannine D. ...	...	7	...	...	...	7
	Yalgoo G.F. ...	4	3	...	...	4	3
Copper ...	Ashburton G.F. ...	9	2	...	...	9	2
	Lawlers D. ...	1	...	...	...	1	...
	Broad Arrow G.F. ...	...	1	...	...	...	1
	West Pilbara G.F. ...	42	93	...	...	42	93
	East Coolgardie G.F. ...	2	...	...	...	2	...
Lead ...	Northampton M.F. ...	2	...	...	...	2	...
Silver-Lead	Ashburton G.F. ...	5	5	...	...	5	5
Coal ...	Collie River M.F. ...	280	393	...	...	280	393
	State generally ...	...	1	...	...	...	1
Asbestos ...	Marble Bar D. ...	7	2	...	...	7	2
Wolfram ...	State generally ...	...	3	...	...	...	3
Total—Other Minerals		577	903	614	406	1,191	1,309
GRAND TOTAL		15,707	16,910	1,559	1,426	17,266	18,336

\* Classified elsewhere as employed at mines.

Comparing the years 1908 and 1909, there has been an increase of 1,070 men engaged in mining. This increase is mostly attributable to gold mining, wherein the number of men engaged is greater by 952 than in 1908; the number of men working reefs or lodes increased by 877, and alluvial by 75. In

mining for minerals there was an increase of 118, principally due to copper and coal mining, the number of men employed being greater by 214 in the former and 114 in the latter. Tin mining showed a decrease of 208 and other minerals 2.

TABLE 18.  
Average Number of Men employed at Mines during 1909.

Mineral.	Above Ground.	Under Ground.	Total.	Percentage of total men employed.	Increase or decrease compared with 1908.	
Asbestos ... ..	1	1	2	'01	-	5
Coal ... ..	93	301	394	2'28	+	114
Copper ... ..	309	188	497	2'87	+	214
Gold ... ..	6,973	9,034	16,007	92'44	+	877
Lead ... ..	...	...	...	...	-	2
Silver-Lead ... ..	1	4	5	'03	-	2
Tantalite ... ..	2	...	2	'01	+	2
Tin ... ..	*372	34	406	2'34	-	208
Wolfram ... ..	3	...	3	'02	+	3
Total ... ..	7,754	9,562	17,316	100'00	+	995

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

The above table deals with men working their own mines or employed on wages, and is compiled from returns furnished to the Department by mine owners. The percentage employed shows decreases in tin, asbestos, and lead, but increases in all others.

TABLE 19.  
Average Number of Men employed at Gold Mines during 1909, 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 1908.	Percentage of total men employed.	
					1908.	1909.
1. Kimberley ... ..	...	...	...	- 1	'01	...
2. Pilbara ... ..	83	75	158	+ 30	'84	'99
3. West Pilbara ... ..	10	2	12	- 9	'14	'07
4. Ashburton ... ..	...	...	...	...	...	...
5. Gascoyne ... ..	...	...	...	...	...	...
6. Peak Hill ... ..	66	34	100	- 25	'82	'63
7. East Murchison ... ..	843	1,058	1,901	+ 206	11'20	11'88
8. Murchison ... ..	729	990	1,719	+ 141	10'43	10'74
9. Yalgoo ... ..	30	28	58	+ 29	'19	'36
10. Mt. Margaret ... ..	839	1,082	1,921	+ 8	12'64	12'00
11. North Coolgardie ... ..	682	931	1,613	- 12	10'74	10'08
12. Broad Arrow ... ..	104	175	279	+ 48	1'53	1'74
13. North-East Coolgardie ... ..	169	282	451	- 30	3'19	2'82
14. East Coolgardie ... ..	2,633	3,406	6,039	+ 363	37'51	37'73
15. Coolgardie ... ..	366	460	826	- 74	5'95	5'16
16. Yilgarn ... ..	224	236	460	+ 111	2'31	2'87
17. Dundas ... ..	152	223	375	+ 62	2'07	2'34
18. Phillips River ... ..	43	52	95	+ 30	'43	'59
State generally ... ..	...	...	...	...	...	...
Total ... ..	6,973	9,034	16,007	+ 877	100'00	100'00

The above table shows that the number of men employed on gold mines, excluding alluvial workers, increased to the extent of 877. The principal increases are in the East Coolgardie, East Murchison, Murchison, and Yilgarn fields. The Coolgardie and North-East Coolgardie fields show the largest decreases.

TABLE 20.  
Alluvial Gold Workers.

Goldfield.	1908.	1909.	Increase or decrease compared with 1908.
1. Kimberley ... ..	6	9	+ 3
2. Pilbara ... ..	81	106	+ 25
3. West Pilbara ... ..	27	41	+ 14
4. Ashburton ... ..	5	10	+ 5
5. Gascoyne ... ..	...	...	...
6. Peak Hill ... ..	9	10	+ 1
7. East Murchison ... ..	104	95	- 9
8. Murchison ... ..	157	216	+ 59
9. Yalgoo ... ..	2	2	=
10. Mt. Margaret ... ..	113	85	- 28
11. North Coolgardie... ..	97	93	- 4
12. Broad Arrow ... ..	73	66	- 7
13. North-East Coolgardie ... ..	91	84	- 7
14. East Coolgardie ... ..	98	75	- 23
15. Coolgardie ... ..	69	118	+ 49
16. Yilgarn ... ..	...	1	+ 1
17. Dundas ... ..	10	9	- 1
18. Phillips River ... ..	3	...	- 3
Total ... ..	945	1,020	75

The number of alluvial gold workers increased by 75, the largest increases being in the Murchison, Coolgardie, and Pilbara fields. Murchison heads the list with 216, followed by Coolgardie with 118, Pilbara 106, East Murchison 95, North Coolgardie 93, Mount Margaret 85, North-East Coolgardie 84, East Coolgardie 75, and Broad Arrow 66.

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 January, 1910.

Locality in which Award or Agreement has effect.	Date of Award or Agreement.	Term.	Rock-drill men and Chuckmen in shafts.	Rock-drill men and Chuckmen in rises.	Rock-drill men and Chuckmen elsewhere.	Miners (Hammer and Drill men).	Miners (wet ground) extra allowance.		Bracemen and Platmen.	Skipmen.	Mullockers and Shovelers.	Truckers filling and trucking.	Truckers from Shoots.	Men working in Cyanide Vats, and Filter-press men.	Timbermen.	Surface Labourers.	Boiler Cleaners.	Horse-drivers (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.						
							Per week.	Per shift.																				Surface winding Engines.	All other Engines.	Overtime.			Men on Surface (single shift).	Shiftmen above or underground.			
																														Up to 4 hours.	After 4 hours.	Sunday.					
Black Range ...	17th May, 1907 ...	From 1st June 1907, to 31st May, 1910	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.	48	47		
Black Range ...	0th May, 1908 ...	From 20th May, 1908, to 31st May, 1910	15 4	14 10	14 2	15 0	14 0	13 4	1 3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	47	...	
Black Range ...	14th Aug., 1908 ...	From 8th Aug., 1908, to 31st May, 1910	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	47 & 48	...	
*Burtville ...	4th Sept., 1906 ...	From 6th Sept., 1909, to 7th Mar., 1911	...	...	...	13 4	...	...	1 8	13 4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	47	47		
†Cue-Nannine ...	18th Dec., 1908 ...	From 1st Jan., 1909, to 1st Jan., 1910	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	47 & 48	...	
Gindalbie ...	10th Nov., 1908 ...	From 16th Nov., 1908, to 16th Nov., 1911	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	47 & 48	...	
*Kalgoorlie ...	10th Mar., 1910 ...	From 10th Mar., 1910, to 30th Sept., 1912	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	47 & 48	...	
* Do. ...	10th Mar., 1910 ...	From 10th Mar., 1910, to 30th Sept., 1912	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	48	...	
* Do. ...	10th Mar., 1910 ...	From 10th Mar., 1910, to 30th Sept., 1912	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	48	...	
* Do. ...	10th Mar., 1910 ...	From 10th Mar., 1910, to 30th Sept., 1912	14 4	13 10	13 4	11 8	...	...	...	11 8	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	48	47	
Kanowna (and see Broad Arrow, etc.)	10th Nov., 1908 ...	From 16th Nov., 1908, to 16th Nov., 1911	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	47 & 48	...	
Kunanalling	21st Feb., 1910 ...	From 21st Feb., 1910, to 30th Sept., 1912	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	47 & 48	...	
†Leonora, Kookynie (a), and Laver-ton, etc. (b)	19th Jan., 1909 ...	From 15th Jan., 1909, to 1st Jan., 1910	15 0	14 6	14 0	12 4	...	...	1 8	12 4	14 0	11 6	11 6	11 6	12 4	14 0	11 0	12 6	12 0	13 4	12 0	...	...	...	...	...	...	...	...	...	...	...	...	...	48	47	
† Do.	19th Jan., 1909 ...	From 15th Jan., 1909, to 1st Jan., 1910	14 8	14 2	13 8	12 0	...	...	1 8	12 0	13 8	11 2	11 2	11 2	12 0	13 8	10 8	12 2	11 8	13 0	11 8	...	...	...	...	...	...	...	...	...	...	...	...	...	48	47	
† Do.	19th Jan., 1909 ...	From 15th Jan., 1909, to 1st Jan., 1910	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	47 & 48	...
†Mt. Magnet	18th Dec., 1908 ...	From 1st Jan., 1909, to 1st Jan., 1910	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	47 & 48	...	
† Do.	8th Nov., 1909 ...	From 17th Nov., 1909, to 16th Nov., 1910	14 6	14 0	13 4	12 6	...	...	0 10	12 0	...	11 4	11 4	11 4	12 0	...	10 10	12 6	11 10	13 9	...	...	...	...	...	...	...	...	...	...	...	...	...	...	48	47	
†Marvel Loch	27th Jan., 1910 ...	From 1st Feb., 1910, to 1st Feb., 1911	13 6	13 0	12 6	10 10	...	...	1 8	10 10	...	10 10	10 10	10 10	12 0	10 6	...	11 6	12 6	...	...	...	10 6	...	...	...	...	...	...	...	...	...	...	48	47		
†Mt. Morgans	19th Jan., 1909 ...	From 15th Jan., 1909, to 1st Jan., 1910	14 8	14 2	13 8	12 0	...	...	1 8	12 0	13 8	11 2	11 2	11 2	12 0	13 8	10 8	12 2	11 8	13 0	11 8	...	...	...	...	...	...	...	...	...	...	...	...	...	48	47	
† Do.	19th Jan., 1909 ...	From 15th Jan., 1909, to 1st Jan., 1910	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	47 & 48	...	

\* Industrial Agreement. † Award continues in operation until amended or rescinded by Court. (a.) Sons of Gwalia and Gwalia South Gold Mines at Gwalia; Hills Proprietary Leases at Murrin Murrin. (b.) Westralia-Mt. Morgans Gold Mining Leases at Morgans; area comprised within a radius of eight miles from the Post Office at Gwalia, exclusive of the two large mines above-mentioned; and the area comprised within a radius of 10 miles from the Post Office at Laver-ton.

## PART V.—ACCIDENTS.

TABLE 22.

Men employed in Mines killed and injured in Mining Accidents during 1908 and 1909.

## A.—ACCORDING TO LOCALITY OF ACCIDENT.

Goldfield.	Killed.		Injured.		Total Killed and Injured.	
	1908.	1909.	1908.	1909.	1908.	1909.
1. Kimberley ... ..	...	...	...	...	...	...
2. Pilbara ... ..	...	1	3	2	3	3
3. West Pilbara ... ..	2	...	...	2	2	2
4. Ashburton ... ..	...	...	...	...	...	...
5. Gascoyne ... ..	...	...	...	...	...	...
6. Peak Hill ... ..	...	1	...	1	...	2
7. East Murchison ... ..	5	3	14	22	19	25
8. Murchison ... ..	7	2	20	44	27	46
9. Yalgoo ... ..	...	...	...	...	...	...
10. Mt. Margaret ... ..	3	4	29	38	32	42
11. North Coolgardie ... ..	2	2	5	9	7	11
12.* North-East Coolgardie ... ..	2	3	7	3	9	6
13. Broad Arrow ... ..	...	...	1	1	1	1
14. East Coolgardie ... ..	*14	14	272	283	*286	297
15. Coolgardie ... ..	2	1	7	1	9	2
16. Yilgarn ... ..	...	1	...	1	...	2
17. Dundas ... ..	2	1	2	2	4	3
18. Phillips River ... ..	...	1	4	2	4	3
19. Donnybrook ... ..	...	...	...	...	...	...
MINING DISTRICTS.						
Northampton ... ..	...	...	...	...	...	...
Yandanooka ... ..	...	...	...	...	...	...
Greenbushes ... ..	...	...	2	1	2	1
Collie ... ..	1	...	32	49	33	49
Total ... ..	*40	34	398	461	*438	495

## B.—ACCORDING TO CAUSES OF ACCIDENT.

	1908.		1909.		Comparison with 1908.	
	Fatal.	Serious.	Fatal.	Serious.	Fatal.	Serious.
1. Explosives ... ..	4	10	3	19	- 1	+ 9
2. Falls of Ground... ..	15	59	13	72	- 2	+ 13
3. In Shafts ... ..	*5	22	6	19	+ 1	- 3
4. Miscellaneous Underground ... ..	5	194	7	228	+ 2	+ 34
5. Surface ... ..	11	113	5	123	- 6	+ 10
Total ... ..	*40	398	34	461	- 6	+ 63

\*Not now including 1 fatal accident to a child, which was included in last year's table.

During the year 1909 thirty-four fatal accidents occurred, as against forty in 1908. In last year's report the number killed in 1908 was shown as 41, but this included one fatal accident to a child which has now been eliminated. The number of men injured shows an increase of 62 over the preceding year. Full details of these accidents will be found in the report of the State Mining Engineer.

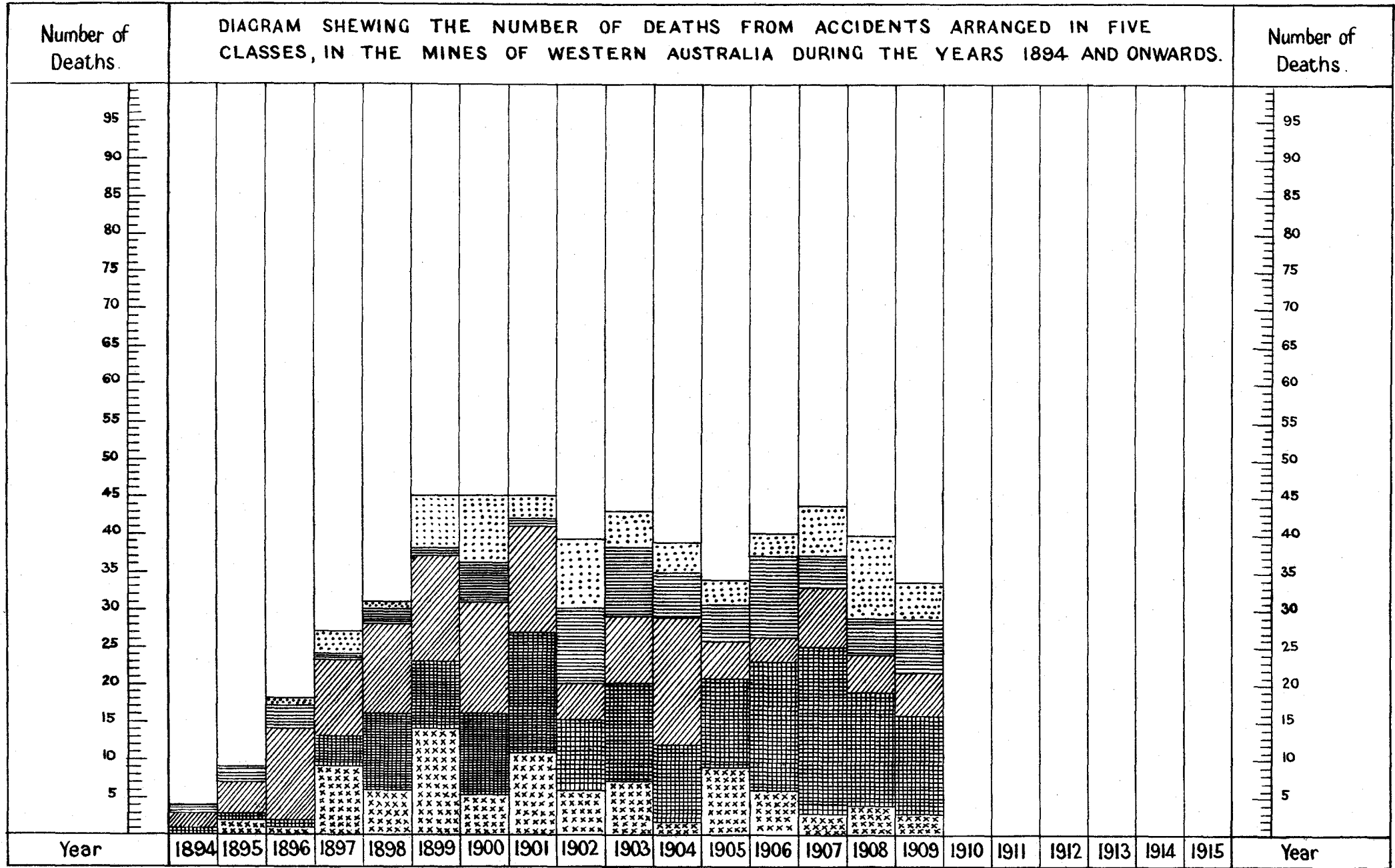
TABLE 23.

Deaths of Persons employed at Mines from Accidents during 1908 and 1909.

Kind of Mines.	1908.						1909.					
	Number of Persons killed.			Death Rate per 1,000 Men employed.			Number of Persons killed.			Death Rate per 1,000 Men employed.		
	Above Ground.	Under Ground.	Total.	Above Ground.	Under Ground.	Total.	Above Ground.	Under Ground.	Total.	Above Ground.	Under Ground.	Total.
Coal Mines ... ..	...	1	1	...	4.90	3.57	...	...	...	...	...	...
Men employed ... ..	...	...	...	(76)	(204)	(280)	...	...	...	(93)	(301)	(394)
Gold Mines ... ..	11	*28	*39	1.43	3.33	2.42	4	29	33	.50	3.21	1.94
Men employed ... ..	...	...	...	(7,672)	(8,403)	(16,075)	...	...	...	(7,993)	(9,034)	(17,027)
Other Mines ... ..	...	...	...	...	...	...	1	...	1	1.45	...	1.09
Men employed ... ..	...	...	...	(693)	(218)	(911)	...	...	...	(688)	(227)	(915)
Total for all Mines ... ..	11	*29	*40	1.30	3.29	2.32	5	29	34	.57	3.03	1.85
Total number of men employed	...	...	...	(8,441)	(8,825)	17,266	...	...	...	(8,774)	(9,562)	(18,336)

\* Not now including an accident to a child, which was included in last year's table.

With one exception all fatal accidents during the year occurred in gold mines. The death rate per 1,000 men employed in gold mines was 1.94, as against 2.42 in the preceding year.



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

TABLE 24.

Deaths of persons employed from Accidents in Gold Mines during 1909, and the Death Rate per 1,000 men employed, and per 1,000 tons of Gold Ore raised during 1908 and 1909 (Number of men taken as in Table 19, not including Alluvial Gold Workers).

GOLDFIELD.	Number of Deaths.			Death rate per 1,000 Men employed.				Number of Deaths per 1,000 tons of Gold Ore raised.	
	1909.			1909.			1908.		
	Above Ground.	Under Ground.	Total.	Above Ground.	Under Ground.	Total.	Total.	1909.	1908.
1. Kimberley ... ..	...	...	...	...	...	...	...	...	...
2. Pilbara ... ..	...	1	1	...	13·33	6·33	...	·309	...
3. West Pilbara ... ..	...	...	...	...	...	...	95·24	...	2·66
4. Ashburton ... ..	...	...	...	...	...	...	...	...	...
5. Gascoyne ... ..	...	...	...	...	...	...	...	...	...
6. Peak Hill ... ..	...	1	1	...	29·41	10·00	...	·015	...
7. East Murchison ... ..	...	3	3	...	2·84	1·58	2·95	·009	·01
8. Yalgoo ... ..	...	4	4	...	...	...	...	...	...
9. Mt. Margaret ... ..	...	1	2	...	3·70	2·08	1·57	·012	·01
10. North Coolgardie ... ..	1	3	3	1·47	1·07	1·24	1·23	·019	·02
11. North-East Coolgardie ... ..	...	...	...	...	10·64	6·65	4·16	·057	·04
12. Broad Arrow ... ..	...	12	14	...	...	...	...	...	...
13. East Coolgardie ... ..	2	...	1	·76	3·52	2·32	2·47 *	·008	·08*
14. Coolgardie ... ..	1	2	2	2·73	...	1·21	2·22	·016	·03
15. Murchison ... ..	...	...	...	...	2·02	1·16	4·44	·008	·02
16. Yilgarn ... ..	...	1	1	...	4·24	2·17	...	·023	...
17. Dundas ... ..	...	1	1	...	4·48	2·67	6·39	·021	·05
18. Phillips River ... ..	...	...	...	...	...	...	...	...	...
19. Donnybrook ... ..	...	...	...	...	...	...	...	...	...
Totals and Averages ... ..	4	29	33	·57	3·21	2·06	2·58 *	·011	·013

\*Deducting one death of a child, included in last year's report.

The number of deaths per 1,000 tons of gold ore raised shows a slight decrease, being .011 as against .013 for the preceding year.

#### PART VI.—STATE AID TO MINING.

##### STATE BATTERIES.

The number of State Batteries has increased from 29 in 1908 to 32 in 1909, the new plants being 5-head mills at Youanme and Messenger's Patch, and a 2-head mill at Desdemona. The number of Cyanide plants in operation is 24, an increase of two on the previous year's figures, and in addition there are slime plants at Mulline, Niagara, Norseman, Menzies, and Leonora, the two latter being erected during the year. There are two tin dressing plants at Greenbushes.

From the inception of the Battery system to the end of 1909 gold and tin to the value of £3,120,794 have been recovered at the State plants; 695,128 tons of gold ore were treated and produced, £2,658,966 worth of gold by amalgamation, £359,881 worth by cyanidation, and £42,192 worth from slimes; and 41,723 tons of tin ore produced tin to the value of £59,755.

During the year the gold ore treated was 94,219 tons for 83,127 fine ounces, and in the preceding year 95,623 tons for 89,875 fine ounces. The scale of charges in existence at State Batteries during 1908 was altered as from 1st February, 1909, the scale introduced ranging from 8s. to 15s. per ton, with rebates under certain conditions; this scale was subsequently changed from 1st November to a differential scale.

The working expenditure for all plants for the year totalled £81,939 7s. 3d., and the revenue

£80,776 16s. 9d., which, after including £802 16s. 10d. for additions, etc., paid from revenue, shows a loss of £1,965 7s. 4d. on the year's operations. The capital expenditure on erections of State Batteries from the inception of the scheme to the end of 1909 was £275,319 13s. 5d., £91,981 1s. 8d. being paid from Revenue, and £183,338 11s. 9d. from Loan. The working expenditure exceeds receipts by £19,015 9s. 5d.

The cost of administration for the year was £4,247 11s. 5d., against £4,370 16s. 1d. for 1908. The report of the Superintendent of State Batteries, which is published as Division III. to this report, contains full details of the year's operations.

##### WATER SUPPLY.

The work of this Branch, which includes the survey for, and construction of reservoirs for conservation of water, boring for water and minerals, sinking wells, clearing tracks, etc., has been continued during the year, and details of the work carried out will be found in the report of the Engineer for Mines Water Supply, published as Division IV. to this report.

A short summary is as follows:—

10 water shafts sunk aggregating	973 feet.
3 bore wells aggregating	439 feet.
80 hand bores aggregating	3,882 feet.
1 diamond drill bore	500 feet.

Tanks have been constructed at Randall's, Carbine, and Yerbillon, and others are in progress at

Chadwin and Nevoria. Pumping plants have been installed at Jourdie Hills and Mt. Ida, and the Davyhurst plant remodelled. Pipe lines were laid at Desdemona, Jourdie Hills, Norseman, Mt. Ida, Meekatharra, and Nannine. The work of providing a water supply on the route to Tanami, and the opening up of a Stock Route from Hall's Creek to Wiluna, is also in hand.

#### GEOLOGICAL SURVEY.

The staff was fully occupied during the year and details of the work carried out will be found in the report of the Government Geologist appearing elsewhere in this volume (Division V.). Geological examinations were made of the West Pilbara goldfield, the country between Roebourne and Peak Hill, the Kalgoorlie field, and the country traversed by the Wiluna-Kimberley Stock Route. Reports were also furnished on the following:— Occurrence of coal measures near Perth; a discovery of coal in Prospecting Area 155H, at Donmybrook; proposed subsidised boring operations at Leonora and Mount Morgans; an application for a subsidy by the Leonora Gold Blocks; liability and causes of spontaneous ignition in Collie coal; a discovery of new minerals in the Phillips River field; Wodgina tin mining centre; deep boring for mineral and other deposits, Roebourne and Onslow districts; ore bodies at Meekatharra; faulting of the lode in the deeper levels of the Great Fingall mine; supposed silver deposit at York; tin find at Coolgardie; gold discovery at Tanami, in South Australia, with the object of endeavouring to trace the auriferous country into Western Australia. Numerous reports were furnished on the question of alienation of mineral lands; applications for assistance under the Mining Development Act; and applications to mine on private property. Three Geological Bulletins were published during the year.

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

The following statement shows the sums advanced during the year 1909 under the provisions of the Mining Development Act:—

	£	s.	d.
Advances in aid of mining work and equipment of mines with machinery .. .. .	5,386	13	5
Advances in aid of boring .. .. .	1,802	9	6
Subsidies to provide crushing plants .. .. .	2,207	8	2
Purchase, repairs, etc., boring plants .. .. .	727	9	10
Providing means of transport .. .. .	1,110	8	0
	<b>£10,234</b>	<b>8</b>	<b>11</b>

In addition to the above, amounts totalling £2,661 5s. 11d. 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 foot level in small mines. Subsidies to the extent of £2,207 8s. 2d. were paid to private crushing plants, the condition being that they crush for the public at fixed rates; in most cases a further requirement being imposed as to treating or purchasing tailings. The ore crushed at such plants during the year amounted to 30,793.50 tons.

The receipts under the Mining Development Act exclusive of interest payments amount to £2,429 5s. 8d., made up as follows:—

	£	s.	d.
Refunds of advances .. .. .	2,262	18	8
Sales of plant .. .. .	166	17	0

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

#### ASHBURTON GOLDFIELD.

The output of gold from this field during the year was 436 fine ounces, and for the preceding year 162 fine ounces, an increase of 274 fine ounces. 10.75 tons of copper valued at £259 were raised, and in the preceding year 188 tons valued at £2,311, a decrease of 177.25 tons valued at £2,052; also 440 tons of silver lead ore valued at £3,520 as against 727.25 tons valued at £5,914 for the preceding year, a decrease of 287.25 tons valued at £2,394. No finds of any note have been reported, and nothing has transpired to justify a supposition of any marked improvement in the coming year.

#### BROAD ARROW GOLDFIELD.

The output of gold for the year was 17,122 fine ounces and for the preceding year 18,430 fine ounces, a decrease of 1,308 fine ounces. The alluvial gold, however, shows an increase, the figures being 606.91 fine ounces for 1908 and 983.07 fine ounces for the year under review. The increased output from the Claremont Gold Mines at the close of last year was

unfortunately not maintained, and the mine is now in the hands of tributers.

In the old centres of the field little or no development work has been done, but in the Siberia centre vigorous prospecting has been pursued, and the developments in several properties are most encouraging. From Lease 1345W (formerly prospecting area No. 251W), from which a very rich crushing was last year reported, the owners in September recovered 1,225 ounces from 65 tons of ore. The outlook for this portion of the field is very bright.

#### COLLIE COALFIELD.

The output of coal during the year was 214,302 tons, and in the preceding year 175,248 tons, an increase of 39,054 tons. This year is again a record, attributable to the continued increase in the bunkering trade and also in a measure to the regrettable strike in the coal mines of New South Wales.

The number of leases held remains the same as last year, but an additional area of 5,380 acres has been taken up under prospecting areas. Con-



siderable activity in trade prevails, and every one is imbued with the utmost confidence in the future. The outlook for the field is most promising.

#### COOLGARDIE GOLDFIELD.

The output of gold during the year was 34,135 fine ounces, and for the preceding year 40,029 fine ounces, a decrease of 5,894 fine ounces. This decrease is largely attributable to the closing down of the Westralia East Extension gold mine at Bonnievale, and restricted operations at Burbanks Birthday gold mine. Apart from these two mines there has not been any marked falling off in the rest of the field. Bonnievale is practically deserted as a result of the closing down of the Westralia, but a resumption of operations is expected shortly.

At Burbanks good work has been done, and the future is brighter.

At Cheapside a ten-head mill has just been completed, and operations will be commenced shortly. At Higginsville, Eundynie, and Widgiemooltha nothing of note has transpired. At Kumanalling matters have been dull, but at the Carbine mine good developments have taken place at the 400 foot level which should result in an improved output.

A new discovery was made at a locality called Chadwin, on the Kurrawang wood line, and many promising shows are opening up.

At Jourdie Hills good progress has been made. The outlook for the coming year is hopeful.

#### DUNDAS GOLDFIELD.

The output of gold for the year was 29,549 fine ounces, and for the preceding year 28,644 fine ounces, an increase of 905 fine ounces. For various reasons this increase is not as large as was anticipated, but with improved developments and additions to plant it is anticipated that the coming year will see the realisation of anticipations.

#### EAST COOLGARDIE GOLDFIELD.

The output of gold for the year was 899,289 fine ounces, and for the preceding year 890,773 fine ounces, an increase of 8,516 fine ounces. No copper was reported, but in 1908 50.67 tons valued at £330 were raised. Mining in this field has progressed steadily, and the year has been marked by splendid developments at depth in some of the large mines, notably the Ivanhoe and Great Boulder mines. The destruction by fire of the Great Boulder Perseverance plant in the month of November caused the throwing out of employment of a large number of workers, and a considerable decrease in the monthly gold yield. The new plant is being installed with all expedition. At the North end of the field vigorous prospecting has been pursued, in many instances with encouraging results. In the outlying centres of Mount Monger and Bulong there are indications of renewed activity and the prospectors are hopeful. The indications point to continued satisfactory progress for this the premier goldfield of the State.

#### EAST MURCHISON GOLDFIELD.

The output of gold for the year was 155,909 fine ounces, and for the preceding year 144,792 fine ounces, an increase of 11,117 fine ounces. No copper was reported, but in 1908 6.77 tons valued at £69 were raised. In the Lawlers district the output shows an increase, and progress has been steady and encouraging. A State Battery is in course of erection at Mount Sir Samuel, which should result

in increased prosperity to this centre. In the Black Range district also the output shows an increase, and the various centres have been opening up satisfactorily. At Youanme a State Battery commenced operations during the year, and has proved of great benefit to prospectors. The railway from Mount Magnet to Sandstone will be completed early in 1910, and should be of immense benefit to the district. The outlook for this field is most promising.

#### GASCOYNE GOLDFIELD.

Mining is still at a standstill in this field, nothing being done with the exception of a few dry-blowers at Bangemall, who appear to be only making tucker. No gold was reported.

#### GREENBUSHES MINERAL FIELD.

The output of black tin for the year was 458.75 tons valued at £34,786, and for the preceding year 576.33 tons valued at £41,046, a decrease of 117.58 tons valued at £6,260. Tantalite of the value of £214 was also produced, but none in the preceding year. For the first nine months of the year mining was very dull, but during the closing three a decided improvement was noticeable, and the price of tin showed an increase. There are now nine (9) dredging plants operating with satisfactory results. Attention has also been again directed to lode mining, resulting in a large body of low grade material being discovered on the Cornwall mine which can be profitably treated. The outlook for this field is more promising than at the commencement of the year.

#### KIMBERLEY GOLDFIELD.

The output of gold from this field was 135 fine ounces, and for the preceding year 150 fine ounces, a decrease of 15 fine ounces. The gold won was all alluvial, no reef mining having been carried on. A sluicing and dredging claim was taken up on the Mary River about 40 miles from Hall's Creek, and a plant erected, but the result being unpayable work was discontinued. Several prospecting parties have passed through to Tanami, a place about 25 miles East of the boundary between South and Western Australia. Although rich gold was discovered during the year, the question of this field being a payable one is still unproved. There is nothing to indicate any improvement in the future prospects of the field.

#### MOUNT MARGARET GOLDFIELD.

The output of gold for the year was 155,865 fine ounces, and for the preceding year 153,597 fine ounces, an increase of 2,268 fine ounces. No copper was reported, but in the preceding year 4,404.10 tons valued at £20,221 were raised. In the Mount Margaret district there was an increase in the output which it is hoped will be maintained, the Lancefield mine having resumed operations. The Mount Morgans district remains quiet and shows a decrease in output for the year. Assistance was rendered by the Government to a local syndicate at Mount Morgans to carry out boring operations, and further assistance is contemplated to follow up some promising indications met with whilst boring. The Mount Malcolm district shows an increased output, and at Leonora in particular the developments are most satisfactory. The operations of the drilling syndicate referred to in last year's report did not meet with any success. The outlook for this field is most promising.

## MURCHISON GOLDFIELD.

The output of gold for the year was 133,106 fine ounces, and for the preceding year 157,848 fine ounces, a decrease of 24,742 fine ounces. 608 tons of copper ore valued at £2,823 were raised, but none in the preceding year. In the Nannine district the developments in various centres are very encouraging, and Meekatharra continues to progress. A railway from this centre to Nannine is now in course of construction. In the Mount Magnet district the Saint George mine showed an improvement in output towards the close of the year. From the Revenue lease at Mount Magnet a sensational crushing of 78 tons for 517 ounces, with nearly two ounces per ton in the sands, was reported. The other centres remained stationary. In the Cue district no developments worthy of note have transpired, but at a locality known as Poona, about 35 miles North-Westerly from Cue and about 40 miles West from Tuckanarra, two prospectors discovered tin, which attracted a good deal of attention at the time, but after about £118 worth of tin had been raised the find was abandoned. In the Day Dawn district matters are still quiet, and unfortunately the production from the Great Fingall mine has not yet shown any improvement. The outlook is, however, regarded as hopeful.

## NORTHAMPTON AND YANDANOOKA MINERAL FIELDS.

Very little mining work was done in these fields consequent on the low prices ruling for base metals. No ore was reported as having been raised.

## NORTH COOLGARDIE GOLDFIELD.

The output of gold for the year was 79,399 fine ounces, and for the preceding year 91,251 fine ounces, a decrease of 11,852 fine ounces. In the Menzies district matters are much the same, but the Maranoa mine, about three miles East of Menzies, is opening up well, and a 10-head battery and air compressor have been erected upon it. The Comet Vale, Mt. Ida, and Yundaga centres are promising well. In the Ularring district the only find reported was from a locality 90 miles West of Davyhurst, but although about 170 ounces of specimens were reported nothing further has been done. In the Davyhurst centre some good crushings have been put through from the Resurgam mine, which is still on payable ore. In the Ularring centre the Redleap mine, formerly known as the Cardinal, has been developing well. At Mulline a good deal of prospecting has been pursued with encouraging results. At Mulwarrie only a few leases are being worked. In the Niagara district vigorous prospecting has been pursued, and at the Orion mine an improvement was reported. In the Yerilla district nothing of note transpired. The outlook for this field is promising.

## NORTH-EAST COOLGARDIE GOLDFIELD.

The gold output for the year was 25,462 fine ounces, and for the preceding year 27,073 fine ounces, a decrease of 1,611 fine ounces. Nothing of note occurred in this field during the year. Prospecting has been steadily pursued in the outlying centres, and in the immediate vicinity of Kanowna, on the whole with promising results. The outlook is encouraging.

## PEAK HILL GOLDFIELD.

The gold output for the year was 7,919 fine ounces, and for the preceding year 7,980 fine ounces, a decrease of 61 fine ounces. There is nothing of note to report from this field, there being only a few shows working in addition to the mine belonging to the Peak Hill Goldfield, Ltd. The operations of the latter show a profit, but no notable developments transpired.

## PHILLIPS RIVER GOLDFIELD.

The output of gold for the year was 6,714 fine ounces, and for the preceding year 4,405 fine ounces, an increase of 2,309 fine ounces. The production of copper was 7,330.70 tons, valued at £29,815, and for the preceding year 2,015.71 tons, valued at £9,233, an increase of 5,314.99 tons, valued at £20,582.

In the early part of the year the Hopetoun-Ravensthorpe railway was taken over by the Government, and this has resulted in a considerable reduction in the costs of smelting and mining. There is little to record in the way of new finds, as prospecting has been practically at a standstill, but a great deal in the direction of development of mines held has been accomplished, and with encouraging results. The most important find was in the Gem Consolidated, at Kundip, where a highly payable lode was struck at 130 feet. Excellent work is being carried out by the smelter, and the prospects of the field are very promising.

## PILBARA GOLDFIELD.

The output of gold for the year was 6,764 fine ounces, and for the preceding year 6,966 fine ounces, a decrease of 202 fine ounces. Black tin to the extent of 293.96 tons valued at £22,431 was raised, and during the preceding year 403.03 tons valued at £30,636, a decrease of 109.07 tons valued at £8,205. Tantalite of a value of £113 was also produced, and 2.83 tons of asbestos valued at £154. There was no activity in mining, the general tendency being to mark time pending the construction of the railway from Port Hedland to a point when reductions in the cost of transport will allow of mining operations being more favourably and economically carried on. The Marble Bar centre has shown some activity consequent on the proposal to erect a State Mill, and a good many leases and prospecting areas have been taken up. A valuable surface deposit of copper was located a few miles South of Marble Bar, which promises to develop into a payable proposition if the values continue at depth. In the Nullagine district operations have practically been confined to 20-Mile Sandy and East-ern Creek.

*Tin Mining.*—The output of tin was 294 tons, the centres contributing being Moolyella, Cooglegong, and Wodgina. The latter showed an increase of 51 tons over the preceding year, and this would have been larger but for an accident to the plant on the Cassiterite mine which necessitated the closing down of the plant.

*Asbestos.*—The production of this mineral shows a decrease on the preceding year, caused through the Pilbara Asbestos mine being under exemption. This property at the lower levels is looking splendid, and the installation of machinery should ensure a prosperous future. The outlook for the field is considered hopeful.

## WEST PILBARA GOLDFIELD.

The output of gold for the year was 1,540 fine ounces, and for the preceding year 1,006 fine ounces, an increase of 534 fine ounces. Copper ore to the extent of 7,135.50 tons valued at £62,447 was produced, and during the preceding year 1,486 tons valued at £17,691, an increase of 5,649.50 tons valued at £44,756. This field shows a marked improvement, and there are indications of its continuance during the coming year.

## WEST KIMBERLEY MAGISTERIAL DISTRICT.

In this district a find of alluvial gold in the vicinity of Obagooma and Yampi Sound was reported, and prospecting parties are now operating in the locality. Little has been done on the iron deposits at Yampi Sound, only five tons of ore having been shipped. A considerable amount of work has been done at the wolfram find 70 miles East of Derby, and about 16 tons of ore raised. A deposit of coal at Lower Liveringa Station in the valley of the Fitzroy was reported. The warden reports that in his opinion the reported discoveries at Tanami have had the effect of attracting prospectors who would otherwise have devoted their energies to this district.

## YALGOO GOLDFIELD.

The gold output for the year was 1,805 fine ounces, and for the preceding year 551 fine ounces, an increase of 1,254 fine ounces. No copper ore was reported, but in the preceding year 9.50 tons valued at £97 were raised. There has been an improvement in the progress of this field, and in nearly all the centres mining has shown a revival, but the results at Messenger's Patch consequent on the commencement of the State Mill have not come up to expectations. The outlook for the field is hopeful.

## YILGARN GOLDFIELD.

The gold output for the year was 20,909 fine ounces, and for the preceding year 22,163 fine ounces, a decrease of 1,254 fine ounces. The year has been marked by considerable activity throughout this field, and in most of the centres the results obtained justify most optimistic forecasts being made. At a locality about six miles North of Hope's Hill a big outcrop was discovered by two prospectors, and although in the absence of development work it is premature to express any definite opinion the indications point to the field being a most valuable one. The outlook for the coming year is most promising.



## PART VIII.—EXISTING LEGISLATION.

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

- (1.) "The Mining Act, 1904."
- (2.) "Sluicing and Dredging for Gold Act, 1899."
- (3.) "Mines Regulation Act, 1906."

(4.) "Coal Mines Regulation Act, 1902."

(5.) "Mining Development Act, 1902."

No fresh legislation was enacted during the year, but a new Regulation, No. 70A, and additions to Regulation No. 97 and Form No. 59 under "The Mining Act, 1904," were gazetted.

## PART IX.—INSPECTION OF MACHINERY.

The Chief Inspector of Machinery reports that operations under the Inspection of Machinery Act have been somewhat retarded during the past 12 months owing to shortness of staff, which fact fully accounts for a decrease in the number of inspections and surveys made and consequent falling off of revenue derivable therefrom.

At the end of the year the number of boilers on the registers was 3,402 as against 3,340 on the corresponding date last year.

One thousand eight hundred and sixty-nine thorough inspections were carried out and seventeen hundred and eighty-one certificates granted, as compared with 1,988 and 1,877 respectively for 1908.

During the year 9 boilers were constructed in the State.

There has been an increase of 162 in the total number of registrations of machinery plants, which now amount to 2,694.

Sixteen hundred and thirty-three of these plants were inspected and 1,515 certificates issued, repre-

senting an increase of 195 and 142 respectively over last year's figures.

The machinery and boilers of 43 vessels registered under "The Boat Licensing Act, 1878," were surveyed, and 113 surveys under the Navigation Act were carried out.

Two hundred and fifty-two candidates for engine-drivers' certificates were examined, and certificates as shown hereunder were granted:—

1st Competency	..	..	..	..	37
2nd Competency	..	..	..	..	43
3rd Competency	..	..	..	..	76
Loco. and Traction Competency	..	..	..	..	17
Traction Competency	..	..	..	..	3
Marine Competency	..	..	..	..	8
Interim Certificates	..	..	..	..	23
Copies of lost and destroyed certificates	..	..	..	..	18
Total	..	..	..	..	225

In carrying out inspection and other work a total distance of 35,601 miles was travelled.

## PART X.—SCHOOL OF MINES.

The School has continued to make good progress during the year, the sixth of its existence.

In the first term there was an increase in the number of individual students, but consequent on a strike in the firewood industry, which caused loss of employment to some of the students, the numbers showed a decrease for the remainder of the year. The total of enrolments, however, was greater than for the previous year. The system of free

assays for prospectors has been continued. A total of 681 assays and determinations was made. The Museum, which is kept open each afternoon, continues to be a source of interest and instruction to a fair number of visitors.

Full details of the work of the school will be found in the report of the Director, published as Division VI. to this report.

## PART XI.—DEPARTMENTAL.

TABLE 26.

## CORRESPONDENCE.

*Letters, Telegrams, etc., despatched during 1909.*

Branch.	Letters.	Telegrams.	Circulars and Advices.	*Statistics and Publications.	Total.
Analytical and Explosives ... ..	2,800	60	350	66	3,210
Chief Accountant ... ..	6,515	112	4,024	...	10,651
Correspondence ... ..	5,599	1,151	5,076	5,500	11,826
Geological Survey ... ..	1,292	63	144	4,992	1,799
Inspection of Machinery ... ..	5,565	320	40	24	5,925
Mines Water Supply ... ..	2,930	423	392	...	3,745
Registration ... ..	9,496	585	300	4,334	10,381
State Batteries ... ..	6,114	460	4,616	...	11,190
Statistical ... ..	168	110	325	1,200	633
Survey and Drafting ... ..	437	26	...	...	463
	40,916	3,340	15,567	16,116	59,823

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

*Inward Correspondence.*

Branch.	1908.	1909.
<i>Correspondence Registered.</i>		
Correspondence ... ..	7,650	8,087
Analytical and Explosives ... ..	2,245	2,112
Geological Survey ... ..	1,422	1,520
Mines Water Supply ... ..	4,674	3,353
Machinery ... ..	8,409	7,723

By comparison with 1908, as appearing at page 28 of the Departmental Report for 1908, it will be seen that, with regard to letters, telegrams, etc., despatched, there is a decrease of 651 against the increase of 3,858 for the year 1908.

TABLE 27.

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

	1908.		1909.	
	No.	Area.	No.	Area.
Surveys on Eastern Goldfields ... ..	406	8,042 acres.	370	4,370 acres.
Surveys on Central Goldfields ... ..	278	3,655	288	4,320
Surveys on all other Fields ... ..	159	5,517	95	6,226
	843	17,214	753	15,176

In addition to the above 184 groups of Business and Residence Areas were surveyed, and in the preceding year 122; also 100 miles 6 chains of roads, connections, traverses, etc., and in 1908, 108 miles 5 chains.

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, 1910.

H. S. KING,  
Under Secretary for Mines.

## DIVISION II.

### REPORT OF THE STATE MINING ENGINEER FOR THE YEAR 1909.

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

Office of the State Mining Engineer,  
Mines Department, Perth, 21st March, 1910.

Sir,

For the information of the Hon. the Minister for Mines, I have the honour to submit the following report on the work of this office for the year 1909:—

*Inspection of Mines under "The Mines Regulation Act, 1906," and "The Coal Mines Regulation Act, 1902."*

During 1909 there have been no changes of any consequence in the stations or personnel of the Inspectors of Mines. Inspector Cullingworth took over charge of the Mt. Margaret district early in the year.

*Inspector's Examination.*—In May an examination was held at Kalgoorlie in accordance with Sec. 5 of "The Mines Regulation Act, 1906," at which three candidates selected from the applicants in the previous year were entitled to be examined. Two presented themselves, and were examined both by means of written papers and orally. Both candidates, Messrs. E. D. Cleland and H. P. Rockett, were successful in passing the Examination, and Mr. Cleland was thereupon confirmed in his appointment as Relieving Inspector of Mines and Inspector for the Phillips River, Greenbushes, and Northampton fields. Copies of the Examination papers are appended to this report (Appendix No. II.). The Board of Examiners consisted of the State Mining Engineer (Chairman), the Director of the School of Mines of W.A., and Inspector of Mines Hudson.

*Inspectors' Reports.*—The Inspectors of Mines have sent in their Annual Reports, reviewing their work for the year 1909, and describing the progress of mining in their districts, the substance of which is contained in the following excerpts:—

#### PILBARA GOLDFIELD.

The Acting Inspector of Mines, Mr. P. C. Riches, reports on 3rd February, 1910:—

*"Mining Generally.*—During the whole of the year mining generally has been in a languishing state. This has been caused, not through unfavourable developments in any of their various properties being worked or prospected, but simply because all mining men are marking time, waiting for the railway, now in course of construction between Port Hedland and Marble Bar, to reach a point when reductions in the present cost of transport will allow of mining operations being more favourably and economically carried on. The one notable exception to the general dullness in mining centres is Marble Bar; there the prospect of speedy erection of a Government crushing plant has been the means of inducing prospectors to take up a good many leases and prospect-

ing areas. Stone is being raised in considerable quantities, and there is every prospect of the battery when erected being fully employed for some long time ahead.

"A valuable surface deposit of copper has been located a few miles south of Marble Bar, which, with the advent of the Railway, should turn into a very payable proposition, that is, of course, if values at a depth are anything like those on the surface.

"The output of gold for the year from the whole goldfield was 6,763.47 fine ounces; of this 5,117.20 ounces were obtained from 3,244.25 tons crushed; 1,390.30 ounces were alluvial gold and 255.90 ounces dollied gold.

"In the Marble Bar district 785 tons were crushed for 1,205.30 fine ounces, and in the Nullagine district 2,459.25 tons were treated for 3,911.97 fine ounces; it will easily be seen from these figures that the reefs throughout the district still keep up their high crushing average.

"In the Nullagine District most of the mining operations have been in the vicinity of the State Battery at 20 mile Sandy, and at Eastern Creek. The Government Battery at 20 mile Sandy has been a godsend to the miners in that neighbourhood; without it most of the shows now profitably worked would be abandoned.

*"Warrawoona.*—At Warrawoona the Klondyke Boulder Syndicate, with Government assistance, is putting down a new main shaft; at a depth of 128ft, a piece of bad ground has been encountered, and sinking has been temporarily suspended. This mine has in the past been a very consistent gold producer.

#### TIN MINING.

"The tin-mining industry has during the past year been in a somewhat dull condition, the total output from the field being 293.91 tons; of this Moolyella contributed 124.00 tons, Cooglegong 82.25 tons, and Wodgina 87.65 tons. Wodgina is the only centre that shows an increase on 1908, viz., 50.85 tons; this amount would have been very much larger but for an unfortunate accident to the machinery on the Cassiterite Mine which has necessitated the closing down of the plant.

#### ASBESTOS.

"The output of asbestos is not as large as for the year 1908; this has been caused through the leases of the Pilbara Asbestos Company being under exemption. At the lower levels the prospects of this property look splendid, a long shoot of valuable fibre having been exposed. As soon as the necessary ma-

chinery for working this property is installed a prosperous future for asbestos mining in this district is assured.

*"Mining Accidents.*—During the past year there have been four mining accidents, one being fatal, two serious, and one minor.

*"Water Supply.*—The water supply of the field has been well attended to, and there is now a permanent supply on all routes, centres, and auriferous areas.

*"Pastoral.*—After having experienced a very dry summer, copious winter rains fell in June and July. The wool clip for the district was a most satisfactory one; this, combined with the high price of wool at present existing, has made the outlook a most satisfactory one from a squatter's point of view.

"With the advent of the railway, the rails of which should be close to Marble Bar by the end of 1910, a new and prosperous career for this field can confidently be expected; the large deposits of gold, tin, copper, and asbestos that are only awaiting cheaper means of working should put this field in the forefront of the mining fields of Western Australia.

"I look forward to the year 1910 with confidence, feeling that the depression that has so long hung over this field will now be a thing of the past."

#### CENTRAL GOLDFIELDS.

The Report of the Inspector of Mines, Mr. F. J. Lander, is dated 1st March, 1910, and says:—

"I have dealt with each mining centre separately, and have given particulars regarding the principal gold-producing mines. It is a matter of regret that the gold production has fallen off in the Cue and Day Dawn districts, but there has been a substantial increase in the Nannine district, principally owing to the big mines at Meekatharra.

*"Prosecutions under 'The Mines Regulation Act, 1906.'*—There have been no prosecutions during the year, a warning letter always having the desired effect when alterations have been ordered.

*"Accidents.*—During the year 48 accidents occurred, of which three were fatal and 45 serious.

#### TUCKANARRA.

*"The Nemesis G.M.*—This lease is owned by Messrs. McInnes & Lawrence. During the last 12 months a new main vertical shaft has been sunk. When I last visited this mine the shaft was down 175ft., the owners intending to stop at 200ft. During the year 225ft. have been sunk and 120ft. of driving done on the lease. 250 tons of ore have been stoped and crushed for a yield of 2,300 ozs. valued at £4 2s. per oz., and the mine is looking as well now as at any time in its history of eight years. A 38-h.p. Gas Producer plant is being installed for a 4-drill air-compressor.

#### REEDY'S.

*"The Rejected.*—This is a 12-acre lease, and is held by Messrs. Pooley & Kelly. A shaft 100ft. deep has been sunk, and a level at this depth driven north for 100ft. The reef is vertical and about 16ft. wide. At the 50ft. level a drive has been put in about 70ft., and at this point the ore is worth about 12 dwts. per ton. It is a low-grade proposition, averaging about 9 dwts. per ton, which is rather low, when the ore has to be carted 16 miles to the Tuckanarra Battery.

#### NANNINE.

*"The Nannine Mines.*—For some time this mine has been under a cloud, but recently the old Mount Hall reef has been opened up. At the 140ft. level, where 200ft. of driving has been done 150ft. north and 50ft. south, and at the 100ft. level, where 200ft. of driving has been done 100ft. north and 100ft. south, the reef is about 2ft. wide. Some very good crushings were put through during the year, and at the present time the mine is looking better than it has done for years.

*"Queen of the Lake.*—This is a Prospecting Area held by Messrs. Barry & Grey. A shaft has been sunk 25ft. and some driving done. In addition to this a lot of prospecting work has been done on the surface, and when I was there Grey had just struck a good leader, about 12in. wide, carrying good ore.

*"The Champion Leases.*—These have been taken up again and are being worked by six men. They are working about 40ft. below the surface on a reef about 6ft. wide and worth 15 dwts. per ton.

#### QUINN'S.

*"The Phoenix.*—The main shaft of this mine has been sunk 100ft. during the year, totalling a present depth of 175ft., at which depth a level has been driven 104ft. south and 40ft. north. The 75ft. level has been driven 50ft. south and 20ft. north. The present owners of this property have crushed about 250 tons worth 7 dwts. per ton, and have also crushed 133 tons for the public. The mine is looking better than at any time during its existence.

*"Phoenix Extended.*—This property of 12 acres is held by Kerr and party. A main vertical shaft has been sunk to a depth of 90ft., and the reef cut with 6ft. of a crosscut. The reef averages 3ft. wide and the ore is worth 42s. per ton. At the 85ft. level a drive has been put in 90ft. south and 100ft. north. A rise is now being put up to the surface. 415 tons of ore have been put through the battery during the year for a return of 215 ozs. 5 dwts. over the plates.

*"The Commonwealth.*—This is a 12-acre lease held by Bowie and party. A main underlay shaft has been sunk on the reef to a depth of 71ft. At this point a drive has been put in 24ft. The reef averages 2ft. in width and is worth 24 dwts. per ton. The crushing is done at the Princess Dagmar at a cost of 14s. per ton. The prospects are promising.

*"Princess Dagmar.*—This lease is held by a local syndicate, all of whom are working in the mine. When they took the mine over in March of this year, a vertical shaft was down 90ft. They opened out at 60ft. and drove 80ft. south and 50ft. north. There were only 14ft. of backs at this depth to the old workings, which they stoped out. This ore was worth 12 dwts. per ton. They then went to the bottom of the shaft and drove a crosscut 20ft. and cut the reef. A drive was then put in 100ft. south and 160ft. north. Altogether 462 tons have been mined and crushed for 272 ozs. by their own 5-head battery. At the bottom level going north a shoot of ore has been driven into about 20ft. which is worth nearly an ounce per ton. There is a 5-head battery on this mine, a small winding winch, also a 4in. pump in the bottom of the shaft, which pumps 5,000 gallons of water per 24 hours. The prospects of this mine are better than when the present owners took it over in March last.



*"The Millionaire.*—This is a Prospecting Area of 18 acres held by Pearce and party. This is a large ironstone formation. On this show a great deal of honest prospecting has been done. Two shafts, each over 40ft. in depth, have been sunk, and a lot of surface work done. It is too early to say what the future of this mine will be, but the prospects are promising.

*"Nuggety Hill.*—This is also a Prospecting Area, held by Mr. A. Barnett, who has done a lot of work on the property. The hill is a network of reefs carrying payable gold. More alluvial gold has been taken from this hill than from any area the same size in the State. The reefs are trending north and south and dipping west, the widest being 4ft. Mr. Barnett informs me that he has 100 tons of 10 dwt. ore lying on the surface.

#### GUM CREEK.

*"Hilda Nos. 1 and 2.*—This property of 14 acres is situated seven miles S.W. of the Gum Creek Hotel, and is held by a local syndicate of four men. The trend of the reef is north and south dipping east about 45 degrees. Hilda No. 1 has been worked for the past five years by John Fairey. The water shaft has been sunk 55ft. and opened out 2ft. above the water-level. The reef at this point is about 5ft. wide, and is worth 16 dwts. over the plates, and 6 dwts. in the sands. 24 tons were crushed from this shaft.

A main vertical shaft has been sunk to water-level about 300ft. north of the water shaft, and levels put in 75ft. south and 5ft. north. An underlay shaft was sunk to about 70ft. to the north of the water shaft, and all the ore taken from it is said to be worth an ounce per ton. This ore will not pay to cart to Nannine, over 60 miles distant. The first crushing of 24 tons gave a return of 2 ozs. per ton, the second a return of 2 ozs. 4 dwts., and the third crushing of 24 tons gave 22 dwts. per ton. In the latter case the quartz and formation were all put through, the full width being over 5ft. The fourth crushing of 45 tons gave 39 dwts. per ton. The line of reef has been tested for a length of 600ft. on the surface. The quartz varies from 2in. to 6in. wide, but the formation is more consistent, being composed of diorite schist and very flaky. There are 1,000 tons of ore now at grass that is estimated to be worth 8 dwts. per ton. This consists of the formation of the lode. There are also 15 tons at grass worth 1 oz. per ton.

*"Jupiter.*—This is a 12-acre lease held by John Pentland, Joseph Coleman, and Alfred Burrows, who took up the property about six months ago, and in that time a shaft has been sunk on the underlay 64ft., and a drive put in 36ft. south and 12ft. north. The 36ft. have been stoped to the 50ft. level. At the 50ft. level it was driven for 15ft. north and 30ft. south. 100 tons of 52 dwt. ore have been crushed at the Nannine State Battery, and there are 60 tons of low-grade ore, worth about 12 dwts. per ton, at grass too poor to be carted such a distance.

#### BARRAMBIE AND ERROLLS.

"This district has quite recently been so fully reported on by the State Mining Engineer that there is nothing further to report.

#### PEAK HILL.

*"Peak Hill G.M.*—The ore that is being crushed at this mine is taken from a large open cut. The value of the ore is less than 2dwts. per ton. A lot

of prospecting work has been done in the past 12 months by the Company, but as yet nothing of value has been found. The present Manager has been fighting under unusual difficulties, and it is a great pity his efforts have not been crowned with more success. For the year the Company treated with their 40-head mill 75,171 tons of ore, and cyanided 19,092 tons of sands for a total return of 7,081 ozs. 10 dwts. of fine gold, being an average of 1dwt. 21.22 grs. per ton milled, and the profits from this very low-grade ore amounted to £1,861 9s. 6d. The total footage development amounted to 2,179ft. The Company were successful in getting the lake at the battery filled with flood water during the year, and this cheap and plentiful water supply, coupled with the big tonnage put through, was a great assistance, as the tonnage was the largest for any year in the history of the mine. An average of over 100 men was employed for the year.

*"Old Irish.*—This lease is held by Mahony and party, and contains 24 acres. The reef is 3½ft. wide and is running north and south and dipping east at an angle of 12 degrees. There are two shafts sunk on the property, 38ft. and 64ft. respectively. 265 tons of ore have been taken out of this mine for an average of 15 dwts. per ton over the plates. There are four men working, and they are very hopeful that it will turn out a good property. At the present time it is the most promising show in the whole group at the Ravelstone.

*"Prospecting Area held by Pat Murphy.*—The reef is 15in. wide, trending north and south and dipping east at an angle of 45 degrees. When I visited this area there were 30 tons of ore at grass which was estimated to be worth 15 dwts. per ton.

*"Anglo Saxon.*—This is a 6-acre lease held by Thomas Wilson. 12 ozs. of gold have been dollied on this property from a reef a few feet below the surface. The reef is about 2ft. wide and dips east.

*"Oversight.*—This lease, which is held by Messrs. Flaherty and party, is the old property that was worked some years ago by Woolhouse and party. At the present time work is being done at the 80ft. level on a fairly large kaolin formation with veins of quartz running through it. Very rich patches are sometimes found, but the average value is about 10 dwts. per ton.

#### BURNAKURRA.

*"Federal City.*—The battery has run one shift per day during the year. 2,193 tons have been crushed and 4,112 tons of sands cyanided for a return of 1,309 ozs. 437 tons have been crushed for the public for a return of 322 ozs. 5 dwts. During the year no sinking has been done, but 163ft. have been driven principally at the No. 1 level on a new reef about 2ft. thick, prospecting about 10 dwts. About 50,000 gallons of water have to be pumped per day to keep the mine drained to the 140ft. level, where driving is at present carried on. The Manager and shareholders are hopeful that the present good development will continue and that the mine will be running full time in the near future.

*"Old Alliance.*—These mines are under exemption and practically no work done on them for the past 12 months.

A good deal of prospecting work is being done round Burnakurra.

## GABANINTHA.

"Mining matters are very quiet at this centre. A party of tributers have been working the Mountain View and Tumbulghum leases, but have abandoned the tribute to try elsewhere.

## STAR OF THE EAST.

Nothing is being done at this centre.

## YALOGINDA.

"*Great Oversight.*—This property is worked by Messrs. Newton, Synot, Ord, and McKnight, and consists of 18 acres. One shaft, 82ft. deep, has been sunk on the property and a winze has been sunk 10ft. below the shaft. At the 50ft. level 20ft. of driving has been done, and at the 82ft. level 15ft. of driving. At the surface there is a large formation 60ft. wide with numerous quartz veins running through it. A lot of costeening has also been done, which shows the formation to be consistent both as to width and quartz leaders. 12 tons of this formation were crushed at the Meekatharra State Battery for 12 dwts. per ton over the plates and 3 dwts. in the sands. The main shaft is 130ft. deep, and at that level a crosscut west has been driven 110ft. and east 50ft. At the 100ft. level a crosscut has been driven 80ft. west. At the 50ft. level a drive 50ft. south was put in. There is a winze from the 50ft. to the 100ft. level.

"*Gibraltar.*—This is a 12-acre lease. The lode is visible on the surface for 15 chains, and the formation has been proved for the full length of the lease. Six shafts have been sunk, one of which is 130ft. deep. Four others are 50ft. and one 20ft. in depth. A crushing of 100 tons was taken from the No. 5 shaft and gave a return of 4½ dwts. over the plates and 2 dwts. in the sands. The lode is 42ft. wide in the crosscut at the 50ft. level, with clean walls. At the 100ft. level it is 40ft. wide. The formation is composed of laminations of quartz, schist, and kaolin, and is estimated to go 6 dwts. per ton. Water was struck at the 130ft. level, and a crosscut is now being driven to cut the lode. The owners, Messrs. Newton, Ord, and party, are very sanguine regarding future prospects.

"*Revenue.*—This mine has just started after a lengthy period of exemption. The syndicate made a mistake in not sinking a new main shaft or stripping the old one before erecting their machinery. Four men only are working above water-level.

"*Karangahake.*—This mine is forging ahead and is looking very well. The bottom level is being driven and connections made with the upper levels. The following work was done during the past 12 months:—Levels, 590ft.; winzes and rises, 476ft.; crosscutting, 215ft. More than enough water to keep the 10-head mill going full time has been struck in a crosscut east of the bottom level. The ore in this mine occurs in large lenses, varying in length and width, and in some places peter out to nothing. Cyanide plant, Cornish boiler, and Berdan pans were erected during the year, and 9,000 tons of ore milled. The prospects of the mine are fairly good.

"*Batavia.*—This lease has passed into the hands of a new syndicate, which proposes to erect machinery and develop the mine, the main shaft of which is 100ft. deep and the reef 14ft. in width.

## MEEKATHARRA.

"*Ingliston Consols.*—Developments and progress on this mine for the past 12 months have been very satisfactory. The main shaft is now down to a depth of 384ft., having been sunk a further depth of 140ft. The last 110ft. of sinking was in lode formation interspersed with quartz leaders, a trial crushing of 100 tons yielding 63 ozs. 18 dwts. smelted gold. The No. 2 level north has been extended 106ft. in fair values all the way. In another 30ft. it is expected to reach the rich north chute coming down from No. 1 level. Stopping is being carried on over the back of north level for the whole distance. Average width of stops 9ft., value about 15 dwts. per ton. No. 2 level south has been extended to the Fenian boundary, total distance from shaft being 236ft. Here a winze has been sunk 90ft. on a highly payable reef. Stopping has been carried on over the back of this level for a distance of 120ft., and, although the reef only averages 9 inches in width, is highly payable, being worth 2½ ozs. per ton. During the year 10 head of stamps were erected, a cyanide plant installed, and a 7in. plunger sand pump erected. For the 12 months 4,712 tons were crushed, 2,496 cyanided, and £5,900 paid in dividends.

"*Ingliston Extended.*—On this lease a good amount of work has been done, the total being 2,695ft., made up as follows:—Driving, 826ft.; crosscutting, 1,135ft.; rising, 131ft.; sinking, 558ft., and winzing, 45ft. A new reef has been cut in a shaft sunk north of the old main shaft, but sufficient work has not been done in it to enable one to form a correct opinion as to its value. The prospects of the mine are bright, and good profits should be made during the forthcoming year.

"*Fenian.*—This mine continues to pay enormous dividends to the shareholders, and there is every likelihood of its continuing to do so for a long time to come. During the year a large amount of development work was done and some new plant installed. 10,918 tons were crushed for 13,039 ozs. 10 dwts. 17 grs., 5,150 cyanided for 1,053 ozs. 2 dwts., and 1,640 tons of accumulated sands treated at the State Battery for 654 ozs. 18 dwts.; total, 14,747 ozs. 10 dwts. 17 grs. for the year.

"*Marmont.*—Good development work, principally sinking and driving, has been done on this mine for the year, and the prospects are very satisfactory. Splendid dividends were paid to the shareholders during the year. There has been a good deal of friction between the shareholders for some time, and this has seriously interfered with the working of the mine. Now that there is a change in the management it is to be hoped that even better results will be obtained.

"*Macquarie.*—This lease, consisting of 12 acres, is held by S. Sabelberg and party, employing five men. The main shaft is 115ft. deep and the formation about 20ft. wide. It is principally worked on the open cut system. For the 12 months 1,700 tons of low-grade ore were crushed for 3 dwts. 15 grs. over the plates.

"*Lease 93N.*—Mr. John Savage has held this lease for about 12 years. The deepest workings are 135ft. At the 50ft. level the reef, which is of solid friable quartz, is 35ft. wide. At the same level 130ft. south the reef was tested by a crosscut 40ft. and the hanging wall not reached. At the 90ft. level the reef was driven on south 150ft. and not crosscut. At the present time work is being done at the 135ft. level.

Here the reef has been cut, and driving north is proceeding to connect with the 150ft. south drive of the 90ft. level. There are about 210ft. between the two shafts, and a rise or winze will be made to connect them. 979 tons have been treated for 465 ozs. over the plates.

*"Pioneer.*—The main shaft on this lease is 180ft. vertical. A crosscut was put in south-east for 100ft. and cut the reef. There a winze has been sunk 50ft. on the lode and cut the reef, which is 5ft. wide, averaging 22 dwts. per ton. At the bottom of this winze a drive was put in 35ft. north, the reef being 4ft. wide and averaging 19 dwts. 2 grs. per ton. A rise has been put up from this level to connect with the upper workings, and stoping has begun on quite a new make of fairly rich stone, 3ft. wide. An option was held over this lease by the party who put up the rise, and they considered the stone had petered out going north, but they were incorrect in their supposition.

*"Pioneer South.*—This lease, which is owned by Mitchell and party, has a shaft down to a depth of 80ft. and a crosscut of 50ft., at the end of which the reef has been cut, being about 2ft. 6in. wide and worth 8 dwts. A local syndicate own this lease, and they are very sanguine that it will show up better at a depth. It is to be hoped so, as they are spending much money in development work.

*"Democrat.*—This property, which is held by a local syndicate, is being worked at a depth of 60ft. on a network of small veins, some of which are very rich. The syndicate intend pursuing a vigorous development policy and trust to be rewarded in the near future.

#### CUE.

*"Lloyd's Leases.*—A good deal of work has been done on these groups of leases, the principal crushings being:—Light of Asia, 5,127 tons for 3,550.75 ozs; Agamemnon, South Volunteer, and Queen of May, 331 tons for 127.55 ozs.; and from cyaniding 5,212 tons, 546.25 ozs. were obtained. 1,865½ tons of stone for 1,248.75 ozs. were crushed for the public from shows all within a three-mile radius of the battery. During the year 1,078ft. of sinking, rising, and driving was done on these leases, 556ft. being done on the Light of Asia. An average of 47 men were employed for the year, and the future prospects are most promising.

*"Princess Royal.*—This lease is held by a local syndicate who, in 1908, took a two years' working option over the property. During the year the main shaft was sunk 72ft. (total depth 312ft.), 300ft. of driving was done, and a rise of 114ft. to the level above. From the bottom level a winze 52ft. was sunk with the reef 12in. wide, worth 1oz. to the ton. The developments and crushings were so satisfactory that the Syndicate completed the purchase last October for £4,000.

*"Countess.*—This is a 20-acre lease situated one mile north of Cue and taking in the main Table-Top. The main shaft has been sunk 180ft to water-level, and is well timbered all the way. 200ft. of a crosscut had to be driven to cut the reef outcropping north of the Table-Top. A rise from this point was put up and connected with a winze put down below the old workings. A drive was put in west 100ft. and stoping commenced on the reef, which is 1ft. wide and worth 1 oz. per ton.

*"Dew Drop.*—This is a 12-acre lease held by Dawson and party, and its prospects are very bright. The main shaft is 60ft. vertical, and from that point is sunk on the underlay 120ft., making 180ft., and going on to water-level. All this work has been done during the past year. The stone goes 1 oz. per ton.

*"Starlight.*—This property is held by Rogers & Streuffert. There are 17 acres in their two leases, on one of which a main shaft is being sunk to water-level. At the present time the shaft is down 164ft., and water is expected to be met at 180ft., when 60ft. of a crosscut will have to be driven to cut the reef, which will give them at least 100ft. of backs. 238½ tons have been crushed during the past year for 150.50 ozs., the gold being worth slightly over £4 per oz.

"Almost all the smaller shows round Cue mining centre are doing fairly well.

#### EELYA.

*"Jasper Queen.*—This lease is situated about 16 miles north-east of Cue, and has a main vertical shaft sunk and closely timbered to a depth of 130ft. A chamber has been cut at this level and the reef intersected. The reef is 2ft. wide and worth over an oz. per ton. Water-level is 70ft., and there are 16,000 gallons per hour. Three shifts are continuously employed sinking. For the past year 123 tons crushed yielded 481 ozs., the gold being worth £4 1s. per oz., and the prospects of the mine are good.

#### MINDOOLAH.

*"Bertram's Reward.*—During the year Messrs. Chesson & Heydon worked the above mine and installed a pumping engine at the 120ft. level, where a crosscut was put in 50ft. and cut the reef, which was about 9in. on the footwall and 12in. on the hanging, with mullock between. This was on the west side of the crosscut. On the east side the drive was put in for about 40ft., then a crosscut was put back through the hanging wall 38ft. and cut a reef about 10in. wide, carrying fair ore. On the west side stoping has been done on a block of stone, but the reef is small. Water is giving the owners some trouble, about 24,000 gallons per day being pumped out. The management seem to be unable to make this mine pay, and I am afraid it will soon be abandoned.

*"Mindoolah Main Reef.*—This mine has done very little work during the year, and only a small number of parcels have been crushed for the public.

"The value of gold in this centre is only about £2 5s., and so mining matters are very dead.

#### DAY DAWN.

*"Great Fingall Cons., Ltd.*—This large mine has done a great amount of work for the year, and although the output has considerably decreased, a profit was shown. The work done was as follows:—

*Main Workings.*—767ft. driven, 702 risen, and 294 winzing.

*Smith's United.*—Shaft sinking, 128ft.; crosscutting, 98ft.

*Prospecting Area 122D.*—Crosscutting, 30ft.

*Diamond Drilling.*—This amounted to a total of 1,567ft. for the year.

*Plat Cutting, Winch Chambers, etc.*—A total of 1,152 cubic ft. for the 12 months. The average number of men employed was 368. The number of tons crushed was 140,982, and the total gold production over plates and from concentrates, sands, and slimes was 41,269 fine ozs.

"Extensive development work is being pushed ahead at the lower levels, with a view to further payable ore shoots being discovered at a depth.

*"Creme d'Or.*—Good work has been done on this lease during the past year. At the 100ft. level 120ft. of driving has been done, and 500 tons taken from there and the stopes yielded 405 ozs. over the plates. A 37 H.P. Crossley gas producer plant is to be installed, besides other new plant. They have about 10,000 gallons of water per day, and the owner's are pleased with the promising prospects of the mine.

*"East Fingall and Murchison Associated G.Ms.*—Very little work has been done on these leases for the year, but I am advised that a start will soon be made again.

*"Lake Austin.*—Very little work is being done on the Island. There are 5 men dryblowing and 6 working on reefs. Two men are working on the Golconda and 2 on the Eureka. There is one man on the Central and one on a Prospecting Area north of the Golconda. The men on the Eureka are working in a shaft south of the main shaft, and about 40ft. below the surface. The reef is 5ft. wide and worth about 8 dwts. per ton. A few years ago the Island was a little hive of industry, now it is almost deserted.

#### MT. MAGNET.

*"Morning Star.*—Good work has been done on this mine for the year, as shown as follows:—Crosscutting, 90ft.; driving, 344ft.; winzing, 79ft.; rising, 97ft. Good profits were shown for the 12 months, and the management are to be congratulated upon the economical working of the mine. Active development work is in progress, and the prospects of the mine are very good.

*"St. George.*—A good deal of development work has been done on this lease, principally driving and crosscutting. Owing to the very wet ground here the management has been put to great expense, and the returns for the year have not been as satisfactory as anticipated. The work done was:—Driving, 946ft.; winzes, 369ft.; crosscutting, 634ft.; shaft sinking, 17ft.; rises, 483ft.; making a total of 2,449ft. for the year.

*"Coronet.*—This lease, which is held by Messrs. Millen and Richards, consists of about 18 acres, and is about  $\frac{1}{4}$  mile south of the Morning Star. The main shaft is 90ft. deep, and here a drive was put in south 70ft. 534 tons have been crushed for an average of 15 dwts.

*"Morning Star North.*—The deepest shaft on this property is 90ft. This lease has shown some good returns, as the present party took out a crushing of 40 tons for 33 dwts. per ton over the plates, and 2 ozs. 12 dwts. in the tailings. A further crushing of 14 tons gave 2 ozs. 18 dwts. 9 grs. over the plates. The average width of the reef is 18in., and I consider the owners should do very well out of their mine.

*"Empress.*—This lease has been taken up again by Messrs. Grose and Atkinson, who have erected a 5-head mill, and are now crushing ore from the Galtee More and Dunboynee, two more of their leases. As the ore is easily obtained and easily crushed, the owners are satisfied they can make 3 dwts. over the plates pay them.

#### BOOGARDIE.

*"Jupiter.*—Since the last report by Mr. Cleland, 140ft. of driving has been done at the 100ft. level, 100ft. north and 40ft. south. 160ft. of rising has been done on two reefs, 3ft. and 2ft. wide, carrying fair values.

*"Invercauld.*—This mine is still being worked on the opencut, and only 25ft. of sinking has been done. The owners have crushed 320 tons for 125.25 ozs.

*"Haveluck.*—This lease is owned by Tognolini and party, who have done 112ft. of work above water-level. A crushing of 44 $\frac{1}{2}$  tons yielded 42 ozs. 5 dwts. over the plates, and 38 tons of sands gave 15 dwts. 14 grs. per ton. The owners are good workers and should do very well, as the prospects are most promising.

#### YUIN.

"This district is worthy of more attention than has been bestowed upon it by the prospector, and I would not be at all surprised if some good shows were opened up here.

*"Royal Standard.*—This mine has been taken over by Mr. E. L. Lloyd of Cue, and, with good management, should prove a far greater success than it has in the past. I consider it a good proposition. At present the leases are under exemption.

#### GULLEWA.

"Like the Island Lake Austin, Gullewa has fallen upon evil days. On the Phoenix G.M. a party of tributers are working but are doing very little good.

"Two Italians, J. Divitini and L. Parolo, are now working the Shanadoah as a Prospecting Area. When I was in Gullewa there were 100 tons of ore at grass which they were hoping to put through the Phoenix battery. They estimated the ore value at 15 dwts. per ton. The shaft from which the stone was taken is 60ft. deep on the underlay. The reef runs north and south and dips east, being 2ft. in width.

#### YALGOO.

*"Ivanhoe.*—Two men are employed in this mine in a shaft south-west of the old main shaft. This new shaft has been sunk 77ft. on the underlay. The ore is heavily charged with pyrites. The reef is 5ft. wide and valued at 10 dwts. per ton. At the present time 400 tons of ore are raised and carted to the battery, but Mr. Lowns informed me he did not intend to start crushing until he had 150 tons broken. This mine gives great promise of being very valuable in the near future.

#### FIELD'S FIND.

*"Field's Reward.*—This mine has been working on tribute since October, 1908. At the 340ft. level 40 feet of driving has been done. 368 tons of ore have

been broken, averaging 1 oz. per ton. The tributaries have also installed a Cornish lift, which deals with 40,000 gallons of water per day. They also purchased a winch, which is erected on the bottom level and is used for raising ore from a winze which is being sunk. At the present time the winze is 75ft. deep and in payable ore.

"There have been difficulties connected with the mine, but these are practically over and the prospects much brighter.

"*Crescent*.—This lease is held by Messrs. Parker and party, and consists of 36 acres. A shaft has been sunk on the underlay for 74ft. There are three parallel reefs on this property, all carrying payable gold, and being about 80 yards apart.

"*Prospecting Area held by C. Euridini*.—This is about 3 miles north of the Golden Grove Hotel. The reef is about 3ft. wide and worth  $\frac{1}{2}$  oz. per ton. There are a few tons of ore at grass.

"*Prospecting Area held by J. Oliver*.—This show, consisting of 18 acres, is situated about 3 miles south of the Golden Grove Hotel. The reef is about 5ft. wide and has been opened up on the surface for a distance of 16 chains. It is valued at 14 dwts. per ton. The reef runs north and south and dips east.

#### FIELD'S FIND ROAD.

"*McDonald and Hampton's Syndicate*.—This is a 24-acre lease situated 3 miles south of Messenger's Patch. Two shafts have been sunk on this property, one 76ft. deep and the other 60ft., both on the underlay. The reef at the bottom of No. 1 shaft is 7ft. wide and valued at 8 dwts. per ton. At the 40ft. level a drive has been put in 50ft. north and a leading stope taken off for 45ft. From this point a rise has been put through to the surface. The reef at the 40ft. level is 18in. wide and is worth 1 oz. per ton from there to the surface.

"*Prospecting Area 189*.—This consists of 9 acres, and is held by Mr. Adam Duffield. The reef is 2ft. wide running north and south and dipping west at an angle of about 30 degrees. Two shafts have been sunk, one on the underlay and the other vertical, the former being 55ft. deep and the latter 22ft. In the underlay shaft there are two drives going north and south each 25ft. in length. This is at the 40ft. level. At the bottom of the vertical shaft a crosscut was made and the reef cut. At this point the reef was 3ft. wide and valued at 12 dwts. per ton. This area is about  $\frac{1}{2}$  mile south-east of the battery site.

"*Vatican*.—This lease is 6 acres in extent and is situated on the left of the Field's Find Road, about 7 miles north-west of Golden Grove. It is held by Lewis Pope, and is worked by him and his son. 20 tons have been crushed at the Lennonville battery for a return of 30 dwts. per ton. The reef is 12in. wide and fairly easy to work.

"*Prospecting Area 185*.—This is held by Duncan McMurtrie, and consists of 18 acres. This is a continuation of the Vatican Reef North. A lot of prospecting work has been done on 6 chains of the reef. Several shallow shafts have been sunk and a considerable amount of open-cutting done. Two men work the Area.

#### MESSENGER'S PATCH.

"*Marloo*.—This lease is opening up much better than was anticipated. It consists of 12 acres, and is owned by Messrs. Messenger, Gilbert, and White. The mine is really a kaolin formation, 4ft. of which is very rich. The formation has been driven into

for 30ft. and no walls have yet been touched. 200 ozs. of gold have been taken out of this claim, valued at £3 17s. per ounce. This, without doubt, is a most valuable property.

"*Mug's Blow*.—The owners of this lease are still content to work quietly in their open cut, dollying enough gold for their present requirements. Messrs. Bradley and Bowes showed me some very valuable specimens of rich gold.

#### MELVILLE.

"*May Queen*.—At the time of my last visit no one was working on the property, and the following was supplied to me by Mr. Parker:—The prospecting shaft is down 80ft. The width of the reef is 22ft. and is of solid quartz. The hanging wall has not yet been met with. The owners have driven south 45ft. in the reef, which prospects 15 dwts. Driven north 155 feet; width of reef in face 7ft., value 15 dwts. A three-compartment shaft in good order has been sunk 124ft., a plat cut, and crosscut put in to reef. The depth of water in the main shaft is 44ft.

#### WEBB'S PATCH.

"*Hill End Murchison G.M.*—For five months of the year this mine did practically no work underground. At the present time the work is concentrated at the 160ft. level. Rock drills have been installed and a new Cornish boiler erected. The reef is 2 $\frac{1}{2}$ ft. wide, and worth about 15dwts. per ton. The manager informs me that the mine is assaying well. There are 1,200 tons of ore in reserve. 100,000 gallons of water are daily pumped from this mine. Local people hold the majority of shares in this property, and during the year, owing to some good crushings, the debts were paid off and a dividend of 2s. per share declared."

#### EAST MURCHISON GOLDFIELD.

The Inspector of Mines, Mr. H. Colbran, reports on 21st February, 1910:—

"The work for the year consisted of 207 mine inspections, 4,177 miles of travelling, 5 reports on applications for Government assistance, 4 investigations into complaints, 1 mining inquiry, 2 prosecutions, 3 attendances at inquests, and general office correspondence.

#### MINING.

"*Lawlers*.—No new developments have occurred in this centre during the past year. The Waroonga and Vivien mines still yield about 7,000 and 3 $\frac{1}{2}$  thousand tons per month respectively. Several of the smaller properties, such as the Sunrise, Vivien, Gem, and Dobra-Serica still continue to open up satisfactorily.

"*Sir Samuel*.—The mine which has kept this centre alive for so many years past, the Bellevue, Ltd., is doing very little at present, the last discovered lode, known as the West Lode, apparently having carried a very short chute of gold. About six of the old shows in Sir Samuel are, however, now being vigorously worked by prospectors, and when the State Battery, which is now being erected, commences to crush, a new impetus will be given this centre.

"*Kathleen Valley*.—Only one gold mine has been working at this centre during the year, the Yellow Aster. On it a new flat reef, yielding high-grade ore, has been stoped for some time, but now appears to be decreasing in size and values.

"A little copper mining has been done at this centre. The Cobar Copper Syndicate took up 170 acres and put down two shafts on a lode which, however, has to date proved disappointing at depth, as in one instance the lode has become very broken up and mullocky, and in the other has turned into a non-auriferous quartz reef. On another lode Mr. Tulloch has put down a shaft about 90 feet on good payable ore and done a little driving on it at that depth, and I believe intends continuing the driving just about water level to prove the length of payable lode.

"*Wiluna.*—At this centre the largest mine, the Gwalia Consolidated, continues to open up in a highly satisfactory manner, and boreholes have proved the continuance of pay-ore of good width to a depth of some 400 feet.

"The W.A., Golden Age, Bulletin North, Indicator, Moonlight, Hop, Bulletin, and Plain English are at present under option to the Oroya Brownhill Company, and vigorous sinking and driving are being done on the Bulletin mine to prove the continuance or otherwise of the pay-ore at depth and in length.

"Work has also been resumed on the Monarch, and at the date of my last visit (12-11-09) a winze, being put down on the reef from the 125 feet vertical level, was down about 50 feet, and showed 6 feet of good payable ore in the face. Other mines working payable stone were the Caledonian, Golden Bracelet, Golden Age South, and the Try Again. Should the development work being done by the option-holders above mentioned prove sufficiently satisfactory for the mines to be taken over and equipped with machinery, a great impetus will thus be given to Wiluna mining.

"*Bronzewing and New England.*—During the year the Bronzewing shaft has been put down to a depth of 130 feet. A 3-head mill with winch and boiler have also been erected, but, unfortunately, to date only about 1,500 gallons of water per 24 hours have been struck, and the prospectors are therefore paying more attention to cutting an adequate supply of water than to breaking ore at present. 80 tons crushed to date from this mine have yielded 69½ozs. of gold.

"At New England the old Glen-Innis has been taken up again under the name of the *Empire G.M.L. 1079*, and has, I believe, now been unwatered and a very good payable reef exposed. A 5½ x 19½ft. Cornish boiler, a compound winch, battery engine, bucket pump and many accessories have already been put on the ground.

"About 15 miles N.W. by W. from the above claim several good discoveries were made during the year.

"On *Harris Reward G.M.L. 1101* is a lode of greenstone schist carrying quartz in varying thicknesses and heavily mineralised. The lode runs N. and S. in a very good alignment, and has been traced on the surface for 900 feet in length continuously. It underlies to the east at an angle of depression of about 55deg., and is between foliated greenstone country. Two 45-foot shafts had, at the time of my visit (21-11-09), been put down on this lode 80 feet apart, and a third, about 10 feet deep, had been sunk about 390 feet still further south. The lode had further been traced by costeens and potholes in a southerly direction for another 400 feet, where a fair size of about 15dwt. stone outcropped. About two miles N.W. of the above is *Ives' Reward G.M.L. 1083*, through which a big quartz reef outcrops, and from which I was told ½oz. prospects could be broken for

some six chains in length. In this vicinity several very promising looking reefs had been discovered, but owing to the scarcity of water and hot weather, very little had been done on them. Fortunately now, however, the Government having paid the prospectors to sink and obtain water, which they have done on the creek about two miles west of *Harris' Reward*, it is to be expected that some of these reefs will be thoroughly prospected.

"*Darlot.*—No new discoveries have been made here during the year, but the *Zangbar*, *Monte Christo*, *King of the Hills*, and *Ballangarry* have continued operations on a payable basis.

"*Pope's Find.*—About 18 miles N.W. of *Darlot*, on a new field, now known as *Pope's Find*, some five claims have during the year been worked. Of these four have been abandoned. The remaining one, a prospecting area held by *Hoskins & Charles*, has on it a small, rich quartz reef in hard diorite country. The reef runs N. and S., and is nearly vertical, but has not to date averaged more than 6 inches in thickness. A crushing of 23 tons yielded, however, 119ozs., and the reef is still being further exploited.

"*Wilson's Patch.*—At *Wilson's Patch*, the *Great Western G.M.* is still being worked by tributers, but results of late have not been too encouraging.

"*Mt. Stirling, Mt. Clifford, and District.*—The *Mt. Stirling* mine still yields parcels of payable ore, and a considerable amount of prospecting is still going on in the district.

"*Manninga Marley.*—The chief mine at this centre, the *Havilah G.M.*, has kept its 10-head mill running continuously throughout the year. A new vertical shaft has been sunk 325 feet, and from it at a depth of 300 feet a south cross-cut has been put in a distance of 65 feet, at which point it has cut the reef about 20 feet in thickness. Driving E. and W. on this reef at the 300 feet level is being vigorously proceeded with.

"*The Marley North G.M.* still systematically turns out large parcels for very good returns.

"*The Manninga Marley G.M.* has been opening up the far east end of the reef at a depth of about 50 feet, and it is looking very promising at that level.

"*Sandstone and District.*—The mine yielding the largest tonnage in this district, the *Oroya Black Range G.M.*, has during the year operated continuously. It crushes from 4 to 4½ thousand tons monthly with its 20-head mill. It is opened up to a vertical depth of 370 feet, and, I believe, continues to look well as to size and value of reef in the bottom. I have pleasure in stating that in this mine in which the reef is overlain with a particularly greasy and treacherous hanging wall, every possible means are taken to protect the workers from injury from falls of ground, by the adoption of a very efficient and systematic method of timbering. At each plat is posted a copy of 'Additional Rules,' all of which have been drawn up with the special object of safe working and discipline, and this, I consider, an excellent idea.

"*The Black Range Mining Co., N.L.*—This mine, carrying 20 stamps, has also during the year had an uninterrupted run. Considerable development work has been done, the main underlay winze, which was put down from No. 3 level, having reached a vertical depth from the surface of some 520 feet. Four levels have also been opened up from it, the bottom one (known as No. 7 level) having to date been driven on the reef for about 150 feet, and proved it to be about 3½ feet thick and worth nearly 2ozs. per ton

for that width. The sinking of the main underlay winze is to be continued, for which purpose a Holman hoist will be used. A large slimes plant is about to be erected on this property.

*"The Sandstone Development G.M. Co., N.L.—*This mine, which is opened up to a vertical depth of about 370 feet, has during the year been equipped with a reduction plant. A 10-stamp battery, two No. 5 Forwood Downs grinding pans, spitzkasten, a six-drill air compressor, a rock breaker and belt conveyer to battery ore bins have been erected. Producer gas is the motive power, and is used to drive two National gas engines, each of 100 horsepower. Charcoal is used from which to obtain the necessary carbon monoxide, and is burnt locally, and procured, I believe, for about £3 per ton. The gas engines, which were started about the beginning of September, and have run practically continuously since, have, I believe, given entire satisfaction and proved themselves much more economical than steam engines and equally efficient in every other respect.

*"The Black Range West G.M. Co.—*Towards the close of the year a company, known as the Black Range West G.M. Co., commenced to sink a vertical shaft on leases adjoining the Black Range Mining Co.'s property, with a view to cutting the Black Range Mining Co.'s reef at a depth of about 400 feet, and to date a 10 feet x 4 feet three-compartment shaft has been put down to a depth of about 120 feet and timbered.

*"The Bull Oak.—*The owners of this property have had very bad luck during the year, having sunk a new 8 feet x 4 feet vertical shaft and timbered and skidded it; they, at a depth of 175 feet, put in a cross-cut 60 feet to the reef when they struck running ground, which filled up their cross-cut and their shaft, and forced them to abandon all work below the 118-foot level.

*"The Kohinoor.—*This mine, which has had a rather short but very payable existence, has now been closed down owing to all payable ore opened up having been worked out. The Kohinoor North, the Breakaway, the Wanderie West, and several smaller shows are still holding their own, but the old Hancock's district generally is now very quiet.

*"Birrigrin.—*Birrigrin generally is looking very quiet at present, most work being done on the Hawthorne Reward, where an inclined shaft has been sunk on the reef for 190 feet. At 136 feet about 230 feet of driving has been done on the reef, and at 190 feet N. and S. drives have been put in. At the date of my last visit (3-9-09) tributaries on the Iona were opening up a reef to the west of the Hawthorne Reward reef, and had an underlay shaft down on the reef for about 40 feet, in which the reef looked very promising. From this reef there had previously been crushed 420 tons, yielding 13dwts. per ton.

*"At Montagu, eight miles from Birrigrin, the owners of the Caledonian and Montagu Boulder have, on the latter property, erected during the year a 10-stamp battery, 20 by 6 feet Lancashire boiler, winch, and accessories. At the date of my last visit all underground work was confined to the Montagu Boulder workings in which six miners were employed above the 32-foot level.*

*"On the Caledonian it was proposed to instal a pump, and then further prospect the lode at the 100-foot level.*

*"A little prospecting on adjacent claims is also going on at Montagu.*

*"Youanme District.—*At Youanme all the claims on the main line of lode are at present under option, and are being vigorously developed and sunk upon with a view to determining the lengths and depths of the payable chutes of gold. On expiration of option time, should these mines be taken over and equipped with a large up-to-date plant, there is no doubt the Youanme will develop into a large and regular gold-producing centre.

*"During the year the public battery has been put into operation and has, I believe, given every satisfaction, and been a boon to the field.*

*"Accidents.—*During the year there have been reported to this office 41 accidents—three fatal, 22 serious, and 16 minor. Of the 41, four were caused by explosives, nine by falls of ground, seven in shafts, eight miscellaneous, and 13 on surface. Of the three fatal accidents, one was caused by the man's own carelessness in not, after firing, trying the ground before resuming ordinary mining work. The second was purely accidental, resulting from a stone suddenly coming off a slide and greasy head, and the third resulted from the man not adhering to arrangements made with the driver as to signalling, and consequently being lowered in a cage into about 90 feet of water and being drowned.

*"Of the 22 serious accidents, 12 were purely accidental, six were caused by negligence on the part of the injured men, three by negligence on the part of fellow-workmen, and one by negligence on the part of the mine manager.*

*"Of the 16 minor accidents, 14 were purely accidental, one was the result of carelessness on the part of injured man, and the remaining one was caused by carelessness on the part of a fellow-workman.*

*"General Remarks.—*Generally speaking, the provisions of the Mines Regulation Act of 1906 are well complied with throughout the district. Some of the regulations, however, especially those relating to ventilation, and those relating to the testing of winding ropes subsequent to re-shoeing, are in some instances sadly neglected. With regard to the latter I would state, that although an Inspector may at any time require any rope to be tested in his presence, yet considering the fact that to go unawares on to a mine and insist on a working winding rope being cut when perhaps no spare shoe is in stock on the mine would mean putting the rope out of commission for from four to six hours, and thus seriously obstructing the working of the mine. One feels very reluctant to take such a course unless he has well-grounded suspicions of such rope's defectiveness.

*"In conclusion I would state that the prospects of the East Murchison Goldfield are brighter than they were a year ago, and if the options at Wiluna and Youanme result in the mines being taken over this year's gold output must greatly exceed that of the past twelve months."*

#### MOUNT MARGARET GOLDFIELD.

Mr. S. Cullingworth, Inspector of Mines, reports on 28th February, 1910:—

*"I have the honour to submit my Annual Report for 1909 on the Mt. Margaret Goldfield and those portions of the North Coolgardie Goldfield which are included in the Malcolm Inspector's District.*

*"Taking the district as a whole, and considered generally, the mining industry is on a solid and prosperous basis.*

"It is true that in one or two instances there has been a partial cessation of work, the most noticeable instance being that of the Cosmopolitan, a mine which formerly employed a large number of men; on the other hand these disappointments have been more than counterbalanced by the good developments which have taken place in other mines. Perhaps the most encouraging feature is, that good results have been obtained in the smaller mines. In some instances these are privately owned, and have yielded their owners good profits, or at least a substantial means of livelihood.

"There have been the usual fluctuations which are inseparable from mining districts, resulting in some portions of the district being in a languishing condition, and others, which at the beginning of the year were under a cloud, being now in a flourishing state. Several mines which ceased work in the earlier days through one cause or another are now being re-worked, and it is gratifying to be able to point to the satisfactory result obtained in most instances. There are many other abandoned properties which, judging by their records and the words of men who previously worked in them, would seem to offer chances of success if worked under present-day conditions. Unfortunately, the workings of most of these mines are inaccessible; either they have been worked out to below water level or the shafts and workings have caved in. It would, therefore, mean a fair amount of capital to re-open them; owing, doubtless, to the uncertainty of operations disclosing payable ore, capital is not forthcoming for ventures of this nature.

"There is no doubt that portions of the district are well worthy of systematic and scientific prospecting; the old system of knapping an outcrop and simply looking at the broken stone is not sufficient. An instance of this is the Democrat mine at Linden, the owners of which inform me that the outcrop had been well knapped before they prospected it and found it to contain good values.

"It may well be that though the portion of stone out-cropping is poor, or the portion knapped and even doliied is poor, there are still great possibilities of the lode or reef carrying a payable shoot of stone.

"The class of prospecting here indicated often entails too much work, and takes too much time for the ordinary prospector, and, therefore, so far it has not been undertaken, but it seems to me the mines of the future must be chiefly discovered in this manner, perhaps by following up a known belt or channel of auriferous country, studying the ore occurrence in those mines working along this belt, and systematically sampling and assaying the area of country selected for prospecting.

"Almost all the prospectors now working in various parts of the district can only pay close attention to those reefs or lodes which contain, from the surface, high-grade ore, which, in fact, will give them from the start payable results. Low-grade bodies which do not promise an immediate return have perforce to be left; the same remarks apply to those reefs or lodes which after yielding one or two good crushings become poor or pinch in size. It is possible they may make again both as regards size and values, but in most cases the dead work cannot be undertaken, and the prospector is obliged to leave them and look for something else.

"*Inspection of Mines.*—There have been three prosecutions under the Mines Regulation Act during

the year, the results of which are embodied in a separate report.

"Special attention has been given to the winding ropes and safety appliances; the cutting and re-shoeing of ropes and the frequent examination and testing of catches and hooks have been strictly insisted upon. An interesting experiment was tried on the Underlay Shaft of the Sons of Gwalia mine with a skip fitted with safety grips. Although not successful under all conditions it was shown that under favourable conditions the grips would act and hold the skip, and it seems probable that further work along the lines of the invention would solve this important question, the greatest difficulty being to so adjust the catches to act with the back weight of the rope over the sheave, and at the same time to have them so as not to interfere with the ordinary running of a light or empty skip down the shaft.

"*Metallurgical Progress.*—In metallurgical work in this district the most important alteration has been the adoption on one or two plants of the vacuum system of slime treatment, replacing either wholly or in part the filter press. Minor alterations in the methods of crushing, grinding, classification, and subsequent treatment have taken place, but these, though important to the mines concerned, do not involve any specially new features.

"*Mining Progress.*—On some of the smaller mines producer gas engines have been erected, and on others the handy little oil engines, fed through a carburettor and driving friction winches, have been installed.

"As regards the individual mines themselves, very little can be added to my report of September last.

"*Leonora.*—At the Sons of Gwalia Mine the development work continues to open up large bodies of ore which, I am informed, are highly payable. According to published returns this mine showed a profit of from £8,000 to £9,000 monthly. The output has lately been increased, and is now about 13,000 tons per month.

"At the Sons of Gwalia South about 500 feet of development work is undertaken monthly. The ore bodies lately opened up are, I understand, very satisfactory and have given the mine a good reserve of ore. Additions and alterations are being made to the surface plant, and the output is to be increased to 3,000 tons monthly. At the Gwalia Proprietary (late Tower Hill) some interesting prospecting work is being done with a view of picking up the continuation of the Gwalia ore channel. Although this work has not been long in operation the Manager informs me he has traced gold-bearing ore by surface workings towards his southern boundary, one vein or lens now being open cut shows gold at times freely, and presents an encouraging appearance. This prospecting work is being done in the schist channel to the east of the large quartz reef originally worked.

"The Trump Mine, which has been idle for many months, was re-opened a few weeks ago. A small parcel of 28½ tons has just been cleaned up at the State Battery for a return of 83ozs. 8dwts. over the plates.

"At Pig Well some good crushings have lately been reported by the State Battery: as—the Starlight, 50 tons for 261ozs. over the plates; P.A. 476C, 7½ tons for 34ozs. 2dwts.; P.A. 655C, 17½ tons for 18ozs. 15dwts.

"*Niagara.*—The Orion Mine is being developed below 500 feet; at this level a main incline shaft has been commenced and will be continued for 200 feet.



According to the published report for the year ended June last, 6,301 tons of ore have been crushed for the year, yielding bullion value £15,520, the ore averaging 11.6dwts. fine gold per ton. The reef is now being driven on at 600 feet from No. 1 winze; here the published returns show the face to be 48 inches wide, value 23dwts. Considerable alterations and improvements have been made to the surface plant.

"The Champion Mine, at Kookynie, has lately cleaned up at the Niagara State Battery 431 tons for 298.55ozs.

"The upper levels of the Cosmopolitan are still worked by tributers, but the water is now up to the No. 2 level. The Altona, belonging to the same company, is worked in a small way by tributers.

"Morgans.—Westralia Mt. Morgans: It is understood that there is a scheme on foot to reconstruct this important mine, and to provide more capital for development. As this mine has produced a large quantity of gold, over one and a quarter million pounds' worth, I understand, it is to be hoped the necessary capital will be forthcoming. The Transvaal: At 300 feet development work has opened up a large ore body of some 14 feet or so in width. I am informed it is payable throughout. At the time of my last visit this had been driven on for some 30 feet or so; should the body maintain its size and value as development progresses this should prove to be a most important mine.

"At Mt. Margaret several parties of tributers are at work. At one claim adjoining the Mt. Morven Reward some rich parcels of copper ore containing gold have been raised. Most of the properties worked are, however, in the early prospecting stages, and as yet it is not possible to say what their future may be.

"At Yundamindera mining is quiet. Between this centre and Linden several prospectors are working. There is a promising belt of country some 20 miles S. E. of Yundamindera, but the owners of the various leases merely take out the best ore, as they have to cart it either to Linden or Yundamindera, leaving poorer material behind. The matrix is quartz and the ore bodies appear to be of lenticular structure. Very little development work has as yet been done, but some of the reefs visited warrant further opening up, but here my previous remarks apply; when a lens gives out the prospector usually cannot afford to go on developing.

"At Linden the two-head Government mill is kept fairly well employed. On the Democrat Mine a friction winch and oil engine have been put in, and the shaft is now being sunk to 200 feet on the underlay; the vein and lode material alongside it has now widened out to the full width of the shaft and the whole body, I am informed, carries payable values. At the Camel Backs, distant about 10 miles from Linden, Rufin and Party have done a considerable amount of development. A shaft, 120 feet deep, has been sunk, and a level driven some 150 feet in length; the vein above this level is rather small, but, I understand, very consistent in values. At the above level it widens out, and underfoot there is about 4 feet solid quartz, which, I am informed, carries good gold throughout. In this locality there are several promising looking lines of reef, which I should think are worthy of prospecting.

"Laverton.—The Lancefield Mine resumed work about March last, and is now employing a large number of men. No. 5 level has been opened and is being driven on. As development progresses the ore body

maintains its size, and both from published returns and from information the values appear to be quite up to if not above those of the upper levels.

"The Ida H.: Several additions have been made to the surface plant, and a new compressor has been erected. The No. 8 level has been reached and driven on. I am informed the length of payable ore has increased, and is now of greater length than in the upper levels.

"Mining matters at Burtville and locality are quiet at present.

"Murrin Murrin.—Hill's Proprietary has been considerably developed during the year, and I am informed payable values have been discovered and are now being developed at the 300 feet level. This is the deepest level so far attained, and here the lode appears to maintain its size.

"The Anaconda Copper Mines have been idle throughout the year. The mine is now being unwatered, and it is understood fresh capital has been introduced."

#### NORTH COOLGARDIE GOLDFIELD, ETC.

Mr. W. F. Greenard, Inspector of Mines, reports on 27th January, 1910:—

"I have the honour to submit my Annual Report for the information of the Hon. the Minister for Mines on the administration of the "Mines Regulation Act, 1906," on the Menzies, Ularring, and Edjundina Districts of North Coolgardie, the Broad Arrow Goldfield, together with the Mulgarrie, Gordon, Gindalbie, Kalpini, Kurnalpi, and Mulgabbie Districts of the North-East Coolgardie Goldfield.

"A systematic and continuous inspection has been maintained throughout the above districts for the year 1909.

"A strenuous enforcement of the provisions of the Mines Regulation Act for the safety of every man employed on and in mines has been carried out. The accidents during the year are—two fatal and 10 serious, with several minor accidents. One of the fatal accidents was caused by a young man named Raleigh boring in the toe of an old hole, causing an explosion which killed him. The second occurred at the State Battery, Menzies, to a man named Twyford, through some shafting falling on him.

"The serious accidents were thoroughly inquired into, and reports on same submitted to you.

"There are practically no foreigners employed in the districts under my control.

"The filling of stopes has been strictly enforced. The storage of dynamite above and below ground has been carefully considered, and the burning speed of fuse carefully tested on all mines.

"The cutting and reshoeing of ropes every six months have been attended to; the oiling with hot castor oil with a small quantity of lime mixed has given good results.

"Safety cages, hooks, and chains are carefully tested and inspected in accordance with the Act.

"Special attention has been given to ventilation, sanitation (above and below), and temperature of all underground workings. All complaints received during the year have received immediate attention. Proper travelling ladderways between levels in stopes have been provided in all mines. Safety braces have been insisted on where safety detaching hooks are in operation.

"In conclusion, every effort is made to make the work of a miner on the fields under my control as safe as it can possibly be—results speak for themselves.

#### MENZIES.

"The completion of the new main shaft at the Menzies Consolidated Mine last year has materially improved the working conditions of this property. The re-arrangement of the surface machinery is now under consideration, together with the additional equipment of two vacuum filter presses; if completed on sound practical lines it will undoubtedly reduce the present working costs.

"The small prospecting mines in the vicinity of Woolgar have not been as productive as formerly, but there is a large area of auriferous ground which requires more energetic prospecting.

"The mines in the immediate vicinity of Menzies are being worked by small parties, and the future outlook is no worse than it was last year.

#### ULARRING.

"Mulline and Riverina are not doing much development, and mining is somewhat depressed.

"The Cardinal, Shamrock, and the Riverina Mines have given some excellent returns from the old workings.

"Mulwarrie is depressed, a little prospecting work is being done on the Mulwarrie and Mulwarrie North (DeBauns); Wilkinson continues to work the 'Man Reef' Mine, and Cadby and party the old 'Killaloo.'

"Mining at Davyhurst is far from satisfactory. The Golden Pole, Waihi, and Homeward have been worked on tribute during the year.

"The Great Ophir has been slowly developing throughout the year, and the present manager feels confident that with the necessary machinery to treat the ore economically a good payable mine would be developed.

"The Callion has suffered during the year from the want of a sufficient water supply. The Callion Co. have erected an excellent 10-stamp mill, together with a cyanide plant equipped with automatic appliances and every labour-saving device possible. If a sufficient water supply were available the mine would have a good chance to establish itself on a payable basis. This battery has now tested most of the claims at Callion, and the returns go to prove that they are mostly low-grade, but the returns also prove that several of these propositions are well worth further work on proper lines. The Callion Co. and the manager have done everything possible with a small water supply in treating the prospectors' ore.

#### SIBERIA.

"During the year the phenomenal crushing from the Siberia Consols Mine has caused a large number of prospectors to return to this field. Several large schist lode formations have been discovered under the surface alluvial patches that were worked out in the early days. Further development of these formations is necessary before anything definite can be said.

#### BROAD ARROW.

"Ora Banda.—A good deal of development work has been done on the Gimblet group during the year for satisfactory results. Shortage of battery water appears to be the trouble, and there is a good deal of friction between the subsidised battery and the prospectors.

"Bardoc and Vetersburg are depressed and very little prospecting is being done.

"The Golden Arrow is being worked by tributers, there are also a number of outside claims being prospected, from which payable results are obtained. If cheap crushing were available there are a number of lode propositions well worth further development. Cheap crushing is a necessary corollary to cheap carting and mining.

"Paddington.—Mt. Corlac has been worked by a few tributers, the Paddington Consols also; the main shaft has given some trouble and considerable repairs and timbering would be necessary before work could be done at the bottom. Mining at Paddington is depressed.

"Comet Vale.—During the year this place has continued to develop satisfactorily. The Sand Queen has erected a good 10-stamp battery. The Gladstone Mine has opened out at the 200-foot level on a large payable reef. There are also a number of small claims doing good development work at Comet Vale.

#### NORTH-EAST COOLGARDIE.

"Mulgarrie is at a standstill, and very little work is being done.

"The Gordon.—The Sirdar G.M. Co. has worked the mine from an open cut, crushing a large tonnage of low-grade ore. No development work has been done during the year.

"Gindalbie.—The Melton Mine has done very little work during the year, and mining is generally depressed.

"At Kalpini, Kurnalpi, and Mulgabbie prospecting work has been maintained, and a lot of gold has been won from various claims.

"Yarrie has continued to be worked by a few prospectors and tributers, but very little development work has been done. On the Wallaby line known reserves of payable ore have been rather heavily taxed; development below water on this large line of reef is very necessary.

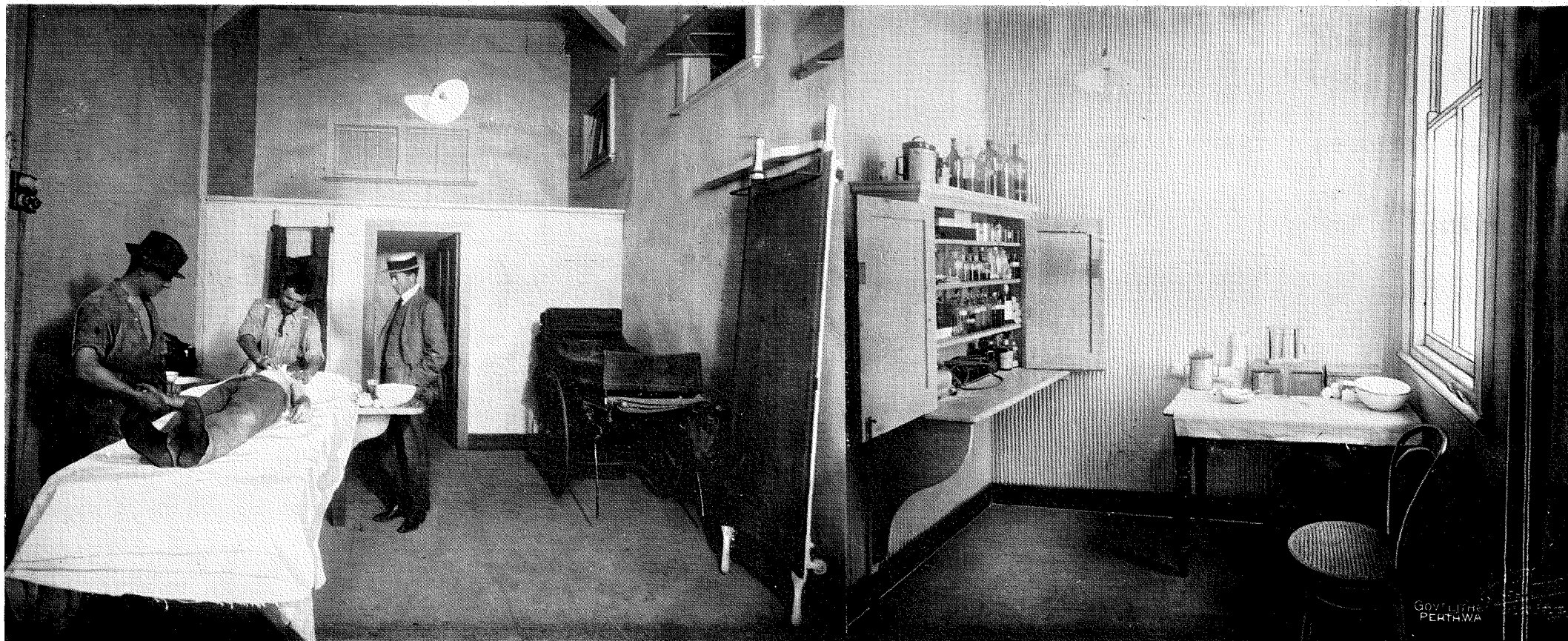
"The Dostmund, owned by Mr. Speakes, has given one or two good crushings, and good values are now being developed on a small reef of a very promising nature.

"Edjudina has done better work this year, and the developments below water are of a much more reassuring nature than last year.

"The Neta and Genevieve have been taken over under option by Mr. Mandelstamm, and with proper equipment and good management there is every reason to think they should be payable.

"The Senate, owned by Waach and party, is being developed satisfactorily. During the year the mine has been equipped with an air-compressor and receiver. With the assistance of compressed air a winze has been sunk 80 feet below the 200ft. level. The ore channel was followed down, and at 280 feet the reef is 2 feet 6 inches wide, carrying 30dwt. values. The boiler power not being sufficient to allow further development the owners are now arranging to instal a large producer gas engine. This should materially assist the development of this promising little property.

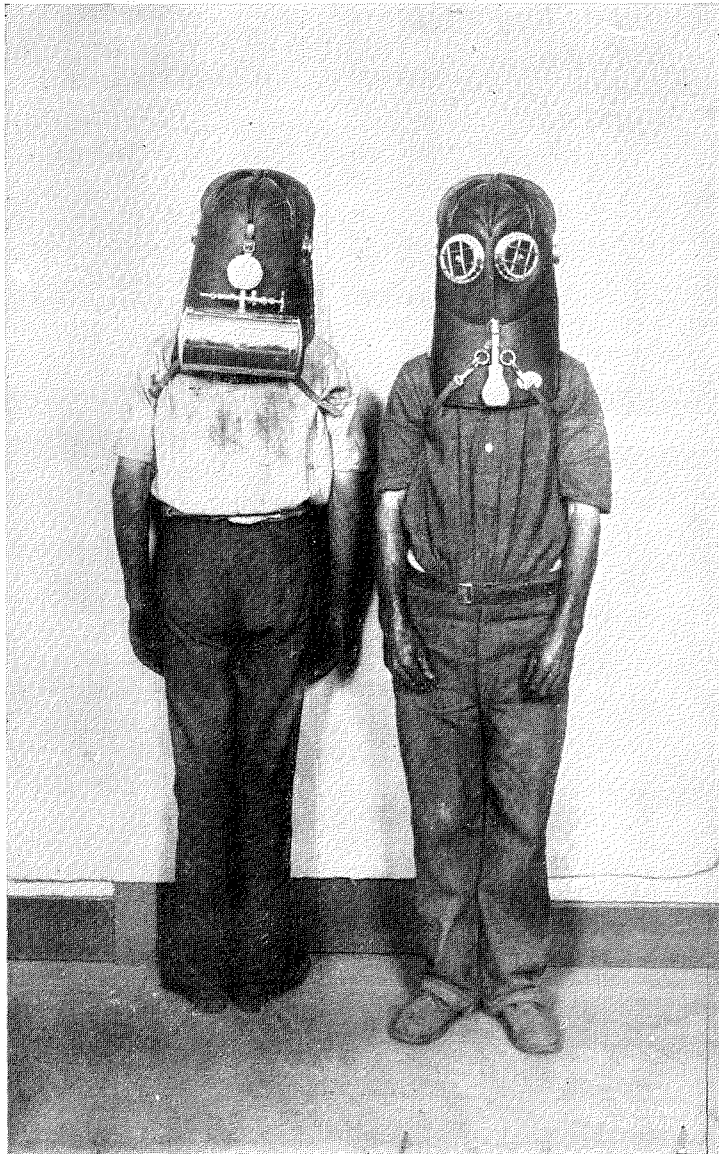
"The Gawler Mine, to which the Mines Department advanced £750 in assisting in the equipment and sinking of a main shaft to 200 feet, has opened up much more satisfactorily than developments promised last year. The syndicate, after spending £5,000, had great difficulty in locating the values above the 200-foot level. Values have now been located, and with a little consideration from the Department in a few months



Golden Horseshoe Estates Coy., Ltd., Casualty Ward.



The Ivanhoe Mine Casualty Ward.



The "Vajen Bader" Safety Helmet, as used at the Golden Horseshoe Mine.



this syndicate should be in a position to start to refund the loan. At present more development work is necessary at the 200 feet to allow of a more economical working of the ore.

*"Pingen.*—The Anglo-Saxon has continued to work for satisfactory returns. They are now crushing a five hundred ton parcel, from which a 30dwt. return is expected. Mining is somewhat depressed at Pingen.

*"Mt. Ida.*—Developments at this centre are of a very promising nature. The Meteor Mine has been developed down to the 250 feet, where good values were found, and there is a promising future before the property.

*"The Unexpected South* has also been opened up at the 250 feet, where very high values were located.

*"The Forest Belle* has also continued to develop satisfactorily, at 170 feet the reef is 7 feet to 8 feet wide carrying 80s. values.

"In conclusion, it must be admitted that the whole of these centres have immense auriferous resources, and many will eventually become large mining centres."

#### EAST COOLGARDIE GOLDFIELD.

Mr. J. O. Hudson, Senior Inspector of Mines, has forwarded a report dated 23rd February, 1910, as follows:—

I have the honour to submit for your information my Annual Report for the year 1909 on the East Coolgardie Goldfield.

"1. The mines have been regularly inspected, and where defects were noted they were promptly remedied.

"2. *Explosives.*—The explosives used were of good quality and there was only one case of serious accident which could be attributed to explosives, that being a case of a miner being overcome by fumes in a winze. Experiments have been made during the year with electric firing. The experiments were conducted in drives, the cut and easers being fired. During the experiments one hundred and fifty detonators were used. In every case the explosion was attained on the first attempt. This demonstrates the great improvement in the manufacture of the detonators of the present day over the old system of electric firing, when it was a common occurrence for the detonators to fail to explode and rendering it difficult to determine in which charge the defect occurred. The defects are usually electric, and under the present system there is a simple method of testing for such defects which removes any anxiety in this direction. The experiments, although not sufficiently extensive to enable one to arrive at a definite conclusion, demonstrated that the absence of fuse smoke improved the conditions considerably and that it was possible to considerably reduce the quantity of explosives used in the cut and obtain better results.

"3. *Stopes.*—The question of filling stopes has received close attention and is being carried out in a satisfactory manner.

"The introduction of belt conveyors for the transport of filling material has greatly reduced the costs in this direction, and with a systematic scheme of large filling passes it should prove more economical to place the residues underground than to sluice or truck to dumps. The introduction of light belt conveyors has been effected for filling rill stopes. When the stopes have reached the upper level each stope taken places the top of the stope farther from the

filling pass. This necessitates the filling having to be trucked, which proves costly. To obviate this a light belt conveyor is laid down, which can be extended as the stope advances. The conveyor is driven by a small Holman hoist.

"4. *First Aid.*—The St. John's Ambulance Association are to be congratulated on their work during the past year. On most of the large mines there are well equipped casualty wards, and in a number of cases small corps have been trained.

"On several mines the shift bosses and permanent staff have received training in this very necessary work. I am of the opinion that the Mines Regulation Act should have a provision that all shift bosses should have sufficient training to render first aid in cases of accident. It is to be regretted that this good work is greatly hampered owing to limited finances.

"It has been suggested that a Mines First Aid Association should be formed. I am of the opinion that it would prove very beneficial and would be the means of creating well-trained men throughout the industry.

"5. The Golden Horseshoe Estates have imported two 'Vajen' rescue helmets for use in rescuing men overcome by gases.

"6. *New Plants.*—The following plants have been erected by small syndicates during the past year:—

"Hannan's Consols: two Huntington mills and cyanide plant.

"Lord Nolan Syndicate: five-head stamp battery.

"Last Chance: one Huntington mill.

"Hidden Secret: five-head stamp battery.

"Milanese: two Huntington mills.

"Mystery: one Huntington mill.

"7. *Accidents.*—Attached is a list of accidents which does not include machinery accidents, they being dealt with by Inspectors of Machinery.

"There were twelve fatal accidents in East Coolgardie Goldfield during the year other than caused by machinery, and four in the North-East Coolgardie, as shown on Tables 1 and 2.

"2 on the Golden Horseshoe Estates.

"2 on the Associated Gold Mines.

"1 on the Great Boulder Proprietary.

"1 on the Ivanhoe Gold Corporation.

"1 on the Great Boulder Perseverance, Ltd.

"1 on the Hainault Gold Mine.

"1 on the New Chaffers Gold Mine.

"1 on the Associated Northern Gold Mine.

"1 on the Hannan's Reward Gold Mine.

"1 on the Central and West Boulder Gold Mine.

"The following were the causes of the accidents:—

"(1.) A man was overcome by fumes in a winze; another man descended and lashed him to the rope. While being raised the affected man slipped through the rope and fell to the bottom of the winze.

"(2.) A shoveller was assisting to cover an ore pass in a stope and fell down the pass.

"(3.) A miner was barring down ground in a stope when a piece under which he was standing fell on him.

"(4.) A miner bored into a hole containing explosives.

"(5.) A platman while caging a truck was hauled up and jammed against the cap-piece of the plat. It appeared as if he had given the signal to raise the cage and then found that the truck was not in the cage properly and that he endeavoured to recage the truck without using the danger signal.

"(6.) A miner fell down an ore pass which was covered by a kick-up. It was surmised that he could not see owing to dense smoke, or that he had no light.

"(7.) A miner, after firing, returned in dense smoke and walked under the bar in front of a winze and fell into it. The winze was off the main road.

"(8.) A miner after firing the face in a rill stope descended the rill. He returned under the ground which had been fired. A stone fell from the face, striking him.

"(9.) A miner was shovelling under stull timber, when the ground at the foot of one stull fell away, allowing the loose mullock to fall, which covered the man, suffocating him.

"(10.) A miner was employed in an open cut. A large piece of ground fell from the side, striking him.

"(11.) A pipefitter employed underground received a jarred hand by his mate striking a spanner with a light hammer. He worked for eight days and his hand became painful, and he discontinued work. He died forty-four days after the accident from a complication of diseases.

"(12.) A tributer working in a shallow surface shaft did not work in the morning owing to wet weather. In the afternoon he returned for his cycle. He was sitting on the side of the shaft talking to his mate when he fell back into the shaft. Both men had spent the day in an adjacent hotel and had not worked that day.

"The last two accidents can hardly be termed mining accidents as neither death was due to the men's employment in a mine.

"There is also a case included in the North-East Coolgardie district of a similar nature. A man, not employed on the mine, was seen at night in the town in anything but a sober condition. The following morning he was found in an open cut severely injured; he lingered for a few days and then died. This accident is included in the list of fatals although the Act only requires the owners to protect the men employed on the mine.

"These three cases considerably increase the percentage of accidents in these districts for the year.

"There has been a slight percentage reduction of accidents for the past year on the number of men employed.

"8. The following are the principal developments in the mines:—

"*Great Boulder Proprietary.*—Total depth of shafts: Main shaft, 2,599ft. 6in.; Edward's shaft, 2,557ft.; Hamilton's shaft, 1,871ft. Shaft sinking during the year: shaft sinking, 387ft.; driving, 3,157ft.; crosscutting, 687ft.; rising, 421ft.; winzing, 1,039ft.

"The principal points of development as reported by the General Manager are as follows:—

"The Main shaft 2,200ft. level drive north has been extended 138ft.; total length, 163ft. For the last 89ft. the ore for a width of 5ft. averages in value 11dwts. per ton.

"The 2,350ft. level south drive has been driven 109ft. 6in. in mineralised country worth 2 to 4 dwts. per ton.

"The 2,350ft. Level North drive on the West Vein driven 38ft.; the last 32ft. for a width of 3ft. has averaged 20 dwts. per ton. The South drive on the same vein has been driven 117ft. 6in.; ore 5ft. wide, average value 28 dwts. per ton.

"The 2,500ft. Level Main West Crosscut has been driven 76ft. At 52ft. struck lode 4ft. wide worth 10 dwts. per ton. In driving north on this lode, a distance of 93ft., the ore averaged 4ft. 6in. in mineralised country, worth 2¾ dwts. per ton.

"Edward's Shaft 2,350ft. level north drive has been extended 154ft. 6in.; total 259ft.; the ore for the extension given has averaged 4ft. 9in. in width and 7¾ dwts. per ton. The south drive has been driven 417ft.; ore 4ft. 6in. wide, assay value 7¼ dwts. per ton; total length of drive 536ft.

"At the 2,500ft. Level the crosscut west has been driven 117ft. 6in. At 98ft. struck very hard quartz lode for 51ft., value 10½ dwts. per ton. The drive north of this lode for 51ft. has averaged 5ft. in width, and 12½ dwts. per ton. The south drive for 54ft. has averaged 5ft. wide, 13¼ dwts. per ton.

"Hamilton shaft 1,650ft. Level north drive has been extended 143ft. 6in. in ore 4ft. wide, average value 10¾ dwts. per ton; total length of drive 319ft.

The south drive has been advanced 289ft. in ore 4ft. 9in. wide, assay value 7¼ dwts. per ton; total length of drive 463ft.

"The crosscut east at the 1,800ft. level has been driven 248ft. At 220ft. east of the shaft struck 2ft. band of quartz worth 2 dwts. per ton. The north drive has been driven 206ft. 6in. in mineralised country, worth 2 dwts.; present end in country. The south drive has been driven 203ft. in ore 4ft. wide, worth 3 dwts. per ton.

"The chief additions to the surface plant have been—

"At Edward's shaft a new Thompson & Company's vertical compound winding engine has been erected, together with surface condenser. Skips for hoisting ore have been made, and the whole of the winding plant is working satisfactorily.

"Rock-breaker and bin have been completed at the same shaft. Wooden framework for belt conveyor has been erected, rollers and gearing made, the sections of belting installed, and all brought into use in conveying ore to the ball mills.

"Two Cornish boilers have been built in at the main shaft to provide extra steam power.

"Tunnel for exhaust steam pipes from the ball mill and air compressor engines in the main shaft shed has been made, ready for connection with new condensing plant which is in course of erection.

"At Hamilton shaft new Belliss Morcom engine for driving the condensing plant has been built in, and is working satisfactorily.

"Site for new condensing plant has been cleared near the sulphide mill engine house, excavations made, foundations built, and portions of the machinery erected.

"At the sulphide mill, concrete floor has been laid in the Griffin mill room. Motor to drive sulphide mill tailings pumps and portion of ore cooling conveyor has been installed.

"New No. 8 Krupp ball mill has been started at work.

"Three-throw pump has been removed from previous position and re-erected at cyanide plant for pumping residues to waste dump.

"Wooden framework to support extra solution storage tanks at cyanide mill has been erected, and storage vats placed in position.



"Shelter shed of galvanised iron for men engaged in unloading firewood has been erected.

"New duplex pump for fire service has been placed in position, and fire mains and pipes are in progress of laying.

"9. *Lake View Consols, Limited.*—Total depth of shaft, 1,945ft.; shaft sinking during 1909, 17ft.; driving, 1,795ft.; crosscutting, 1,224ft.; rising, 258ft.; winzing, 339ft.

"There were no developments of interest during the year, except that the lower levels have been further opened up for stopping.

"10. *South Kalgurli, Limited.*—Depth of main shaft, 1,522ft.; driving, 3,457ft. crosscutting, 1,804ft.; rising, 15ft.; winzing, 631ft.

"A large amount of development has been carried out on the western portion of the lease from Morty's shaft. The El Oro lode has been driven on to the Hainault boundary. A sluicing scheme has been installed for the disposal of residues. The residues are being sluiced to a tailings lease 8,000ft. east of the mine. The scheme is working satisfactorily.

"The residue dump on this mine was a great source of annoyance and expense to the adjoining mines and residents, and the discontinuance of depositing residues will be greatly appreciated by all persons in the vicinity.

"11. *Hainault Gold Mine.*—Depth of main shaft, 1,014ft.; driving during 1909, 1,572ft. 6in.; crosscutting, 726ft. 6in.; rising, 491ft. 6in.; winzing, 197ft. 6in.; diamond drilling, 499ft.

"The management report as follows in respect of developments for the year:—

"Prospecting operations have been carried out at the south end of the lease on the El Oro lode 850ft. level with, so far, satisfactory results. This lode was also picked up at the 750ft. level, but the values have been lower there than at 850ft. level.

"Prospecting work has also been done at the 500ft. level east of the main shaft on the northern extension of Lake View lode, and this work gives promise of adding to the ore reserves.

"During the year an Edward's roasting furnace and grinding pan have been erected with the necessary pump and settlers for the treatment of the concentrates. The plant worked satisfactorily during the period under review.

"12. *Ivanhoe Gold Corporation.*—Depth of main shaft, 2,252ft.; shaft sinking during 1909, 126ft.; driving, 2,512ft.; crosscutting, 1,120ft.; winzing, 1,245ft.; rising, 417ft.

"At the 1,970ft. level the East lode was cut in a crosscut from Patterson's shaft, and was proved to be 47ft. in width of high-grade ore.

"At the 2,120ft. level the lode was cut 17ft. in width with payable values.

"During the year connections were made with the Golden Horseshoe Estates at the 1,300ft. level, Middle lode, and with the Great Boulder Proprietary (Hamilton's shaft) at the 1,600ft. level. These connections have caused considerable improvement in the ventilation of the mine.

"The main shaft, from 2,235ft., is being carried down 17ft. x 5ft. in the clear, and provision is being made to have four compartments in it.

"13. *Great Boulder Perseverance, Limited.*—Depth of shafts: No. 1, 90ft.; No. 3 (main shaft), 1,989ft.;

No. 4, 290ft.; No. 6, 1,493ft.; No. 8, 195ft.; No. 9, 60ft.; No. 10, 110ft.; "Furness," 235ft. Shaft sinking during 1909: No. 3, 67ft.; No. 6, 183ft. Driving during 1909, 5,830ft. 6in.; crosscutting during 1909, 2,593ft. 6in.; rising and winzing, 2,343ft.

"The principal developments were the opening up of the Lake View lode north and south of the main shaft at 1,300ft. and 1,900ft. levels.

"Driving on 'F' lode at the 900ft. level and the intersection of this lode in the higher levels.

"The plat has been cut and timbered at the 1,450ft. level No. 6 shaft, and crosscutting started east and west.

"A disastrous fire occurred on the mine which destroyed the main engine room and stopped crushing operations, and was the means of throwing a large number of men out of work.

"The main shaft on this mine is being carried down from 1,900ft. 19ft. 5in. x 5ft. in the clear to admit of four compartments in it.

"14. *Associated Northern, Limited.*—Depth of main shaft, 1,045ft.; driving during 1909, 452ft.; crosscutting, 469ft. 6in.; rising and winzing, 666ft.

"No developments of interest have been reported during the year.

"15. *Oroya Brownhill.*—Depth of shafts: Brownhill main shaft, 600ft.; Oroya North main shaft, 1,085ft.; Oroya South main shaft, 1,538ft.; Iron King, 520ft.

Oroya Brownhill: shaft sinking during 1909, 141ft.; driving during 1909, 443ft.; crosscutting, 1,463ft.; rising, 286ft.; winzing, 152ft.

"Central Boulder: driving during 1909, 479ft.; crosscutting, 400ft.; rising, 72ft.; winzing, 85ft.

"A vacuum slimes plant has been installed capable of treating 20,000 tons per month.

"The residues are being sluiced to a tailings lease east of Trafalgar townsite.

"The Oroya Brownhill have amalgamated with the Kalgoolie Amalgamated and Golden Links, and the ore will be treated at the Brownhill battery, which is in a central position.

"It is intended to convey the ore to the mill by small locomotives.

"16. *Golden Horseshoe Estates.*—Depth of shafts: main shaft, 1,900ft.; Ivanhoe South Extended shaft, 2,030ft. Shaft sinking during 1909, 194ft.; driving, 3,193ft. 6in.; crosscutting, 1,748ft. 6in.; rising, 81ft.; winzing, 2,239ft. 6in.

"The General Manager advises that the ore reserves on 31st December as 1,071,638 long tons, containing 593,924.21 ozs. of gold.

"A second 500 K.W. turbo generator and several large motors have been added to the plant.

"It is intended to instal a 750 K.W. turbo generator to work on exhaust steam from the large air compressor and mill engine, and to add twenty head of stamps to the mill, also five tube mills, and to increase the weight of the stamps in the old mill to 1,275 lbs.

"17. *Associated Gold Mine.*—Depth of shafts: Judd's shaft, 2,128ft. 9in.; Tetley's shaft, 1,423ft. 3in.

"Shaft sinking during 1909.—Judd's: 271ft. 3in.; driving, 2,424ft. 6in.; crosscutting, 2,816ft.; rising and winzing, 2,030ft.; diamond drilling, 1,288ft. 9in.

Mr. W. M. Deeble, Inspector of Mines, has forwarded a report, dated 16th February, 1910, as follows:—

"I herewith beg to hand you my report on the mines under my supervision in the East Coolgardie and North-East Coolgardie Goldfields.

"A special effort was made during the year to reduce the number of accidents, but after all had been done the average remains very much the same as in the previous years. One feature noticeable is that, although there are nearly 1,000 tons of nitro-glycerine explosive consumed in the goldfield a year, and not only is it handled in transit and storage, but each plug is handled in charging holes, yet with all the handling of this high explosive, the percentage of accidents by it is low.

"*Developments.*—The developments in the larger mines are opening up well at depth, and the ore reserves are years in advance of the mills. Some managers are increasing the crushing power on the mines, with a view to larger output in the near future.

"*Golden Horseshoe.*—This mine is the largest in the State. It last year treated 294,964 tons of ore and paid £165,000 in dividends during the same period. I learn from the manager that 20 additional stampers of 1,275lbs. each are to be erected during the coming year, and the 50 stampers in the old mill also increased to 1,275lbs. weight. It is also proposed to erect additional concentrators, roasting furnaces, etc., to meet the increased crushing power.

"During the coming year it is expected that a 750 K.W. turbo-generator will be installed to work on exhaust steam from the big air-compressor and mill engine. Where firewood is so expensive as it is in Kalgoorlie the Mining Engineer is always on the lookout to reduce costs in this direction. Exhaust steam turbines are now being used in some places with a steam pressure of 3lbs. per square inch above the atmosphere, which, together with a vacuum, are said to give good results. It will be interesting to get results under Goldfields conditions. During the year a second 500 K.W. turbo-generator and several large motors were installed to drive various sections of the plant. (For particulars of development see Inspector Hudson's report.)

"*Great Boulder Proprietary G.M.*—It is always a good sign to see new machinery erected on the large mines, as it shows continued confidence of both management and directors. With the new winding engine on Edward's shaft a depth of 4,000 feet can be reached. This engine is the largest in Western Australia, and is estimated to lift a load of 16,000lbs. at its worst point, or two tons net from 4,000 feet. The engine was started for winding ore in May, 1909, and I learn is giving satisfaction. The engine was manufactured in Australia. The ore now is hauled up in a skip tipped automatically, and is conveyed to the mill by a belt conveyor and handled altogether by machinery until the treatment is complete. There is a noticeable addition near the main shaft, which is, no doubt, appreciated by the men working there: a shelter shed has been erected over where the firewood is discharged from the railway trucks, which must make the work easier for those engaged in it.

"The deepest shaft on this mine is now down 2,599 feet 6 inches, and the ore in the lowest level highly payable. (For particulars of development see Inspector Hudson's report.)

"With such developments as these at a depth of 2,500 feet there is a very promising outlook for the future of this field.

"The mine produced 210,284 tons of ore of 2,000lbs. during 1909, and paid £262,500 in dividends.

"*Kalgurli G.M.*—A considerable amount of development work has been done in the mine during the year. The bodies of ore, although large, are rather difficult to follow and open up to the best advantage for taking out the ore. This mine produced 126,740 tons of ore during the year and paid £150,000 in dividends. (See Inspector Hudson's report for development details.)

"*Associated G.M.*—A large amount of development work has been done on this mine, and it is reported that the most encouraging is in the bottom level. When we consider the bottom level is down 2,000 feet it shows that the eastern line of lode carries gold downwards as well as the western lines in the Great Boulder and Horseshoe. This mine produced 137,179 tons of ore during the year and paid £49,536 in dividends. (Details of development work in Inspector Hudson's report.)

"On the surface a new 80-90 ton duplex furnace is being erected.

"I learn from the management that specifications are in hand for an exhaust turbo-generator set of 500 K.W.

"*Hannan's Star G.M.*—The Hannan's Star G.M. has been doing practically nothing but development work during the whole of the year. Large bodies of ore have been opened up, but I am unable to speak of values. The Manager reports satisfactory results. (Details of development work in Inspector Hudson's report.)

"*Oroya Brownhill.*—This mine has been one of the large producers in Kalgoorlie, but fell back slightly during the year. The Company owns four mines, known as 'Brownhill,' 'Oroya North Block,' 'Oroya South Block,' and 'Central and West Boulder Block.' Ore is hauled from four separate shafts and hauled to a mill on the Brownhill. This all means expense, which most of the other mines do not have to contend with. Each shaft has to have its staff of engine-drivers and braccemen, and the ore requires more handling to get it to the mill. Despite all this the expenses are very low. A large amount of development work has been done, but I am not in a position to state the values. (For details of development see Inspector Hudson's report.)

"This company has treated 138,188 tons during the year, and paid £45,000 in dividends.

"There are a large number of small mines in this district, but not any one has developed anything during the year worth recording.

"*Filling Worked-out Ground.*—On taking out large ore bodies to keep mills with capacities of from 12,000 to 20,000 tons per month going it is found that the time occupied in refilling is a serious consideration, in addition to the expense. Different methods are being tried in Kalgoorlie mines, but there seems to me to be one which is not being carried out as much as it could be, particularly to fill flat stopes. On the Oroya Brownhill G.M. a system of conveyor belts is in use both underground and on surface. A belt worked by a small winch conveys the sand to the top of a filling pass and from the bottom of the pass a belt, worked by a small winch using compressed air, conveys the sand to the stope to be filled. In this mine the stopes are on a rill and the stopes in the lower levels made to fit in line as much as possible, so as to reduce the handling of filling to a minimum. If used in flat stopes the sand could be taken from the bottom of the filling pass in the stope. A small

engine on a bar like a Holman hoist, with slight alterations, could be used to drive a belt conveyor, and on the opposite end a bar with an extension arm could be arranged to suit the delivery. If the belts were made in short lengths to couple by hooks another length could be put on as filling progressed, and trestles with rollers on put in the filled places to keep the belt from sagging. A simple conveyor of this kind could be quickly erected and as easily taken down.

*“Water and Firewood Consumption per ton of Ore.*—The water and firewood used and ore crushed during 1909 by the mines in the Kalgoorlie and Boulder Mines Water Trust is as follows:—

“The total water used was 328,727,200 gallons in treating 1,700,743 tons of ore of 2,000lbs. per ton, which is equal to 193.2 gallons per ton. For sluicing purposes 77,148,900 gallons were used. As part of the residues are kept on some of the mines to be returned to the workings for filling purposes it is rather difficult to estimate the amount of water required per ton to sluice them away. It is noticeable that there is very little difference in the amount of water used per ton in the wet and in the so-called dry processes.

“Taking three of each, the averages are as follows:—

<i>Wet Process.</i>	
1—	173.2 gals. per ton.
2—	166           ”
3—	304           ”
<hr/>	
Aver.	212.6       ”

<i>Dry Process.</i>	
1—	213.6 gals. per ton.
2—	219.5       ”
3—	163.9       ”
<hr/>	
Aver.	199.0       ”

“The firewood used in the handling and treatment for the above tonnage was 423,302 tons.

*“Ventilation.*—The ventilation in most of the mines is good, but as the mines get deeper and are connected by drives to adjoining mines, the temperature in the upper levels tends to get higher. This seems to be unavoidable in large mines, like some in Kalgoorlie, where developments are so far ahead of the mills and the output so graded that it is necessary to work at various places from near the surface to, in some cases, below 2,000 feet depth to keep the average return. Under these conditions the men working on the upcast side must get some of the fumes from explosives used by those nearer the downcast. The temperature of the ground in Kalgoorlie is not high and apparently does not increase much with depth, as far as can be gauged by the thermometers put in bore-holes at different levels.

“In the Great Boulder Proprietary G.M., 2,350 feet level, a drive was in 300 feet. The temperature in the end was 83deg. A thermometer put in a hole 6 feet deep and paper pressed on top, after ten minutes showed a temperature of 84deg. In the Golden Horseshoe G.M., at the 1,700-foot level, a thermometer put in a hole 6 feet deep and paper pressed on top, after ten minutes showed a temperature of 83deg. The most surprising result obtained was in a drive from the No. 3 shaft in the Golden Horseshoe. The shaft is down 2,000 feet without any other connection from

the surface. From the bottom of the shaft a drive goes in 1,100 feet, and the drive was still being driven on by a rock drill. The rock drill was stopped for ten minutes and the temperature then in the end registered 79deg. A hole 5 feet deep bored in the face the day before registered on the thermometer 83deg. The highest temperature for the depth was found in the Kalgurli G.M. at 1,450 feet level in a drive 65 feet off a cross-cut, the temperature in the drive registered 81deg., and in a hole bored in the face 84deg. It is just possible that when a face is bored the air and water meeting mineral would cause decomposition sufficient to vary the temperature slightly.

*“Suction Gas Engines.*—The first gas producer in Kalgoorlie was installed on the Great Boulder Proprietary G.M., and was used for firing the calciners. I am informed that when it came to forced work it was found that there was not sufficient body in the gas, and the management had to revert to the wood fire furnace to get the quantity through. Wood suction gas engines are in use outside this State, but as far as I can learn have not up to the present given the satisfaction of the ones using charcoal. If wood could be utilised, and as little attention required at the engines as those now using charcoal there would be a considerable reduction in this already economical power. With tests I made at Norseman some years ago with dry wood I obtained 16 bags of charcoal of 80lbs. each from a ton of firewood, which is equal to 4s. 7d. At present firewood is delivered at the mine at 13s. per ton and charcoal at 60s. There are now seven suction gas plants in Kalgoorlie and all users speak highly of them and the little attention necessary to keep them running. A number of the users are not engineers and have had no previous experience with gas engines, which proves that they must be simple to run. I find that in most cases the costs are not kept closely and those attending to the machines do other work also. In one case I was supplied with the following figures, and on this plant, as costs sheets of everything are kept, they will be correct:—

*70 H.P. Engine Suction Gas.*

	£	s.	d.
Labour .. .. .	42	0	0
Repairs .. .. .	6	5	0
Oil, Water, and Stores ..	15	0	0
Charcoal, 65s. per ton ..	78	15	0
	<hr/>		
	£142	0	0

which is practically 40s. per H.P. per month.

“One 30 H.P. engine, I was told, uses 4½cwt. of charcoal per day, which is equal to 14s. for fuel. The water used was equal to a half-pint per H.P. per hour.

“At Messrs. Riedel and Norton’s battery at Kanowna a suction gas engine has been put in in place of an oil engine to drive a stamper battery, and the owners informed me that they were saving about £60 per month by the alteration. By the figures given me I find 24 H.P. works out at £1 3s. 10d. per day for materials. At Martin’s public crusher a 50 H.P. gas engine is used to supply power to work 15 stampers, tailings wheel, two pumps and a dynamo. Before the suction gas was installed a steam engine was used to drive the same machinery, and the owner informs me that the cost of firewood was £100 and water £25 per month. Now the power is supplied at £45, or a saving of £80 per month. These mills are now crushing for 12s. per load of quartz = 30cwt., and softer material in proportion.

"Of course in all new machinery faults can be found, and alterations are necessary to suit local conditions. In a country like this where good water is not always available, salt water, or water that will give a precipitate would have to be used, in which case there would be trouble with the water circulation in the engines as at present made. This can easily be overcome by having the water-jacketed parts fitted each with an easily removable cover and mud-holes to make the parts easily accessible to remove any deposit.

"One thing to be guarded against is that these engines are liable to give off poisonous gases, and therefore should not be erected in a close building.

"It seems to me probable that a regulation will be necessary to meet this danger.

#### NORTH-EAST COOLGARDIE GOLDFIELD.

"*Kanowna District.*—Nothing sensational has been discovered in this district during the year, but a fair amount of gold has been won both from alluvial and quartz. Most of the material carrying gold outside the alluvial wash is quartz, but there is one claim known as the "Dead Horse," where the material is lode matter. It is just possible that in a district like this, where the prospector is only looking for reefs, good lodes may be overlooked.

"The main mines are the White Feather Main Reef and the North White Feather G.M. In the White Feather Main Reef an average of 53 men have been employed. The prospecting and development work done is 2,459 feet, and during the same period 4,748 tons were treated for a return of 2,553ozs. over the plates, valued at £8,520.

"Development for year:—

Sinking prospecting shafts ..	739	feet
Driving .. .. .	762	"
Cross-cutting .. .. .	361	"
Rising .. .. .	412	"
Winzing .. .. .	185	"
	—	
Total .. .. .	2,459	"
	—	

"*North White Feather G.M.*—This mine is the largest in Kanowna employing men on wages. A fair amount of development work has been done during the year, and although the tonnage of ore reserve has not opened out up to expectations the management anticipates that there is sufficient to keep the 20-head mill employed for another two years.

"The development work done during the year was as follows:—

Level.	Driving.	Rising.	Winzing.	Cross-cutting.	Sinking.
	Feet.	Feet.	Feet.	Feet.	Feet.
200ft. ..	77	27	164	..	..
314ft. ..	559	94	..	87	..
414ft. ..	613	179	..	82	..
514ft. ..	412	349	..	163	..
614ft. ..	284	383	..	16	..
714ft. ..	445	451	..	124	..
814ft. ..	62	144	..	82	..
914ft. ..	6	33	..	49	..
Shaft sinking from surface .. .. .	..	..	..	..	171
	2,467	1,660	164	603	171

"Total development work—5,065 feet.

"*Wood's Find G.M.*—This mine is now being worked by the Golden Valley Syndicate, who have done a considerable amount of work to clear the mine of water. At first the inflow of water was about 40,000 gallons daily, and now it has dropped to from 20,000 gallons to 24,000 gallons. The bottom level at 300 feet deep is unwatered, and a winze is being sunk on the reef to prove values downward. As far as I could see the reef in other places in the mine varies from one foot to 6 feet wide, but in the winze the reef will average 5 feet wide. The last crushing of 140 tons returned 66.94ozs. fine gold. This, I was informed, was made up of 25 tons from the winze below the 300-foot level, and the remainder from stopes above the level. Since this mine started under the present syndicate is only seven months, so they have not had time to prove much, but it seems to have an excellent prospect.

"A large number of small shows are being worked sufficient to keep two custom mills going. Altogether 49,885½ tons of ore have been crushed during the year for a return of 22,465.17ozs. fine gold, and 771.84ozs. have been dollied.

"*Accidents.*—There have been four fatal accidents in Kanowna during the year. One was caused by a fall of stone in a stope, and the other a man was putting a piece of timber to form a rearing at an end of ground when a piece of rock fell and knocked him down a pass. Both these accidents occurred in the North White Feather G.M. In the White Feather Main Reef whilst the lower levels were being unwatered, some centres and a runner was found to be out and a man went down to repair it. When pulling at a piece of runner it came away easier than expected, which caused the man to overbalance and fall down the adjoining compartment.

"In the same mine a man was killed by falling into an open cut and then down the winze from the bottom of the open cut. This man was seen at 10 p.m., when he was under the influence of drink; it was shown he had several drinks after, and took a bottle of beer away with him. I walked down the side of the open cut and am satisfied that if the man had not been under the influence of liquor the accident would not have occurred. The man was not employed on the mine, but as it occurred on the mine it is recorded as a mining accident.

"*Randall's and Bulong.*—Although these places continue to employ a number of miners there is very little that's new to record, and all that is doing at Randall's and Bulong may be classed as prospecting work.

"A small belt of country to the north of Bulong has given rich dabs in places. In the Golden West G.M., a parcel of 35cwts. returned 38ozs. of gold. The gold occurs at the intersection of ironstone leaders and quartz.

"About five miles N.E. of Bulong two men are working on a greenstone formation, in the cleavages of which gold makes in the form of gilt. In sinking a shaft 15ft. 74ozs. of gold were obtained, but the owners sank further through ground of very little value. From present appearance it would seem as if they had passed through a shoot, and the best way to work it is to follow the gold until they gain some further knowledge of how the gold is making.

"Two men working on leaders at 'Sudden Jerk' occasionally get a rich patch. During last year they made over wages for the whole year, and were away for about four months.

## COOLGARDIE, YILGARN, AND DUNDAS GOLDFIELDS.

Mr. J. Crabb, Inspector of Mines, has reported under date 10th January, 1910, as follows:—

"I have the honour to submit my Annual Report on the gold-mining industry in the Coolgardie, Yilgarn, and Dundas Goldfields for the year ending 31st December, 1909.

### COOLGARDIE GOLDFIELD.

"During the period under review there has been a slight falling-off in the gold yield on the Coolgardie Goldfield. This of course is due to the Westralia & East Extension Mine, Bonnievale, and the Burbanks Birthday Mine, Burbanks, having considerably reduced their mining operations. I do not think, however, that the decline will continue a great deal longer, as there appear to be good prospects of a fairly substantial increase within the next year or so. There appears to be every likelihood of an additional thirty head of heavy stamps being brought into operation before the end of the present year, and I anticipate that, as time goes on, attention will be again directed to some of the properties that have not yet been thoroughly handled. Should any receive attention it is to be hoped that those who promote companies and those who invest in them will assure themselves that the ventures have some reasonable chance of success. This does not appear to have been the case in the past; and promoters seem to have too often looked more to success in floating a company than the ultimate working of the mines. An improvement in this direction would be certain to restore confidence, and bring about renewed mining activity.

"Tributing has played an important part in mining in this field during the year, and in many instances has proved highly satisfactory to both tributers and mine owners, at mines where owners had apparently worked their mines to a standstill. This has given rise to the question: Why is it that a mining company is unable to operate its mine at a profit, but on resorting to tributing is enabled to show a good profit? A few of the reasons why the tributers reduce their mining costs to less than that of a company may not be out of place in this report, and may be briefly enumerated here as follows:—

"(a.) A tributer does not break more ground than is absolutely necessary to permit of present operations; while a company as a rule will make the various excavations sufficiently large to aid in the future development of the mine.

"(b.) Tributers appear to be able to get more work from their men, and in working themselves they naturally work harder than if they were working for a company.

"(c.) Tributers are usually practical men and concerned with profits only. They use more skill in such operations of mining as the placing and depth of holes, timbering, filling, and in sorting the ore.

"(d.) Tributers reduce the developments to a minimum, and do not sink much money in the ground in the hope of finding more ore.

"(e.) Tributers do not bear the expense of a manager's office.

"As a rule the tribute agreements are very satisfactory to all concerned. Occasionally one hears of high royalties, but the fixing of equitable royalties is not often an easy matter as so much depends upon the character of the ore body. It sometimes happens, owing to unexpected discoveries, considerable

amounts have been taken from the mines by tributers upon payment of royalties very much out of proportion to the value of the tribute, and upon the other hand, there are many cases in which unforeseen contingencies have made the royalties entirely too great. It is impossible, under our present system of tributing, to insure a fair division between owner and tributer. The sudden widening or narrowing of a vein, the opening or pinching of a chute, a change in the nature of the ground, and numerous other incidents affecting the cost of production are unprovided for.

"On examining many of the tribute agreements it has been very clear to me that both parties have attempted to provide for a fair basis of royalties by arbitrarily assuming variable ratios to exist between cost of producing the ore and its value.

"There can be no doubt that tributing is very often not only an advantage to tributers but to the mining companies for whom they work. The system has its drawbacks, however, in many ways, but I hardly think it necessary to deal with them in this report.

### THE MINES.

"Very good progress has been made at Tindals mine, and recent developments at the 300ft. level are reported to be very satisfactory. The lode is said to not only retain its average width (about 10ft.) here, but to show a marked improvement in values compared with values obtained from the upper workings.

"A very fine 20-head mill, a large air compressor, mill engine, and all other necessary machinery of the very latest type, by Fraser & Chalmers, has been installed and well housed. Ten of the stamps have been at work for some months, but the other ten will be brought into operation at a very early date. Consequently the tonnage for the coming year will be doubled, and as a considerable amount of ore will be obtained from the bottom level, where it is said that the ore shows an increase in value, it is also expected that the gold yield will show a fair increase per ton.

"It is generally thought that there is a good future for this mine.

"During the month of December, 1,086 tons were milled for 311.05 ozs., and 765 tons of sands were treated for 53 ozs.

"Value per ton of ore milled, £1 0s. 6.38d.; value per ton of sands treated, 4s. 9.57d.; value per gross ounce extracted by mill, £3 8s. 11½d.; value per gross ounce extracted by cyanide, £3 9s. 3d.

"Griffiths's Mine has been worked by a party of tributers for nearly the whole of the year. In the early part they confined their operations to the bottom level (No. 3) for a few months, but finding that the ore here was not quite payable, turned their attention to the northern portion of the upper workings. After working here for some little time they located at the No. 1 level what is considered to be the continuation of the main ore body.

"I may here state that the lode which strikes north-south is faulted some distance north of the main shaft, No. 2 level, by a cross-course which cuts off the lode at a very acute angle, so much so that the foot-wall of the cross-course might easily be mistaken for the hanging wall of the lode. A few years ago the No. 2 level was extended a considerable distance for the purpose of finding the dislocated portion, but as the drive was put in almost in the same direction as the strike of the lode, the attempt failed.

"The tributers on developing an ore body at the No. 1 level formed the opinion it was the dislocated portion of the main body, and on sinking a winze at a point about 100ft. north of where the fault occurred at No. 2, from the No. 1 level, found that the lode had been thrown about 20ft. west, and that the width of the cross-course is 80ft.

"During a recent visit to the mine I learned that there is about 6,000 tons of ore in sight estimated to be worth about 30s. per ton.

"It is thought that the tributers will be able to treat about 4,000 tons of this with the 10-head mill that is on the mine, before the term of tribute expires, and as mining and milling can be done for about 14s. per ton it will be seen that the tributers are likely to do very well.

"The assistance given to the tributers in respect to cheap water under the Mines Development Act has been found to be of great benefit, and I doubt very much if this assistance had not been given, whether the present results would have been brought about.

"The lode is about 10ft. wide at the No. 2 level. When the term of tribute is up the owners will no doubt develop the lode by extending the No. 3 level. A new lease of life appears to have been given to the mine, and I think it may be reasonably expected that the mill, which has been run very intermittently for a considerable time, will be kept going almost continuously.

"At New Bayleys Mine a great deal of work has been done by tributers and the company at different parts of the mine, but up to the present not much of importance has been opened up.

"During the latter part of the year the drive at the 433ft. level, Ogilvie's shaft, was extended 165ft. from a point 105ft. north of shaft where lode is faulted. On driving 46ft. the lode was picked up, and when first struck was found to be worth about 1 oz. per ton, but on driving along, its values gradually dropped off. It is intended to continue this drive, as it is thought there are very good prospects of the vein increasing in value.

"It is also intended to sink the above-mentioned shaft to a depth of 630ft. and drive along the line of lode toward Bayleys Consols Mine at a depth of 600ft. This will prospect the New Bayleys line, and at the same time enable the Company to test Bayleys Consols 120ft. below the deepest workings, which are now flooded.

"It is to be hoped that this work will be carried out (as it will be the means of testing both mines to a reasonable depth), and that the company will meet with the success it deserves.

"The King's Cross, which has been worked by a party of tributers for nearly the whole of the year with fairly satisfactory results, is said to be looking well below the 240ft. level. Owing to the promising appearance of the vein and the high values that were obtained by means of underhand stoping, it has been decided to sink the main shaft to a depth of 350ft. This work is now in progress, and when completed it is intended to instal a 9in. Cornish pump, and to replace the present hoist by a more powerful one.

"Just now the inflow of water is not a very serious matter, but it is anticipated that a fairly large flow will be encountered when the lode is tapped at the next level, as the mine is supposed to be in the Coolgardie Redemption, Hanover, and Golden Bar water belt.

"The value of ore below the 240ft. level is reckoned to average about 2 ozs. per ton.

#### *Burbanks.*

"During the year about £12,000 has been spent on machinery and development work at the Main Lode G.M.

"A fine electric plant has been installed and is working smoothly.

"The generator is of the three-phase alternating type, rated at 150 K.W., with a frequency of 50. It is coupled direct to a 250 H.P. compound vertical engine of the very latest design. At No. 4 plat an electric pump capable of discharging 150,000 gallons per 24 hours against a head of 1,000ft. and an electric hoist operated by a 25 E.H.P. motor have been installed.

"At No. 5 an electric pump capable of discharging 150,000 gallons per 24 hours against a head of 200ft. has been placed near the main shaft. The generator and motors are by J. P. Hall & Co., Oldham; compound engine by Robey & Co., Lincoln; electric hoist by J. Rooth Bros., Bodley, and the pumps by Pearn & Co., Manchester.

"The main shaft has been sunk to 700ft., and a level opened up from this depth. Two winzes sunk 250ft. apart at this level have proved the lode to be highly payable. One winze is reported to be in ore worth from 16 dwts. to 1 oz. per ton.

"During the latter part of the year work was resumed at a point about 700ft. away from the main workings on a reef that, so far as proved, promises to be highly payable. A sample of 75 tons treated from the shallow workings yielded nearly 1 oz. per ton.

"The net profit for the year after providing for the amount expended on machinery, in sinking the main shaft, and in the development of the mine, was £7,971.

"During the month of December the company crushed 932 tons for 629.77 ozs. Sands yielded from 720 tons 185.95 ozs.

"The prospects of this mine are considered to be very good.

"At Burbanks Birthday G.M. a considerable amount of tributing has been done in the upper levels. During the month of December 724 tons were treated for tributers for 406.78 ozs.

#### *Lord Bobs.*

"Very high-grade ore is still being mined at the Lord Bobs G.M.

"A parcel of 133 tons recently treated gave a return of 3 ozs. 2½ dwts. per ton. Previous crushings from this mine have averaged about £6 16s. 3d. per ton.

"At the Grosmont G.M. a 10-head mill and a suction gas plant have been installed and will be brought into operation at an early date.

"A large body of ore has been opened up that is considered to be highly payable.

"Water has been laid on to the mine, a distance of about six miles, from the Goldfields main pipe line.

"A great deal of development work has been done at the Cheapside mine, and its prospects at present are considered to be very promising. A parcel of 70 tons treated in December gave a return of 40 ozs.

*Kunanalling.*

"Mining at Kunanalling has been a little dull of late. The principal mines now being worked are the Star of Fremantle, Shamrock, Blue Bell, Inkerman, Hopeful, and Sydney Mint.

"The Star of Fremantle is said to be improving at depth. The last parcel of 84 tons gave a return of 33.40 ozs. over plates, and from 1 ton 2 cwts. of concentrates 7 ozs. 5 dwts. were obtained. The ore in the bottom level is found to carry a small percentage of nickel.

*Balgarric.*

"The only mine now at work in this centre is the United Australia. There is a large body of ore on this mine (about 100ft. in width) that has been proved to a depth of 100ft. At present the ore is being treated at the Stanley battery, but as it has to be carted about two miles, progress seems to be very slow. The principal drawback to this property appears to be the scarcity of water. It is thought by a great many who have examined the mine that it could be made a highly payable one if provided with an up-to-date plant and a good supply of water.

"A parcel of 220 tons treated during the month of December returned 91.40 ozs. by amalgamation.

*Carbine.*

"At the Carbine G.M. splendid developments have taken place at the 400ft. level. In the southern portion of the No. 4 workings the lode was cut off by a cross-course, which cut through the lode at an angle 30 degrees, and almost vertical. The fault was considered a normal one, and a crosscut was put in through the cross-course at a point where it was considered almost certain the dislocated portion would be again found. After doing about 8ft. of cross-cutting through a hard diorite dyke the lode was picked up, and where cut proved to be worth about 30 dwts. per ton.

"The ore body has been proved to be nearly 300ft. in width and to carry fair values throughout. The progress of this mine is retarded through the scarcity of water for milling purposes. The 10-head mill can only run about half time on the present supply. On sinking a winze from the 400ft. level a fairly good supply was struck, and it is thought that a good supply will be found in the crosscut that is now being put in from the 500ft. level. If a sufficient supply cannot be obtained from this level I have been given to understand that satisfactory arrangements will be made to get it from a well situated about three miles from the mine.

"At the Carbine South developments are being carried on at the bottom level. Up to the present I am not aware of anything of much importance being found.

*Chadwin.*

"At Chadwin a few promising shows are being opened up, and a fairly regular output of gold may be reasonably expected from this centre.

"SurrIDGE and party intend to instal a five-head mill and a suction gas plant as soon as a sufficient supply of water for treatment of ore can be obtained.

*Jourdie Hills.*

"Very good progress has been made of late at the Jourdie Enterprise mine, and its future prospects are considered to be promising.

"The ore between Nos. 1 and 2 levels is proving to be highly payable.

"It is intended to sink the main incline at an early date to a depth of 300ft., and to extend the No. 2 level south about 200ft. for the purpose of picking up a chute of gold that is reckoned to exist at about 250ft. south of the main incline.

"The five-head mill that was erected in the early part of the year is now working smoothly. Some little trouble was caused in the early part of the year through portions of the machinery not working satisfactorily, and the owners appear to have been put to a very considerable expense in rectifying a small matter.

"At Derry's Own a large Cornish boiler is about to be installed for the purpose of operating the air compressor that has been on the property for some time. The present boiler is found to be too small for the work required of it. As soon as the new boiler is installed a start will be made to drive north and south from the bottom of the incline, on the reef, a distance of 150ft. each way.

"The reef at the bottom of the incline is reported to be about 6ft. in width and to be highly payable. Should the proposed drives prove the reef to continue both in size and value, a 10-head mill will be erected.

"At the Pride of Jourdie North there is not much fresh to report.

"The five-head mill has been kept running fairly consistently on ore obtained from the mine and treating ore for the public.

*Bonnievale.*

"Mining at Bonnievale has during the whole of the year been very dull; this of course is due to the Westralia & East Extension mine having been practically closed down.

"The Vale of Coolgardie has been worked by a party of tributers, but apparently results have not been very satisfactory.

*Widgemooltha.*

"Mathews and party, who are working the Nottingham Castle, are raising 2 oz. stone from a small vein. A parcel of 10 tons treated at the State mill some little time ago gave a return of 4 ozs. per ton.

"The Flinders mine is being worked by a party of tributers, who have of late been doing a good deal of development work.

"At the Yorkshire Lass work is confined to stopping and driving at No. 1 level. The lode here averages 3ft. in width. During a recent visit there were 90 tons of ore at grass estimated to be worth 25 dwts. per ton.

"Hopper and party are opening up a large lode formation a little south of the State mill, but up to the present results have not been satisfactory. A parcel of 120 tons treated at the State mill only gave a return of 4 dwts. over the plates, which was just about sufficient to cover cost of milling and cartage.

*Merrigig.*

"In the early part of November a small reef was discovered by a party of wood-cutters, about 1½ miles East of the Merrigig Railway Station (Coolgardie-Norseman Line). A shaft has been sunk on it to a depth of 18ft., which has proved the reef to be worth about 1 oz. per ton and to average 1ft. in width. There are now 7 tons at grass, which will be brought to the State mill at Coolgardie for treat-

ment very shortly. Since the discovery was made the locality has been prospected a little, but so far nothing of value has been found outside the prospectors prospecting area.

#### *Higginsville.*

"Mining at Higginsville has been very dull during the year. The Sons of Erin G.M., which was purchased a few months ago by Mr. Sampey, is being worked principally by tributers. Some of the tributers are reported to have done fairly well, whilst others have hardly cleared expenses.

"Apart from the Sons of Erin very little mining has been done.

#### *Eundynie.*

"At the time of a recent visit to the Brilliant G.M., the owners had raised a parcel of 70 tons from an underhand stope below No. 1 level.

"This parcel was expected to yield about 1 oz. per ton. There appears to be a chute of stone worth about 1 oz., 70ft. in length and 2ft. in width, a little south of the main shaft. As this chute has a fairly sharp pitch south, and there being a fairly large body of water to contend with, it has been decided to instal a small pumping plant to enable the ore to be more economically mined.

"At the Hidden Secret North a 10-head mill has been erected and a good supply of water for milling purposes obtained some little distance from the mine.

"A fairly large quantity of ore has been opened up that is considered to be of a highly payable character. Owing to the nature of the ore it has not been possible to extract more than about 50 per cent. of gold by ordinary amalgamation. A cyanide plant capable of treating 500 tons of sands per month is to be erected in the very early part of this year.

"A good deal of work has been done on the Hidden Secret, but up to the present the ore treated has proved to be far from payable.

"In the early part of the year tin was discovered in small quantities a few miles south of Londonderry, and at First Find, which is situated 14 miles west of Coolgardie.

"Mr. Fraser, who was the first to discover tin at Londonderry, applied for a Reward claim, but on making an inspection of the property I could not see sufficient to justify me in reporting favourably on it. Consequently the application was not granted, and from what I can learn, little or nothing has been done in the locality since.

"Mr. Mercer was the first to discover tin at First Find. Some fine specimens of cassiterite were found near a large quartz outcrop and also in the outcrop. Some of the specimens weighed from 1 lb. to 2 lbs.

"I submitted to the Government Mineralogist and Assayer a sample of ore obtained from the outcrop, and a sample of alluvial taken a few feet away from the outcrop, who reported as follows:—

"I have examined the two samples of tin marked 761/09 submitted by you and have obtained the following results:—

"3662. Lode tin ore. Metallic tin, 41.82 per cent.

"3663. Alluvial tin ore. Metallic tin, 43.62 per cent.

"The only impurity detected in lode ore was quartz.

"The alluvial ore contained much quartz, beside felspar, mica, and iron oxides.

"I could not detect tantalite or columbite in either sample. The clean cassiterite probably assays not more than 70 per cent. metallic tin."

"I may here state that the sample from the lode was the best that I could obtain, and therefore it would not of course be a fair estimate of the average value of the lode.

"A little development has been done to a depth of 20ft. which has proved the vein to carry a small percentage of tin. This is the only work that has been done on it, and the property is now abandoned.

"In the face of the encouraging results obtained it is somewhat surprising that more work has not been done to prove the value of the lode to a reasonable depth.

#### DUNDAS GOLDFIELD.

"Mining on the Dundas Goldfield has been fairly brisk, and its future prospects appear rather encouraging.

"The principal producer has been the Mararoa, which is equipped with a 20-head mill.

"The mine has been developed to a depth of about 600ft., and the reef is reported to be looking well in the bottom, and having every appearance of going to a great depth.

"At No. 5 level the reef has been driven on a distance of 650ft. in payable ore, and, so far as proved, averages about 17ft. in width. The north face was reported to be in ore worth between 50s. and 60s. per ton.

"On an average about £2,000 per month is being made.

"At the Viking a Cornish boiler and hoisting engine have been installed. The main incline has been deepened another 100ft., making the total depth 400ft. The last 100ft. sunk is said to be in stone of exceptional value. The vein averages 18in. in width and is reckoned to be worth about 3 ozs. per ton.

"At the Northern Star a 10-head mill and a 100 B.H.P. suction gas plant has been installed, which will be brought into operation at a very early date. It is reported that the ore body has been proved payable for a length of 800ft. It is anticipated that 1,000 tons of ore will be treated per month.

"The Venture G.M., which was taken under option by the Cumberland G.M. Co. a few months ago, is now being vigorously prospected. Up to the present developments have been fairly encouraging, and there appear to be reasonable prospects of the company completing the option.

"Vincent and party, who are working the Sun mine, are obtaining very good results. At the 100ft. level a drive has been put in north 60ft. on stone averaging 3ft. in width, worth 30 dwts. per ton. The reef is said to have every appearance of going down to a considerable depth.

"The main shaft at the New Moon has been sunk to a depth of 300ft. and a drive put in south 130ft. and north 90ft.

"It appears that the reef was lost some time ago in the No. 3 level owing to it being cut off by a normal fault. In consequence of this the driving of this level north was discontinued. A few months ago, however, a change of management was made, and the new manager, after making a very careful examination of the geological features of the mine, formed the opinion that the reef could be again picked up by continuing the drive. This work was at once undertaken, and on driving a very short distance the dislocated portion was located just exactly



as expected. The drive has been extended 60ft. since on stone worth 25 dwts. per ton.

"During the early part of the year the Aeme mine was under offer to a Kalgoorlie syndicate. A good deal of development was done by this syndicate, but the option was not completed. It has again been placed under offer. The original prospectors of the property cleaned up a parcel of 100 tons in November for a return of 9 dwts. per ton.

"The reef is said to average about 4ft. in width, and it is thought if the mine were equipped with a suitable plant it could be made highly payable.

"At the Princess Royal a great deal of prospecting work has been done at different points of the mine, and in some instances with satisfactory results. A large quantity of stone that had been left in several parts of the mine as unpayable has been taken out and treated with highly payable results. It is to be regretted that the company cannot see its way clear to test the value of the large ore body to reasonable depth below the present workings.

"At the Cumberland a fair amount of development work has been done, but results appear to be anything but encouraging. Of late the pillars of stone that have been left in various parts of the mine are being taken out, and nothing of importance is now being done below the No. 3 level.

"Mining at the Lady Miller has practically been at a standstill; a little development has been done, but nothing of much importance has been disclosed. The lower portion of the lode on this property has been cut off by a large cross-course or fault, which dips at a fairly flat angle toward the north. Up to the present very little has been done to locate the continuation of the main ore body below the fault.

"I have been given to understand that a plant will shortly be installed to treat the accumulated slimes and tailings, which it is thought can be done without much difficulty.

"There are several small shows being worked on the field with very satisfactory results. Nearly the whole of the ore raised from the various prospects is treated at the State Mill.

"Mr. Hoffnan has installed a five-head mill on the Oversight mine, and it is expected to be brought into operation during the early part of the year. In addition to the mill a 5-drill air compressor has been installed. It is estimated that there are about 3,000 tons of ore in sight of a highly payable character."

#### YILGARN GOLDFIELD.

"The output of gold from the Yilgarn Goldfield has been very well maintained during the year, and judging from the results obtained from some new discoveries there appear to be very good prospects of the yield being materially increased during the next year or so.

"At Golden Valley a five-head mill is being erected to treat ore from the Violet G.M. A shaft has been sunk on this property on the lode to a depth of about 70ft. on stone that is estimated to be worth about 2½ ozs. per ton. The lode so far as proved appears to be about 5ft. in width.

"About 9 miles north of Southern Cross a large reef was discovered in the early part of the year by a prospecting party, Hoffman and Harris. Several claims were pegged out along its line and on the prospectors' lease, and the lease adjoining it on the north; the reef is said to prospect very well. A parcel of 50 tons taken from along the outcrop of the prospectors' claim gave a return of a little over

1 oz. per ton. The reef here is reckoned to be 40ft. wide in places.

"A shaft has been sunk on the claim north of the prospectors' to a depth of 40ft. and a crosscut put in 9ft. which has proved the stone to be worth 1 oz. 16 dwts. per ton.

"A detailed account of this find will be found in my report forwarded to your office in November.

"About two miles south of the above-mentioned Armstrong and party are working a small reef worth about ½ oz. per ton.

"Adjoining Armstrong and party on the South Kennedy and party are also working a small reef worth about 1 oz. per ton.

"A good deal of prospecting has been done at Hope's Hill, and some highly payable parcels have been taken from the Hope's Hill G.M.

"A five-head mill has been erected near the old Hope's Hill battery site. This battery is worked by horse power, and is supposed to be capable of crushing about 2 tons in eight hours.

"Fraser's mine has been worked principally by tributers who confined their operations principally in the upper workings. An option has been taken over the mine, and at present a blind shaft is being sunk on the lode from the bottom level for the purpose of testing the ore body to a reasonable depth.

"Very little work has been done at the Transvaal G.M. during the year. There appears to be a likelihood, however, of the mine being taken over by a company. The mine is equipped with a 20-head mill, and water is laid on from the goldfields main. The present method of treatment is not suitable, namely, amalgamation and cyanidation.

"There is a large body of ore opened up which is thought would be highly payable if properly treated.

"At the Greenmount the usual mining operations have been carried on in the oxidised zone, and the 10-head mill has been kept almost constantly employed.

"At the Sunbeam very little work has been done underground. The mill has been kept almost constantly employed on public stone.

"Some splendid stone is being raised at the May Queen. The reef, which averages about 1ft. in width, has been opened up to a depth of 100ft. A parcel of 86 tons treated a few months ago gave a return of 502 ozs. It is reckoned that there is a block of stone opened up 90ft. in height and 80ft. in length, worth about 5 ozs. per ton.

"During a recent visit to Jacoletti a little development was being done between Nos. 1 and 2 levels. A good deal of public crushing is being done at this mine.

"The Mountain Queen was under offer to a company for a very substantial figure, but the option was not completed. A considerable amount of development work was done which proved the mine to be a valuable one. It has been estimated that 22,000 tons of ore had been exposed of a highly payable character. A vertical shaft was sunk to a depth of 200ft. and a level opened out at 100ft. and 200ft.

"The lode has been opened up at No. 1 for a length of 400ft., and at No. 2 about 200ft. The width of lode ranges from 15ft. to 40ft.

"At the Marvel Loch very good progress has been made.

"During December the mill ran 577 hours, treating 1,470 tons for 571 ozs., valued at £1,943 18s. 6d. Nine hundred and eighty-six tons sands produced 133 ozs., worth £371 17s. Total, 1,470 for £2,315 15s. 6d.

"Mining cost £575 14s. 6d.; development, £430 5s.; realisation, £29 8s.; profit, £788 15s. 8d.

"At the Never Never mining has been a little dull; this appears to be due in a great measure to shortage of water.

"At the Great Victoria a vertical shaft is being sunk for the purpose of testing the large lode to a depth of about 300ft., and also to try and obtain sufficient water to run a 10-head mill, which it is intended to erect as soon as a sufficient supply of water can be obtained.

"Very good progress is being made at Spring Hill. The mine is opening up well at depth. The reef in the bottom level is reckoned to be 10ft. in width and to be worth about 9 dwts. per ton.

"A 50 B.H.P. suction gas plant has been installed, and is reported to be working well. A five-head mill, 1,050lb. stamps, is being run for a total cost of 3s. per 24 hours for fuel. To run the same plant with steam, the owner informs me, cost nearly £2 per day.

"Cheriton's Golden Mile is practically abandoned.

#### VENTILATION.

"The ventilation in the mines on the Coolgardie, Yilgarn, and Dundas Goldfields has, with two exceptions, been ideal, as will be seen from the following tests which I made from time to time. In both the above cases instructions were issued to have the ventilation improved, and it is expected that the defects will be overcome at a very early date.

"Wet and dry bulb thermometer readings were taken in places where the temperature was thought to be highest, and the greatest percentage of humidity existed; and tests for carbon dioxide gas were made where it was thought the greatest percentage would be found.

"The distribution of the air has been regulated by means of stoppings and air doors. Connections between workings that were poorly ventilated or proposed workings that were likely to be poorly ventilated by natural ventilation have been made as soon as it was found practicable to do so.

#### CONDITION OF VENTILATION.

##### Various Mines.

Date,	Name of Mine.	D.B.	W.B.	Humidity.	CO <sub>2</sub> .	Remarks.
1909.		Frh.	Frh.			
March 6	Acme ... ..	70	70	100	...	No. 2 South face.
March 16	Princess R. N. ... ..	72	69	84	...	No. 2 level, North.
July 14	Cumberland ... ..	70	68	88	...	800ft. level, West.
July 15	Mararoa ... ..	56	50	65	...	No. 5 level, North.
July 15	Mararoa ... ..	59	54	71	...	No. 6 level, North.
July 16	Princess R. ... ..	64	59	72	...	No. 5 level, North.
July 16	Princess R. ... ..	52	49	80	...	1,000ft. level.
Oct. 23	Valkyrie ... ..	61	59	88	.053	Top of upcast winze No. 2.
Oct. 23	New Moon ... ..	57	56	93	.061	North face, No. 3 level.
Oct. 25	Mararoa ... ..	69	64	73	.053	North face, No. 5 level.
Oct. 26	Princess R. ... ..	72	69	84	.070	North end, No. 5 level.
Sept. 21	Burbanks B. ... ..	55	54	...	...	No. 3 level.
Nov. 10	Fraser's G.M. ... ..	65	62	83	.070	South end, No. 5 level.

"The air at surface just prior to making the above tests was found to contain a slightly less percentage of moisture than the underground air.

"In a large number of the mines so much attention has been paid to the proper distribution of the air, and it appeared so good, I did not think it necessary to make any tests.

##### Underground Workings.

"Close attention has been paid to the underground excavations by the management of the various mines, and it is a very pleasing duty to report that not one accident of a serious nature has occurred from fall of ground. Stopes have been kept well filled where it has been found economical to adopt the filling method; and where it has been found impracticable to use filling, the stopes have been well secured by timbering.

##### Accidents.

"Three fatal accidents occurred, one on each goldfield. On the Coolgardie, E. J. Rodgers met his death whilst starting an air compressor on the Burbanks Main Lode G.M.

"On the Yilgarn Goldfield, A. Polinelli met his death through falling into a pass a distance of 9ft. and a quantity of ore running on him.

"On the Dundas Goldfield, J. Serra met his death through losing his foothold in an incline shaft and falling a distance of about 18ft.

"All accidents have been reported to your office as they occurred.

"There have not been any prosecutions during the year."

#### COLLIE COALFIELD.

The Annual Report of the Inspector of Mines, Mr. T. D. Briggs, dated 18th January, 1910, says:—

"The total output of coal was 214,300 tons, being by far the largest quantity raised in any one year, and an increase of 39,053 tons on the previous year's output. The increase in the output was fairly gradual from 11,480 tons in January to 16,488 in October, but in November and December, owing in a great measure to the dispute in the coal mining industry in New South Wales it leaped to nearly 25,000 tons and 28,145 tons respectively, and a much larger quantity could have been sold had the mines been able to produce it.

"I have not the exact figures of the quantity purchased by the Railway Department, but the orders given to the various mines totalled nearly 120,000 tons, which was approximately supplied, and is the largest quantity purchased by the Railway Department for any similar period. I am unable to obtain the figures

of the coal supplied to shipping, but with the coal supplied to private consumers within the State added, a total of about 94,000 tons was supplied to other than the Government Departments.

"The number of men employed in the mines increased from 300 in the early part of the year to 543 in December. The production per man employed, however, was somewhat less than the previous year, being 580 tons. This can be accounted for by a number of men being employed on the Westralian leases for some considerable time without producing coal, and to the fact that the delay experienced by some of the companies in procuring additional coal-cutting machines necessitated a considerable quantity of coal being got by a more expensive and less expeditious method.

"There were no fatal accidents during the year. The non-fatal accidents totalled 79, 49 of which were classed as "serious" and 30 as "minor." Of the accidents, 15 occurred on the surface. Five were caused by "falls," and 59 were "miscellaneous underground." Many of the accidents classed as serious cannot reasonably be considered as such, as shown by the fact that in eight cases the injuries were "contusion of finger," but as the injured persons were incapacitated for a fortnight or more, with our system of classification they come within the category of "serious."

"There were three prosecutions under "The Coal Mines Regulation Act, 1902." In two cases proceedings were taken against managers for breach of General Rule 1. The other was one against a manager for breach of Section 6. In each case a conviction was obtained.

"Fifteen permits to employ persons on Sunday were granted under Section 46 of "The Mines Regulation Act, 1906." Of this number, nine were granted to the Proprietary, three to the Scottish, two to the Cardiff, and one to the Westralian, the average number of men employed per permit being 5.33.

"I am pleased to state that up to the present no indications have been observed of the presence of fire-damp in any of the mines. The "falls" occasionally give off "black-damp," but not to seriously interfere with the condition and safety of the workings.

"The Calyx Bore, put down on the Prospecting Area about eight miles east of Collie, has proved the existence of several workable seams of coal close to the Collie to Narrogin Railway, and steps are being taken to develop the property with a view of placing coal on the market.

"The increase in the trade, and the mining operations generally throughout the year, must, I think, be regarded as very satisfactory."

#### GREENBUSHES MINERAL FIELD, PHILLIPS RIVER GOLDFIELD, NORTHAMPTON MINERAL FIELD, ETC.

Mr. E. D. Cleland, Inspector of Mines, reports under date 28th February, 1910:—

"In accordance with instructions I beg to report that, during the year, I have been engaged in relieving Inspectors on the Murchison and East Coolgardie Goldfields, and have made visits of inspection to Northampton, Cosmo-Newberry Ranges, Greenbushes, Phillips River, Pilbara, and West Pilbara Goldfields.

The approximate total distance travelled during the year was 11,343 miles.

#### GREENBUSHES TINFIELD.

"During the year the output of black tin from this field has been as follows:—

Lode tin ..	44.40 tons
Stream tin	414.35 "

Total ..	458.75 "	Value, £34,786.
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"Compared with the output of 1908 lode tin shows an increase of 30.50 tons, but a decrease in the production of stream tin of 148.08 tons, and a decrease in the value of the total output of £6,260.

"The average number of men employed during the year in mining was 220, as compared with 331 for the preceding year, a falling off of 111 workers.

"*Stream Tin.*—The falling-off in the output of stream tin is largely due to the fact that many of the smaller claims have become almost exhausted of the richest tin-bearing ground, what remains being payable only when handled in large quantities by means of suction dredges.

"In some instances claim holders have been in a position to provide small dredging plants to deal with the low-grade ground, but in cases where no capital was forthcoming the miners have forsaken their claims in favour of cutting railway sleepers, for which there has been a good demand.

"When this source of employment ceases, new ground will, doubtless, be prospected and worked, and the output of tin will be increased.

"The principal producers of stream tin are the Greenbushes Development Company, and the leases held by Mr. F. A. Moss.

"In both these properties work has been carried on continuously throughout the year, the period of greatest activity being during the winter months, when there is an abundant supply of water.

"The Greenbushes Development Company is operating two floating and four portable dredges, one five-head battery and puddler, and one ball mill.

"On Mr. Moss' leases, one floating and one portable dredge, and one Huntington mill are in operation.

"Smaller portable dredges have been erected, and are in course of erection, at various points, namely, Giese's claim, the Little Wonder lease, and the Westralian Gully. There are also a number of streamers at work on the three Cs. leases, Poverty Flat, etc. In these last, water is raised by means of small pumps worked by oil engines, and the sand is streamed over tables.

"In Floyd's Gully little has been done during the year, but additional working capital has been raised to work Astles' claims, and a powerful suction dredge is being constructed, and will be at work by the beginning of winter.

"The Co-operative Union Coy's plant, and the State battery at the southern end of the field have been fairly busy. It is probable that at least three additional dredging plants will be erected before winter.

"No figures are available in regard to the cubic yards of ground treated by the dredges. But it is probable that the quantity for this year would exceed that of 1908, because by the adoption of portable plants, and improvements in handling material, it is possible now to treat ground which under earlier conditions could not be profitably dealt with.

"The introduction of portable dredges enables the slopes and summits of hills to be sluiced, which, to the floating dredge, would be inaccessible. This is noticeable in the case of the Mt. Jones leases, where

tin-bearing ground is situated on a plateau some 150 feet above the level of the creek.

*Lode Mining.*—The development of the lodes remains in abeyance, unfortunately, though what has been done indicates that with proper plant and management this branch of tin-mining might be profitably undertaken.

“During the year the South Cornwall Mine has been in the hands of tribute parties, and the aggregate yield of black tin has been 11 tons, of the value of £843. A part of this has been derived from shallow surface workings, and part from the 130-foot level.

“At this level the south drive was extended about 40 feet, making a total of about 90 feet from the prospecting shaft. For this length the lode has been mined to an average width of about 8 feet, but the eastern wall has not been reached and ore remains on that side; the full width of the lode has not, so far, been proved. During the last 40 feet of driving the average value of the ore obtained was estimated at 13s. per cubic yard.

“The failure of the tribute party working on this level was principally due to the want of economic methods of handling the ore, and the necessity of carting it to a treatment plant. Treatment and cartage charges absorbed nearly 54 per cent. of the value of the ore.

“Although very little mining has been done on this lease, the value of black tin produced up to the close of 1909 amounts to £1,607.

“On the adjoining mine—the Cornwall—three blocks have been worked on tribute.

“During the period from August to December of this year these tributers raised 14.76 tons of black tin, of the value of £1,161.

“On what is known as the Eastern lode, practically new ground, very good results have been obtained. At the time of my visit last November the workings had reached a depth of 50 feet, and a shoot of ore was being worked for a length of from 70 to 80 feet. The lode was then being mined for widths varying from 5 to 12 feet, but no wall on either side has been exposed.

“On the Western lode, the tributers were engaged in cleaning out the old open-cut workings, preparatory to going deeper, and some very good bunches of ore had then been found.

“Both the Cornwall and South Cornwall leases are worthy of being properly opened up and worked.

“With well arranged equipment for economically handling the ore, with a dressing plant on the ground, and good management, these mines would probably develop into large producers of black tin.

*Accidents.*—Two accidents of a serious nature were reported during the year, one being a fall from a dredge platform, and the other being caused by the over-turning of a truck.

*Inspection.*—Two visits of inspection were made during the year and, on the whole, the requirements of the Mines Regulation Act have been well observed.”

(*Note.*—A description of the dredges used at Greenbushes appears hereunder in Appendix No. III.)

#### NORTHAMPTON MINING DISTRICT.

“During 1909 the only mining work attempted in this district has been on the Wheal May Mine.

Early in the year the mine was let on tribute, the workings were unwatered and development resumed. The prospects met with were of a very encouraging nature.

Unfortunately, however, the tribute party had not command of the capital sufficient to instal the necessary plant for pumping, etc., and operations had to be abandoned.

I inspected the mine in March, 1909, and the appearance of the lode in the bottom level indicated that the mine was worthy of deeper development. If equipped with a good pumping plant capable of dealing with about 10,000 gallons per hour, and a proper system of development undertaken the mine should become a profitable producer.

The available records show, up to date, that the total production of the district has been:—

Copper ore of the value of ..	£148,744
Lead ore of the value of ..	£366,048
Grand total ..	£514,792

#### PHILLIPS RIVER GOLDFIELD.

##### MINING.

*Ravensthorpe and Elverdton Centres.*—On the two principal mines of the Phillips River G. & C. Company recent developments have been very satisfactory.

At the Mount Cattlin Mine the main shaft has been sunk to 550 feet, and a plat and cross-cut have been opened at the 530-foot level; it will be two or more weeks, however, before the lode is struck. But as winzes have been sunk to 500 feet in payable ore the management have reason to anticipate finding the lode of at least equal value at 530 feet.

The stopes above the 400-foot level have not yet been heavily drawn upon, but so far the work done therein shows a width of ore rather greater than that exposed in the back of the level. The values also have shown a slight increase as stoping has progressed.

Bins for holding smelting and concentrating ore have been erected close to the shaft, and are now on the eve of completion. From the mine the ore is tipped on to a grizzly, whence the fines pass into one bin for subsequent transference to the sintering plant; the rough ore falls into a second bin, thence is fed to a 14 x 24-inch rock-breaker, and is conveyed by belt to a bin at the railway siding. During its progress the large lumps of waste rock are picked off by hand. A second bin at the siding is destined for concentrating ore. The bins each have a capacity of 250 tons, and they discharge direct into the hopper trucks for conveyance to the smelter.

At the Elverdton Mine the main shaft has been sunk to over 500 feet, and a level has been opened at 500 feet. The lode was met with at 50 feet east of the shaft, and has been proved to a width of 16 feet. The average value of this width—though slightly lower than that of the lode in the upper levels—is such as to provide a good margin of profit over and above the present cost of mining, transport, and smelting. The character of the ore at this level is said to make it an easier smelting proposition than that of the upper levels.

Above the 400-foot level the stopes are looking well, both as to size and value.

Ore bins, similar in design and arrangement to those of the Mt. Cattlin Mine, have been erected on the railway siding and discharge direct into hopper trucks. A conveyer belt from the rock-breaker to the bins enables pickers to take out some of the waste rock.

The recent good development at the Elverdton Mine, and the known values of the lode in the Mount

Cattlin Mine, at a depth of 530 feet, give good promise for the future of the district. So far there is good reason to believe that the lodes will continue to live down to greater depths.

As soon as the present lowest levels have been sufficiently opened out, it is the intention of the Company to resume sinking the main shaft at both the Elverdton and Mount Cattlin mines. The General Manager feels confident that he has good mines under his control, and is determined to test their value at depth as quickly as circumstances will permit. From the present appearance of the mines a bold and vigorous policy of development is fully justified.

At the Mt. Benson Mine the upper levels have been cleaned of ore by tribute parties, and no work is now going on. Deeper sinking and further development is now needed, and I am informed that the Company will undertake this as soon as the other two mines and the treatment plant are well under weigh.

The Mt. Desmond Mine is also hung up for the present, with the exception of a little work being done by tributers. The lode in this mine, as far as known, is purely a concentrating proposition and nothing is to be gained by breaking down ore until the concentrating plant is able to deal with it.

The Marion Martin Mine—a property belonging to the P.R.G. & C. Company—is being worked on tribute. Very little systematic development has been attempted on this property, the work so far done consisting in sinking shafts to water level on shoots of ore and taking out the richest portions.

The present tribute party is working on a shoot having a length of from 12 to 14 feet and 5 to 6 feet wide, and with a present depth of some 80 feet. The ore is hand-dressed to about 17 per cent. copper, and it carries from 5 to 6dwts. gold per ton. A very small royalty is charged and the tributers are quite content with their present lot in life.

With deeper development it may be found that the various shoots of ore that have been prospected at surface, combine in one continuous ore body. But neither tributers nor prospectors are in a position to deal with this proposition, and the future of the mine lies in the hands of the Company.

At Mt. McMahon, on the range to the east of Ravensthorpe, the Company has been engaged in boring with the diamond drill to test the country lying below a strong ironstone out-crop striking along the western slope of the hills.

The results obtained from this work indicate that a pyrites lode does exist, and that in the future, development by means of shaft sinking, etc., will be justified in order to thoroughly test the value of the lode. The General Manager states that it will be at least 12 months before anything definite will be known of it. The prospects, however, have been sufficiently good to induce the Company to apply for six additional blocks of an aggregate area of 288 acres.

Among the smaller properties in the Ravensthorpe and Elverdton centres there is little in the way of new development to record during the past six months. But in those that are yielding ore the lodes look well, and the owners are well satisfied with their prospects. Taking the mines in order from north to south:—

The resumption of work on the Diamond Jubilee line of reef is in hand, and it is stated that there is a good prospect of outside capital being brought in to open out one or other of the mines on the line.

The Floater Mine has not yet resumed vigorous work. At the 170-foot level south, however, a little

prospecting is being done on the vein of quartz which has been left exposed in the face. So far the prospects are encouraging, and it is probable that further work in this direction will prove the existence of a new lens of ore. But as there are only two men at work on this property development cannot be pushed ahead as vigorously as the indications in the mine appear to justify.

On the Grafter Mine, easterly from the Floater, a little work is being done, and recently a small patch of rich ore was met with.

At the Maori Queen development is at a standstill for want of capital, and the mine may shortly be let on tribute. The remaining battery sands are in course of treatment, but there is no large quantity on hand.

The Mount Cattlin West has not been further developed during the past six months. The ore requires concentrating and will have to wait until the Company's plant is ready to deal with it, or until the owners can instal a small plant of their own.

To the eastward the Last Chance and the Emily Hale are producing good ore.

In the former mine stoping is proceeding at the 110-foot level. Here the lode shows a width of from 40 to 48 inches and stands almost vertical. The ore is sorted by hand up to about 17½ per cent. copper, and contains about 2½dwts. gold per ton.

The drive at this level has been extended some 70 feet in a north-westerly direction, and the face shows good grade ore. The eastern wall is clean and well-defined, but no true wall shows on the western side. Small veins of ore are noticeable making outwards and the advisability of cross-cutting is evident. At the present time, however, the owners are breaking good ore in the stope, and have no time to devote to development work or prospecting.

The lode in this property has been proved for a considerable length by a series of shafts and drives, and the whole has the appearance of being a property worthy of deeper and more systematic development.

A considerable quantity of medium-grade ore is being left, as not being profitable to cart to the Company's works. This can only be dealt with by the owners erecting a simple dressing plant that would enable them to bring up the grade to a profitable percentage, and save cartage of waste rock.

The owners of the Emily Hale have sufficient ore developed to last them a further six months at their present rate of output. On the exhaustion of the present stopes further development will be necessary.

Ore is now being mined at a depth of from 80 to 90 feet from surface, and to a width of about 36 inches on the average. As sent to the smelter it carries 18 to 20 per cent. copper and 2 to 3dwts. gold per ton. Medium-grade ore is left standing or is put to one side at surface.

In both the above-mentioned mines water level has been reached, and deeper sinking will not be possible until pumping or bailing appliances are installed.

Other mines in the immediate neighbourhood are at a standstill owing to the values not being quite sufficient to make it profitable to cart the ore to the Company's works.

An ore-dressing plant could be kept well employed by the mines in this group.

Viewed generally, the Ravensthorpe and Elverdton centres show improvement during the past six months. This is more particularly marked by the development at the Elverdton Mine, and the practically assured

prospects of the 530-foot level of the Mount Cattlin Mine.

The future of the smaller mines depends upon the ability of the owners to put in pumping plants so that lower levels may be opened, and, in several instances, the erection of simple ore-dressing machinery so that the lower grade ore may be dealt with.

No centrally situated plant will supply this necessity because the cost of cartage from mine to works will cut profits to a vanishing point. Each mine or, possibly, where several mines are closely grouped and can combine, must be able to deal with the low-grade ore direct from the shaft with the least possible cost in handling.

*Kundip Centre.*—The Flag Mine holds premier position in this centre in regard to depth and extent of development. The main shaft has been sunk from the 200-foot level to 325 feet, and a level is now being opened at 300 feet. At the present time the cross-cut has been driven 12 feet from the shaft and the main lode should be met with in a further 50 feet.

The trouble in dealing with the inflow of water has been overcome by the installation of an 8-inch Cornish lift. This has a 46-inch stroke, and at the rate of five strokes a minute the shaft is easily kept in fork. The pumping engine has two 14-inch cylinders. The plant has been well erected and is running very smoothly, and the cost of pumping is very much less than it was with the steam pump. In fuel alone the saving has been 30 cords per month, and there is now an ample supply of steam for all mining purposes.

The first 20 feet of sinking from the 200-foot level was done with the steam pump at a total cost of £19 per foot. The remaining depth has been sunk with the lift, and has totalled a trifle over £11 per foot. The shaft is 11 feet x 4 feet in the clear, timbered with 9 x 2-inch jarrah, with 2-inch rising chocks between the sets. The costs quoted include labour, timber, hoisting, explosives, pumping, and a proportion of salaries and general expenses.

At a depth of 270 feet from surface highly mineralised country was met with, and continued nearly to the bottom. In addition to copper the veins assayed up to 3 and 4dwts. gold per ton. The same country has now been met with in the cross-cut, but its width has not yet been ascertained. As exposed in the cross-cut the veins of mineral are up to 3 and 4 inches in width and, as stated by Mr. Grant, have yielded on assay up to 20 per cent. copper. The gold contents had not then been determined.

The opening up of the 300-foot level will be pushed ahead. In the meantime a little ore is mined and treated from some of the shallow workings.

At the Two Boys Mine the treatment of the battery sands is being continued with satisfactory results. Early in the year mining will be resumed. This will probably take the form of sinking a new shaft to pick up the lode that is being worked with good results in the adjoining mine—the Gem Consolidated.

In a portion of the old workings a tribute party has been at work, with the result that 80 tons of ore were mined for a yield of 17dwts. per ton by amalgamation and 5dwts. per ton in the sands.

On the Gem Consolidated the new lode is being prospected from the 150-foot level by means of a winze. It is the owner's intention to carry this down until on a level with the bottom of a main shaft that was sunk some time back, but which failed to strike the lode. Subsequently the shaft will be connected with the workings on the lode, and the work of de-

velopment will be rendered simpler and cheaper than it is under existing conditions.

Work in the Gem Mine is confined to following a shoot of ore lying between two converging cross-courses.

Beyond these intrusions very little prospecting for the other part of the lode has been done. Assuming that it will be picked up, the future of the mine will be more assured.

The ore at present mined is easily treated. At the five-head stamp mill about 20 tons per day is crushed. The yield by amalgamation is quoted at 6dwts. per ton, and from the treatment of the sands a further yield of about 2dwts. per ton is obtained.

The total cost of mining, hoisting, tramming, crushing and cyaniding is given as 15s. per ton—a figure which indicates careful management.

At the Hillsborough Mine work has been confined to ore breaking, and there is no fresh development to report.

With the installation of a powerful suction gas engine on the Harbour View Mine, it had been hoped that operations would have been resumed underground. It had been calculated that by use of a small air-compressor sufficient power would be gained to work the mine pump and get the levels clear of water. It has been proved, however, that the compressor was not sufficiently powerful, and the water still remains in the levels and the mine is idle.

The owners of the Christmas Gift Mine have been considering a proposal to let a working option over the mine to an Eastern States syndicate, but nothing had been decided at the time of my visit.

The shaft is just on water level at a depth of 125 feet, and the opening up of the bottom level has given good results.

There is no plant on the mine, and not much more development can be undertaken until some machinery is put in. If the owners succeed in disposing of the mine to a company with some capital there will be a chance of the property being well opened up, and the result will probably be beneficial to the district no less than to the owners.

In Sullivan's Gully, some two miles north of the Christmas Gift, surface working has been undertaken, and some patches of good stone have been met with.

I was not able to visit the spot. The particular feature of the locality appears to be the occurrence of small quartz veins which are traced up to their junction with jasper bars, and which at the point of contact yield good results.

With the exception of the Flag Mine the past six months' work does not show any new or important development.

The discovery of what appears to be a new ore channel in the Flag Mine is a matter of great interest and, from the values given by assay of the veins, may later prove to be of great value to the Company. This development also emphasises the fact that parallel veins and lodes exist at Kundip, and that cross-cutting from various levels is a matter deserving of close attention.

The smaller mine owners are in the same plight as those in the Ravensthorpe centre. After having sunk to water level they have no means of going deeper and, consequently, the end of the mine, as far as they are concerned, comes in sight.

It would be to the benefit of the owners to try and get the assistance of capital for development of the mines, and the erection of necessary plant before the upper levels of the mine have been exhausted of rich ore. A mine that has been stripped down to water level has nothing to show that is attractive, and is not likely to induce money to come in. Its past record of values won is of slight satisfaction to a prospective owner.

There is no reason to think that the Kundip mines will give out in depth. But unless capital is brought in to assist in development the general advancement of the district must, of necessity, be retarded.

#### ORE TREATMENT.

Mine owners are enabled to dispose of their copper ores either to the local works of the Phillips River Gold and Copper Company, or by rail and steamer to more distant markets. At the present time the majority find it slightly to their advantage to deal with the Company. Disagreements as to assay values are more easily adjusted, and the rule of cash payments by the Company has many advantages over transactions carried out at a distance.

The Company has met with many troubles in connection with the arrangement and running of its smelter and concentrating plants, but these are gradually being overcome.

During the Christmas season very little work will be carried on in the mines, as a large number of the employees are going away to spend holidays with their friends. Advantage will be taken of this migration to shut down the plant and effect various repairs and alterations that are required.

The ore and flux bins have been completed, and all materials are now conveyed by belt to the feeding floor.

The sintering plant is not quite finished, but is nearly so, and should be in working order early in the coming year.

The erection of the concentrating mill has been completed and some trial runs made. It is found, however, that some portions of the machinery are not quite suitable, and a change in this respect is being effected. The plant should be ready for work very shortly, and the Company will then be in a position to deal with its accumulated low-grade ores and provide regular supplies for the smelter.

For all steam purposes water has to be obtained from the Government dams, the demand occasioned by actual loss being about 10,000 gallons per day. A doubt has been expressed that the present contents of the dams will not be sufficient for steam and domestic purposes throughout the summer unless some fortuitous falls of rain occur. It is to be hoped that no delay in ore treatment will thus come to pass for, with sufficient water, the Company should be able to anticipate a steady run throughout the year.

If it were possible to assume that steam will continue the prime motive power for the plant, the building of dams and the conservation of a portion of the many millions of water that run to waste yearly, would be a first consideration. But it is probable that before long the Company will decide to put in oil or producer gas engines, and thus dispose at once of the dual expense of water and fuel—items that figure largely on the cost sheets.

At the present time firewood is supplied under contract at a reasonable price, but as the supplies are

not large and are daily growing less it is certain that contractors will, later on, demand higher prices.

The initial expense of installing an oil or gas engine plant would be considerable, but the annual saving that would be effected by it, as compared with the cost of steam in this district, would soon repay the Company.

The stamp batteries in the field deal only with gold ores, and there are sufficient of these to meet all demands for a long time to come. Unfortunately, some of the gold ores contain a little copper, though not enough to make them a smelting proposition. The sands, however, cannot be treated profitably by cyanide, and in one or more instances considerable value in gold is locked up in battery residues.

Experiments have been tried on the field with a view to eliminate the copper from the sands, and then treat them with cyanide. I was informed that in one instance a process had been evolved by which the copper could be cheaply removed, but details regarding this were not then being made public.

The small mine owners are already considering the possibility of erecting small and simple plants for dressing their low-grade ores at the mine so as to save the waste of paying for the cartage of useless rock.

This expense prevents them from sending low-grade ores to the Company and, as a consequence, these are either left standing in the mine or are put to one side at the surface. In either case possibly profitable ore is locked up. Elaborate plants are not needed, but only those that will roughly dress up the ore to a percentage that will permit of it being sold at a profit to the owner.

The field contains large quantities of ore that will run from 3 to 6 per cent. of copper, and it would be possible to work these up to a marketable value without any very great expense in the way of plant. Working on lines such as these the mine owners would secure a longer life to their mines and, in many instances, would have some years' work in sight on the ores lying above water level, and which have already been developed.

#### OUTPUT OF COPPER.

For the 10 months of the current year the official returns show that 4,886.55 tons of ore have been treated for a yield of 352.16 tons of metallic copper of the value of £19,057.

The average yield per ton of ore has been 7.20 per cent.

The figures for the complete year will show a large increase over those for the year 1908, and if no heavy decline in the price of copper occurs the output for the coming year should be largely in advance of 1906.

#### THE GOLD YIELD.

For the 10 months ending 31st October the ore treated was 5,339.38 tons for a yield of 5,002.71 fine ounces of gold, or an average of .93ozs. per ton of ore."

(Note.—Mr. Cleland's reports on the Cosmo-Newberry Ranges and Pilbara and West Pilbara fields are printed separately in Appendix No. IV. to this Report.)

#### MINING ACCIDENTS.

Herewith are submitted tabulated statements of the mining accidents for the year ended 31st December, 1909, for the customary tables Nos. 22, 23,

and 24\* of your Annual Report, with the totals of the previous year for comparison. It has, however, been found advisable to make a small change in the method of registering these accidents, to bring that of this State in line with those usually followed elsewhere, and to restrict the accidents tabulated entirely to such as have happened to persons engaged in the occupation of mining, and which have been a result of their occupation. Hitherto it has been customary for us to include in the tables all accidents in mines to persons, whether they were engaged in mining work or not, so long as the accidents were the result of mining work. In 1908 for example the case was included of a child who fell down a prospecting shaft, in 1907, those of a man not a miner, who in the night-time fell into an open-cut on a mine, of a child who was caught by a conveyor belt and killed, and of a child who fell down an open mullock shaft, and in 1904 those of two men—one a prospector, the other an aboriginal native—who fell into disused prospecting shafts. In 1909 there have been two somewhat similar fatal accidents, one to a boy who fell down a disused shaft, and another to a man who, while under the influence of liquor at night, fell into an open-cut and down the pass beneath it, and there was also a case of a little girl falling down an abandoned shaft, who fortunately was not killed.

Under Section 26 of "The Mines Regulation Act, 1906," the occurrence in a mine of accidents attended with serious injury to *any* person must be reported, and the definition of the word "mine" in Section 3 of the Act includes an abandoned mine and the abandoned workings of an active mine as well as workings under present operation. Accidents such as above mentioned to strangers and trespassers must therefore be recorded equally with such as happen to miners in the course of their occupation. But in the tables the rates per 1,000 are made out on the basis of the number of persons engaged in mining occupations, and it is evidently proper therefore to deduct from the total number of accidents all such as have been recorded as happening to persons not engaged in mining occupations, before calculating the rates per 1,000 persons employed. There are cases which are difficult to classify, as for example that of the intoxicated miner who falls down an abandoned shaft, or even a working shaft at which he is a trespasser. Being a miner, it may be argued that one of the risks of his occupation lies in his having to live in a locality where dangerous holes in the ground are liable to be common, and therefore that his case should be taken in when showing the deaths due to accident in that occupation. On the other hand the fact of his intoxication has co-operated with the dangerous nature of the ground to cause the accident, just as men in the same condition are often killed by being run over by railway trains, or by falling off wharves.

The rule which it has now been decided to follow in this matter in this State is that all accidents in and about mines resulting in serious injuries to any person will be investigated as far as possible by the Inspectors of Mines and recorded, but only such as happen to persons engaged in operations connected with the working of mines, or lawfully visiting them, will be included in the statistical returns showing casualty rates per 1,000 persons employed.

Adoption of this rule would cause alteration of the table of death rates since 1904 given in my

last year's report as follows, now including also 1909:—

	1904.	1905.	1906.	1907.	1908.	1909.
Total fatal accidents recorded	43	34	40	46	41	37
Less persons not engaged in mining	2	...	...	3	1	3
Fatal accidents to men engaged in mining	40	34	40	43	40	34
Total men engaged in mining	19,615	19,342	19,429	19,113	17,266	18,336
Accident death rate per 1,000 men	2.04	1.76	2.06	2.25	2.32	1.85

The diagram of fatal accidents per annum sent herewith, in illustration of the tables, has been amended in accordance with the rule, from 1904 onwards, in order only to show the fatal accidents to persons engaged in mining, and not the total accidents to all and sundry persons who may have met their deaths on mines. The alterations make no very great difference in the diagram, and affect the mortality rates by only a fraction, but even small differences serve to direct attention to and emphasise the necessity of having statistics of various countries compared on strictly similar lines of preparation. Considerable differences are liable to exist in the methods of compiling the figure expressing the number of men employed, which is all-important in calculating the death rate per 1,000, and also in the inclusion or exclusion of accidents on the surface of mines and in connection with machinery, which may make great differences in the rates. Our Mines Regulation Acts include the mills, often large and complicated, in which the products of the mine are treated, as part of the mine, and where a large number of men are employed in such mills on surface there must necessarily be some accidents.

In cases where the ore is treated away from the mines, the treatment works do not come under the definition of mines, and accidents at such as do not, would not be included in the mining casualties totals. Also the nature and local conditions of the mines themselves make a very great difference in the liability to accident, and this factor must be taken into account, too, in comparing the casualty rate in different countries. For example the death rate per 1,000 persons employed above and underground during 1908 in all mines of the United Kingdom was 1.322, which was made up of a rate of 1.467 for all underground workers and .740 for all surface workers. It was also the average of a rate of 1.320 in the coal mines (1.45 underground and 0.77 aboveground), 0.89 in the iron mines, and 1.60 in all other mines. Again, the death rates from underground accidents for the various countries ranged from nil in Cheshire and .64 in Nottingham, to 2.78 in Cornwall and 3.17 in Somerset. The death rate in metalliferous mines of the United Kingdom is usually higher than that in the coal mines, and it is very noticeable that the rates in Cornwall where deep vein-mining is carried on are not lower than those in this State. Inspection of Table 80 of the Home Office General Report and Statistics of Mines and Quarries for 1908, page 91, shows great variation in the death rates from underground mining accidents in thirty different counties of Great Britain, notwithstanding that all are working under the same Mines Acts and Regulations and under the same central administration, which makes it quite clear that local conditions must be mainly responsible for the differences, and not deficiencies in the mining laws or in the way in which the Inspectors of Mines carry out their duties.

\* See pages 20 and 21.



The latest comparative table of death rates in mines in various countries which has been available to me in writing this report is that in the British Home Office Mines and Quarries General Report and Statistics for 1907, No. 284, on pp. 268-269. Among mines of the British Empire the rate for Western Australia for that year, given as 2.51 (now amended as above to 2.25) is higher than that of the 14 other members of the Empire tabulated, including Great Britain and Ireland 1.32, New South Wales .94, Queensland .75, South Australia 1.15, Tasmania .80, Victoria 1.16, New Zealand 1.43, Ontario 1.40, and several less important mineral producers, and lower than that of six, namely, British Columbia 5.10, Gold Coast 2.75, Natal 2.73, Newfoundland 3.73, Rhodesia 3.96, and Transvaal 4.58.

Table 22 shows that 34 persons were killed and 460 injured by mining accidents during 1909, as against 40 killed and 398 injured in 1908. It also shows the distribution of the accidents in the various gold and mineral fields, and the classification of the accidents according to causes. 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 total mortality from this cause, although 1909 shows a welcome decrease.

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 1.85 for 1909, as against 2.32 for 1908. The rates per 1,000 are based upon the figures in your Table No. 17, which gives a grand total for 1909 of 18,336 men employed at mines, above and underground, inclusive of the alluvial gold workers.

Table No. 24 gives a summary for 1909 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 1908 for comparison. The numbers of men on which these rates are based are given in your Table No. 19, and do not include alluvial workers.

Hereunder is attached a general table showing the fatal and serious accidents during 1909 classified according to the gold or mineral field in which they happened, and also according to causes. The totals from each cause for 1908 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	11	4	42	*2	†4	5	149	...	60	‡2	17	14	283
2. Mt. Margaret ... ..	...	3	3	7	1	4	...	11	...	9	...	4	4	38
3. Murchison ... ..	...	...	1	12	...	5	1	19	...	5	...	3	2	44
4. East Murchison ... ..	...	2	2	3	1	3	...	4	...	7	...	3	3	22
5. Coolgardie ... ..	...	...	...	...	...	...	...	1	...	...	1	...	1	1
6. Yilgarn ... ..	...	1	...	...	...	...	1	...	...	...	...	...	1	1
7. North Coolgardie ... ..	1	1	...	4	...	...	...	2	...	2	1	...	2	9
8. North-East Coolgardie ... ..	...	...	2	...	1	...	§	3	...	...	...	...	3	3
9. Broad Arrow ... ..	...	...	...	...	...	...	...	1	...	...	...	...	...	1
10. Dundas ... ..	...	...	...	1	1	1	...	...	...	...	...	...	1	2
11. Pilbara ... ..	...	...	1	1	...	...	...	1	...	...	...	...	1	2
12. Peak Hill ... ..	1	...	...	...	...	...	...	...	...	1	...	...	1	1
13. Yalgoo ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...
14. Phillips River ... ..	...	...	...	...	...	2	...	...	1	...	...	...	1	2
15. Collie ... ..	...	...	...	2	...	...	...	37	...	10	...	...	...	49
16. Greenbushes ... ..	...	...	...	...	...	...	...	...	...	1	...	...	...	1
17. Northampton ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...
18. West Pilbara ... ..	...	1	...	...	...	...	...	...	...	1	1	...	...	2
Total for 1909 ... ..	3	19	13	72	6	19	7	228	1	96	4	27	34	461
Total for 1908 ... ..	4	10	15	59	¶5	22	5	194	4	81	7	32	¶40	398

Not including—\* One fatal accident to a boy. † One accident to a girl. § One fatal accident to a man. ¶ One fatal accident to a boy. All not employed in the mines. ¶ Not now including one fatal accident to a child, included in last year's Report.

(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, 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, but were found not to prevent the sufferer from returning to his work within 14 days, and therefore have

not been tabulated. Very little significance would attach to the number of such accidents reported to the Inspectors, as it would be very incomplete, many similar accidents being disregarded by the sufferers and not reported.

#### Fatal Accidents.

Brief particulars are hereunder attached of each of the fatal accidents reported during 1909, viz. :—

#### Explosions.

One man was killed at the Maranoa Gold Mine, Menzies, through an explosion. The accident seems to have been due to a charged hole being cut out by a previously exploding blast, leaving some of the blasting gelatine in the butt of the former, which

deceased probably struck in some way. All reasonable care seems to have been exercised.—(2066/09.)

A man was killed at the Associated G.M., Kalgoorlie, through boring into an unexploded charge. At the inquest deceased's mate stated he had gone for some water for a hole they were pitching, when he heard an explosion, and on going back found deceased expiring. He further stated that they had been boring all the shift and had charged no holes, so that it would appear that an old unfired hole had been bored into, although no misfires had been reported. The jury brought in a verdict of accidental death. Probably the primer and part of a charge had been detached from the rest of it when firing previously, and had exploded after being cut out, thus giving the proper number of explosions, and leading the men to believe that all had gone off successfully, although the bottom part of a hole remained unfired.—(2581/09.)

One man lost his life at the Peak Hill G.M., Peak Hill, through an explosion. There is no evidence to prove how the accident happened, but it is presumed that the deceased thought one of the holes he had fired had missed fire, and he returned to the face, when the charge exploded and killed him. No one but himself could in any way be blamed. (4382/09.)

#### *Falls of Ground.*

At the Central and West Boulder G.M., Kalgoorlie, two men were shovelling ore back under the stulls when some ground at the foot of one of the stulls gave way, causing stull and laths to fall, one man being completely buried under the dirt and suffocated, the other jammed against the wall. Both men were rescued as speedily as possible, but in one case all efforts at restoration were of no avail; the second escaped without injury. The Coroner's Jury brought in a verdict of accidental death, no blame attachable to anyone.—(1994/09.)

While stoping at the Ivanhoe G.M., Kalgoorlie, two men fired two holes in a face. They were working on the rill system, and could have gone to the North with safety, but went out to the South, passing under the ground they were shooting down. They returned the same way and just as the man who was in front reached the face a piece of ground fell from the back striking him on the body and causing injuries from which he died the following day. The fall was due to a flake of ground having been loosened by the shots, and the accident to the man's own careless action in going under baulked ground before it had been examined. There was no necessity for them to do so, and the practice is a dangerous one. At the Coroner's Inquest a verdict of accidental death, no blame attachable to anyone, was brought in.—(2328/09.)

One man was killed at the Associated G.M., Kalgoorlie, by a rock (about 1 ton) falling on him. When the deceased and his mate went on shift they followed the usual and proper practice of examining the back to see if it was safe, and decided to bar down a flake which seemed loose. This brought down a quite unexpected fall of rock, causing the accident. At the Coroner's Inquiry a verdict of accidental death was given.—(4777/09.)

A man received serious injury, from which he died 13 days later, at the Hannans Reward G.M., Kalgoorlie, through a large mass of dirt falling in the open cut and jamming him against the bank above the shoot. A verdict of accidental death, no

blame attachable to anyone, was brought in at the Coroner's Inquiry.—(1469/09.)

One man was killed in the Sons of Gwalia Mine, Leonora, by a slab of rock from the hanging wall falling on him whilst he was in the act of shovelling ore. The wall was supposed to have been examined before he went to work, but there were some grounds for suspicion that the examination had been rather perfunctory. The Coroner's Jury, however, found no blame attachable to any person.—(3114/09.)

Another man lost his life through a fall of ground in the Lancefield Gold Mine, Laverton. On the day of the accident a machine miner having been instructed to take down a piece of loose ground put a plug of explosive behind it and fired, and on returning he found deceased, who was a shoveller, already at work, and that the ground had not come down. While examining the ground he heard a crack, and had only just time to jump clear when the piece he had fired fell, and almost immediately a further large fall took place, the roof coming down for 65 feet in length and burying deceased under it. Deceased was about 40 feet away from the place where the shot was fired, and the ground was supposed to be safe. The Coroner's Jury found a verdict of accidental death, but added that they considered the area of hanging wall exposed too large to be kept without mullock. The Inspector of Mines seven days before the accident had instructed ore-breaking in this stope to be stopped till filling was put in, but did not consider the back immediately dangerous.—(3610/09.)

One man met his death at the Sons of Gwalia South Gold Mine, Leonora, through returning to his stope before the machine men had finished barring down the loose ground after blasting, and when close to where the shots had been fired a large piece of rock fell on him. The Inspector of Mines had no fault to find with the manner in which the work was conducted.—(4502/09.)

One man was killed at the Great Fingall Gold Mine, Day Dawn, while barring down loose ground after firing. Deceased had sounded the back before starting barring down and considered it safe. The piece of stone that fell was what is termed a "saddle-back," which would fall without giving any warning, and a man casually sounding a stone of this kind might easily be deceived. The Coroner's Jury found no blame attachable to any person.—(3554/09.)

A man lost his life in an Unregistered Alluvial Claim at Moolyella, near Marble Bar, through a heavy fall of ground which fell and crushed him. A Coroner's Inquest investigated the accident, and found no blame attachable to any person.—(954/09.)

One man was killed at the Waroonga Gold Mine, Lawlers. The deceased and his mate were cutting hitches preparatory to putting in stulls to form a pass. The ground being hard a quarter plug of gelignite was fired in the hitch, and the deceased after firing returned, and without trying the ground commenced to dress out the hitch when a slab (about 100 lb.) came away from just above it and knocked him into an upstanding lath, causing internal injuries, resulting fatally.—(782/09.)

A fatal accident occurred at the North White Feather Gold Mine, Kanowna, through a fall of ground. A man was removing the ore that had been used as temporary filling over stulls, when the ground gave way and he was buried beneath a large quantity

of rock. The Jury of three practical miners at the inquest returned a verdict of accidental death, no blame attachable to anyone, but the Inspector of Mines is of opinion that the practice of removing ore used temporarily as filling is a doubtful one.—(1633/09.)

Another fatal accident in the North White Feather Mine, Kanowna, resulted in the death of one man who with his mate was putting in a rearing at the end of a stope preparatory to filling the stope. When the work was nearly complete, a piece of rock fell out of hanging wall and struck deceased on the head, knocking him down the pass a distance of 79 feet. At the Coroner's Inquest a verdict of accidental death was returned, no blame attachable to anyone.—(4383.)

At the Vivien Gold Mine, Lawlers, one man was killed while spalling rocks in a stope through a large stone falling on him from the back and breaking his neck. The ground was oxidised and rather treacherous, and the stope was well filled up with mullock.—(1536/09.)

#### *In Shafts.*

One man was killed at the Sons of Gwalia Mine, Leonora, through the engine-driver overwinding a skip, which knocked away a plank on which deceased was working higher up the shaft, and precipitated him down the shaft. The engine-driver stated he was unaware anyone was working in the shaft, and therefore it appears he did not take as much care as usual to avoid overwinding. The Department proceeded against the shift boss in charge of the work, but the case was dismissed by the Warden on the grounds of insufficient evidence that it was owing to the negligence of the accused that the accident was caused.—(4250/09.)

A boy nine years of age while picnicking with his parents and others at Parkestown Racecourse, near Kalgoorlie, fell down an abandoned water shaft and was drowned. The shaft was unprotected, but there was a dump about six feet high which he would have to climb to get to the shaft. On reaching the top of the dump the edge of the shaft apparently gave way carrying the boy with it. A man named Wm. Campbell was lowered down the shaft by a rope, and after some trouble recovered the body. His action in going down was very courageous, especially as the air in the shaft was rather foul, so much so that the rescuer collapsed on reaching the surface. The accident is not included in the Tables as a mining accident, for reasons above explained.—(3910/09.)

The exact cause of an accident, which resulted fatally, at the New Chaffers G.M., Kalgoorlie, is unknown. On the engine-driver receiving the signal he began to raise the cage, but noticing something had caught in the shaft immediately shut off steam and applied the brake. The shift boss being informed that deceased was missing went to the plat and found a truck of ore tipped on its end in the cage, and on removing the truck found deceased under the cage. The accident would seem to be due to the truck not having been properly in the cage, and after giving the signal deceased probably thought he would have time to go to the east side and push it back on to the plat, or else he must have overlooked the fact of having given the signal to hoist. The Coroner's Jury returned a verdict of accidental death, no blame attachable to any person.—(4000/09.)

One man lost his life through falling down a prospecting shaft of the Northern Associated G.M., Kalgoorlie. The day of the accident was very sultry, and later on heavy rain fell. Deceased and his mate, who belonged to a party of tributers, went to an hotel near by when the rain came on and had some liquor, afterwards returning to the mine. Two boys saw deceased sitting on the edge of the shaft and his mate standing near by, and on the former attempting to rise he slipped and fell down the shaft. On being brought to the surface the injured man expired. At the Coroner's Inquest a verdict of accidental death, no blame attachable to anyone, was given.—(1114/09.)

One man was killed through falling down the shaft of P.A. No. 284, Norseman. The deceased and another were working a P.A., and while ascending by means of a ladderway he slipped and fell a distance of about 30 feet, sustaining injuries which caused his death. The ladderway was not a good one, but deceased and his mate alone were responsible for its condition.—(1635/09.)

A fatal accident occurred in the Great Western Gold Mine, at Wilson's Patch, through deceased in mistake giving the signal 2 knocks, to "lower," which he had just before specially arranged with the engine-driver was to mean that the latter was to begin bailing water. On receiving the signal the engine-driver accordingly lowered the cage into 80 feet of water, and the deceased was swept out of the cage and drowned. The men were resuming work after the mine had been idle for a long time, and the cage was stopped too high above the floor of the level for the men in it to get out comfortably. The deceased evidently rang the ordinary signal to lower, quite forgetting what he had arranged with the engine-driver. There was no knocker line below the level, and the two men in the cage were unable to signal for the cage to be stopped before it reached the water. The second man in the cage was able to hold his breath until the cage was pulled up again, having a marvellous escape from death.—(1692/09.)

One man lost his life while repairing the shaft of the White Feather Main Reef G.M., Kanowna. When the shaft was being unwatered it was found that three runners on the north end of the shaft were broken, and some centres out between the north and middle compartment, which deceased and his mate were sent down to repair. They were using a tank to stand on, and when about half way through the work deceased took hold of a piece of timber and pulled it, and on it coming away easier than he expected he overbalanced and fell into the next compartment, and down the shaft into a tank 90 feet below. At the Coroner's Inquiry a verdict of accidental death, no blame attachable to anyone, was given.—(3609/09.)

#### *Miscellaneous Underground.*

At the Great Boulder Proprietary a man lost his life through falling down a winze on which there was a "kick-up" or tippler; it is not known how he came to fall as nobody witnessed the accident, but when found he was still alive and stated "my light went out and I just touched something and was gone." It would appear that deceased and his mate after firing four holes went in opposite directions to prevent anyone approaching the blast, and it can only be surmised that after his light went out he walked into the winze. Previous to the accident it was not

considered that there was any risk of anyone being hurt in this way, but since then all the "kick-ups" in the mine have been fenced.—(3422/09.)

Two men at the Golden Horseshoe G.M., Kalgoorlie, were overcome by noxious gases resulting from blasting. They had been firing in a winze, and one returned to work in about twenty minutes after the shots had been fired although both knew that the compressed air supply was off and not blowing the fumes out. Not long after being lowered the man who had gone down called out for help, and his mate got a trucker to lower him down on the windlass rope and placed the first man in a loop of it. The trucker then pulled him as far as the brace of winze, but while trying to get him landed the unconscious man slipped through the rope, fell to the bottom of the winze, and was killed. The other man who had gone down also became unconscious from the fumes, but soon recovered. Both men neglected easy and obvious precautions in entering the gases, and no one was to blame but themselves for the accident.—(1872/09.)

A man lost his life in the Hainault G.M., Kalgoorlie, through falling down a winze used for storage of ore. It is presumed that he was returning to see the effect of some shots he had fired, and in the dense smoke fell into the winze. The bar guarding this appears to have been in place, and deceased must have got under it. Men who followed him along the level found the smoke very thick. The accident was due to the deceased's own action in attempting to go along the level before the smoke had cleared.—(2469/09.)

At the Golden Horseshoe G.M., Kalgoorlie, a man was killed by falling down a pass while covering it with logs. Two men were placing a log over the pass, and after his mate had put his end down on the south end of the pass, deceased went to the other end to place the log parallel with the wall plates, and whilst doing so the south end slipped into the pass, and deceased was dragged or thrown into it. A verdict of accidental death, no blame attachable to anyone, was brought in by the Coroner's Jury.—(4076/09.)

A pipe-fitter at the Great Boulder Perseverance while loosening a plug cock got his hand jarred: blood poisoning afterwards set in, and the man died six weeks after the accident occurred. The medical certificate of death stated the cause as diabetes, diphtheria, palmar abscesses, cellulitis, sloughing hand, and heart failure. It is very questionable whether such a case as this should be considered a mining accident.—(2482/09.)

One man met his death by drowning through the lower levels of Robinson's Gold Mine, Murchison, becoming flooded by water, which had accumulated in old and disused workings situated at a higher level in an adjoining mine. A rise was being put up for the purpose of letting the water run down to the lowest levels of the mine, whence it was to be raised to surface. After the top of the rise had nearly reached the water, a final charge was put in and fired for the purpose of making an opening. The water quickly flooded the bottom workings where four men were working. All escaped save deceased, who was washed into a winze and drowned. The men were warned of the danger, but do not seem to have anticipated that the water could come so soon, or that there would be any danger if it did come, as there was not enough to quite fill the level. The deceased fell into the winze while trying to escape, and

received injuries from the fall which doubtless prevented him from getting out of the water. The men appear to have entirely underestimated the effect of a sudden rush of water.—(2966/09.)

One man was killed at the Fraser's South Gold Mine, Southern Cross, while knocking down broken ore in a slope into a shoot which had run empty. The ore broke away with him and he was carried into the shoot by it and buried, death resulting from suffocation.—(2136/09.)

One man received fatal injuries at the White Feather Main Reef, Kanowna, through falling down an open cut. Deceased, who was not an employee of the mine, was at the time of the accident under the influence of liquor and had wandered on to the mine on his way home at night. The fence round the open cut was in a dilapidated condition, and the pass in the bottom of the cut was partially covered. This case is again referred to hereunder in a note on the protection of the surface openings into mines, and has not been included in the tables showing deaths per 1,000 men employed in mines.—(2136/09.)

#### *On Surface.*

A man was killed at the State Battery, Menzies, through the fall of a shaft and pulley. The engine-driver had run the belt, which was driving the overhead intermediate shafting connecting with the tailings pump, off the pulley on the main shaft and was tying it back with a rope, when this became twisted round the shaft and pulled the belt in also, with the belt doubled. The other end being still on the intermediate shaft the full strength of the double belt acted to pull down the shafting, a length of which and pulley attached carried away and fell upon the tables where deceased was at work cleaning out a mortar box, causing his death.—(2098/09.)

A fatal accident in the Burbanks Main Lode engine-house, whereby a man was killed through being struck on the head with the starting lever of the compressor, was due to the deceased having omitted to open the by-pass on the air-cylinder before using the lever. A compression of air in the cylinder was thereby set up which caused the engine to come back, throwing up the lever with great force. At the inquest a verdict of accidental death was returned.

A man came to his death at the Hannans Consols G.M. Battery, Kalgoorlie, through being drawn in between a belt and pulley and suffocated. It appears that after a stoppage the engine-driver called out to the deceased that he was going to start the motor and received a reply that he was "all right." He started the motor, and finding that it had a load stopped it, and went to ascertain the cause, and found deceased caught between the belt and pulley. It is not known how the deceased came to be in the position in which he was found, but it is surmised that he was walking up the belt race to his place on the feeding stage instead of taking the proper way between the two Huntington Mills. At the Coroner's Inquiry a verdict of accidental death, no evidence to show how it occurred, was returned.—(2260/09.)

One man was killed at the Associated G.M., Kalgoorlie, while attempting to put a belt on with a piece of iron pipe, while the machinery was in full motion. It is surmised that the moving pulley arm struck the iron pipe and drove it into deceased's body. This accident again exemplifies the danger of putting belts on while shafting is at full speed. The Coroner's Jury brought in a verdict of accidental death, no blame attachable to anyone, but added

that they considered engines should be slowed down when putting belts on.—(4625/09.)

A deplorable fatal accident occurred at the Lord Nolan Battery, Kalgoorlie, to a boy who attempted, in the absence of the proper driver, to haul up some ore from an inclined shaft by means of a winch. He had been warned not to touch the winch, but must have started it and been caught by the rope and pulled round the drum. The boy was a trespasser, and the accident is not one which is properly chargeable as a mining accident, and is therefore excluded from the tables showing the deaths by accident among persons employed in mines.—(1064/10.)

At the Ironclad M.L., Phillips River, a tributer while hauling dirt from a 59 feet shaft with a windlass lost his hold of the handle of the windlass, and in attempting to regain it was struck on the forehead, causing injuries which resulted in his death a few hours later. A verdict of accidental death, no blame attachable to anyone, was brought in at the coroner's inquest.—(1053/10.)

A review of the fatal accidents during 1909 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. One case, that of the man killed who had returned too soon to a misfire, was directly attributable to a breach of a specific provision of the Mines Regulation Act, but although in more than one other case there was evidence that the requirements of the Act had not been complied with, there was not sufficient proof to sustain a charge of breach of the Act against any person. Two deaths were directly due to drunkenness of the sufferer. A good many of the fatalities must be regarded as due to quite unpreventable accidents, of a sort inseparable from the miner's occupation, but in a larger proportion of the cases there was more or less of an element of carelessness, want of forethought, perfunctory performance of duty, or ignorance of the approved methods of mining practice, which carried some degree of culpability. In these cases it cannot be said that the accidents were unpreventable, as they should not have occurred had all parties concerned given proper attention to their duties and exercised reasonable prudence and foresight. Cases of this sort are due to so many varied causes that they can rarely be dealt with satisfactorily by regulations, but when it is seen that a certain class of accident frequently recurs, it may be of advantage to introduce a regulation specifically dealing with its causes. In a later paragraph reference will be made to certain proposed regulations which have been under discussion during the year in consequence of fatal and serious accidents.

#### SERIOUS ACCIDENTS.

Though this has been done repeatedly in previous Annual Reports, it may be well again to point out that the accidents included under this heading are not only all such as would ordinarily be regarded as "serious" in common speech, but include also all in which the injuries received are severe enough to keep the injured man from returning to his work within fourteen days. Many of them are comparatively slight in their effects, though often very painful for a short time, and consideration should be given to this point when comparing the number of accidents recorded with those of other States and countries, no fair comparison being possible unless it is first ascer-

tained that the sets of figures compared have been made up on the same lines. Of 283 accidents in the East Coolgardie Field reported as "serious" in 1909, only about 26 were cases of breakage of the larger bones, permanent serious injury to eyes or limbs, or injuries likely to have lasting disabling effects. The others comprised bruises, cuts, broken and crushed fingers and toes, scalds, burns, jarred hands, poisoned cuts, shocks to the system, smaller dislocations, strains and wrenches.

*Explosions and Explosives.*—Eighteen persons received injuries recorded as serious during 1909 from explosions, and one man was injured by burning of an explosive. In the latter case the man had put a piece of explosive into his pocket, his mate having taken the canister away, and a spit of fire from the lighted fuse must have ignited the explosive, which burned strongly without exploding, causing severe injuries. Nine men were injured by premature explosions, and from delaying too long after firing their fuses. Three men were hurt by explosions through boring into old holes in which explosives had been left. Another was hurt through returning to re-light a fuse which he thought had not ignited, an action which was a breach of the General Rules. Three men were injured through explosions occurring while breaking and removing rocks after firing, owing to unexploded parts of charges being thrown out among the stones. One man was injured through his candle, which he had hung on a lath in the crib place, igniting a short fuse attached to a detonator, which exploded. This accident was due to carelessness on someone's part in leaving a capped fuse at the crib place.

A very serious accident which may yet result fatally occurred early in December in the Gwalia Proprietary Mine. Two men were driving from two prospecting shafts to connect with each other, and had come so near that they could hear each other knocking, and had therefore arranged signals to warn one another when each was about to fire. Through some misunderstanding of the signals or mistake in sending or hearing them one of the men remained in the face, charging some holes, after the other had given the firing signal. The latter's shot broke through and very seriously injured the former man. There was great want of judgment in attempting to work two faces so close to one another: it would have been much better practice to have finished the connection from one end only.

*Falls of Ground.*—Seventy-two men were injured more or less seriously during the year by falls of ground. In 18 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 five instances the accidents were due to the injured men's own carelessness in working under known bad ground, and in one instance to the injured man not taking sufficient precaution to see that the ground was safe before passing under it. In a few cases the inspectors have not been quite satisfied that all proper care was exercised by those concerned, but have been content with warning them, without taking any legal action. The great majority of instances, however, were purely accidental mishaps not preventable by exercise of ordinary skill and care, the accidents being of a class inseparable from the miner's occupation.

*In Shafts.*—Nineteen persons received serious injuries in shafts from various mishaps. Seven were hurt by falls of material down the shafts, such as stones and timber, and eight by accidents in connection with the working of cages, buckets, kibbles and skips. There were two accidents in connection with stages erected in shafts, one from a plank of a stage falling and carrying the man with it, and one through the collapse of a stage precipitating a man to the bottom of the shaft. One man received serious injuries through the ladder he was standing on giving way, and one through falling from a ladder. Many of these accidents were more or less due to want of care on the part of the men concerned, but not of such degree as to amount to culpable negligence.

*Miscellaneous, Underground.*—Two hundred and twenty-eight persons were injured by miscellaneous mishaps underground. In 60 cases the injuries were sustained while handling and loading trucks and skips, 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, fractures and cuts. In 46 cases the injuries were due to falling and rolling loose rocks and stones, such as runs of ore and mullock while shovelling, or stones running down rills and ore shoots, and five men received severe cuts while handling sharp stones. 34 men were hurt while handling rock-drills and coal-cutting machines, and parts of same, and three by the breaking down of the stages on which machines were erected. Other falls in the workings from stages, ladders, or rills, in passes, and so on, caused injuries to 29 men, and 12 were hurt by falling tools and pieces of machinery. Flying splinters of stone and steel injured 18 men, and seven men were hurt while handling timber. The remaining cases were due to various accidental causes, jarring of hands, strains, blows from tools, and so on. Most of them must be regarded as purely accidental mishaps, but there is no doubt that very many of them could have been avoided had there been a little more care taken.

*Surface Accidents (including Machinery).*—In and about the surface works of mines 122 accidents were recorded for 1909. The causes were very various. Two men were scalded by hot water and five burnt. Seventeen persons sustained injuries from falls caused by missing their footing, slipping and overbalancing. Twenty-four men were hurt by trucks and skips—by being jammed or struck by them, by them capsizing, or by the men sustaining strains while working them. Flying splinters injured two men, and two men got their hands jarred. Falls of timber and pieces of machinery while being handled accounted for 11 cases of injury. Seventeen were caused by machinery in motion, seven of these being caused by handling belts in motion. Two men were injured by a run of sand, and nine were hurt while handling timber. Other causes of accidents were strains from lifting heavy weights, small stones rolling from ore heaps at batteries, and so on. Most of them were mishaps of an accidental character, the only way of preventing which is the exercise of greater care and forethought by the workmen themselves, and were not from causes which could be effectively dealt with by restrictive regulations, with perhaps the exception of those due to handling belts in motion.

#### WINDING MACHINERY ACCIDENTS.

Under Regulation 11 of "The Mines Regulation Act, 1906," it is necessary for mine owners to report to the Inspector of Mines all accidents to the winding machinery, whether such accidents have caused injury to persons or not. Such accidents as were attended with injury to persons have already been mentioned, but there were also six accidents unattended with injury to persons reported during 1909, all in the East Coolgardie Goldfield.

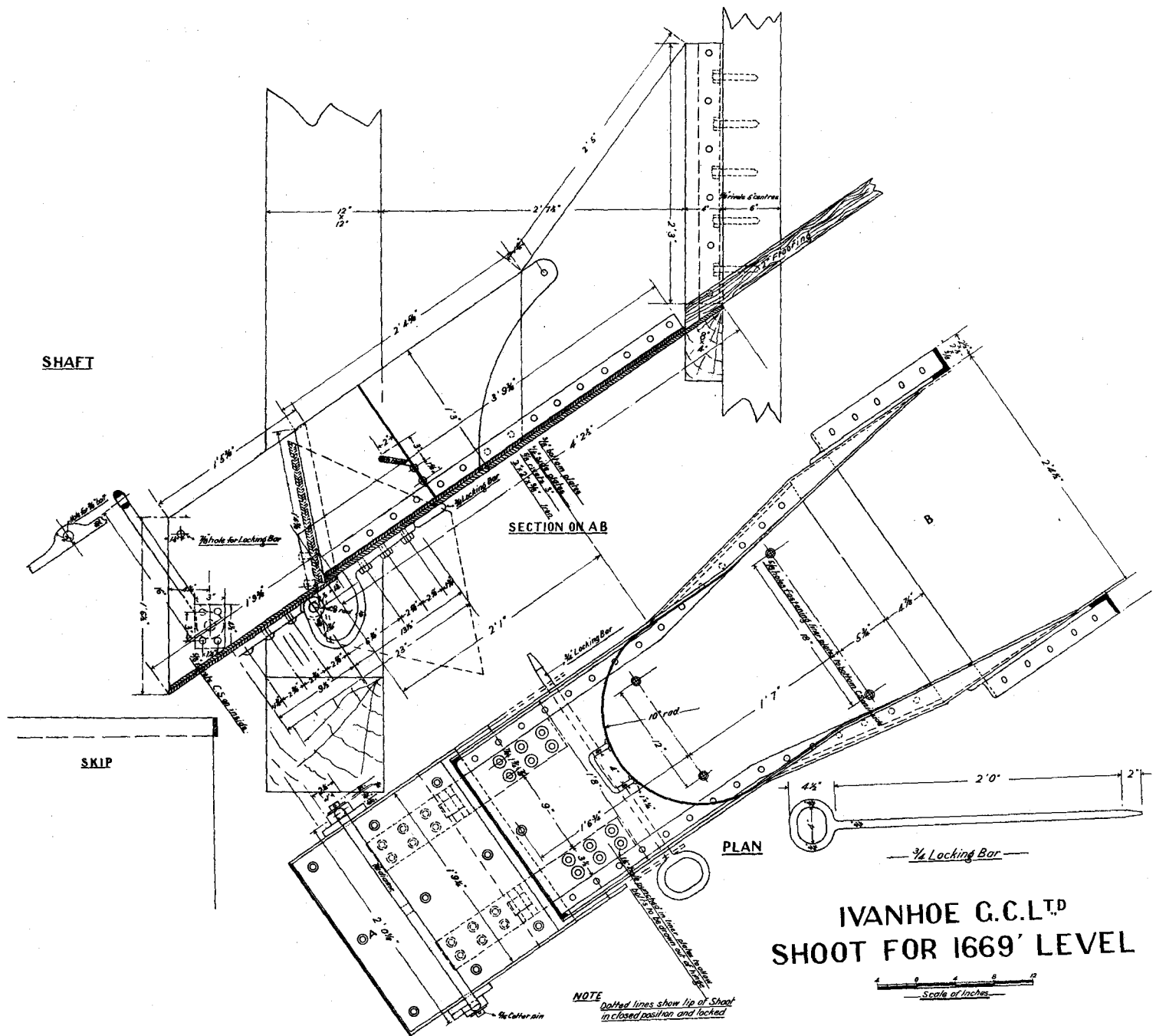
The following are particulars of these cases:—

(1.) In bailing water the empty tank at the surface was raised three or four feet in order to dip the other tank in the shaft. The driver put his brake down and left the winder in order to attend to the compressor engine. While so doing the brake slipped off and the full tank of water pulled the empty tank to the pulley wheel. The thimble was fractured and the pin of the shackle bent, but no other damage resulted. Evidence was given that the engine and brake were in good order.

(2.) In this case the driver was moving tanks slowly up and down in the shaft. One tank had been hoisted clear of the collar of the shaft in order to put bearers in for it to rest upon, and steam had been shut off. The driver was ordered to raise the tank a little higher; he eased the brake but his foot slipped off it, and although the lever was in reverse position there was no steam on, and the weight of the second tank in the shaft pulled the first tank up to the wheel. The only damage done was to the side straps of the tank and that but slight.

(3.) The north compartment skip was hauled to the bin, emptied and lowered back into the shaft. On re-entering the shaft the safety catches (eccentric) caught the runners, or guides, and held the skip; about 10 feet of slack rope piled in the skip before the driver could stop his engine. Before the slack could be recovered the safety grips in some way became released, the skip dropped, and the safety hook snapped in two near the shackle bolt hole at the upper end, and the skip fell to the bottom of the shaft. The hook was  $2\frac{1}{4}$  in. by  $\frac{3}{4}$  in. iron. The strength of the grippers had been tested once a month only, instead of every two weeks as required by the Act. The guides showed that the grippers of the falling cage had marked the guides but had not held. The skips were not used for lowering men.

(4.) Ore was being hoisted from the 1,400ft. level in double-decked cages, the load consisting of two full trucks; when at about the 1,300ft. level the driver felt the load go off. It was found that the safety hook had broken right across and near the bolt hole at top of the hook. The metal was  $2\frac{1}{2}$  in.  $\times$   $\frac{3}{4}$  in. at each side. The cage fell but the grippers failed to act until the cage struck the remaining portions of a pent house at the 1,600ft. level; the grippers then acted, with the result that the cage runners were torn from the shaft, and the cage fell over on its side. No damage, other than that, was done to the shaft. The grippers had been tested three weeks before, when the cage fell two inches. It is the practice on this mine to overhaul and examine the cage gear each morning prior to the men going down. On subsequent testing of a piece of the broken hook the metal was not found to be brittle, but bent under the blows of a hammer. The hook had been cleaned, annealed, and new rivetted about three weeks before the break occurred. The entries in the Company's book showed that the cage grippers had been tested



SHAF

SECTION ON AB

PLAN

3/4 Locking Bar

IVANHOE G.C.L.<sup>T.D</sup>  
SHOOT FOR 1669' LEVEL

NOTE: Dashed lines show lie of Shoot in closed position and locked

Scale of inches

only by taking up slack in the chains attached to the cage, and not by taking slack in the rope near the drums of the winding engine.

(5.) An engine-driver left his winding engine in order to attend to the boilers, and in his absence the steam valve must have opened and caused the cage to be drawn up to the poppet-heads, where the safety detaching hook acted and hung it up. The rope was pulled into the engine room before the winch could be stopped. It turned out that one of the drums had been fractured and patched, and the brake could not be used on it, while the other brake by itself was insufficient to hold its drum against a load. This engine was in bad order and condition for working, and the owners were debarred by the Inspector of Mines from using it for men until repairs were effected.

(6.) An underground winch was rendered temporarily useless by breakage of the shaft carrying the pinion wheel. This of itself did no harm, but incidentally the laying up of the winch led to an accident by necessitating the use of a chain ladder, which became kinked and then straightened out suddenly, throwing off a man who was going down by it.

*Holman Hoists.*—The occurrence of two accidents with Holman Hoists through unauthorised persons taking charge of them and allowing kibbles to fall on to men working at the bottom of winzes has drawn attention to an abuse which is very liable to arise, and to prevent which requires much care and vigilance on the part of the mine authorities and Inspectors of Mines. The Regulations require that all drivers of such hoists shall be proved capable of working them before they are allowed to take charge of them, and the mine manager must give a certificate of competency, which is to be checked by the Inspector of Mines. Unless this regulation is rigidly enforced accidents are likely to happen, which would most probably lead to much more onerous legislation in the matter of requiring all drivers of hoists to be provided with certificates from an outside board of examiners. In the second case referred to instructions have been given to prosecute the offending parties for breach of Regulation 14, but the case had not come on for hearing up to the end of the year.

*Ore Bin Shoots in Shafts.*—One of the accidents during the year, though due to another cause, incidentally directed attention to the necessity for more care in the construction of some of the loading stations at which ore is delivered from ore bins or pockets by shoots into skips in shafts. Some of these are much too cramped for proper working room and not well lighted. The men who have to work right alongside open shafts in such cases should have an even floor on which to stand, good light, and good fences between them and the shaft.

Another accident brought out a quite unexpected source of danger, in that the movable lip of the loading shoot had somehow protruded into the shaft and caused sudden arrest of the descent of a skip with a cage beneath it. The lip was made so as to be swung down into the shaft when required to fill a skip, and to be drawn back by a counterbalance which pulls it out of the shaft. The loaded skip also pushes it out of the shaft as it ascends. In some way it appears to have become jammed from falling right back out of the shaft, and must have projected

a little, enough to be caught by the frame of the cage. This has now been remedied as shown in the accompanying drawing, which shows the locking-bar which has been adopted, and which must be inserted by the platman before he leaves the station. The lip is automatic in its action as before, but must be quite clear of the shaft before the locking bar can be inserted.

*Cage under Skip.*—The last-mentioned accident also led to discussion of the practice adopted in the Ivanhoe mine of hanging a cage under the skip when changing shifts. The arrangement of the head-gear on this shaft does not lend itself to rapid interchange of the skip and cage, and the shaft is a very busy one, in which loss of time is serious. It has therefore been usual to suspend a cage under the empty skip when men are to be raised and lowered at change of shifts, and there has been doubt expressed as to the safety of this practice. If there is an obstruction in the shaft and the cage catches, or if its safety catches act from any cause and hang it up, there seems reason to fear that the impact of the following skip upon it may do serious damage by suddenly shearing off the obstacle, bursting the guides and centres, or crushing the frame of the cage. The skip, also, however, has safety catches, which should come into action immediately it strikes the cage. After examination of the appliances used in this particular case, the conclusion was reached that with the large and very strongly constructed cages and guides in use in the Ivanhoe mine there was no need to object to the practice of attaching them below the skips, while the latter were kept empty, although it might be necessary to do so in other cases where light structures were employed.

*Spliced Winding Ropes.*—In my Annual Report for 1907 reference was made to the use of spliced winding ropes, and to the contention of several mine agents and managers that they were perfectly reliable. In March, 1909, an application was made by the management of a Boulder mine to be allowed to increase the length of their hauling ropes, to be used in sinking their main shaft, by splicing on the necessary length at the drum end of the ropes. They were 2,400 feet each in length and hauling from the 2,000 feet level. It was desired to use them to the 2,270 feet level, which would bring the splice, proposed to be 75 feet long, between the pulley and the drum. The splice would start to wind upon the drum shortly after the cage left the 2,270 feet level. Men would not be allowed to ride below the 2,000 feet level until the rope had been thoroughly tested. On this last condition the use of the rope was allowed, but it was very carefully watched by the Inspector of Mines. On 1st May the length of the splice was measured and found to be 105 feet and it had drawn out two inches; its diameter was reduced one thirty-second of an inch. On 17th May the lay of the portion spliced on had increased considerably in length and the lay in the original portion of the rope had reduced to such an extent that the strands were being forced out of position. The splice had opened so much that it would be impossible to prevent water from lodging in the heart of the rope and causing internal corrosion. The rope had become unsafe, and its use was discontinued. It may be that this particular splice was badly made, but it was made with special care, and the trial thus shows that a very carefully made splice may prove utterly unreliable. There is no way in which the good



performance of the splice can be guaranteed, and there are no means of ascertaining what is its strength. Even if it carries its load for a considerable period quite successfully, there is still no guarantee that it has a proper reserve of strength to meet emergencies, and it may be almost at point of failure for a long time.

*Safety Catches for Skips in Inclined Shafts.*— During the year a trial was made at the Sons of Gwalia mine of a safety catch invented by Mr. H. W. Cole, the following particulars being from a report by Mr. Cullingworth, Inspector of Mines, who attended at the trial:—

“The inventors have aimed at producing safety grips, which, although they act instantaneously, are not intended to bring the skip to a standstill at once, but to do so gradually, *i.e.*, within 20 or 30 feet.

“The grippers themselves consist of steel rollers threaded with left and right hand threads. These work in slots in an iron frame the inner edge of which lies close against runners between the rails; these frames are set at a slight angle so that the back edge is a little farther from the runners than the front edge. The levers from the bridle at the back of the skip, assisted by a strong spring under the centre of the skip, fly forward when the tension on the bridle at the foot is released, and by means of connecting rods push the grips forward and bring them hard against the runners; the threads with which the grips are provided are for the purpose of holding the skip down on to the runners and prevent it jumping.

“For the grippers to work it is necessary to have two runners eight or nine inches high placed inside the rails, leaving a space in the middle of the track for the ordinary wooden rollers fending off the winding rope.

“The length of run provided for the trials was rather too short for a decisive test, being little over 20 feet. The runners were laid on the poppet-head from the mouth of the shaft towards the tip, and a slip hook and chain were fixed at the top end.

“The first trial was made with an empty skip standing at the top of the run without any weight of rope above it. When the hook was slipped the grippers caught and held the skip, the length of drop of skip before stopping being 2ft. 4in.

“The second trial was made from the drum of the winder with all the back weight of rope over the sheave. With this back weight the grippers failed to come into action, and the skip dashed down the run to the sollars provided across the mouth of the shaft. Two more trials were made with a full skip without any back weight of rope; in each case, although the grippers acted, they failed to hold the skip in the length of the run; whether they would have done so in another 20 or 30 feet could not be proved; the grippers scored the runners from the start to the bottom, showing they were in action and decidedly steadied the descent of the skip, but I consider it very doubtful whether they would have eventually stopped it. It is more likely, I think, that the heavy skip would have gradually gathered way in its descent.

“The trials, although not quite conclusive, proved that with present adjustments the grippers will not act with the back weight of rope over the sheave. It is possible that with men on, the grippers would stop the skip in the event of the rope breaking close to the shackle, but not otherwise, nor in my opinion

would they be strong enough to stop a full skip of ore.

“I understand Mr. Cole wishes to make some further tests, and intends making alterations to try and overcome the back weight of rope, and also to give the grippers more power.

“I think it is quite possible that better results will be obtained by experimenting; it is quite likely, too, that hardwood runners in place of the oregon ones would be more satisfactory.”

It seems likely that this device can be improved so as to be thoroughly workable. The great difficulty in getting a satisfactory solution of this problem lies in the objections on the score of expense to putting in the necessary guides in addition to the rails themselves.

#### PROSECUTIONS FOR BREACHES OF MINES REGULATION ACTS AND REGULATIONS.

The following are brief particulars of the cases of prosecution during 1909 for offences against the Mines Regulation Acts:—

(1.) The manager of a mine was charged with driving a winding engine without being duly certificated, and also with employing another person as an engine-driver without his having a certificate, and was fined 5s. and costs 2s. on each charge.

(2.) A man who had wilfully and wrongfully removed timber from a shaft was fined £10 and costs £7.

(3.) A shift-boss in charge of men working in a main shaft was prosecuted for negligence which resulted in the death of a man working at a higher level repairing the shaft. The Magistrate dismissed the charge on the ground that there was not evidence that the accused's negligence had been the cause of the injury to the deceased, but costs were not allowed to the defendant.

(4.) An engine-driver who had wilfully left his engine unattended was fined £3, with costs £3 12s.

(5.) A manager was fined £1 and costs for employing men on Sunday without obtaining the permission of the Minister or Inspector.

(6.) A manager was charged with failing to keep all machinery in good order and condition, owing to a winding rope having broken and caused an accident to a man in the bottom of the shaft. The rope was in bad order. The case was dismissed on technical objections to the information.

(7.) A manager was fined £5 and costs 2s. for employing a foreigner unable to speak and understand the English language.

(8.) A manager on whose mine a fatal accident had happened through a crane fouling electric cables was fined £25 and costs £13 18s. 6d. for failure to keep all machinery in good order and condition.

(9.) A main shaft winding rope having been found to be in very bad condition, the mine manager was fined £5, with costs £2 4s.

(10) and (11). The manager and a shift boss of a large mine were proceeded against separately for negligence whereby the lives of men were endangered, in causing men to work under a sand pass in which water had accumulated above the sand. The cases were dismissed, with costs against the Department. Notice of appeal was given, and the magistrate was asked to state a case for the Supreme Court, which he did, and afterwards amended. The amendment was objected to by the defence, and the appeal was

not pursued, it being considered preferable to test the issues raised as to the responsibility of a manager for all work done in his mine in some fresh case.

(12) and (13.) Two colliery managers were prosecuted for failure to provide sufficient ventilation. One was fined £5, costs 2s., the other £2, costs £1 6s. 2d.

(14.) Another colliery manager was fined 5s., with costs 2s., for having men working underground for longer periods than allowed by the Statute.

(15.) The owners of a small mine at which a serious accident had occurred through the breaking of a windlass rope were proceeded against for failing to keep their machinery in good order and condition, and were fined altogether £4, with costs £2 7s.

#### EXEMPTIONS FROM SECTION 31 OF THE MINES REGULATION ACT, 1906.

During 1909 certificates of exemption were granted under Section 31, Subsection (4) of "The Mines Regulation Act, 1906," to 27 persons to enable them to take charge of the machinery on small mines. In all such cases it has to be shown that it is impracticable to employ a certificated engine-driver, and the Inspector of Mines certifies that he has examined the applicant in the use of the machinery in question, and found him fit to have charge of it. The exemption does not apply to raising or lowering men in shafts or working cages, skips or buckets in shafts over men at work below. Since 15th October, 1909, it has further been notified to applicants that renewals of exemption will not be granted unless they make a *bona fide* attempt to pass the Engine-drivers' Examination before again applying.

These exemptions have been of great service to many owners of small plants which have not work enough to give constant employment to a certificated engine-driver.

#### PROTECTION OF SURFACE OPENINGS INTO MINES.

The occurrence during the year of the two fatal accidents above recorded, namely through a man falling into an open-cut and ore pass, and a boy falling into an abandoned water shaft, also a serious accident to a little girl who fell down an unprotected shaft, has drawn attention very strongly to the need for the better observance of the requirements of the Mines Regulation Act in respect of fencing and guarding all holes in the ground caused by mining. Fault lies not so much with the owners of mines in failing to protect such holes as with other persons who remove the coverings and fences. So long as a mining lease has an owner he may be compelled to protect all openings upon it, and if unauthorised persons try to remove his fences and covers, the obligation is upon him to protect himself by preventing them from doing so and prosecuting any offender whom he can catch. Many mine owners appear to regard it as a hardship that they should have to maintain the fences and coverings once they have been constructed, but unless they actively resist and resent encroachments of this sort just as much as they would in the case of theft or destruction of any other part of their property, they can expect very little sympathy for being obliged to replace the coverings over and over again. If they would only take active measures to protect their property, there can be little doubt that they would succeed soon in making these depredations uncommon.

When a lease or other mining tenement has become abandoned, and has reverted to the Crown the position is different, for there is no legal obligation on the Crown to maintain coverings over old shafts. The removal of protecting dumps, fences, and covers then ought to be considered a most serious offence against the community in general, for once they are gone it is no one's special business to replace them, and the holes may become a very dangerous public nuisance. An understanding has subsisted for some years past between some of the Roads Boards in the more populous districts and the Government that the former shall attend to the protection of all dangerous old shafts in their district, with aid from time to time as necessary from the Public Works Department, but in the multitude of other works requiring attention it often happens that the danger must become very pronounced before any steps are taken for protection.

It appears to me that public feeling and opinion are greatly at fault in this matter, the removal of coverings of shafts being often regarded as a very venial offence, to be overlooked with a smile by those who see it going on. It would very soon be stopped if everyone seeing it being done would make a point of giving information to the police, so that restitution might be insisted upon and punishment inflicted. Cases like that of the poor little girl who fell down an open shaft on the corner of two streets of the Trafalgar Townsite at Kalgoorlie, owing to the despicable conduct of persons who had stolen the plank covering, tearing it up in spite of its being firmly spiked down, to save themselves some little trouble and cost in getting firewood, ought to bring it home to every parent on the Goldfields that this is no light offence, but a most serious one, which lays a trap that may cost him the life of one of his own children.

#### SUNDAY LABOUR IN MINES.

During the year 1909 there have been very few complaints about men having to work underground on Sundays, and not many Sunday labour permits have been asked for. Even at Christmas time when it has often been necessary in previous years to allow a good many men to be employed on two Sundays to make up for the loss of time in Christmas and New Year's days, it was found possible this time to greatly restrict the number of men employed. The greatest amount of Sunday labour permitted was in the Great Fingall mine at Day Dawn, where heavy falls of country rock in the shrinkage stopes were found to necessitate a good deal of Sunday work at times in order that the mill might be kept running constantly.

#### FOREIGNERS IN MINES.

In January, 1909, the question of the employment in mines of foreigners unable to speak English intelligibly was again brought up by a question in the Legislative Assembly regarding the case of an Italian workman employed in the Sons of Gwalia mine who pleaded in the Police Court that he was unable to speak or understand English, and required an interpreter. The matter was investigated by the Inspector of Mines, who found that the man could converse in English quite readily and intelligibly, had been four years working in mines in this State, and readily replied to questions about the nature of his work and the appliances in use. He, however, said he did not think his knowledge of the language

was good enough to allow him to do without an interpreter in the Police Court.

In September, 1909, a very similar case arose in connection with evidence given at the Supreme Court at Kalgoorlie by Italian witnesses, who had been working in the Lancefield mine, near Laverton, in regard to the trial of one of their countrymen for murder. Several of these witnesses required an interpreter, and their ignorance of English was somewhat severely commented upon by the presiding Judge. The Press report of His Honour's remarks was thereupon sent to the Inspector of Mines, with instructions to examine the men and report if there had been any breach of the provisions of the Mines Regulation Act. The Inspector accordingly interviewed four of the men—two not having returned—and talked with them about their work and their personal affairs. "Each man quite understood and gave suitable replies, and the replies to all questions were given without hesitation. Each man was asked in turn why he wanted an interpreter, and each gave a similar reply, viz., that although they could understand and reply to ordinary conversation they did

not consider they were good enough for a Court of Law." This explanation seemed a very common sense and sufficient one. There was also a very similar case at Day Dawn, where an Italian who could speak English well enough for ordinary purposes wanted an interpreter's assistance when brought into a Court of Law. The Inspector reported that it is a common practice for foreigners to be able to converse in English outside the Court, but when placed in the witness box they asked for an interpreter, as they seemed to be afraid of committing themselves in some way.

In consequence of questions on this matter in the Legislative Assembly, the Inspectors of Mines were requested to send circulars to all the more important mines in their districts requiring a return of the number of British and foreign workmen employed during September, 1909. Returns were received from 137 mines employing a total of 11,759 men, 5,111 of whom were employed on surface, and 6,648 underground, equal to 43.5 and 56.5 per cent of the total respectively, and may be tabulated thus:—

	Employed on Surface.		Employed Under-ground.		Total.	
	Number.	Per cent. of Grand Total.	Number.	Per cent. of Grand Total.	Number.	Per cent. of Grand Total.
(A.) Of British Nationality—						
(1.) By birth ... ..	4,823	41.0	5,839	49.7	10,662	90.7
(2.) By naturalisation... ..	71	.6	73	.6	144	1.2
Total ... ..	4,894	41.6	5,912	50.3	10,806	91.9
(B.) Of Foreign Nationality—						
(1.) Italian ... ..	92	.8	533	4.5	625	5.3
(2.) Austrian ... ..	58	.5	158	1.4	216	1.9
(3.) Of other European countries ... ..	58	.5	39	.3	97	.8
(4.) Of any other country ... ..	9	.07	6	.05	15	.1
Total ... ..	217	1.87	736	6.25	953	8.1
Grand Total ... ..	5,111	43.5	6,648	56.5	11,759	100.0

The total average number of men employed on mines during 1909 was 18,336, so that it will be seen that the returns included 64.1 per cent. of the total number. Most of the others not accounted for are employed in small mines and prospecting ventures worked directly by their owners, and in which the proportion of foreigners to British is certainly much smaller than in the larger mines. Had these been included it is probable that the percentage of foreigners would not have been over 7 per cent.

#### REGULATIONS.

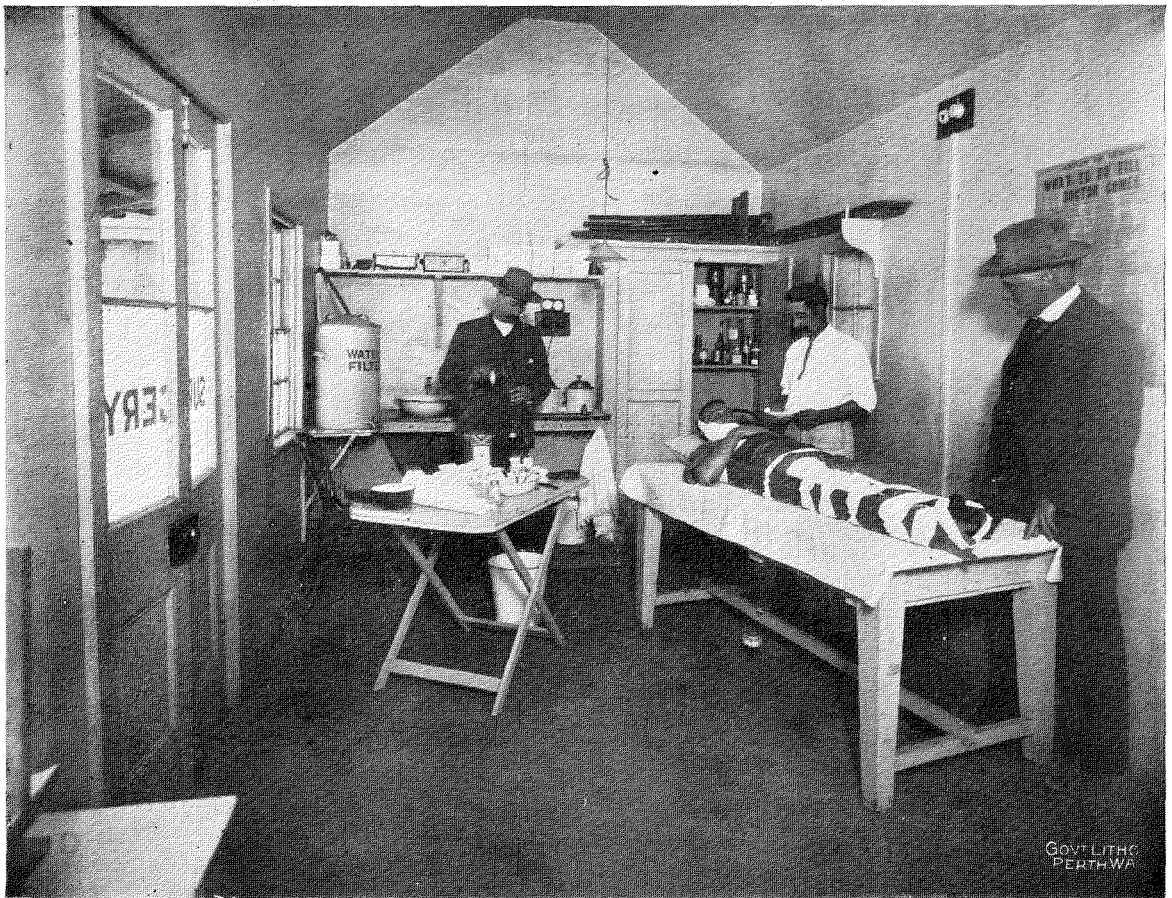
*"Hung-up" Passes.*—The Regulation, No. 39, dealing with entrance of men into "hung-up" passes, brought into force on 7th February, 1908, and quoted in last year's Annual Report, has been strongly objected to by the representatives of the workmen, and a promise was given to Parliament by the Hon. the Minister for Mines that it would be withdrawn. In order to discuss the matter fully a meeting was held towards the end of the year at Kalgoorlie between the Inspectors of Mines at Kalgoorlie and the State Mining Engineer on behalf of the Mines Department, the President and Vice-President of the

Chamber of Mines on behalf of the mine-owners, and the President and ex-President of the Federated Miners' Union on behalf of the workmen, at which agreement was reached as to the substance of an amended regulation. As, however, the question of men entering the shoots of "shrinkage system" stopes was involved, and this was a matter in which the Day Dawn Miners' Association was particularly interested, reference was also made to this body, but after some discussion it refused to make any recommendation in the matter, stating that it did so as a protest against the continuation of the shrinkage system of stoping at all. No further progress was made in the matter up to the end of the year.

*Running Machinery.*—The Regulations referred to in last year's report referring to precautions to be taken by men working in the vicinity of rapidly moving shafting, belts, and other machinery have not yet been put forward owing to various delays and objections. There were at least nine accidents recorded during the year which were due to men trying to do their work alongside running machinery without having it slowed down to a safe limit of speed. There is naturally a strong objection in a



The "Fleuss-Davis Hill" Apparatus, side view.

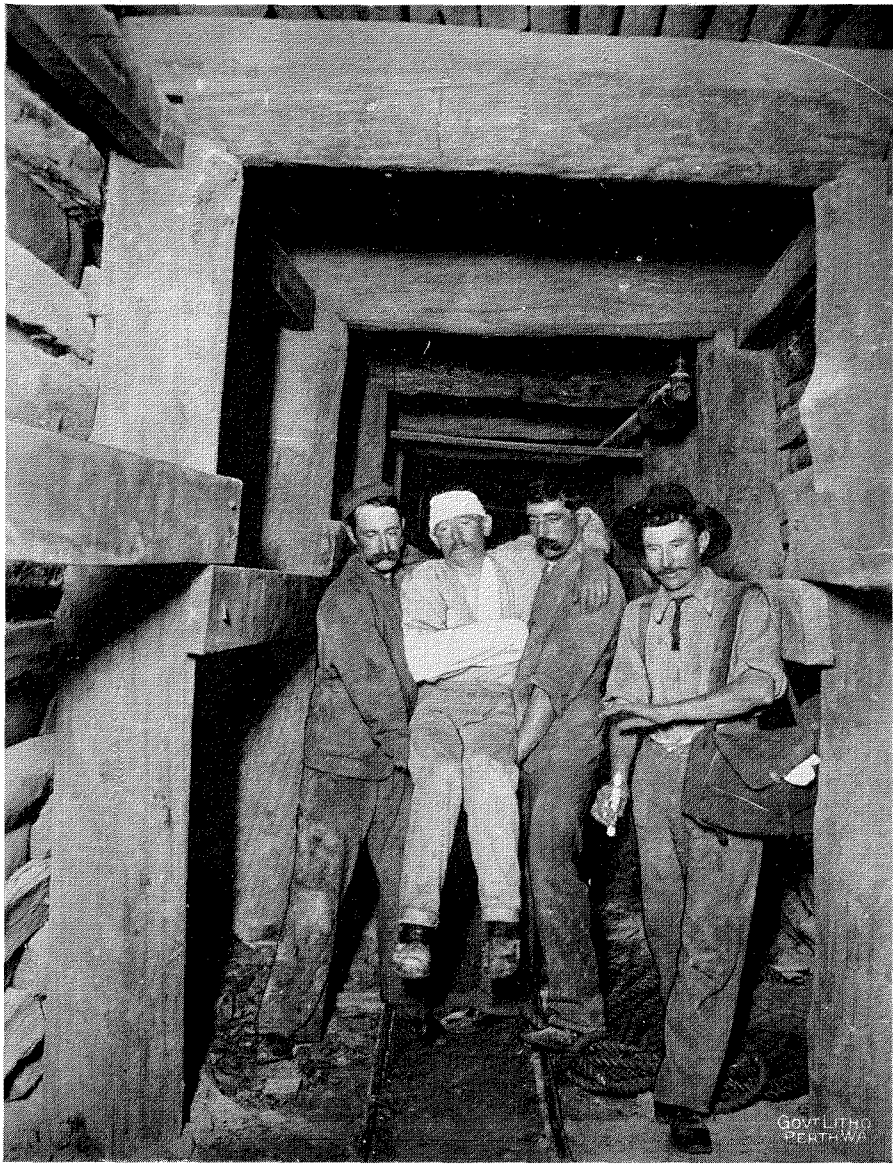


Great Boulder Proprietary Mine Casualty Ward.

GOVT LITHO  
PERTHWA



Patent Stretcher in use. Man being brought to surface in vertical position.



Showing method of carrying patient by means of two-handed seat.

large mill to having a great deal of machinery brought nearly to a standstill while repairs are made to some one part of it, but it has been abundantly demonstrated that many of the practices in vogue in this respect are attended with an undue amount of danger to the men employed. A great deal of trouble would be avoided if more attention were given to sectionalising the work of the mills, so that there should not be a great deal of machinery all driven from the same countershaft. Driving of small groups of machines from separate electric motors, or from gas engines fed from a central gasometer, enables a better system to be introduced in this regard than in the case where the whole of the mill machinery is driven by a maze of shafting and belts actuated by one large central engine.

*Electrical Regulations.*—Regulations on the general lines of those in force in New South Wales and Great Britain have been prepared during 1909 by the Government Electrician in co-operation with this office. The draft regulations have been carefully considered by a special committee of the Chamber of Mines, and many amendments made in consequence of their suggestions, but the final draft was not ready for Cabinet approval until after the beginning of the present year. There were no accidents reported during 1909 in mines of this State from use of electricity, but the experience of other countries shows that strict regulations are very necessary in order that accidents may be minimised. The Government Electrician's report on the state of many of the electric installations at Kalgoorlie showed great need for improvements to secure safety.

#### AMBULANCE WORK IN MINES.

There has been great improvement in the provision of ambulance requisites on most of the larger mines of the State during the last two years, largely due to the energy and enthusiasm of the local representative of the St. John Ambulance Association at Kalgoorlie, Mr. C. E. Bolton. Most of the mines now have corps of men trained to render first aid to injured men, and well-fitted rooms at surface where such can be attended to by a medical man before removal to the hospital. The movement is an admirable one and deserves all possible support and encouragement both from the Government and the community in general.

#### STATE ASSISTANCE TOWARDS MINING DEVELOPMENT, UNDER THE MINING DEVELOPMENT ACT, 1902, AND THE VOTE FOR DEVELOPMENT OF MINING.

In previous Annual Reports each year from 1903 onwards, attention has been repeatedly drawn to the generally unsatisfactory results of State advances and subsidies in aid of Mining Development, and some of the causes of failure have been discussed. The year just gone by is no exception to its predecessors in this respect, very little return having accrued to the State from a by no means illiberal expenditure. The details and schedules in Appendix No. 1 to this report show the present position in this regard of the propositions to which money has been advanced or granted.

In the "Gazette" of 19th October, 1906, it was notified for public information of applicants for advances under Parts II. and III. of "The Mining Development Act, 1902," that such advances will as a

rule only be granted in cases where they are expended in purchase and erection of approved machinery. In all other cases the Minister will only make advances when satisfied that there are very strong reasons, in the general public interest, for granting assistance, or that the mine is already equipped with necessary machinery. This notice has since been adhered to very closely, except in a few cases of prospecting ventures which seemed exceptionally deserving of assistance in sinking, and in consequence, latterly there has generally been machinery on which to realise in repayment of the loans when the ventures have proved unsuccessful. It has more often than not, however, been found impossible to obtain anything like a fair price for mining machinery sold under a bill of sale, and experience proves that apparently good security in such cases can only be valued at an enormous discount in the event of failure of the mine. In some cases where no reasonable price could be obtained for the plant acquired by foreclosure of the mortgages, it has been found possible to get other parties to take over the security at the amount of the debt upon it, repayable on terms. This course has prevented the complete sacrifice of some valuable securities, and gives another opportunity of giving the mines a trial, which is the main end to be served by State assistance towards mining development. It has also been usual for some years past to require a percentage, usually 15 per cent. of the gross proceeds of gold or mineral won to be paid after each crushing or treatment of the ore in reduction of the loans, instead of leaving them to be repaid in full at a stated time. The amounts received in repayment of loans and interest are however still very far from equal to the sums advanced, and every year it is found necessary to write off considerable amounts as irrecoverable.

The State of Western Australia is by no means singular in finding itself making heavy annual losses through such advances, most of the other States of the Commonwealth having had a very similar experience with their expenditure to encourage mining development. The administration of the Votes for the purpose has therefore often come under severe criticism both here and elsewhere, the failure to secure profitable results being held up as evidence of want of business capacity on the part of all concerned. It is easy to make such complaints, but a very different matter to show how improvement is to be effected. Most of the applications for financial assistance which are received under the Mining Development Act are of a highly speculative character, and are not reasonable business risks at all. It is usually only after he has found himself unable to finance his enterprise through ordinary business channels that an applicant tries to obtain State assistance. The considerations which have weight with the Administration in granting assistance are not merely the ordinary business ones of profit and loss, but extend to questions of public policy, and may be largely influenced by public sentiment. For example, assistance has been given, with some liberality, to several companies formed locally in some of the mining centres, with the object of opening up and prospecting abandoned mines or new discoveries in their vicinity, in order to try to resuscitate the mining industry there. In such instances the company has started operations with the full knowledge that success depends on their finding bodies of ore which have still to be discovered, and knowing well



that every penny subscribed is liable to be lost. Nevertheless no discoveries can be expected unless search is made for the ore, and unless someone undertakes this work it is obvious that mining must come to a standstill. It cannot be said that such prospecting is a sound business investment, for success is entirely problematical, but it is clear that it is a business necessity—so far as the maintenance of the mining industry is concerned—that a good deal of it shall be done. As a matter of public policy it has been customary for our own, and many other similarly circumstanced Governments, to give liberal assistance to such local efforts, but clearly it would be unfair to impute business incapacity if the result should not be successful. In such cases repayment of the moneys advanced is to be expected only if success attends the operations, when of course the borrowers would individually reap the benefit, and ought therefore to refund the money advanced by the State, but when the result is failure the money has been lost in a good cause, and the loss ought to be borne with equanimity.

The factor that the State, when it lends money to people struggling with the development of their mines does so on grounds of policy and public sentiment, and not merely as a business investment, runs through and fundamentally affects the whole of the transactions under the Mining Development Act, the object of which is not to make money for the State by lucrative money-lending to mines, but to assist struggling mine-owners with loans at the lowest permissible rate of interest to put their mines upon a sound productive footing, and to strengthen the State by establishment of a profitable industry.

The experience of the working of the Mining Development Act since its inception shows that the most common cause of failure of the assisted ventures has been that the borrowers have greatly underestimated the difficulties which are liable to be met with, and have made their estimates of cost on an optimistic basis of everything going well and in accordance with anticipations. But in mining, the unexpected is always happening, the most varied obstacles crop up which could not be foreseen, and delays and expenses which have not been provided for are constantly being incurred. Time and again it has happened that borrowers have therefore found themselves quite at the end of their resources before the projected operations were completed, and have had to abandon enterprises which they might have been able to make successful if they could have found a little more capital. But if the Government were to make it a condition of all loans that the borrower should have a good deal more capital in hand than he thinks necessary, the Mining Development Act in respect of these would be a futility, as the mine-owners would not think it necessary to borrow at all. The most common case is that mine-owners do not come to the Government for assistance until they have very nearly exhausted their own financial resources, and this seems to have been anticipated by the Legislature, for the Act clearly contemplates that a borrower may supply his own contribution to work done with aid of loan in the shape of his own party's labour. In making these advances, therefore, the Government has to take the risk of the borrower meeting with difficulties that will prevent him from bringing the enterprise to completion as well as those of the venture turning out badly as a mining proposition.

One of the most promising lines of assistance on which the Government can proceed under the Mining Development Act appears to be that of helping mine-owners to provide themselves with batteries and treatment plant, the prospects of recovering the moneys advanced being much better in such cases than in most others. Incidentally, advantage is usually taken of such advances to require the borrower to crush for the public at stipulated rates as nearly similar as local circumstances admit to those of State batteries. There have been a good many advances of this sort during recent years.

The schedules appended do not show by any means the whole of the Government expenditure in aid of mining development, as railways, water supply, State batteries, and all public facilities generally in mining districts are in greater or less degree Government assistance to the development of mining. The present figures only include those expended directly under the Mining Development Act, and chargeable to the Vote for the Development of Mining.

#### FIELD WORK.

The past year has been one of more than usual pressure of office work, and in consequence only 57 days were spent by myself travelling to the various mineral fields. Two visits were made to Kalgoorlie on various departmental business, and one to the Callion and Waverley districts. A short visit was made to Cue and Mt. Magnet early in the year in connection with an inquiry into accidents in the St. George mine, a report on which was published as Appendix No. 1 to last year's Annual Report. In July and August a visit was made to several of the Murchison fields, including Cue, Barrambie, Erroll's Quinn's Gabanintha, Burnakura, Yaloginda, Meekatharra, Chesterfield, and the Poona Tinfield, and to the Peak Hill district. A report on these districts has appeared, usually in more or less condensed form, in the Press, and is now in course of publication in full in Bulletin form. In June a short report was made on an occurrence of a quartz reef in the Darling Ranges, near Gosnell's, which is appended hereto, Appendix No. VI.

#### APPENDICES.

The following appendices are submitted with this Report, dealing more fully with matters of public interest, which have been parts of the work of this office during the past year:—

*Appendix No. 1.*—Particulars of advances under "The Mining Development Act, 1902," and the Mining Development Vote (with tables attached).

*Appendix No. 2.*—Examination Papers set at Examination for Inspectors of Mines.

*Appendix No. 3.*—Inspector Cleland's report on methods of dredging for alluvial tin at Greenbushes.

*Appendix No. 4.*—Inspector Cleland's report on the Pilbara and West Pilbara Goldfields.

*Appendix No. 5.*—Inspector Cleland's report on the Cosmo Newbery Ranges District.

*Appendix No. 6.*—State Mining Engineer's Report on a Quartz reef in the Darling Range, near Gosnell's.

I have, etc.,

A. MONTGOMERY, M.A., G.G.S.,  
State Mining Engineer.

## APPENDIX No. 1.

## ADVANCES UNDER "THE MINING DEVELOPMENT ACT, 1902," AND THE MINING DEVELOPMENT VOTE.

(a.) *Pioneering Mining and Prospecting.*

(1.) *Oversight G.M.L. 957Y, Bulong* (see 1908 Report No. 14).—The tributers on this mine to January 14th, 1909, had crushed 16 tons of ore for 93ozs. 19dwts. of gold, worth £337, from which royalty was received amounting to £27 8s. Later in the year there was a movement to reconstruct the syndicate and do further work, but nothing seems to have come of it.

(2.) *Sunbeam G.M.L. 1121X, Kanowna* (see 1908 Report No. 15).—Early in 1909 the Department foreclosed its mortgage and took possession of the mine and plant. Tenders were called for the purchase of mine and plant, but none satisfactory was received. In March the mine and plant were given over to Mr. F. W. Howes on his undertaking the debt owing by Thomas and Oakley. Howes' crushings during 1909 yielded £864 12s. 10d., from which he has paid £200 13s. 10d. in reduction of the loan and accrued interest.

(3.) *Eclipse G.M.L. 1047X, Gindalbie* (see 1908 Report No. 16).—Interest on the loan has been paid with fair regularity during 1909.

(4.) *Rollo's Reward G.M. Co., Kanowna* (see 1908 Report, No. 18).—Nothing has been done on this mine during 1909, but the sum advanced has not yet been written off as irrecoverable.

(5.) *Mount Chester M.L. 250, Ravensthorpe* (see 1908 Report No. 20).—The owners of this lease having done nothing during 1909 to test it, and failing to pay interest on the moneys advanced, it has been decided to forfeit the lease for non-payment of rent, but this had not been done up to the end of the year.

(6.) *Westralia Tasmania G.M.L. 1665T and Mt. Noungeel G.M.L. 1745T, Erlistoun* (see 1908 Report No. 22).—The owner of this mine has not yet been able to repay his loan, but has paid interest with fair regularity. In December he also remitted £50 2s. 6d. in reduction of the principal of the advances.

(7.) *Carbine South Syndicate, Ltd., G.M.L. 758S, Kunanalling* (see 1908 Report No. 23).—Interest on the advances made to this Company has been duly paid to 30 June, 1909, but nothing in repayment of the principal. The Company has been doing active development work and possesses a mine of considerable market value, which is security for the advances.

(8.) *Trenton G.M. Co., N.L., G.M.Ls. 388D, 399D, 400D, Day Dawn* (see 1908 Report No. 24).—The liquidator of this company, during 1909 sold the plant for £520, of which £483 4s. were paid to the Department. The balance of the advances must be regarded as loss, but had not been written off up to the end of 1909.

(9.) *Coolgardie Prospecting, Development, and Mining Co., N.L., Coolgardie* (see 1908 Report No. 25).—During 1909 very little was done, the company trying to obtain further capital, and the mine being let when possible on tribute. The matter was still in a very unsatisfactory position at the end of the year.

(10.) *Emily G.M.L. 1510, Day Dawn* (see 1908 Report No. 26).—In May, 1909, the syndicate gave notice that it was unable to carry on work and requested the Minister to take possession of the mine under his mortgage, which was accordingly foreclosed. The plant was advertised for sale by public auction, but no bids were received. The amount owing for principal and interest was £405 6s. 3d. at date of foreclosure (14th July, 1909). The plant was then agreed to be handed over to Messrs. Williams, Woosnam, and Gray, on their undertaking the liability of the old syndicate for advances and interest. Documents had not been completed at the end of 1909.

(11.) *Greenbushes Prospecting and Mining Company, Ltd., Greenbushes South Cornwall M.L. 300* (see 1908 Report No. 27).—Early in 1908 the mine was let on tribute to Messrs. King, Tully, and Bailey, on condition that all royalties should be payable to the Minister in reduction of the advances and interest thereon, and later all rent for boiler and winch at £1 per week. These tributers worked from a prospecting shaft sunk to 130 feet level. In June the tribute was taken over by Messrs. Astles, Huitson, and Tedge, who continued working until July 10th, when they gave up the use of the machinery and went into the shallow ground.

(12.) *North End Mines, Ltd., Kalgoorlie* (see 1908 Report No. 28).—No further sinking of the main shaft was done during 1909, and the work was confined to that of the tribute parties.

(13.) *Kingdom Come M.L. 112, Northampton* (see 1908 Report No. 29).—No work has been done on this mine during the past year, and the machinery has been in charge of a neighbouring sheep station overseer. Notice has been given to the owners that the lease will be forfeited unless all dues are paid. No action had, however, been taken up to the end of the year to foreclose the mortgage.

(14.) *The Jupiter G.M.L. 771M, Mt. Magnet* (see 1908 Report No. 30).—Very poor progress was made with the development of this mine during 1909, and part of the year it was let on tribute. The owners professed themselves unable to deal satisfactorily with the influx of water into the mine. Transactions with them were complicated during the year by litigation respecting some tailings from a crushing at the Boogardie State Battery, which had not been settled at the end of the year.

(15.) *Mindeloo G.M.L. 1518, Mindoolah* (see 1908 Report No. 31).—In February, 1909, the borrower was in difficulties on account of a fairly heavy inflow of water, and was allowed to open out at 112 feet, instead of 135 feet as originally intended, but an application for a further loan of £50 was refused. In July, as work had been discontinued, notice was given that the loan would be called in if it was not at once resumed, and men were sent out for a short time. In October the Mining Registrar reported the mine deserted, and it was decided to foreclose the

mortgage, but this had not been effected up to the close of the year.

(16.) *Coolgardie Redemption G.M. Co., G.M.L. 3918 and 4052, Coolgardie* (see 1908 Report No. 33).—The loan in this case was to be repayable in quarterly instalments beginning 1st February, 1909, of not less than £150, and 10 per cent. of the gross value of the first and 15 per cent. of the value of all the other gold won from the mine, but difficulties arose and in March a further loan of £250 was authorised for the purpose of unwatering the mine conditionally upon the Company raising the same amount. In June and July the Company was again in difficulties with over a month's wages unpaid to several of its workmen. The Government refused to lend any more money, and in September notice was given that the mine must be worked or let on tribute, and that unless satisfactory arrangements were made the security would be taken possession of by the Government under its mortgage. Attempts to let the mine on tribute, and to arrange means to carry on the work were still in progress at the end of the year.

(17.) *Dreadnought South G.M.L. 5334Z, Menzies* (see 1908 Report No. 34).—This mine was worked in 1909 until end of September, when six months' exemption from working was granted.

(18.) *Wheal May Lead Mine, Northampton* (see 1908 Report No. 35).—Early in 1909 work was resumed on this mine but soon stopped for want of funds. In April a further loan of £100 was approved at the rate of £1 for £1 on shaft sinking, but not to exceed 30s. per foot below the 70 feet level. The mine was let to a party of tributers, who unwatered it and sank the shaft 4 feet 2 inches, from which 2cwt. of clean galena ore was bagged. Heavy rains flooded the mine, and the party broke up. Nothing more was done up to the end of the year.

(19.) *Jourdie Enterprise G.M. Syndicate, G.M.L. 786S and 773, Jourdie Hills* (see 1908 Report No. 36).—During 1909 this venture was carried on under very considerable difficulties from shortage of water supply and want of funds, and the borrowers were unable to repay any of the advance. Negotiations were entered into regarding crushing for the public with the aid of a subsidy of a shilling per ton, but came to nothing. The Company gradually improved its position during the year.

(20.) *Kanowna Prospecting Co., Ltd., Kanowna* (see 1908 Report No. 37).—The work on P.A. 323X was carried on during the greater part of 1909, and a good shoot of ore was struck, which for a time promised very well. While stoping was in progress on this no subsidy was paid.

(21.) *Chamberlain M.L. 149, Wodgina* (see 1908 Report No. 39).—In February, 1909, the syndicate went into liquidation, but no part of the advance has been repaid. This advance was in the nature of a subsidy, repayable in the event of success.

(22.) *Lubra G.M.L. 669G, Niagara* (see 1908 Report No. 40).—The plant on this mine was transferred to P.A. 245G, but the purchaser was unable to complete the purchase and handed all back to the Department. Tenders were called for its purchase, but none were received that could be accepted.

(23.) *Hooley and Morris, P.A. 159S, Kintore* (see 1908 Report No. 42).—Owing to disagreement amongst the partners they decided not to accept the cheque for £75 15s. 9d. sent to them in 1908, and asked that the mortgage be released and the bill of sale discharged, which was duly effected and brought the whole transaction to a conclusion.

(24.) *President Loubet G.M.L. 611U, Callion* (see 1905 Report No. 4).—The advances in this case were written off in 1907 as irrecoverable. It has been proved during 1909 that the depth of the shaft was improperly measured, and that instead of being 193 feet deep as stated in the annual report of 1905, it was only down 144 feet 6 inches from the collar of the shaft. The matter has been placed in the hands of the Crown Law Department, who were investigating it at the end of 1909.

(25.) *W.E.G. G.M.L. 505G* (see 1905 Report No. 1).—Since the end of 1905 the mine has been worked on tribute, the proceeds going to the W.A. Bank, which holds a first mortgage over it. The operations have been rather unsuccessful, but reduced the debt to the Bank to £206 16s. 9d. on 1st October, 1909. An inspection of the mine was made in July, 1909, by the Inspector of Mines, who reported that it showed a good possibility of becoming a payable concern if crushing could be continuously carried on. In October the boiler and smoke stack were condemned by the Inspector of Machinery, and the tributers had to cease mining operations. In December a valuation of the machinery and plant on the mine by the Inspector of Machinery showed their original value to be £1,793 12s. 2d., their value on the mine as about £904 10s., and for removal, £522 10s. At the end of 1909 the matter was still unsettled, but it had been decided to take possession of the security and try to sell it, as a going concern if possible.

(26.) *Kanowna Low Grade G.M.L. 1194X, Kanowna* (see 1908 Report No. 44).—The balance outstanding on this loan was written off after realisation of the security, being irrecoverable.

(27.) *The Alicia G.M.L. 254F, Mt. Morgans* (see 1906 Report No. 14).—In 1907 this mine was put under option to Mr. W. C. Hill, who put a 10-head battery upon it. Later this was rented by Mr. Hamblin, the original owner, who also erected a cyanide plant. There was much delay in making progress with the work of the mine, but in April, 1909, the owner reported he had sunk the shaft to 280 feet, and that in the cross-cut at that depth the lode was 15 to 20 feet wide, with 10½ feet of payable stone, but also that there was a heavy influx of water. The Inspector of Mines on visiting the mine to report found everything stopped, and was unable to get below for water. The mine appears to be a promising one, but more capital is required. In July it was placed under option to a possible buyer. Later on in the year the owner was involved in legal proceedings over another lease, and was unable to make any progress with the Alicia.

(28.) *The Lost and Found, M.L. 374, Greenbushes* (see 1906 Report No. 9).—In 1907 the owners came to the conclusion that their shaft was wrongly placed and that there was no use in continuing it. They offered to return the money lent to them as soon as they were able to do so. Interest was paid very regularly till May, 1909, when the owners gave notice that they were unable to do further work on the lease for want of means. In July, 1909, six months' exemption from observance of labour conditions on the lease was granted, the owner expressing his intention of continuing work on it as soon as he was able to do so. He has since the end of 1909 resumed work on the lease.

(29.) *Lady Florence G.M.L. 1265* (see Annual Report for 1905, No. 8).—In August, 1906, a further advance of £100 was approved to Messrs. Chesson and

Haydon for deep-level work in the "Cue One" mine, on condition of their spending £1,500 of their own money, and becoming personally liable for repayment. Nothing was done, however, by the owners to take advantage of this loan, and in 1907 they were trying to dispose of the property to a company to be formed in England. Nothing seems to have come of this scheme, though in March, 1909, Mr. Chesson stated that he still expected money to be remitted from London for working the mine.

(30.) *Green and Wheatley. Sinking for Deep Lead at Bulong.*—In 1903 some boring was done on the Great Oversight lead at Bulong without much success beyond locating deep alluvial ground. In July, 1909, Messrs. Green and Wheatley, who had been concerned in the previous work, applied for assistance in sinking a shaft to test the ground, which was granted to the amount of £50, to be expended under the supervision of the Inspector of Mines, who limited the rate of advances to 4s. per foot to 60 feet depth, and thereafter 6s. per foot. The first shaft sunk was flooded during heavy rains and collapsed when 35 feet deep. A second one was down over 100 feet at the end of the year, and has since been bottomed at 138 feet 6 inches.

(31.) *Gawler G.M. Co., Ltd., G.M.L. 418R, Edju-dina.*—In August, 1907, application was made for a loan in aid of purchasing machinery and developing the "Neta Extended" mine. The Inspector of Mines having reported favourably on the prospects of the mine, a loan of £750 was approved, £500 to be spent on machinery and £250 on shaft sinking, on the basis of £ for £. From one reason and another there were delays in settling the matter, and no advances were made during 1908, but early in February, 1909, all was completed and the sum of £750 paid over. The mine has been working during 1909 and interest paid without much delay, but up to the end of the year the Company had not been able to make any reduction of the principal sum advanced.

(32.) *McLellan and Smyth, P.A. 221W. Sinking for Deep Lead at Waverley.*—In November, 1908, these prospectors asked for assistance in sinking to test deep alluvial ground in the Waverley field. They had sunk three shafts, 100 feet, 96 feet, and 95 feet, and done a good deal of driving on the lead, getting a little gold, but nothing payable. After report of the State Mining Engineer it was decided to give advances up to £50 in aid of further sinking and driving on the lead, at rates not more than 7s. 6d. per foot. This assistance was not accepted, however, till May, 1909, further work having been done in the meantime. Since May the party have continued working to the end of 1909, and have sunk a fourth shaft. Unfortunately, they have met with no success to reward their exemplary perseverance.

(33.) *Baird and Party. Prospecting for Deep Alluvial Lead, Bulong.*—In reply to a request for assistance in prospecting some deep alluvial ground on the Bulong Park Lands, a sum of £20 was authorised to be expended at the rate of 5s. per foot for shaft sinking, approved by the Inspector of Mines. After sinking to 103 feet another sum of £20 was also authorised at the same rate for cross-cutting and driving. The shaft was sunk to 105 feet, and a drive made west 49 feet and east 37 feet. Nothing payable was discovered. This advance should be regarded as a subsidy rather than a loan.

(34.) *Kalgoorlie North End Development Company, N.L., G.M.L. 3880E, Devon Consols, Kalgoor-*

*lie.*—About the middle of 1908 a local company was formed in Kalgoorlie to acquire and work the Devon Consols mine, from which 22,493 tons were stated to have been crushed for returns of 13,505ozs. of gold, and made application for assistance in opening the mine below the workings of the previous owner. The project was favourably reported upon by the State Mining Engineer, and in December, 1908, Cabinet approved loans to £1,500 on condition that the Company expended £1,000 on the same operations of approved development below the depth of 260 feet, which was the bottom of the shaft at the time of starting. Great delay arose in completing the necessary documents on account of the somewhat complicated interests involved in the ownership of the machinery on the mine, and in May the Company applied for leave to stop shaft sinking for a time at the 350 feet level and drive there for the lode, this work of driving not to receive any Government assistance until after the full amount of sinking 200 feet had been completed. No. 3 level was opened out 100 feet below No. 2 level, and there is a well hole 14 feet deeper, not yet timbered. After cross-cutting 42 feet at No. 3 level the lode was cut, 2 feet wide, assaying 29s. per ton.

(35.) *Klondyke Boulder G.M.L. 604, Warrawoona.*—In November, 1908, the owners of the Klondyke Boulder mine at Warrawoona, Pilbara Goldfield, applied for assistance in sinking their shaft, and forwarded full particulars of their proposal early in 1909. A favourable report having been received from the Inspector of Mines and Acting Warden the State Mining Engineer recommended a loan, but owing to the large amount of Government expenditure going on in the Pilbara field Cabinet refused any further outlay in mining development. After the visit of the Hon. Premier in May the matter was reconsidered and an advance of £500 approved in aid of expenditure in sinking the main shaft.

(36.) *Britannia G.M.L. 953M, Mt. Magnet.*—In October, 1908, Messrs. Manners and James made application for some assistance to get a boiler to complete their Tremaine Mill plant, and the application was favourably reported upon by the Inspector of Mines. Loans up to £150 were approved upon the basis of £ for £ of the borrowers' expenditure. The boiler was duly erected and the plant has been working during 1909, but owing to the borrowers' delaying to pay their share of the cost of the boiler, the total amount advanced to the end of 1909 was only £85 0s. 8d.

(37.) *The Transvaal, G.M.L. 536, Southern Cross.*—Towards the end of 1906 application was made by the owners of this lease for assistance by way of supplies of water, not to exceed two million gallons, from the Goldfields Water Supply Administration, which was granted, the value of the water as paid by the Mines Department to the Goldfields Water Supply Administration being treated as an advance at 5 per cent. interest. Since then the owners have been struggling hard to obtain capital for working the mine, which has been under option to various parties from time to time, and efforts have been made to sell it both in the Eastern States of Australia and in England. No progress of consequence had, however, been achieved up to the end of 1909, at which date the loan and interest were still outstanding. Below water level the ore in this mine contains much arsenical pyrites, which has been a great difficulty, requiring an expensive plant to secure proper recovery of the values.

(38.) *The Harbour Lights*, G.M.L. 1056C, *Leonora*.—In June, 1909, application was made by the owners of this mine for an advance of £500 on the security of the untreated slimes belonging to them at the Leonora State Battery, for the purpose of obtaining machinery and sinking the main shaft. The net value of the slimes was estimated at £612 1s. 6d. by the Superintendent of State Batteries, and it was arranged to advance the owners of the mine this amount from the Vote for Development of Mining on condition of their expending the amount on purchase and erection of machinery. As the values in the slimes are realised they will be repaid to the Vote.

(39.) *Water Supply to Hannan's Reward Tributaries, Kalgoorlie*.—In November, 1908, it was arranged by Cabinet to advance Messrs. Hunt and Williams, tributaries of the Hannan's Reward mine the cost of their water supplies up to £250, from the Mining Development Vote. The mine was working on very low-grade ore and in danger of closing down altogether, and the loan was made in the hope of being able to help in preventing this.

(40.) *Water Supply to Tributaries of Griffiths G.M., Coolgardie*.—In January, 1909, it was arranged that assistance should be given to the tribute party working the Griffiths G.M. by paying for water used by them from the Goldfields Water Supply to the extent of 1s. 6d. per 1,000 gallons up to a total of £200, on condition of their doing development work approved by the Inspector of Mines. In November the prospects of the mine were so much improved that the tributaries did not desire to draw the full amount of their advance, and since the end of the year the total amount lent, £156 14s. 4d., has been repaid.

(b.) *Assistance in erecting Batteries and Treatment Plants to be used for Crushing for the Public.*

(41.) *Little Doris*, G.M.L. 771T, *Erlistoun* (see 1908 Report No. 47).—Messrs. Doyle and Brown having failed to carry out their agreement, the plant was seized and sold for £150 on terms to Mr. McOmish. The deal was, however, cancelled before completion of documents. Mr. Doyle then was allowed to retake possession of the plant on payment of the debt of £167 1s. 3d. outstanding on it, which completed the deal to him. The bill of sale was then duly discharged.

(42.) *Spring Hill*, G.M.L. 721, *Parker's Range* (see 1908 Report No. 48).—In June, 1909, the borrower was notified that he must pay five per cent. of all the gold won, but not less than £50 per quarter in reduction of his indebtedness.

(43.) *Ora Banda*, G.M.L. 1288W, *Waverley* (see 1908 Report No. 49).—During 1909 the owners of the Ora Banda battery completed repayment of all the advances made to them, with accrued interest.

(44.) *The Never Never*, G.M.L. 665, *Yilgarn* (see Annual Report for 1906, No. 18).—This battery has been working pretty constantly since its erection in 1906, but from one cause and another the owner has not been able to repay more than portion of the loan and interest. In January, 1909, the borrower was required to make arrangements for reduction of his debt under penalty of foreclosure of his mortgage. In May the debtor called a meeting of his creditors, and arrangements were made whereby he should make monthly payments of a specified sum to his creditors, *pro rata* to their claims, and some payments have been received by the Department in consequence in

reduction of his debt. The battery has crushed for the public, but there was a great deal of trouble during 1909 between the battery owner and the prospectors, and it became necessary for the Department to take action to secure proper performance of the former's obligations in respect to crushing for the public.

(45.) *Hidden Secret North*, G.M.L. 4253, *Eundynie* (see 1908 Report No. 51).—In February, 1909, a boring plant was lent to the syndicate in order to assist them in getting water. They struggled with a succession of difficulties all through the year, with gradually improving prospects, and were not pressed for repayment of the loans in consequence. They have now obtained a fair supply of water and are likely to be more successful.

(46.) *Edward Hodder, Machinery Area 64, Randal's* (see 1908 Report No. 52).—During 1908 the oil engine, which formed part of the security seized, was repaired at a cost of £8 13s., and sold for £73 13s., thus giving a net refund of £65.

(44.) *Roebourne Copper and Gold Mines, W.A., Ltd.*, G.M.L. 135, *Roebourne* (see 1908 Report No. 53).—This company had three months' exemption from working in the beginning of 1909, having then expended £5,200 locally on the mine and mill, and crushed 1,000 tons of stone for a return of £1,286. In March the Company assigned its plant to the Government, and surrendered its leases. In August the plant was let to Redmond and party at £20 per month rent, subsequently altered to a sale, by which they paid £100 in cash and £100 on approved guarantees for all the movable stores, and took the battery and gas-producer plant at £700 on a hire-purchase agreement payable £20 per month. The battery is to crush for the public when required.

(48.) *Lady Pratt*, G.M.L. 128X, *Mulgarrie*.—In January, 1909, application was made by Mr. McKenna, of Mulgarrie, for assistance to erect a battery on the old "Hit or Miss" mine, for his own and public crushing. According to the report of the Inspector of Mines the success of the mine seemed rather doubtful, but in view of the value of a public mill to the district, advances up to £250 were approved. Erection of the battery, which is of 10 stamps and driven by an oil engine, was completed in October, 1909.

(49.) *Mystery*, P.A. 157, *Yalgoo* (see 1908 Report No. 41).—The "Royal Mint" syndicate, which took over the battery from Messrs. Wilson and Moxon, having broken up without signing the formal documents of hire-purchase, the original mortgage was foreclosed. The plant was then handed over to Mr. H. V. Johnstone, to be paid for by him at the rate of £3 per week up to £345, plus interest at 5 per cent., together with 10 per cent. of the net proceeds of all gold won from the Royal Mint mine. A subsidy of 2s. per ton was granted on all ore crushed for the public, and this also is to be handed over in payment of the plant. Several crushings were put through during the year.

(50.) *Mulga Queen*, G.M.L. 1517T, *Duketon* (see 1908 Report No. 32).—No adequate tenders having been received for the purchase of the battery and plant it was not sold, but in May, 1909, an offer was accepted from Messrs. Thompson and Krause, two of the original owners, to take it over for the debt upon it, they undertaking the liabilities and to pay interest and 15 per cent. of all moneys received for public crushing.

(51.) *The Lady Agnes, G.M.L. 910Y, Randell's* (see 1908 Report No. 43).—The business in this case proving very unsatisfactory notice of foreclosure of the mortgage was given on 16th June, 1909; the property was seized, and a caretaker placed in charge. In August tenders were invited for purchase of the chattels covered by the mortgage, and some of them have been sold.

(52.) *Malcolm Prospecting Company, N.L., Mt. Malcolm* (see 1908 Report No. 19).—The company has worked its mine throughout 1909 without being able to repay either principal or interest on the advances made to them. The subsidies payable to the company on crushings made for the public are now credited to the interest account. A report from the Inspector of Mines having shown that the company is doing its best to carry on the mine, and that the machinery is good security for the loan, no action has been taken as yet to enforce repayment of the advances.

(53.) *Randwick, G.M.L. 978C, Mt. Malcolm* (see 1908 Report No. 38).—The option-holder over this mine having found results unsatisfactory gave up his option, and returned the mine to the owners. In October Mr. F. A. Allen applied for a lease of the plant in order to crush for the public. The Department took possession of its security and agreed to lease the boiler to Mr. Allen at 50s. per week, but owing to difficulties due to some portions of the plant having been removed to Malcolm, next to nothing was done up to the end of 1909.

(54.) *Crown, G.M.L. 1398W, Black Flag (formerly the Last Chance)*.—In July, 1909, application was made for assistance to buy a new boiler for this mine, the owners of which were crushing for the public. After a fairly favourable report from the Inspector of Mines a loan of £200 was granted for the purchase of a boiler, repayable from monthly crushings, but not less than £30 quarterly, on condition that 10 stamps were available for public crushing. Later on it was found the advances might be limited to £150, a satisfactory boiler having been obtained for that amount.

(55.) *Gibraltar, G.M.L. 708N, Yaloginda*.—In May, 1909, application was made by Messrs. Ord and Travers for assistance in putting up a small battery on their mine. After considerable negotiation, and a favourable report from the Inspector of Mines on the property, it was agreed to advance £600 towards the purchase and erection of machinery that would cost £1,036 9s. 10d., consisting of a gas producer plant and engine and a 10-head battery, of which 5-head would be available at all times for the public crushing. The erection of the battery was finished in November, 1909.

(56.) *Callion G.M. Co., W.A., N.L., Callion*.—In July, 1907, the owners of the Callion mine approached the Department for assistance in putting machinery on their mine, and their application was favourably reported upon by the Inspector of Mines. A loan of £1,000 was approved, but in October of the same year, the company having found their first scheme of equipment beyond their means asked that the loan be made available for the erection of a small battery and very different outfit of machinery, a proposal which could not be entertained. In April, 1908, fresh proposals were put forward by the Company, which had, meantime, been reconstructed, for a loan in aid of the erection of a 10-head battery, which should be open for public crushing, estimated to cost £2,731

5s. 10d. For this a loan of £1,000 was approved on 16th October, 1908. Erection of the plant was gone on with at once by the company, and by June, 1909, the battery was nearly completed, but there was delay in beginning public crushing through financial difficulties of the company, and trouble in obtaining sufficient water supply. The company asked for further Government assistance, but this was not granted. In August the battery was completed and crushed for the public.

(57.) *Red Hill Westralia G.M. Co., Ltd.; Sons of Erin Battery, Higginsville*.—Towards the end of 1905 an arrangement was come to whereby in consideration of the owners of the Sons of Erin mine putting up a 10-head battery and crushing for the public at prescribed rates, the Government provided a water supply, for which the owners should pay 10 per cent. per annum as rental. The well was sunk and equipped with pump etc., in 1906, and thereafter was twice deepened, the total cost being £3,528 6s. 2d. In December, 1908, the owners gave notice of termination of the agreement to rent the well, but continued to crush for the public with water from the company's own mine. Rent has been paid, after some delay, up to the date of termination of the agreement. During 1909 the Red Hill Westralia Co. used a little water from the well, paying a daily rental for it of 10s., and in September sold their plant and lease to Mr. A. Sampey, who proposed to continue crushing for the public at the same rates as before. Arrangements for leasing the well to Mr. A. Sampey for an agreed term were in progress at the end of 1909. This case is here noted as being in effect one of assistance to provide public crushing facilities under Part IV. of "The Mining Development Act, 1902," but the expenditure and revenue therefrom have not been charged to the mining development accounts, but to those of the Mines Water Supply, and, therefore, do not appear in the schedules hereunder.

(58.) *Water Supply to Public Crushing Plant, Ballagundi*.—In September, 1908, a numerously signed petition was received for the erection of a public battery at Ballagundi, and was supported by a strong recommendation from the Kalgoorlie Municipal Council. The Inspector of Mines examined the district, but could not report in favour of a State battery being erected. In January, 1909, the Minister decided there was not sufficient assured support in the district to allow him to take the risk of putting up a State battery simply to attract development. In March, 1909, a proposition was made by Mr. A. Tantau, of Kalgoorlie, that he should put up a five-head battery at Ballagundi on condition that water should be laid on from the Bulong main. The cost was estimated at £350, and the Goldfields Water Supply Administration required £140 to be paid at once towards laying the pipes. The Minister agreed to advance £140 to pay for the laying of the pipes, and to grant a subsidy of 1s. per ton on ore crushed for the public at State battery rates, and to be responsible for the rental of £30 per annum for two years. The battery was put up and started crushing in July, 1909, but the venture proved a failure, and it was shut down in October, 1909.

(c.) *Miscellaneous Advances.*

(59.) *Collie Coal Briquettes. Jas. H. Shekleton's Experiments* (see 1908 Report No. 55).—In January,

1909, it was arranged to assist Mr. Shekleton to carry out his experiments on a working scale at the Collie Proprietary Company's briquetting plant at Bunbury. After much trouble he made about three-quarters of a ton of briquettes, instead of 10 tons, as desired, the feeding arrangement of the large plant proving unsuitable for trials of small parcels. The briquettes were not a success, disintegrating very rapidly. Some made of N.S.W. slack coal were rather more successful, but still not strong enough for practical use. Mr. Shekleton then made some further experiments on a smaller scale in Perth with a hydraulic press, which turned out smaller briquettes of considerably better quality, but still not quite satisfactory.

(60.) *Mt. Magnet Municipal Council—Water Supply.*—In December, 1904, assistance was granted from the Mining Development Vote to this Council, to enable them to provide a water supply for the town, at a cost which proved to be £460 17s. 10d., to be repaid by one-half of the receipts for water sold. Up to the end of 1908 only £91 13s. had been repaid, and during 1909 there were further repayments of £23 7s. This is an advance that would be more properly chargeable to some other vote than that for Development of Mining.

(d.) *Boring.*

(61.) *Purchase of Carbons, Repairs to Drills, etc.*—Particulars of expenditure on these heads are given in the tables attached.

(62.) *Boring at Collie.*—In September, 1906, a new discovery of coal was made near the 253½-mile peg on the Collie-Narrogin railway, some eight miles easterly from the town of Collie. Its calorific value in two analyses proved to be 10,540 and 10,741 B.T.U., equal to the better class of the Collie coals which were being worked. Three shallow shafts were sunk during 1907, and in January, 1908, application was made for State assistance in opening up this discovery, but before granting this it was decided to have a geological examination, which was carried out by Messrs. Woodward and Talbot, of the Geological Survey. In March, 1908, the cost to the prospectors of sinking and boring amounted to £211, and work was stopped for want of funds. A sum of £50 was granted to the party as a subsidy, and also a reward lease of 200 acres. Early in 1909 the application of the party for further assistance to bore with a diamond or calyx drill was complied with by the Minister agreeing to pay half the expense of boring to a depth of 500 feet, up to a maximum advance of £250, repayable with interest at 5 per cent. by quarterly payments of sixpence per ton on any coal marketed. There was a good deal of delay before a drill was available, but in September a calyx drill was sent to the field. On 21st October a six-foot seam of coal was cut at 199 feet from surface, after passing through five smaller beds. Boring to 500 feet was completed about the end of November and the drill returned.

(63.) *Sandstone North, G.M.L. 561B and 566B, Sandstone.*—In March, 1909, the Sandstone North Syndicate applied for assistance in boring on their two leases to prospect them. The Inspector of Mines' report having shown that the project was practicable and afforded fair chances of success, assistance was granted to the value of the wages of the foreman. Three bores were sunk to 140, 135, and

140 feet, but the flow of water was too heavy for the pump employed to enable them to be carried deeper. A reef was cut at 45 feet in No. 1 bore. Three more bores were then put down along the line of the reef to 100, 128, and 46 feet, No. 5 cutting the reef, two feet thick, at 50 feet. Nothing payable was found and the leases were surrendered.

(64.) *Mount Morgan Diamond Drilling and Exploration Syndicate, Ltd., Mount Morgans.*—A movement to have some diamond drilling done in the Mount Morgans district was started in 1904, but though Government assistance was promised the local share of the necessary funds could not be raised, and the matter made no progress till the middle of 1908, when a syndicate was formed to do the work, the Government contributing £2 for every £1 expended by the local people. The drill was sent to Mount Morgans in July, 1908, and boring carried on till January, 1909, when the syndicate got into financial difficulties. The company was then reconstructed, and boring resumed and carried on till July, 1909, when eight holes had been put down, viz., 1, 564 feet; 2, 493 feet; 3, 504 feet; 4, 832 feet; 5, 360 feet; 6, 310 feet; 7, 310 feet; 8, 325 feet; aggregating 3,698 feet. The total cost was £2,042 0s. 2d., or plus depreciation, £2,137 0s. 2d., giving costs per foot, 11.043s. or 11.557s. Assays of the cores showed mostly poor results in gold, except those from No. 8 bore, in which from depth of 216 feet to 233 feet the average assay was 8dwts. 3grs. of gold per ton. Since termination of the boring a company has been formed to further exploit the reef cut in No. 8 bore.

(65.) *Mt. Cassiterite, M.L. 84, Wodgina.*—In March, 1909, the owners of this mine having found the water supply from their wells to have become greatly reduced so as to be unable to keep the mill going, applied for assistance in boring for water, and a plant was lent to them on condition of their paying one-half cost of boring, and the whole or greater part of it in the event of the work being successful and the water utilised by them. In July the finding of a good water supply in a bore 45 chains west of the Mt. Cassiterite was announced, the total cost of boring having been £141 14s. 1d. The well, subsequently sunk to a depth of 82 feet by the owners of the mine, gave a supply of 12,000 gallons per day. Owing to the mill being stopped by an accident to its engine, payment of half the cost of boring was not pressed for during 1909.

(66.) *Leonora Diamond Drilling and Prospecting Co., Leonora.*—In 1908 a company was formed in Leonora, with capital £2,000, to bore for reefs in the vicinity of the town of Leonora, and the Minister agreed to give 30s. to the £1 towards such work. Sites for a line of bores were selected by the State Mining Engineer. In February, 1909, tenders for boring at 15s. per foot were accepted. Two bores, inclined at 45 degrees, were put down without cutting values in gold of any consequence, and then the company suspended operations.

(67.) *The Great Fingall Consolidated, Ltd., Day Dawn.*—In December, 1908, application was made by this company for the loan of a diamond drill, which was agreed to. Owing to other work, however, they then postponed taking the use of the drill until July. Work was carried on thereafter until the end of the year, 1,200 feet of horizontal boring being done. Since the close of the year the cost of the work has been refunded by the company.

(e.) *Subsidies to Batteries.*

(68.) In the summary hereunder there is a schedule showing the tonnage crushed during 1909 at various batteries throughout the State, which have undertaken to crush for the public at rates and on terms fixed by the Minister for Mines, and the rate of subsidy, and amount of subsidy paid to them. 30,767.43 tons of ore were so crushed for the public, being an increase of 7,561.20 tons over the previous year, and the amount of subsidy paid was £2,207 8s. 2d., or at the average rate of 1s. 5½d. per ton. In 1908 the average rate was 1s. 9½d. per ton. It is satisfactory

to note that although the average rate of subsidy has been lower during 1909 than in 1908 the tonnage crushed has not fallen off, but is nearly one-third higher.

(f.) *Providing means of Transport for Miners and Prospectors.*

(69.) The expenditure for the year has been £1,110 8s., against which there is a credit of £122 4s. 10d. The maintenance of the Government camels used for prospecting comes under this heading.

SUMMARY OF EXPENDITURE ON MINING DEVELOPMENT, UNDER THE MINING DEVELOPMENT ACT, 1902, AND FROM THE DEVELOPMENT OF MINING VOTE, FROM 1ST JANUARY TO 31ST DECEMBER, 1909.

Mine or Owner.	Mining Centre.	Amount.	Total.
		£ s. d.	£ s. d.
<b>A.—ADVANCES IN AID OF MINING WORK AND EQUIPMENT.</b>			
Baird and Party .. .. .	Bulong .. .. .	40 0 0	
Britannia .. .. .	Mt. Magnet .. .. .	85 0 8	
Coolgardie Redemption Co. .. .. .	Coolgardie .. .. .	253 3 6	
Dreadnought South .. .. .	Menzies .. .. .	38 4 11	
Emily .. .. .	Day Dawn .. .. .	1 14 6	
Gawler .. .. .	Edjudina .. .. .	750 0 0	
Green & Wheatley .. .. .	Bulong .. .. .	23 14 0	
Greenbushes Prospecting Co. .. .. .	Greenbushes .. .. .	3 5 0	
Griffiths .. .. .	Coolgardie .. .. .	156 14 4	
Jourdie Enterprise .. .. .	Jourdie Hills .. .. .	500 0 0	
Hannan's Reward .. .. .	Kalgoorlie .. .. .	250 0 0	
Harbour Lights .. .. .	Leonora .. .. .	612 1 6	
Kalgoorlie North End Development Co. .. .. .	Kalgoorlie .. .. .	492 0 0	
Kanowna Prospecting Co. .. .. .	Kanowna .. .. .	485 13 0	
Klondyke Boulder .. .. .	Warrawoona .. .. .	250 0 0	
Lubra .. .. .	Niagara .. .. .	2 15 0	
McLellan & Smyth .. .. .	Waverley .. .. .	26 12 6	
Mindeloo .. .. .	Mindoolah .. .. .	71 10 0	
Sunbeam .. .. .	Kanowna .. .. .	36 12 6	
Wheal May .. .. .	Northampton .. .. .	70 11 0	
			4,149 12 5
<b>B.—ADVANCES IN AID OF ERECTION AND EQUIPMENT OF BATTERIES FOR PUBLIC CRUSHING.</b>			
Ballagundi (Water Supply) .. .. .	Ballagundi .. .. .	152 10 0	
Callion G.M. Co. .. .. .	Callion .. .. .	1,000 0 0	
Crown .. .. .	Black Flag .. .. .	150 0 0	
Hidden Secret North .. .. .	Eundynie .. .. .	259 1 10	
E. Hodder .. .. .	Randell's .. .. .	2 0 0	
Lady Agnes .. .. .	Do. .. .. .	50 19 9	
Lady Pratt .. .. .	Mulgarrie .. .. .	161 12 6	
Mulga Queen .. .. .	Duketon .. .. .	45 10 10	
Orabanda (Water Supply) .. .. .	Waverley .. .. .	244 10 1	
Randwick .. .. .	Malcolm .. .. .	2 12 0	
Roebourne Copper and Gold Ms. .. .. .	Roebourne .. .. .	27 5 9	
Royal Mint .. .. .	Yalgoo .. .. .	8 6 8	
			2,104 9 5
<b>C.—MISCELLANEOUS ADVANCES.</b>			
Shekleton's Briquette Experiments .. .. .		87 9 6	
			87 9 6
<b>D.—BORING.</b>			
<i>(a.) Advances—</i>			
Coal Boring .. .. .	Collie .. .. .	163 17 8	
Gt. Fingall Co. .. .. .	Day Dawn .. .. .	63 10 0	
Leonora Diamond Drilling Co. .. .. .	Leonora .. .. .	420 5 11	
Mt. Cassiterite .. .. .	Wodgina .. .. .	151 3 1	
Mt. Morgans Diamond Drilling Synd. .. .. .	Mt. Morgans .. .. .	925 12 10	
Sandstone North .. .. .	Black Range .. .. .	58 0 0	
			1,782 9 6
<i>(b.) Subsidies and General Expenditure—</i>			
Hidden Secret North G.M. .. .. .	Eundynie .. .. .	20 0 0	
Purchase of Carbons .. .. .		716 15 10	
Repairs to drills .. .. .		10 14 0	
			747 9 10
Carried forward .. .. .			8,871 10 8



SUMMARY OF EXPENDITURE ON MINING DEVELOPMENT, ETC.—*continued.*

Mine or Owner.	Mining Centre.	Amoun.	Total.
Brought forward .. .. .	..	£ s. d. ..	£ s. d. 8,871 10 8
E.—MISCELLANEOUS EXPENDITURE.			
Bonus on Lead Ores Exported .. .. .	Onslow .. .. .	106 3 9	
Carting Ore from Twin Peaks (Subsidy) .. .. .	.. .. .	9 8 6	
Cutting Track .. .. .	Cosmo Newbery Hills .. .. .	20 0 0	
Inspection of Properties .. .. .	(Various) .. .. .	70 2 0	
North Lead Pumping Plant .. .. .	Kanowna .. .. .	92 5 6	
Orabanda Battery Subsidy .. .. .	Waverley .. .. .	250 0 0	
Preliminary Investigations .. .. .	(Various) .. .. .	39 19 11	
Testing Collie Coal .. .. .	Collie .. .. .	12 9 9	
			600 9 5
SUBSIDIES ON CARTAGE LONG DISTANCES TO BATTERIES.			
Alderson, R. .. .. .	Edjudina .. .. .	24 0 0	
Barker, R. H. .. .. .	Lennonville .. .. .	3 7 6	
Brown, E. .. .. .	Yarri .. .. .	1 0 0	
Cametson Bros. .. .. .	Darlot .. .. .	13 15 0	
Carter & Hambleton .. .. .	Do. .. .. .	13 15 0	
Clark and Party .. .. .	Meekatharra .. .. .	17 2 0	
Clark, J. J. .. .. .	Yalaginda .. .. .	3 3 0	
Creer, T. .. .. .	Norseman .. .. .	7 4 0	
Cooper, G. A. .. .. .	Gindalbi .. .. .	25 0 0	
Goddell, A. .. .. .	Southern Cross .. .. .	6 18 0	
Deckson, E. T. .. .. .	Meekatharra .. .. .	8 17 0	
Deckson & Party .. .. .	Do. .. .. .	16 10 0	
Doolan, W. .. .. .	Gindalbi .. .. .	15 0 0	
Frackrudden .. .. .	Laverton .. .. .	30 0 0	
Gordon, J. .. .. .	Yalaginda .. .. .	2 9 6	
Greenwell, W. .. .. .	Do. .. .. .	3 0 0	
Hall, A. B. .. .. .	Pilbara .. .. .	33 10 0	
Hunter & Pegler .. .. .	Nannine .. .. .	8 0 6	
Haggett, J. .. .. .	Do. .. .. .	4 4 0	
Higgins, J. .. .. .	Hope's Hill .. .. .	7 10 0	
Kirkpatrick Bros. .. .. .	Phillips River .. .. .	13 15 0	
Kuhlman, L. C. .. .. .	Hope's Hill .. .. .	4 10 0	
Landsell, J. .. .. .	Nannine .. .. .	7 5 6	
Lordon & Windsor .. .. .	Yarri .. .. .	4 0 0	
Mt. Kersey G.M. Syndicate .. .. .	Yalgoo .. .. .	11 9 3	
McCannon, T. .. .. .	Yerilla .. .. .	10 0 0	
O'Brien, M. .. .. .	Nannine .. .. .	21 4 6	
O'Neil, D. .. .. .	Mt. Monger .. .. .	4 0 8	
Pope, J. .. .. .	Darlot .. .. .	14 5 0	
Possingham, J. E. .. .. .	Nannine .. .. .	1 10 0	
Rintoul, F. .. .. .	Kalgoorlie .. .. .	24 9 0	
Rooney & Sommers .. .. .	Mertondale .. .. .	9 15 0	
Ross, H. P. .. .. .	Gum Creek .. .. .	8 5 0	
Rowan, H. .. .. .	Southern Cross .. .. .	1 10 0	
Sewell, J. .. .. .	Nannine .. .. .	4 17 6	
Smith, G. L. .. .. .	Yalgoo .. .. .	7 10 0	
STATE BATTERIES :—			
Recoup of crushing charges deducted in lieu of cartage subsidies (27 items) .. .. .	.. .. .	2 0 0	
		10 7 0	
		12 10 6	
		20 9 0	
		1 16 0	
		55 15 0	
		1 16 0	
		0 14 0	
		1 14 6	
		1 9 0	
		1 14 0	
		21 3 0	
		4 4 0	
		15 4 6	
		8 3 0	
		3 4 6	
		10 6 0	
		1 7 0	
		0 18 0	
		11 2 0	
		1 16 0	
		4 16 0	
		4 4 0	
		11 10 0	
		2 4 0	
		9 9 0	
		6 3 0	
Carried forward .. .. .	..	618 10 11	9,472 0 1

## SUMMARY OF EXPENDITURE ON MINING DEVELOPMENT, ETC.—continued.

Mine or Owner.	Mining Centre.	Amount.	Total.
		£ s. d.	£ s. d.
Brought forward .. .. .	..	618 10 11	9,472 0 1
<b>STATE BATTERIES—continued.</b>			
Thornton, A. .. .. .	Nannine .. .. .	3 18 0	
Thomas & Party .. .. .	Menzies .. .. .	6 1 3	
Warham, M. .. .. .	Nannine .. .. .	11 2 0	
Wales, J. .. .. .	Boogardie .. .. .	4 7 6	
Wood, R. R. .. .. .	Kalgoorlie .. .. .	3 12 0	647 11 8
<b>SUBSIDIES TO BATTERIES CRUSHING FOR THE PUBLIC.</b>			
	Tons.	Rate per ton. s. d.	
Atkins, F. .. .. .	573	5 0	Warrawoona .. .. .
de Bernales, C. .. .. .	443	various	Yundamindra .. .. .
Carswell & Party .. .. .	28	1 6	Kunanalling .. .. .
Cooper, W. H. .. .. .	157·43	5 0	Marble Bar .. .. .
Coulter, E. G. .. .. .	£11	2 6	Quinn's .. .. .
Dallison Bros. .. .. .	345	2 0	Kundip .. .. .
Davis, I. .. .. .	57½	1 6	Jourdie Hills .. .. .
Debetaz, A. .. .. .	272	2 0	Birrigrin .. .. .
Eastlake, F. .. .. .	620	2 0	Do. .. .. .
Friedman & Johnston .. .. .	1,253	1 6	Orabanda .. .. .
Do. .. .. .	4,960	1 0	Do. .. .. .
Greenbushes Co-op. Union .. .. .	6,020	0 4	Greenbushes .. .. .
Hailstom, E. .. .. .	120½	2 0	Menzies .. .. .
Harbour Lights G.M. Co. .. .. .	25	10 0	Leonora .. .. .
Henwood, S. C. .. .. .	344½	1 6	Bulong .. .. .
Jacoletti G.M. Co. .. .. .	3,824	1 6	Jacoletti .. .. .
Lang, S. C. .. .. .	439½	1 6	Webster's .. .. .
Malcolm Prospg. Co. .. .. .	549	1 6	Malcolm .. .. .
Paton & White .. .. .	606	1 0	Randall's .. .. .
Pauley & McCoy .. .. .	38	2 0	Edjudina .. .. .
Pender Bros. .. .. .	422½	2 0	Kundip .. .. .
Poole, H. .. .. .	1,158½	2 0	Lawlers .. .. .
Pendergast Bros. .. .. .	103½	2 0	Phillips River .. .. .
Red Hill Westralia G.M. Co. .. .. .	2,773	1 6	Higginsville .. .. .
Smith & Langford .. .. .	1,937½	2 0	Lawlers .. .. .
Spencer & Thompson .. .. .	2,049	2 0	Birrigrin .. .. .
Spicer, J. .. .. .	465	1 6	Tampa .. .. .
Taylor, E. F. .. .. .	313	1 6	Jourdie Hills .. .. .
Williams, J. M. D. .. .. .	559	1 6	Diorite King .. .. .
Total .. .. .	30,767·43	1 5½	2,207 8 2
<b>PROVIDING TRANSPORT FOR PROSPECTORS.</b>			
Purchase of Horses, Camels, etc., and Maintenance of Camels .. .. .	..	..	1,110 8 0
<b>SUBSIDIES ON DEVELOPMENT WORK.</b>			
Alexander, G. .. .. .	Mt. Ida .. .. .	1 10 3	
Bull Oak G.M. Co. .. .. .	Sandstone .. .. .	47 19 5	
Cowan, E. .. .. .	Niagara .. .. .	23 4 4	
Clark & Henry .. .. .	Meekatharra .. .. .	6 17 6	
Clark, J. J. .. .. .	Do. .. .. .	7 12 6	
Dept. of Mines for work on Gawler Mine .. .. .	Edjudina .. .. .	13 19 6	
Dawkins, H. S. .. .. .	Black Range .. .. .	41 15 1	
Duncan, W. .. .. .	Menzies .. .. .	5 8 0	
Firman, H. .. .. .	Do. .. .. .	8 3 1	
Graham & Marquand .. .. .	Norseman .. .. .	6 15 0	
Keenan, P. .. .. .	Menzies .. .. .	47 5 0	
Klenk, C. E. .. .. .	Black Range .. .. .	22 12 4	
Matthew, S. J. H. .. .. .	Coolgardie .. .. .	5 11 4	
Miller, T. H. .. .. .	Darlot .. .. .	22 13 11	
Nisbit, R. .. .. .	Coolgardie .. .. .	28 12 6	
Parker, A. E. .. .. .	Niagara .. .. .	9 5 0	
Rufin, P. .. .. .	Linden .. .. .	6 19 0	
Roberts, W. J. .. .. .	Pinjin .. .. .	73 14 6	
Richmond, G. M. Co. .. .. .	Coolgardie .. .. .	16 16 0	
Walker, E. F. .. .. .	Norseman .. .. .	16 4 0	
Ward & Connolly .. .. .	Pilbara .. .. .	26 11 5	
Walker, G. .. .. .	Mt. Ida .. .. .	4 9 3	
Turich Tony .. .. .	Norseman .. .. .	14 8 0	
GRAND TOTAL .. .. .	..	..	458 6 11
			£13,895 14 10

## REFUNDS DURING 1909.

Mine or Owner.	Mining Centre.	Amount.	Total.
A.—ADVANCES REFUNDED.			
Greenbushes Prospecting and Mining Company .. .. .	Greenbushes .. .. .	£ s. d. 7 0 0	£ s. d.
Lady Agnes G.M. .. .. .	Randell's .. .. .	75 12 6	
Lady Pratt G.M. .. .. .	Mulgarrie .. .. .	8 12 4	
Little Doris G.M. .. .. .	Erlistoun .. .. .	184 16 8	
Mulga Queen G.M. .. .. .	Duketon .. .. .	27 18 0	
Never Never G.M. .. .. .	Nevoria .. .. .	156 16 10	
Orabanda G.M. .. .. .	Orabanda .. .. .	7 1 0	
Roebourne Gold and Copper Mines .. .. .	Roebourne .. .. .	120 0 0	
Royal Mint G.M. .. .. .	Yalgoo .. .. .	84 10 0	
Spring Hill G.M. .. .. .	Parker's Range .. .. .	70 0 0	
Sunbeam G.M. .. .. .	Kanowna .. .. .	179 14 0	
			922 1 4
B.—RECOVERED FROM SALE OF SECURITIES.			
Hodder, E. .. .. .	Randell's .. .. .	73 13 0	
Mulga Queen G.M. .. .. .	Duketon .. .. .	10 0 0	
Trenton G.M. .. .. .	Day Dawn .. .. .	83 4 0	
			166 17 0
C.—MISCELLANEOUS REFUNDS.			
Cost of Diamond Drilling Gt. Fingall Mine .. .. .	Day Dawn .. .. .	63 10 0	
Cost of Diamonds used in drilling .. .. .	(Various) .. .. .	1,131 15 6	
Mt. Magnet Water Supply .. .. .	Mt. Magnet .. .. .	23 7 0	
Means of transport for prospectors .. .. .	(Various) .. .. .	122 4 10	
			1,340 17 4
Total .. .. .			£2,429 15 8

## ADVANCES WRITTEN OFF, TO 31st DECEMBER, 1909.

Year Authorised.	Name of Mine or Borrower.	Nature of Work.	Locality.	Amount of Loan and Interest written off.	Date written off.
1902	Manners & Gore .. .. .	Battery erection .. ..	Gabanintha .. ..	£ s. d. 285 0 4	29-5-05
1903	Cheyne, C. C. .. .. .	Sinking shaft .. .. .	Yandanooka .. ..	70 17 0	31-12-04
1903	Foran and party .. .. .	Opening deep alluvial lead	Kalgoorlie .. ..	150 0 0	14-2-06
1903	Hannan's Reward and Mt. Charlotte G.M. Co., Ltd.	Boring for reef .. ..	Kalgoorlie .. ..	383 11 9	31-12-04
1903	Irwin River Coal and Prospecting Syndicate	Boring for coal .. ..	Irwin River .. ..	925 6 0	23-3-05
1903	Jameson, C. A. .. .. .	Opening deep alluvial lead	Smithfield .. ..	50 0 0	30-6-04
1903	South Fingall G.M. Co., Ltd.	Boring .. .. .	Day Dawn .. ..	1,030 18 0	18-1-04
1903	Waite and party .. .. .	Opening deep alluvial lead	Trafalgar .. ..	100 0 0	18-4-05
1904	Admiral G.M.L. .. .. .	Boring for reef .. ..	Peak Hill .. ..	719 1 1	30-3-06
1904	Blake, McKinnon, & Muir ..	Working deep lead .. ..	Kanowna .. ..	50 0 0	23-9-04
1904	Bell, Wm. .. .. .	Battery water supply ..	Mosquito Creek ..	520 12 6	31-12-05
1904	Marshall, Geo. .. .. .	Erection of puddler ..	Coolgardie .. ..	152 17 2	15-2-06
1904	Ninety-eight G.M.L. .. ..	Sinking shaft .. .. .	Bulong .. ..	262 2 11	13-3-07
1904	President Loubet .. .. .	Do. .. .. .	Callion .. ..	255 18 3	12-6-07
1904	Stuart, Rollo, & McIvor ..	Boring for lead .. ..	Kanowna .. ..	262 11 6	22-5-07
1904	Tierney and party .. .. .	Sluicing alluvial .. ..	Coolgardie .. ..	150 0 0	22-10-04
1904	Westralia Mining and Oil Corpn., Ltd.	Boring for oil .. .. .	Warren R. .. ..	618 14 7	20-3-06
1904	White Flag Consols .. .. .	Sinking shaft .. .. .	Wilson's Patch ..	48 10 5	3-10-06
1905	Battler's Hope .. .. .	Do. .. .. .	Greenbushes .. ..	118 18 4	6-6-07
1905	Brooklyn G.M.L. .. .. .	Sinking shaft and purchase of machinery	Lennonville .. ..	91 1 11	18-6-09
1905	Chadwick's Reward .. .. .	Sinking shaft .. .. .	Koolyanobbing ..	110 3 5	30-6-08
1905	Gt. Northern G.M. Co. .. ..	Do. .. .. .	Kalgoorlie .. ..	203 5 0	8-4-08
1905	Iron King G.M.L. .. .. .	Water supply .. .. .	Bullabulling .. ..	25 0 0	29-6-05
1905	Haddon, G.M. .. .. .	Do. .. .. .	Southern Cross ..	71 8 4	22-11-06
1905	Little Doris G.M.L. .. .. .	Battery erection .. ..	Erlistoun .. ..	356 3 0	25-9-08
1905	Monkland G.M.L. .. .. .	Sinking shaft .. .. .	Gindalbie .. ..	576 7 6	28-4-09
1905	Mt. Ida Battery Lease .. ..	Do. .. .. .	Mt. Ida .. ..	313 6 2	29-5-07
1905	Pakeha G.M.L. .. .. .	Do. .. .. .	Paddington .. ..	149 15 5	24-4-08
1906	Coolgardie Opal G.M.L. .. ..	Do. .. .. .	Coolgardie .. ..	102 4 6	10-10-07
1906	Hague & Arthur .. .. .	Battery erection .. ..	Menzies .. ..	158 19 7	3-9-08
1906	Kalgurli G.M. Syndicate .. ..	Mining Development ..	Paddington .. ..	239 19 11	23-4-08
1906	Menzies Prospg. and Development Co.	Sinking shaft .. .. .	Menzies .. ..	594 0 11	3-3-09
1906	Nicholson, Mahoney, & O'Donohue	Battery erection .. ..	Gum Creek .. ..	351 14 2	5-2-08
1906	W.A. Sluicing Syndicate .. ..	Water supply .. .. .	Coolgardie .. ..	309 1 3	21-2-07
1907	Coady, J. H. .. .. .	Making briquettes .. ..	Collie Coal .. ..	82 3 2	29-4-08
1907	Corrin, J. .. .. .	Sinking shaft .. .. .	Nullagine .. ..	195 3 1	26-8-08
1907	Cross, F. .. .. .	Do. .. .. .	Yarri .. ..	50 0 0	28-4-07
1907	Dellavedora and party .. ..	Do. .. .. .	Parker's Range ..	106 13 10	27-11-08
1907	Elias, T. .. .. .	Driving tunnel .. .. .	Greenbushes .. ..	245 17 11	24-6-08
1907	Just-in-Time G.M. Co. .. ..	Battery erection .. ..	Mt. Morgans .. ..	1,011 19 9	3-12-08
1907	Providence Copper G.M. Co. ..	Sinking .. .. .	Goongarrie .. ..	22 5 7	14-5-08
1907	Robinson and party .. .. .	Battery erection .. ..	Mt. Ida .. ..	136 14 9	24-6-08
1907	Reid, G. .. .. .	Sinking .. .. .	Peak Hill .. ..	25 11 3	22-6-08
1907	Tierney, Aldridge, and party ..	Crosscutting .. .. .	Coolgardie .. ..	162 6 3	18-2-09
1907	Whale G.M. .. .. .	Mining development ..	Niagara .. ..	129 18 3	29-12-08
		Total .. .. .		£11,976 5 7	

MINING DEVELOPMENT EXPENDITURE.

Advances Outstanding at 31st December, 1909.

No. of File.	Name of Lease, Mine, or Borrower.	No. of Lease.	District.	Amount Authorised.	Principal previous to 1909.	Moneys advanced during 1909.	Principal Moneys.		Interest.		Total Principal and Interest outstanding 31st Dec., 1909.
							Repaid.	Balance Outstanding.	Paid.	Outstanding.	
				£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	
A.—PIONEER MINING AND PROSPECTING.											
4809-07	Alicia .. .. .	G.M.L. 254F	Mt. Morgans .. ..	245 0 0	195 0 0	..	..	195 0 0	4 2 6	25 15 0	220 15 0
4434-08	Britannia .. .. .	G.M.L. 953M	Magnet .. .. .	150 0 0	..	85 0 8	..	85 0 8	..	1 12 3	86 12 11
2866-07	Carbine Sth. .. .	G.M.L. 758s	Kunanalling .. ..	500 0 0	401 10 0	..	..	401 10 0	26 11 9	10 4 0	411 14 0
4860-07	Coolgardie P.D. and M. Synd. ..	G.M.Ls. 4093, 4117	Coolgardie .. ..	1,500 0 0	900 15 5	..	..	900 15 5	19 19 10	67 16 9	968 12 2
2162-09	Coolgardie Redemption .. .. .	G.M.Ls. 3918, 4052	Do. .. .. .	1,000 0 0	750 0 0	253 3 6	..	1,003 3 6	..	52 14 10	1,055 18 4
4006-09	Dreadnought South .. .. .	G.M.L. 5334z	Menzies .. .. .	300 0 0	208 14 11	38 4 11	..	246 19 10	7 9 1	5 19 11	252 19 9
4718-07	Eclipse .. .. .	G.M.L. 1047x	Gindalbie .. .. .	450 0 0	450 0 0	..	..	450 0 0	39 15 2	11 9 0	461 9 0
3166-09	Emily .. .. .	G.M.L. 1510	Day Dawn .. .. .	400 0 0	370 7 3	1 14 6	..	372 1 9	..	44 7 10	416 9 7
4599-08	Gawler .. .. .	G.M.Ls. 418R, 497R	Edjudina .. .. .	750 0 0	..	750 0 0	..	750 0 0	33 5 6	9 10 4	759 10 4
1637-09	Griffiths .. .. .	G.M.L. 1902	Coolgardie .. .. .	200 0 0	..	156 14 4	..	156 14 4	..	..	156 14 4
2998-06	Jourdie Enterprise .. .. .	G.M.Ls. 786s, 773s	Jourdie Hills .. ..	1,000 0 0	500 0 0	500 0 0	..	1,000 0 0	34 17 9	12 14 1	1,012 14 1
4549-08	Hannan's Reward .. .. .	G.M.L. 160	Kalgoorlie .. .. .	250 0 0	..	250 0 0	..	250 0 0	..	..	250 0 0
2892-08	Jupiter .. .. .	G.M.L. 771	Magnet .. .. .	400 0 0	400 0 0	..	..	400 0 0	5 0 0	22 1 8	422 1 8
1806-04	Harbor Lights .. .. .	G.M.L. 1056c	Leonora .. .. .	612 1 6	..	612 1 6	..	612 1 6	..	..	612 1 6
3101-09	Kalgoorlie North End Dev. Co. ..	G.M.L. 3880E	Kalgoorlie .. .. .	1,500 0 0	..	492 0 0	..	492 0 0	..	8 5 6	500 5 6
2756-08	Kanowna Low Grade .. .. .	G.M.L. 1194x	Kanowna .. .. .	750 0 0	678 18 3	..	594 16 3	84 2 0	..	9 15 3	93 17 3
4434-09	Klondyke Boulder .. .. .	G.M.L. 604	Warrawoona .. ..	500 0 0	..	250 0 0	..	250 0 0	..	0 18 9	250 18 9
363-06	Lady Florence .. .. .	G.M.L. 1265	Cue .. .. .	1,000 0 0	1,000 0 0	..	..	1,000 0 0	..	236 9 0	1,236 9 0
4276-06	Lubra .. .. .	G.M.L. 669	Niagara .. .. .	154 6 6	150 0 0	2 15 0	..	152 15 0	..	12 0 10	164 15 10
4000-05	Mindeloo .. .. .	G.M.L. 1518	Mindoolah .. .. .	300 0 0	97 10 0	71 10 0	..	169 0 0	..	8 1 1	177 1 1
3461-08	North End Mines .. .. .	G.M.L. 4037	Kalgoorlie .. .. .	1,000 0 0	436 10 0	..	..	436 10 0	..	46 6 11	482 16 11
4598-06	Oversight .. .. .	G.M.L. 957Y	Bulong .. .. .	850 0 0	822 0 0	..	..	822 0 0	91 13 9	63 15 9	885 15 9
4258-07	Rollo's Reward .. .. .	G.M.L. 1214x	Kanowna .. .. .	300 0 0	285 9 2	..	..	285 9 2	3 7 5	29 7 1	314 16 3
697-09	Sunbeam .. .. .	G.M.L. 1121x	do. .. .. .	1,000 0 0	982 10 0	36 12 6	179 14 0	839 8 6	112 8 11	28 12 11	868 1 5
1722-09	Transvaal .. .. .	G.M.L. 536	S. Cross .. .. .	325 0 0	325 0 0	..	..	325 0 0	..	42 17 1	367 17 1
3415-08	Trenton .. .. .	G.M.Ls. 388D, 399, and 400	Day Dawn .. .. .	1,000 0 0	1,000 0 0	..	483 4 0	516 16 0	6 5 6	104 8 6	621 4 6
524-05	W.E.G. .. .. .	G.M.L. 505G	Niagara .. .. .	500 0 0	296 16 1	..	..	296 16 1	..	89 10 4	386 6 5
3045-05	Westralia Tasmania .. .. .	G.M.Ls. 1665r, 1745r	Erlistoun .. .. .	300 0 0	299 4 9	..	..	299 4 9	31 3 7	7 13 3	306 18 0
608-09	Baird & Ors .. .. .	G.M.L. 45w	Bulong .. .. .	40 0 0	..	40 0 0	..	40 0 0	..	..	40 0 0
2390-00	Green & Wheatley .. .. .	P.A. .. .	Do. .. .. .	50 0 0	..	23 14 0	..	23 14 0	..	..	23 14 0
850-08	Kanowna Prospg. Co. .. .. .	G.M.L. 323x	Kanowna .. .. .	750 0 0	166 6 3	485 13 0	..	651 19 3	..	..	651 19 3
4457-08	McLellan & Smyth .. .. .	G.M.L. 221w	Waverley .. .. .	50 0 0	..	26 12 6	..	26 12 6	..	0 8 10	27 1 4
3072-07	Chamberlain .. .. .	M.L. 149	Wodgina .. .. .	100 0 0	72 2 7	..	..	72 2 7	..	5 6 4	77 8 11
1095-08	Greenbushes P. & M. Co. .. .. .	M.L. 300	Greenbushes .. ..	1,200 0 0	1,060 3 4	3 5 0	7 0 0	1,056 8 4	6 0 0	81 6 8	1,137 15 0
2825-07	Kingdom Come .. .. .	M.L. 112	Northampton .. ..	200 0 0	200 0 0	..	..	200 0 0	..	15 11 0	215 11 0
2663-05	Lost and Found .. .. .	M.L. 374	Greenbushes .. ..	150 0 0	64 10 0	..	..	64 10 0	6 9 8	4 19 11	69 9 11
3535-07	Mt. Chester .. .. .	M.L. 250	Ravensthorpe .. ..	250 0 0	185 8 10	..	..	185 8 10	6 12 1	19 6 10	204 15 8
1807-09	Wheal May .. .. .	M.L. Loc. 6	Northampton .. ..	300 0 0	229 9 0	70 11 0	5 15 9	294 4 3	..	20 5 5	314 9 8

B.—ASSISTANCE IN ERECTING BATTERIES AND TREATMENT PLANTS TO BE USED FOR CRUSHING FOR THE PUBLIC.											
1706-09	Callion .. .. .	G.M.L. 860u	Callion .. ..	1,000 0 0	..	1,000 0 0	..	1,000 0 0	..	40 0 4	1,040 0 4
3325-09	Crown .. .. .	G.M.L. 1398w	Black Flag .. ..	150 0 0	..	150 0 0	..	150 0 0	..	0 4 11	150 4 11
851-09	Hidden Secret Nth. .. ..	G.M.L. 4253	Eundynie .. ..	1,000 0 0	740 18 2	259 1 10	..	1,000 0 0	26 8 4	75 16 0	1,075 16 0
2289-08	Lady Pratt .. .. .	G.M.L. 1228x	Mulgarrie .. ..	250 0 0	..	170 4 10	8 12 4	161 12 6	1 8 8	0 4 11	161 17 5
3785-08	Lady Agnes .. .. .	G.M.L. 910y	Randell's .. ..	480 0 0	434 0 9	50 19 9	75 12 6	409 8 0	..	27 7 5	436 15 5
4567-07	Malcolm Prospg. Co. .. ..	G.M.L. 1175c	Malcolm .. ..	1,550 0 0	1,550 0 0	..	..	1,550 0 0	97 11 1	148 8 8	1,698 8 8
2344-08	Mulga Queen .. .. .	G.M.L. 1517t	Duketon .. ..	550 0 0	445 19 8	45 10 10	..	453 12 6	27 18 0	33 14 9	487 7 3
146-10	Never Never .. .. .	G.M.L. 665	Yilgarn .. ..	1,000 0 0	1,000 0 0	..	156 16 10	843 3 2	89 6 4	65 14 5	908 17 7
705-09	Ora Banda .. .. .	G.M.L. 1288w	Waverley .. ..	348 0 0	..	244 10 1	..	244 10 1	..	..	244 10 1
1574-08	Randwick .. .. .	G.M.L. 978c	Malcolm .. ..	560 0 0	552 9 5	2 12 0	..	555 1 5	..	45 3 5	600 4 10
1799-09	Roebourne C. & G. Mines .. ..	G.M.L. 135	Roebourne .. ..	1,000 0 0	1,000 0 0	27 5 9	120 0 0	907 5 9	14 8 8	41 13 6	948 19 3
3304-08	Spring Hill .. .. .	G.M.L. 724	Parker's Range .. ..	855 0 0	854 16 5	..	88 2 0	766 14 5	99 7 11	19 19 6	786 13 11
3683-09	Mystery .. .. .	P.A. 157	Yalgoo .. ..	350 0 0	339 7 9	8 6 8	89 10 0	258 4 5	..	29 5 2	287 9 7
1343-07	Hodder, Ed. .. .. .	M.A. 64	Randell's .. ..	253 3 2	251 3 2	2 0 0	148 13 0	104 10 2	6 18 4	35 11 3	140 1 5
3921-97	Water Supply to Public Crushing Plants .. ..	..	Ballagundi .. ..	170 0 0	..	152 10 0	..	152 10 0	..	..	152 10 0
C.—MISCELLANEOUS ADVANCES.											
1453-08	Collie Coal Briquettes, Shekelton .. ..	..	.. .. .	105 9 4	17 19 10	87 9 6	..	105 9 4	..	..	105 9 4
63-05	Mt. Magnet Municipal Council Water Supply .. ..	..	.. .. .	460 17 10	460 17 10	..	113 7 0	347 10 10	..	..	347 10 10
D.—BORING.											
130-09	Sandstone North .. .. .	G.M.L. 561B 566B	Sandstone .. ..	100 0 0	..	58 0 0	..	58 0 0	..	..	58 0 0
6701-03	Mt. Cassiterite .. .. .	M.L. 84	Wodgina .. ..	151 3 1	..	151 3 1	..	151 3 1	..	..	151 3 1
2425-08	Leonora D. D. and Prospg. Co. .. ..	..	Leonora .. ..	1,125 0 0	..	420 5 11	..	420 5 11	..	..	420 5 11
1697-09	Mt. Morgans Diamond Drilling and Exploration Syndicate .. ..	..	Mt. Morgans .. ..	1,605 19 8	680 6 10	925 12 10	..	1,605 19 8	..	..	1,605 19 8
3650-07	Boring at Collie .. .. .	..	Collie .. ..	250 0 0	..	163 17 8	..	163 17 8	..	..	163 17 8
Total .. ..				£33,641 1 1	20,856 5 8	8,069 3 2	2,109 1 8	26,816 7 2	798 9 10	1,662 17 2	28,479 4 4

## APPENDIX No. II.

PAPERS SET AT THE EXAMINATION OF CANDIDATES FOR APPOINTMENT OF INSPECTOR OF MINES, 1909.

## MINING—FIRST PAPER.

Tuesday, May 25th, 1909, 10 a.m. to 1 p.m.

Maximum Marks, 300.

N.B.—The Candidates are not to answer more than eight questions.

(1.) Show by sketches, with dimensions, the method you would adopt of timbering with framed sets and close lining of sawn laths, a three-compartment vertical shaft, 12 feet by 4 feet in the clear, to be used for fast hauling with skips, and having two winding compartments, and one used for a ladder-way; also make a specification describing all materials to be used and how they are to be put in.

(2.) What method would you adopt for removing ore from the stopes on a lode which dips at an angle of 30deg. from the horizontal?

(3.) Describe, with sketches, an ore-bin and loading shoot for use with skips in a vertical shaft.

(4.) Describe three commonly used systems of overhand stoping, comparing their suitability for various classes of work.

(5.) Show, by diagrams and description, how you would place and fire the shots in the face of a cross-cut in hard ground.

(6.) Explain the method you would use of placing a new winding rope on the drum.

(7.) Describe the method you would adopt for working out a hard ore-body exceeding 50 feet in width, dipping vertically.

(8.) A pumping engine goes 14 strokes per minute for 13 hours a day, working two 18-inch sets with a 49-inch stroke, and so raises the water accumulated for 24 hours; what is the influx of water into the mine per minute?

(9.) Describe how you would construct an underground dam to resist a pressure of 200 feet of water.

(10.) Describe how you would timber and work a box rise.

## MINING—SECOND PAPER.

Tuesday, May 25th 1909, 2 p.m. to 5 p.m.

Maximum Marks, 300.

N.B.—The Candidates are not to answer more than eight questions.

(1.) Show, by sketches and written explanation, how you would timber a main inclined shaft of three compartments on a dip of 60deg.

(2.) Describe how you would timber a drive in which the sides are swelling ground.

(3.) A winding rope, 3 $\frac{3}{8}$ in. circumference and weighing 10 $\frac{3}{4}$ lbs. per fathom, has a breaking strain of 56 tons. What would be the greatest depth to which it would be permissible to work with this rope, the poppet-heads being 70 feet high, and the cage

and load together weighing 5 tons, the factor of safety being taken at 8 to 1? Give breaking strain of the coupling chains to be employed.

(4.) What is the composition of Blasting Gelatine and Gelignite? What are the products of complete explosion of each, and what noxious gases result from incomplete explosion?

(5.) What precautions would you take in a rise approaching an old timbered winze containing water which had been standing for a long time?

(6.) Explain with diagrams how air-doors and stoppings may be used to improve the natural ventilation in a deep metalliferous mine.

(7.) How would you determine the amount of CO<sub>2</sub> in the air of a mine? What gases are usually found in metalliferous mines and how are they generated?

(8.) Describe a good form of safety-catch for cages in vertical shafts. What are the objections to safety-catches in shafts where rapid winding is practised?

(9.) Describe an appliance which may be fixed below the poppet-heads to prevent a cage from falling down the shaft in the event of the detaching hooks being broken.

(10.) Describe, with sketches, a good construction of pent house for use in deep shafts during sinking.

## METALLURGY—ORE-DRESSING AND SAMPLING.

Wednesday, 26th May, 1909, 10 a.m. to 12 noon.

Maximum Marks, 200.

N.B.—The Candidates are not to answer more than six questions.

(1.) Describe a vacuum filtration process of treating auriferous tailings slimes by cyanidation.

(2.) Describe a process of obtaining bullion bars from slimes precipitated in zinc-boxes in cyanide treatment.

(3.) Describe generally the machines and processes through which ore containing tin oxide must be passed in order to obtain a marketable product.

(4.) How would you proceed to sample a heap of bagged copper ore containing 20 tons?

(5.) Describe how you would proceed in measuring and sampling in order to estimate the value of a block of ore *in situ* in a mine, comprised between two levels and two winzes, and with all sides fully accessible.

(6.) Describe with particulars of capacity and working costs a good type of roasting furnace for auriferous pyritic ores.

(7.) Describe a tube-mill, and explain for what purposes it is used in treatment of auriferous ores.

(8.) Describe the construction and use of spitz kasten.

## ARITHMETIC.

Wednesday, 26th May, 1909, 12 noon to 1 p.m.

Maximum Marks, 100.

N.B.—The whole Paper to be answered.

(1.) Calculate the number of tons of ore in a block 120 feet long between two levels 50 feet apart on a quartz lode averaging 5 feet in width.

(2.) Simplify  $\frac{1}{3} \times \frac{3}{5} \div \frac{\frac{4}{5} \times \frac{3}{4}}{\frac{4}{5} \times \frac{5}{8} \div \frac{5}{8} \times \frac{6}{7}}$

(3.) Multiply together 3.7, .006, and 13.4.

(4.) What is the value of a bar of bullion weighing 320ozs. 6dwts., and worth £3 17s. 6d. an ounce?

(5.) Find the diameter and circumference of a circle whose area is 240,528 square feet.

(6.) How many superficial feet of timber are there in a squared log, 48 feet long, 18in. x 18in. at one end and 12in. x 12in. at the other end?

(7.) A person buys 50 shares in a Company of 100,000 shares for £125. A dividend is then declared, amounting to a total sum of £7,500, in which he participates. Three months after his purchase the person sells the shares for 57s. 6d. a share. What is his total profit, and what rate per cent. per annum does it represent on his original investment?

(8.) Forty tons of copper ore are sold to a smelter on an agreed assay of 18 per cent. copper, 12dwts. per ton of gold, and 6ozs. per ton of silver, with deductions of 5 per cent. from the gross weight of ore for moisture, 1.3 per cent. from the assay in copper for smelting loss, and 1/10th of the values of gold and silver. Copper is paid for at 3s. 6d. per unit, gold at £4 per oz., and silver at 2s. 3d. per oz. What is the net value of the parcel?

## MINING GEOLOGY.

Wednesday, 26th May, 1909, 2 p.m. to 4 p.m.

Maximum Marks, 200.

N.B.—The Candidates are not to answer more than six questions.

(1.) Name and give the composition of four of the principal ores of—(a.) Lead; (b.) Copper; (c.) Silver, stating whether each is found commonly near surface or in depth, and explaining why some are mostly confined to the vicinity of the surface.

(2.) If on driving in a northerly direction along a lode which dipped at 60deg. to the east you met a normal fault which dipped 45deg. in a north-north-westerly direction, show by a diagram in which direction you would proceed to recover the faulted lode.

(3.) Explain what is meant by "Secondary Enrichment" of ore deposits, giving examples.

(4.) Explain how alluvial gold deposits are found.

(5.) What is a shoot of ore? Give your views as to the causes of the occurrence of shoots of ore.

(6.) Describe the blowpipe and other tests by which you would distinguish galena from stibnite, copper glance from silver glance, wolfram from magnetite, quartz from diamonds, and blende from telluride of gold.

(7.) Name and describe the five rock samples set before you.

(8.) What is a "banket" reef? Do you know of any auriferous deposit of this type in Western Australia?

## BOOK-KEEPING AND MINE ACCOUNTS.

Wednesday, 26th May, 1909, 4 p.m. to 5 p.m.

Maximum Marks, 100.

N.B.—The whole Paper to be answered.

(1.) What system would you adopt to ensure correct time-keeping for the men employed on a mine with over 100 employees so as to prepare fortnightly pay-sheets, and to be able to charge exact labour costs against the various portions of the work.

(2.) What system would you recommend in the same mine for receipt and issue of mine stores? Show pro forma example of a summarised monthly statement of stores received, issued, and in stock, showing transactions in gelignite, mine rails, candles, drill-steel, and shovels.

(3.) Show an example of a first monthly progress statement of account with a party of contractors for driving a level, who purchase explosive, candles, and steel, from the mine stores, but have not yet completed their contract, 25 per cent. of the moneys due being held over until the termination of the contract.

(4.) Exemplify the method you would employ in recording assay results in an assay ledger.

## MINE SURVEYING.

Thursday, 27th May, 1909, 10 a.m. to 12 noon.

Maximum Marks, 200.

N.B.—The whole Paper to be answered.

(1.) Explain the method of making magnetic surveys with free needle in the presence of much iron. Give an example, showing actual bearing taken over five consecutive lines of a traverse, it being known that there is no local attraction at the third station, and corrected bearings.

(2.) Describe how true bearings may be carried from surface underground through a deep vertical shaft by means of plumb-lines.

(3.) A connection is carried from one level down to another through a winze and stopes by four lines as follow:—

1st line—true bearing 178deg. 30min., distance

32ft. 6in.—angle of declivity 60deg. 20min.

2nd line—true bearing 123deg. 27min., distance

65ft. 3in.—angle of declivity 41deg. 27min.

3rd line—true bearings 115deg. 16min., distance

42ft. 7in.—angle of declivity 15deg. 18min.

4th line—true bearing 170deg. 10min., distance

15ft. 9in.—angle of declivity 57deg. 16min.

Calculate the bearing of the line from one terminal point of the connection to the other, also the horizontal and vertical distances between these points.

(4.) Calculate the following traverse on meridian and perpendicular and lay it down to scale of one chain to one inch on squared paper:—

N. 82deg. E., 68 links; S. 51deg. E., 95 links; N.

63deg. E., 78 links; N. 20deg. E., 97 links;

N. 35deg. W., 87 links; N. 87deg. W., 140

links; S. 52deg. W., 140 links; S. 48deg. E.,

85 links.

(5.) Describe the method you would adopt in measuring accurately the depth of a deep shaft.

(6.) Describe the method of adjusting the collimation of a dumpy level.



## MINING ACTS AND REGULATIONS.

Thursday, 27th May, 1910, 12 noon to 1 p.m.

Maximum Marks, 100.

N.B.—The whole Paper to be answered.

(1.) What are the requirements of the Mines Regulation Act 1906, regarding keeping of mine plans?

(2.) What do the Regulations require in respect of change-houses?

(3.) What is the duty of all mine employees in regard to satisfying themselves of the safety of appliances and working places?

(4.) What do the General Rules prescribe as to testing safety cages?

(5.) What are the duties and responsibility of a mine manager under the Mines Regulation Act, 1906?

(6.) What are the provisions of "The Mining Act, 1904," as to area of land tenable as a gold mining lease and the term of a gold mining lease?

## SURFACE WORK.

Thursday, 27th May 1909, 2 p.m. to 4 p.m.

Maximum Marks, 200.

N.B.—Candidates are not to answer more than six questions.

(1.) A tramway embankment begins at 12 chains 40 links and ends at 16 chains 60 links. The intermediate depths are—

At 13.00ch.	..	..	3.27 feet
„ 13.30ch.	..	..	5.30 „

At 14.00ch.	..	..	2.28 feet
„ 14.50ch.	..	..	0.21 „
„ 15.00ch.	..	..	3.07 „
„ 16.00ch.	..	..	2.39 „

The cross-section of the natural surface is horizontal throughout. What number of cubic yards of earth will be required for the embankment, the top being 12 feet wide and the slopes  $1\frac{1}{2}$  to 1.

(2.) Calculate the weight of water to fill a circular vat 22 feet in diameter to a depth of 4ft. 6in., taking 1 cubic foot of water as weighing  $62\frac{1}{4}$  lbs.

(3.) Describe a good type of—(a.) friction clutch; (b.) steam brake; and (c.) reversing gear for winding engines. What are your views on the best method of applying steam brakes?

(4.) Explain the method of examining—(a.) Cornish; (b.) water-tube boilers. What are defects usually found in them?

(5.) What precautions are necessary to prevent explosions in air receivers?

(6.) What voltage is dangerous with electric cables carrying—(a.) alternating; and (b.) direct current; and what precautions are necessary when working with or near live cables?

(7.) How would you set about erecting a steel-plate boiler stack, 90 feet high, the total weight of which is nine tons?

(8.) Show by dimensional sketches how you would construct an ore-bin to hold 100 tons of ore, the top of the bin being limited to 20 feet above the surface of the ground, and it being necessary that the bin discharge should not be less than five feet above the surface.

## APPENDIX No. III.

## REPORT BY INSPECTOR CLELAND ON THE GREENBUSHES TINFIELD.

## Methods of Dredging for Alluvial Tin.

In accordance with your instructions, I beg to submit the following report upon the work of alluvial tin dredging at Greenbushes, the class of machinery in use, and the cost of working.

*Occurrence of Tin.*—The alluvial workings are the chief source of tin production, and the most considerable of these are situated a mile or two north of the township of Greenbushes.

The ground in which the tin occurs varies very considerably in character within comparatively narrow limits of distance.

Over large areas the surface consists of ironstone conglomerate, ranging in thickness from 10 to 15 feet. Beneath this is a stratum of puggy, clayey material, succeeded by one of grit and sand, and below all comes the bed-rock.

In places where there is no conglomerate capping, the surface is pure sand, and the lower stratas are as above described.

In all, from the conglomerate downwards, black tin occurs in greater or less quantity, and in the bed-rock may be seen small veins of ore.

From surface of solid rock the depths vary from two to over thirty feet.

As a rule the richest ground is found in the bottoms of the gullies, but payable deposits also occur along the slopes and sometimes on the summits of the hills.

The principal workings are carried on by the Greenbushes Development Company, and by Mr. F. A. Moss, in Spring Gully and Mount Jones.

*Water Supply.*—The average annual rainfall recorded for the district is about 37 inches. But as the field is situated at about the highest point of the surrounding country, and is drained by innumerable gullies and watercourses, no natural conservation of water has taken place.

The ironstone conglomerate forms an impervious surface, but where this is broken the water rapidly drains away through the loose underlying strata into the adjacent rivers and streams.

No artificial conservation has been attempted, and the only permanent supply is the Blackwood River, some seven miles distant from the centre of operations. A pipe line has been laid from the river to the field, and the water pumped up; but this involves considerable expense.

Under these conditions the water used in sluicing is not allowed to run to waste. It is held in dams and, after its slime has settled, is led back for further use.

The period of greatest activity on the field is during the winter months, when the rainfall is equal to all requirements.

*Fuel*, consisting of wood, is abundant.

*Machinery in use*.—This comprises floating and portable suction dredges, stamp batteries, ball and Huntington mills, and steam puddlers.

The various crushing and puddling plants are used for treating those portions of the ground, such as ironstone conglomerate, clay, and pug, which are not amenable to sluicing. These plants in no way differ from similar machines used in gold mining.

The bulk of the tin is gained from sluicing the ground, and the machinery in use ranges from the hand sluice worked by individual claim holders, up to the large suction dredges, operated by steam power.

Suction dredges may be divided into two classes—floating and portable. In the former the whole of the machinery is contained in a barge which is floated up to the face to be worked, while the other being portable, is capable of being moved from place to place by horses, on flats, on slopes, and the tops of hills, that would be inaccessible to the floating barge.

The term "suction dredge" is used to distinguish it from dredges in which the ground is broken down and elevated by means of buckets.

In a floating dredge the barge is framed with heavy oregon or jarrah timbers; sometimes with steel girders; and on these the boiler, engine, pumps, etc., are firmly bolted down.

In length the barges vary from 30 to 35 feet, and from 35 to 40 feet in width. A depth of  $3\frac{1}{2}$  to 4 feet of water is required to float them.

Above the machinery on the lower deck, an upper deck is constructed to carry the grizzly and the sluice boxes. The sides and ends between the decks are housed in to protect the plant from the weather. The upper deck is not covered. A railing surrounds it in order to prevent accidents from men falling over the side.

The engines are of the cross compound coupled special dredge type, with high pressure cylinders of from 10 to  $10\frac{1}{2}$  inches diameter, and low pressure cylinders of 20 inches diameter, and a stroke of 24 inches.

Boilers are of the dry-back marine type, 18 to 19 feet in length and 7 to  $7\frac{1}{2}$  feet diameter. The working pressure ranges from 135 to 140 lbs per square inch.

The pumps used for the nozzle and elevating the gravel are Kershaw's patent centrifugal, the former being 12 and the latter 10 inch. The suction and delivery pipes of the gravel pumps are 10 and 11 inches diameter respectively, the suction being the smaller so that there may be no danger of a stone blocking the delivery. Speed is supplied by rope gear, and the number of revolutions ranges from 110 to 400 per minute. The engine pulley is 96 inches, and the pump pulley 30 inches.

The horse power required to lift the gravel from the well to the sluice boxes—heights varying from 20 to 50 feet—is from 90 to 150.

Water is conveyed to the giant nozzle through 12 inch diameter spiral rivetted steel pipe. Nozzles

vary in size from 2 to 4 inches diameter, according to the character of the ground being sluiced. A balance rod and weight is used to assist in the movement of the joint, and to hold the nozzle at the desired angle.

The sluice boxes on the upper deck of the barge are constructed of timber lined with sheet steel about  $\frac{3}{16}$  inch thick, and are furnished with riffles to catch the tin. The length of the boxes ranges from 75 to 80 feet, with a depth of 2 feet, and a width of 8 feet. From the end of the boxes launders are carried out on trestles to convey the sand to the tailings dump.

*Method of Working*.—On commencing dredging operations, an excavation or paddock is taken out down to bed-rock, or to such lesser depth as that at which payable tin has been proved to occur. On this bottom the barge is built, and the machinery installed thereon. When ready to sluice, water that has been stored in a dam is pumped through the nozzle under a pressure of from 25 to 40 lbs., and the stream directed against the face of the excavation. This, together with the sides, is broken down and is carried by the stream to the well hole beside the barge. From here it is lifted by the gravel pump to the upper deck of the barge, and is discharged over a grizzly.

The finer sand and tin ore pass through the bars of the grizzly into the sluice boxes, and the large stones, hard lumps of clay and pug discharge into the excavation over the side of the upper deck. The heap thus formed is carefully looked over to see that no material carrying black tin has been thrown out. Lumps of conglomerate or clay found to contain ore are thrown to one side for treatment in a crushing or a puddling plant.

The sand falling into the sluice boxes is carried onward by the stream from the pump, and is kept agitated and shovelled back by a man known as a "streamer." The agitation of the sand permits the particles of tin ore to gravitate to the bottom of the box, where they are caught and held by means of the riffles, while the lighter sand is swept away by the water. A considerable amount of skill and practice are required on the part of the streamer in order to obtain clean results and small loss in the tailings.

At such time as may be determined by the manager, the nozzle and gravel pumps are stopped, and the process of cleaning up the sluice boxes is undertaken. With the aid of a gentle flow of water through the boxes much of the sand is washed out until the layer of concentrates is exposed. This is then shovelled into a smaller sluice box, where it undergoes further washing, and the coarser tin ore removed. The very finest is taken to the store and finally cleaned fit for market by means of a Wiloughby concentrator. On the completion of the clean up, work in the face is resumed, and fresh ground broken down and sluiced. The time taken to clean up is about three hours.

Until such time as it becomes necessary to move the barge forward, the tailings are held in a dam on the surface at the rear of the barge. The ground that has been thrown out in the process of making the first excavation falls in as the face and sides are caved, and goes to the sluice boxes with the rest.

When it becomes necessary to advance the dredge, water from the dam is let in until there is sufficient to float the barge; it is then drawn forward by means of winches to the spot selected for it, the water is

pumped out, and the barge settles firmly down on the bottom, and sluicing proceeds as before. The tailings can now be deposited in the excavation at the rear of the barge. To prevent them slipping forward on to, and around, the plant, a bank is formed by means of boughs, branches, and scrub against which the sand settles firmly. The height is increased as work proceeds until it comes up to the level governed by the height of the sluice boxes.

The time occupied in floating a barge into a new position and re-arranging the sluice boxes, launders, etc., varies from 80 to 100 hours. The delay is caused, to a great extent, by the want of water to fill the excavation to a depth necessary to float the barge. And where the supply has to be obtained from a distance by pumping, the filling cannot be quickly accomplished, while the quantity required is determined by the extent of area to be filled. In places where the ground is wide, the barge does not require to be moved as often as when in a narrow gully.

The distance between the barge and the face varies under different conditions. Where the bed has a fairly steep incline, and the material being broken down is "lively" and easily moved, the stream of water from the nozzle carries it quickly to the gravel pump at the barge. But on flatter bottoms, and with a clayey or puggy ground, it is not so easily shifted, and the barge has to be moved forward at more frequent intervals. The maximum distance appears to be about 900 feet between barge and face. The steeper the bottom the easier it is to work down the broken ground.

In ground covered with ironstone conglomerate the use of gelignite is required to loosen and break it up, and it is subsequently further reduced in size by hand labour.

In tin value the conglomerate varies very considerably. When of good grade it is carted or trammed to one of the crushing plants, but when values are too low to warrant this, the rock is left lying in the excavation, and is stacked so as not to interfere with the advance of the barge from time to time. But, valuable or not, it has to be broken down so as to allow the softer and richer ground below to be sluiced out and treated.

The quantity of water passing through the nozzle when breaking down a face is estimated at about 4,000 gallons per minute at a pressure from 25 to 40 lbs. The nozzles vary in size from 2 to 4 inches diameter, varying in conformity with the hardness of the ground attacked.

One man attends to the jet, and upon his skill depends the quantity of ground broken down, and the maintenance of its steady flow to the gravel elevating pump.

When sufficient ground has been broken down at one point, the nozzle is directed to another. This permits the first heap to be looked over and sticks and rubbish picked out and thrown aside, which otherwise might be carried to the gravel pump. By working faces in alternation, good progress can be made.

The life of the gravel pump depends largely upon the character of the material passing through it, the gravel produced by the breaking-up of the ironstone conglomerate causing the maximum wear.

Under average conditions, pump liners have to be renewed after passing from 70,000 to 100,000 cubic yards of gravel.

*Cost of Treatment.*—The cost of treatment varies, naturally, with the nature of the ground being sluiced, and is quoted as ranging from fourpence up to thirteen pence per cubic yard.

In the last-named price are included water, building and maintaining dams, office expenses, removal of barge, making dams and races, general expenses, tindingressing and bagging; but it does not include cost of realisation of the tin after leaving the mine, nor depreciation of machinery and leases.

The cost is based on plants capable of treating from 50 to 60 cubic yards per hour, stoppages not included.

#### PORTABLE SUCTION DREDGES.

In the matter of breaking down the ground, in elevating it to the sluice boxes, and in the disposal of the tailings, there is no difference between the operations of a portable and a floating dredge.

But the portable plant has a great advantage over the floating plant in not requiring an excavation in which to float; in being easily and more quickly moved from place to place; and in its adaptability for use on slopes of hills, or on the summits, and anywhere else that tin may be found to occur.

It would also be well adapted for dredging rivers, such as those on the Pilbarra Goldfield, where the water comes down suddenly in flood, and where a floating dredge would therefore be in danger either of being washed away and wrecked, or of being buried in sand. In situations such as this the portable dredge would be able to work from the bank in comparative safety.

In the portable plants used at Greenbushes by Mr. F. A. Moss, the engines are of the loco. portable type, and are hauled into position by horses. The boilers are worked under a pressure of 100lbs. per square inch, with a consumption of about 2½ tons of wood per 8 hours.

The centrifugal pumps are, for the nozzle, 10 inch; and 8 inch for the gravel; the suction and delivery pipes of the gravel pump being 8 and 10 inches respectively. They are driven by rope off a 54-inch diameter pulley at the engine, and an 18-inch diameter at the pump.

The height to which the gravel has to be lifted ranges from 25 to 33 feet, requiring about 35 nominal horse power.

The diameter of the nozzles varies from 2¾ to 3½ inches, and the water pressure from 25 to 30 lbs.

The sluice boxes are of steel, 75ft. long, 2ft. deep, and 6ft. wide. The supports are timber trestles carried to the height necessary for the formation of the tailings dump.

The engine and pumps are sheltered with galvanised iron roofed sheds, constructed so as to be easily pulled down and removed. The time required for removal and re-erection of plant is forty-eight hours with eight men.

The working staff comprises: three men in the face and sluice, two men at the boiler and engine, two at the boxes and dam, and one for general work, or a total of eight.

The capacity of one of these plants in heavy sand is about 25 cubic yards per hour.

The cost amounts to one shilling per yard, including shifting the plant, pumping water, making dams, administration and general expenses; but does not include cost of realisation of the tin after leaving the mine.

The Greenbushes Development Company give the cost of sluicing with the portable dredge as from sixpence to one shilling per cubic yard, according to the nature of the ground dealt with.

\* \* \* \* \*

It is probable that the portable type of dredge is the one that will in future be adopted in preference to that of the floating plant.

In first cost it is very much cheaper than the floating dredge, and is infinitely better adapted for dealing with alluvial deposits as they occur at Greenbushes.

In making any comparison of the cost of suction dredging at Greenbushes with that of similar work in

any of the Eastern States, it is necessary to allow for the varying character of the ground at Greenbushes, and the various kinds of plant required for treating it.

The limited supply of water during a portion of the year is also a serious drawback, and makes against low cost of production.

But taking all things into account it will be found that the costs quoted above are not largely in excess of those obtaining in other Australian States where alluvial ground is being worked by suction dredges.

\* \* \* \* \*

I attach schedules of information given as to particulars of machinery, etc.

#### GREENBUSHES TIN DREDGING MACHINERY.

##### FLOATING SUCTION DREDGES.

###### *Barge.*

Owners.	Dimensions.	Draught.	Material.	Maker.
Greenbushes Development Company ..	Ft. (1) 30 x 35	Ft. 4-6	Oregon .. ..	Thompson & Co., Castlemaine, Victoria
Do. do. .. ..	(1) 30 x 35	4-6	Jarrah .. ..	Greenbushes Development Co.
F. A. Moss .. ..	35 x 45	3-6	Oregon with steel girder foundations	Thompson & Co., Castlemaine, Victoria

###### *Engines.*

Owners.	Type.	Cylinders.		Stroke. Length.	Makers.
		Hgh. Prs.	Low Prs.		
Greenbushes Development Company	Cross Compd. coupld. special dredge type	Ins. 10	Ins. 20	Ins. 24	Thompson & Co., Castlemaine, Victoria
F. A. Moss .. ..	Horizontal Compound	10.5	20	24	Thompson & Co., Castlemaine, Victoria

###### *Boilers.*

Owners.	Type.	Dimensions.		Fuel Consumption.	Working Pressure.	Maker.
		Length.	Diameter.			
Greenbushes Development Company	Return dry-back marine	Ft. 18	Ft. 7	..	lbs. 135	Thompson & Co., Castlemaine, Victoria
F. A. Moss .. ..	Marine .. ..	19	7½	3 tons wood per 8 hours	140	Thompson & Co., Castlemaine, Victoria

## GREENBUSHES DEVELOPMENT COMPANY.

*Pumps.*

Maker .. .. .	Thompson & Co., Castlemaine, Victoria	Thompson & Co., Castlemaine, Victoria
Type .. .. .	Kershaw patent centrifugal ..	Centrifugal
Size—Gravel .. .. .	Ten inch .. .. .	Ten inch
„ Water .. .. .	Twelve inch .. .. .	Twelve inch
„ Suction Pipe .. .. .	Ten inch .. .. .	Ten inch
„ Delivery Pipe .. .. .	Eleven inches .. .. .	Twelve inch
Driven by .. .. .	Rope .. .. .	Rope
Pulleys—Pump .. .. .	24 inch .. .. .	30 inch
„ Engine .. .. .	96 inch .. .. .	96 inch
No. of Revolutions .. .. .	400 .. .. .	110
Height of Lift .. .. .	50 feet .. .. .	20 feet
H.P. required .. .. .	150 .. .. .	90 B.H.P.
Approximate length of life in cubic yards of gravel	Depends on class of material treated	Pump liners last from 70,000 to 100,000 cubic yards of gravel
Minimum quantity of Water required	Approximately 4,000 gallons per minute through nozzle	
Distance of Barge from Face .. ..	Varies .. .. .	Varies up to 900 feet. Depends on ground being worked
Pipe Main, Pump to Nozzle .. ..	.. .. .	12 inch spiral rivetted steel, made by Mephan Ferguson
Size of Nozzle Bits .. .. .	3, 3½, 4 inch .. .. .	2 to 4 inch
Pressure of Water .. .. .	30 to 40 lbs. .. .. .	25 to 35 lbs.

*Sluice Boxes.*

Maker .. .. .	Thompson & Co., Castlemaine, Victoria	Owner
Dimensions—Length .. .. .	80 feet .. .. .	75 feet
„ Depth .. .. .	2 feet .. .. .	8 feet
„ Width .. .. .	2 feet .. .. .	2 feet
Material .. .. .	Iron .. .. .	3-16 steel plates
Supports .. .. .	Wooden trestles .. .. .	Wooden trestles
Means used to catch and clean Ore ..	Sluice boxes with riffles and hand streaming	Riffles, and then run through streaming box
Time required for clean-up .. ..	.. .. .	Three hours
Method of cleaning for bagging ..	Streaming, and through Willoughby	Streaming and through Willoughby with water at 10 lbs. pressure

## CAPACITY OF PLANT.

	Greenbushes Development Coy.	F. A. Moss.
Cubic yards per hour .. .. .	60 .. .. .	50, not including stoppages
Horse Power required .. .. .	150 .. .. .	100
Cost of Horse Power .. .. .	.. .. .	Approximately seven shillings per hour
Time shifting and re-arranging Plant	96 hours, approximately .. ..	Approximately, 80 to 100 hours
Depth of ground worked .. .. .	14 to 35 feet .. .. .	3 to 14 feet
Description of ground .. .. .	Sand, clay, and conglomerate ..	Sand, gravel, and puggy cement
Overburden .. .. .	.. .. .	None
Conglomerate or Cement, how treated	In battery, chilian and ball mills..	Loosened with gelignite, and hopperings sent to chilian mill
Working costs .. .. .	Four pence to eight pence per cubic yard	Average, thirteen pence per cubic yard
Labour employed—		
At face and in sluice .. .. .	.. .. .	3 men
On barge .. .. .	.. .. .	3 men
Tailings dam .. .. .	.. .. .	1 man
General .. .. .	.. .. .	1 man—Total, 8 men
		Water, building, and maintaining dam, office, etc, charged to working costs. Total costs include removal of barge, making dams and races, office, tin dressing and bagging, but does not include cost of realising the tin after leaving the mine, nor depreciation of machinery and leases

## PORTABLE SUCTION DREDGE.

NO BARGE REQUIRED.

*Engines.*

Owner.	Type.	Cylinders.	Stroke.	Maker.
F. A. Moss .. ..	1 Loco., Portable .. ..	Ins. Diam. Two 12 inch ..	12 inch ..	Marshall & Sons
F. A. Moss .. ..	1 Loco., Portable .. ..	One 12 inch ..	10 inch ..	Marshall & Sons

*Boiler.*

F. A. Moss—Working under a pressure of 100lbs. steam the firewood consumption amounts to  $2\frac{1}{2}$  tons per hour.

*Pumps.*

F. A. Moss—Maker, Thompson & Co., Castlemaine, Victoria

Type, Centrifugal.

Size, Nozzle, 10 inch.

Size, Gravel, 8 inch.

Size, Suction Pipe 8 inch.

Size, Delivery Pipe, 10 inch.

Pulleys, Pump, 18 inches diameter.

Pulleys, Engine, 54 inches diameter.

Horse Power, 35 nominal.

Height of Lift, 25 to 33 feet.

Pipe Main, Pump to Nozzle, 10 inch steel spiral rivetted, made by Mephan Ferguson

Size of Nozzle,  $2\frac{1}{2}$  to  $3\frac{1}{2}$  inch bits.

Pressure of Water, 25 to 40lbs.

*Sluice Boxes.*

Maker, Tomlinson Bros., Perth, W.A.

Dimensions :— Length, 75ft. ; Depth, 2ft. ; Width, 6ft.

Material—Steel, with timber trestles supports.

Methods of Cleaning up, etc.—Same as those of floating dredges.

Dams—Same as those of floating dredges.

Capacity of Plant—Up to 25 cubic yards per hour with heavy sand.

Time required to shift Plant—Approximately, 48 hours, with 8 men.

Depth of ground worked—Four to fifteen feet of gravel and sand, but no loam, and no overburden. Ironstone conglomerate not payable.

Working Costs—One shilling per cubic yard.

Labour employed—

At face and in sluices, 3 men

Boilers and Engines, 2 men

Boxes and Dam, 2 men

General, 1 man ; Total, 8 men

Total Cost—Includes shifting Plant, pumping water, making dams, administration and general, but does not include cost of realisation after it leaves the Mine.

APPENDIX No. IV.

INSPECTOR CLELAND'S REPORT ON PILBARA AND WEST PILBARA GOLDFIELDS.

PILBARA AND WEST PILBARA GOLDFIELDS.

I have the honour to submit for your consideration the following notes in regard to districts and mines visited by me during August and September of this year.

The time occupied in making the inspection of the various districts, counting from the date of arrival at Port Hedland to day of departure at Cossack, was eight weeks four days. The distance covered in coach and buggy, from start to finish, was approximately 850 miles.

The districts were visited in the following order:—

Lallarookh, Marble Bar, Just-in-Time, Marsh's Asbestos Claims, Warrawoona, Nullagine, Middle Creek, 20 Mile Sandy, Mosquito Group, Eastern Creek, McCarthy's Claim (west of Wyman's Well), Moolyella, Bamboo Creek, Talga-Talga, Cooglegong, Pilbara Asbestos Co.'s Leases ("Chrysotile"), McPhee's Claims (20 to 25 miles south of Lallarookh), Wodgina, Siffleete's Claim (south of the Stannum Group), Pilbara, Station Peak, Whim Creek, Roebourne, Weerianna.

Throughout these districts very little mining was in progress, and only in a few instances did I meet with any serious efforts to open up the reefs at depth.

The majority of the leases were in the hands of prospectors and fossickers following small leaders of quartz and working alluvial by dry-blowing.

The reason usually given for not working the reefs was the want of facilities for crushing ore, or, where a battery was in the district, the high rates charged for crushing, and the cost of cartage.

There was, undoubtedly, some truth in this, but it was also commonly apparent that the majority of the workers were not skilled miners. There were, of course, a few exceptions to this rule, and more of like nature will be required if mining in the North-West is to progress as it should. What are wanted are skilled men possessed of a little capital and able to combine to erect small ore-treatment plants. When such combinations are possible, but the co-operators are short of funds to purchase the necessary plant, the assistance of the State in this respect would be of general benefit.

The cost of fuel, stores, wages, and living conditions generally were the same as those quoted in your report on these fields in April-May, 1907.

But, in the face of high prices, it was curious to find that good board at the hotels was usually not more than 25s. per week—very little, if at all, higher than the tariff on the Eastern Goldfields. Men who did for themselves assured me they could live as well as they required at a cost not exceeding 20s. per week.

Fuel for steam purposes is, practically, non-existent, and the same remark applies to timber for mining; supplies are very small in view of any extensive work going on, and the cost is very high. At Warrawoona, the Klondyke Boulder Co. made a contract for a supply of 100 cords of firewood at 25s. per ton, but on completion of this they could not obtain further supplies under 35s. per ton. The high charges are based on the fact that the natural feed does not suffice for horses when working; that some artificial feed is necessary, and that fodder costs about 28s. per bale of 100lbs. weight. It is said that there is a good supply of mulga firewood some 40 to 50 miles south and east of Nullagine, but this would mean the construction of a railway line to make it available. The smallest possible quantity of timber has been used to secure the mine workings throughout the fields. Such as it is, the creeks and river beds are the sole source of supply, and not by any means an unlimited one. It would be advisable to protect this timber to some extent by creating the river beds forest reserves, and permit cutting and carting only under license. This would be some protection against the total denudation of the rivers, and would also be a check on waste. For battery and all power purposes it will be cheapest to install oil and producer-gas engines at the outset. Two or three small oil-engines are in use in the Marble Bar district for electric lighting, pumping, etc. At the Mt. Cassiterite mine, at Wodgina, a 60 to 70-h.p. oil-engine is in use. On this plant the consumption of oil is given as 2 gallons per hour at 1s. per gallon, or a total cost of 16s. per eight hours with a full load on the engine. For hoisting in shafts, oil or gas engines could be used in conjunction with friction hoists.

The cost of transport from Port Hedland has been a serious item of expense. As a result of inquiries regarding the estimated difference the railway would make in this respect, Mr. G. W. Miles, of Marble Bar, kindly furnished me with the following comparative table. The present landed costs are placed in one

column, and in the other, the landed costs on completion of the railway to Marble Bar, allowing freight to

be £2 per ton from Port Hedland, which works out a shade over fourpence per ton per mile:—

Item.	Present Cost.	Future Cost.
	Per ton. £ s. d.	per ton. £ s. d.
Sugar .. .. .	33 0 0	27 0 0
Flour .. .. .	22 0 0	16 0 0
Salt .. .. .	13 0 0	7 0 0
Fodder .. .. .	17 0 0	11 0 0
Galvanised Iron .. .. .	34 0 0	26 0 0
Bar Iron .. .. .	25 0 0	17 0 0
Lime .. .. .	Bushel. 0 5 7	Bushel. 0 3 6
Cement .. .. .	Cask. 3 4 0	Cask. 1 16 0
Jarrah .. .. .	Load. 22 10 0	Load. 14 10 0
Explosives .. .. .	Case. 3 0 0	Case. 2 15 0
	172 19 7	123 4 6
	Minus 28.5 per cent. off to future.	Plus 39.8 per cent. on to present.

## PILBARA GOLDFIELD.

### MARBLE BAR DISTRICT.

#### *Lallarookh Centre.*

No work is going on here, and there will probably be no revival until about the time when the railway is completed as far as the Gorge River hotel.

On the British Exploration Co.'s leases the mine and plant are idle, and the information I was able to glean was afforded by men who had worked in the mine, and from consulting the plans which were placed at my disposal.

On the Reward Claim the shaft on the north reef has a total depth of 150ft., and a level has been opened at 141ft. This has been driven easterly 91ft. and westerly 40ft., the former connecting with an old underlay shaft and the latter with a winze from No. 1 level. At No. 2, or lowest, level the reef is stated to vary in width from 18 inches to 9 feet, and to be lens-shaped. The quartz gave prospects of free gold as high as 2.50 ozs. per ton. A good deal of sulphide ore was met with and yielded assays as high as 11 ozs. per ton. From No. 1 level to surface the reef has been stoped out, but, judging by the plans, ore remains between the two levels, and is also under foot. On the south reef a fair amount of development work appears to have been done, but judging by statements made the values were not as good as in the north reef.

The poppet legs at the main shaft on the Reward Claim are of light timber, poorly constructed, and not capable either in height or strength for economical work. The upper section of the shaft is small, but below No. 1 level it has been carried down on larger dimensions; but both gear and shaft are sufficiently good to enable the reef to be proved to a greater depth—work that should certainly be undertaken. The battery originally here has long since been removed. A winding engine in good order, and a tubular boiler are at the main shaft, and there is a good outfit of tools and stores.

The Lallarookh belt of country consists of greenstone schists standing vertically, or almost so, and all along the western side of the Main Range both in a northerly and southerly direction there appear to be good indications for reefs and lodes.

The official returns show that up to date this centre has yielded 7,717.51 ozs. gold from 6,532.50 tons of ore, an average of 1.18 oz. per ton.

#### *Marble Bar Centre.*

*The Black Angel*, P.A. 198, owned by H. Newman and party, 18 acres, lies about four miles northerly of the town of Marble Bar. This claim adjoins the eastern boundary of an old claim known as the White Angel, long since abandoned as unpayable under the then conditions. As a rule the reefs in this district strike about N.E.-S.W., but the one being worked on the White Angel strikes a little south of east and dips north about 45deg. It has been prospected along the surface for about 300 feet in length, and several holes and shallow shafts have been sunk. At the time of inspection the principal shaft had been sunk 30ft. on a reef about 12 inches wide. The quartz is a good deal ironstained, and also shows some iron pyrites. A crushing of 10 tons yielded 8.80 ozs. gold by amalgamation. The value of the gold is stated to be £3 17s. 6d. per oz. by test made at the Bank.

The cartage from the claim to the Stray Shot battery (a little over four miles) was 20s. per ton, crushing 30s. per ton, making a total of 50s. per ton exclusive of the cost of mining. On one of the other reefs observed the strike was north-east, and the width of outcrop 18 to 36 inches. From this, pan prospects are stated to have yielded up to 1 oz. per ton. The country rock is a soft, easily worked schist, which stands well without timbering.

*The New Chum Railway*, G.M.L. No. 672 (12 acres), owned by Maher & Devan, lies about three miles north of Marble Bar, and a little to the east of the main road and railway survey. The outcrops



of a series of lenses of quartz can be traced for 400 to 500 feet along the surface, striking approximately north-east and dipping about 40deg. north-west. The quartz shows iron oxide and pyrites and a little carbonate of copper. At the western end of the line a shaft has been sunk to about 15ft. on the underlay, showing 9ft. wide of quartz on the eastern end. From this shaft a parcel of 45.22 tons of ore was crushed for a yield of .59 oz. per ton. A stone picked from the outcrop by me showed fairly coarse free gold. The old shaft is wrongly placed at the extreme western end of a lense. The owners propose to resume work shortly.

*The Jo-Jo*, P.A. No. 184 (10 acres), held by Hammil and Thomas, is situated about a mile and a half north-east of Marble Bar and to the north of the old General lease. The reefs on this property lie to the west of, and parallel to, the Ironclad line of reef. They strike north-east and dip north-west about 40deg. The outcrops of three reefs are visible, the most easterly one being along the crest of a low hill. The eastern reef has been slightly worked by open-cut on the outcrop at several points along its course. The quartz obtained in this way is stated to have been crushed for an average yield of .70 oz. per ton. Some 600 or more tons are lying broken on surface, and estimated by owners to be worth .60 oz. per ton, and not payable under existing conditions.

At about 118ft. west of the eastern reef the remaining two reefs have been intersected at a depth of about 54ft. by a small vertical shaft. In width they vary—in lens shape—from an inch or so up to 18 and 36 inches. From the bottom of the vertical shaft the reefs have been followed 26ft., and at the bottom they appear to be inclining at a higher angle. A band of soft greenstone schist, 24in. thick, separates the two reefs but does not carry any value. At a point a little below the bottom of the vertical shaft a level has been driven 60ft. on the reefs in a north-easterly direction, and their size is maintained in this length; the values have also been consistently kept up. At the point at which the shaft cut the reefs a parcel of 9½ tons is said to have yielded a return of 22.75 ozs., or an average of 2.39 ozs. per ton. In July of this year the official returns show that a parcel of 49 tons yielded 153.07 ozs., or an average of 3.12 ozs. per ton. This was obtained from the drive above mentioned, and was crushed at the Stray Shot battery. Crushing cost 30s. and cartage 5s., or a total of 35s. per ton exclusive of owners' time in working at the battery and the cost of breaking and raising the ore.

The deepening of the shaft a further 40 to 50 feet should result in cutting the eastern reef. This development will be attempted when a new and larger shaft is sunk—work that the owners purpose doing shortly when they have some money in hand.

Adjoining the Jo-Jo on the south the old Bohemia is being worked by two men who are now sinking a shaft to cut the same line of reef as that in Hammil and Thomas's claim.

North of the old Band of Hope mine and, apparently, on the same line of reef, a prospecting area of 18 acres has recently been pegged out by Godley and O'Neil.

In past years a number of shafts were sunk to prospect a series of small reefs but development was not carried out to any extent. On sampling the quartz dumps at these shafts the present owners

estimated the value to average 1oz. per ton and have now set to work to further test the country.

The Ironclad Line of Reef is not now being worked, and the shafts, etc., were inaccessible to inspection. From what could be seen from the surface a good deal of stone is in sight. It is certain that this line of reef will be again worked now that a State battery is to be erected. The yield per ton for an output of over 2,000 tons is recorded as averaging .70 oz.

The Railway Signal G.M.L., No. 658, 24 acres, is held by Browning and Maher. This area includes the greater portion of what was known as the General Lease.

A good deal of work has been done on this mine in past times. No underground inspection was possible owing to the workings having caved in in some places and, in others, being full of debris and waste rock left by fossickers.

It is intended to resume work here. The owners will probably save both time and expense by opening fresh shafts, etc., rather than trying to re-enter the old workings.

At one point—near the summit of a hill—a tunnel exposes four reefs lying one behind the other. A selected parcel of 30.36 tons from this place averaged .96 oz. per ton.

Passing southward from the Railway Signal lease towards the Homeward Bound, a number of reefs are outcropping through the schist, and very little prospecting has been done upon them.

On *The Homeward Bound Mine* an old shaft is being cleaned out and prospecting is being again undertaken. Prior to my departure further sinking had disclosed a new reef of 5ft. in thickness and carrying gold. I had previously pointed out to the owners that the reefs occurred one above the other, and that sinking should be continued through the schist and until the granite footwall was reached. A good deal of shallow prospecting work was done on this lease years ago, and the reefs exposed in the workings show thicknesses of from 24 to 36 inches. It is stated that from these workings 455.50 tons of ore yielded 526.30 ozs. gold, or an average of 1.15 oz. per ton.

Adjacent to the Homeward Bound are the *Shamrock*, the *True Blue*, and the *Coongan Star* mines. None of these have been worked for some years past, and the workings were inaccessible.

Southerly from the Homeward Bound mine is the Roberts Group, comprising the Stray Shot, the Excelsior, and the Augusta mines, aggregating 24 acres. A portion of this ground was at one time known as the Coongan Gold Blocks Consolidated. In the group the Excelsior lease is in the south-west corner, with the Stray Shot to the northward, and the Augusta situated on a hill and lying along the eastern boundary of the two other leases. The leases are riddled by a number of small vertical shafts sunk to intersect a flat-lying reef which outcrops along the summit of the hill to the east. From each shaft the reef has been mined as far outward as the nature of the ground permitted safe working. It is stated that the aggregate quantity crushed from these workings was about 5,000 tons, and the average yield slightly over 2 ozs. per ton. The 10-head battery on the Stray Shot lease is about worn out, and the boiler unsafe to use.

In this group I was able to inspect a portion of the underground workings of the *Augusta Mine*. The reef outcrops fairly boldly on the eastern slope and

near the crest of a low hill. The thickness of the quartz is up to 36 inches at most, and occurs in lens-shaped bodies which succeed one another closely along the strike of the lode. The dip is westward at an angle of from 20 to 25 degrees, and at places almost horizontal. The strike of the reef is north-west and south-east. The hanging wall is solid greenstone, above which is a soft schist which continues to the surface. The country is very strong and secure, and the larger excavations have been filled with rock and supported by stone pillars built up.

The workings expose two series of lenses of quartz lying parallel to one another and separated by about 3ft. of rock, the lower lenses forming the floor of the workings. The lower series is said to have yielded as good prospects in gold as the upper one, and it is curious that both were not mined at the one time and so obtaining double the quantity of ore at no additional cost of development. A considerable amount of driving has been done, but the workings are well secured and in good order, and mining could be resumed without expense in fixing things up. A good deal of quartz has been left standing, being, presumably, not of a payable grade at the time the mine was being worked. The exploitation of the reef now under foot, and the deepening of one or more of the vertical shafts in search of other underlying reefs—the existence of which is very probable—is work that would be worth undertaking.

At a point about four miles from Marble Bar, at what is known as the Big Schist, the Devan Reward lease (24 acres) is situated on the eastern side of Duffer's Creek. This area has been applied for by Daniel Devan. Several outcroppings of quartz mark the position of reefs on the top of a bold hill sloping towards the creek. The reefs strike a little west of north and dip at a low angle to the westward.

At the time of my visit only a little prospecting work had been done at a few points along the outcrop of the strongest reef. I noticed coarse free gold in several stones in the heaps of quartz that had been broken out. As far as appearances go, the outlook for the owner is fairly good. In this locality the schist stands up very boldly, and, owing to its very dark and weathered appearance, forms a notable feature of the landscape.

At about three miles southerly from Marble Bar and one and a half miles westerly of the Big Schist Well is the Franklin Gold Mine, comprising G.M.Ls. Nos. 641 and 647, with an aggregate area of 12 acres. The reef outcrop is well defined and can be traced in an approximately north and south direction for upwards of a mile. The dip, near the surface, is about west 50deg., but appears to take a higher angle as it makes down. As no work was in progress, and there were no means at hand, I was not able to get to the lowest levels.

A shaft sunk to a depth of 110ft. on the underlay has proved the reef for an average width of 48in. In the upper workings there is a large quantity of stone in sight, said to be of payable value if it could be treated on the mine. From the bottom of the shaft a crushing yielded 11 dwts. per ton, and as the cost of carting and crushing was high the owners became discouraged and stopped working. No work has been

done for the past two years. It is a pity to see this mine lying idle. The outcrop is the longest and most regular of any in the district, and is contained in good "kindly" country. The elevated position of the mine would enable the ore to be handled very economically if a battery was on the ground, and there is said to be no difficulty about water.

At about one mile south-west from the Big Schist Well is the Devan Lease, G.M.L. No. 687, held by Mitchie, O'Larey, Carboy, and Christy. It is at the foot of a range of high hills, and the reef outcrops along the crest of a low rise in the schist country. In a gully leading down from the present workings the remains of old alluvial diggings can be seen. These are reported to have yielded very good results, but there is no record of the actual output of gold therefrom. The owners, at the present time, are sinking on the underlay of some rich leaders and lode material forming a casing on the hanging wall of a solid quartz reef. Near the surface a parcel of 5½ tons was crushed for a return of 16.84 ozs. gold exclusive of 30 ozs. obtained by dollying the richer specimens.

Adjoining the casing is a formation composed of fine-grained schist carrying minute veins of quartz and ironstone. The owners informed me that for a width of 6ft. this is worth an ounce to the ton on the then face. The values, however, are not constant, but rise and fall very considerably. Eastward from the present workings is a large solid quartz reef said to yield prospects up to 15 dwts. per ton, but not considered sufficiently rich under existing conditions. Bismuth occurs in the quartz and usually is accompanied with coarse free gold.

Northward along this line of country many reefs have been prospected and slightly worked for rich patches, but none of them is now being mined.

*McCarthy's Reward Claim.*—This is situated in Fielding's Gully, about four miles west of Wyman's Well. A Reward Claim of eight acres has been granted and an additional 12-acre lease has been applied for. The workings are on the eastern slope of a hill in which the schist is overlaid by a bed of conglomerates. Traces of gold in the schist below the conglomerate led to sinking an incline shaft to a depth of about 30ft., dipping west about 35deg. This intersected a seam of soft lode material lying between the conglomerate and the schist and having a dip to the east; this seam is rather more than a foot thick and carries some free gold. Very little work has yet been done at this point. No gold is found in the conglomerate. The total gold recorded up to end of July was 9.16 ozs. To the south of the incline shaft a vertical shaft is being sunk in a conglomerate formation. It is a large square shaft and, to me, it did not appear to be placed in a position to meet the gold-bearing seam.

*The Just-in-Time Workings* are situated between nine and ten miles south-west from Marble Bar, following the old coach track. The road is very much washed out, and is not used, the present main road to Cooglegong being further to the north. I found that no work had been done here for a long time past, and no change had been effected subsequent to the visit of the Government Geologist.

The following table shows the total gold production in the Marble Bar Mining Centre up to the end of July, 1909:—

MARBLE BAR MINING CENTRE.  
Total Gold produced to 31st July, 1909.

No. of Lease.	Registered Name of Company or Lease.	Total Gold produced to 31st December, 1908.				Gold produced for 7 months to 31st July, 1909.			
		Alluvial.	Dollied and Specimens.	Ore Treated.	Gold therefrom.	Alluvial.	Dollied and Specimens.	Ore Treated.	Gold therefrom.
		fine ozs.	fine ozs.	Tons (2,240lbs.)	fine ozs.	fine ozs.	tons (2,240lbs.)	fine ozs.	
G.M.L. 673	Enterprise .. ..	..	..	441.16	23.97	..	..	..	
G.M.L. 641	Franklin .. ..	..	69.06	403.84	430.10	..	..	..	
G.M.L. 661	Franklin N. Extend.	..	..	13.25	3.93	..	..	..	
G.M.L. 672	New Chum Railway	..	..	45.22	26.39	..	..	..	
G.M.L. 658	Railway Signal ..	..	..	30.26	29.27	..	..	..	
G.M.L. 674	Thistle .. ..	..	..	6.26	3.58	..	..	..	
G.M.L. 615	Roberts' Group (British Explor. Aust.)	..	..	270.71	420.68	..	..	10.69	
	Voided Leases ..	..	71.26	12,213.15	17,292.55	..	..	..	
	Sundry Claims ..	28.18	35.57	1,260.89	1,772.50	..	..	..	
G.M.L. 687	Devan .. ..	..	..	..	..	..	5.51	16.84	
P.A. 190	Godler, A. J. ..	..	..	..	..	..	11.00	19.50	
P.A. 184	Hamill & Thomas ..	..	..	..	..	..	49.00	153.07	
P.A. 198	Newman .. ..	..	..	..	..	..	10.00	8.80	
	From District generally, per Banks	..	..	..	..	451.47	27.02	..	
		28.18	175.89	14,284.84	20,002.97	451.47	27.02	86.20	
								219.35	

TOTAL GOLD PRODUCTION TO 31ST JULY, 1908.

Alluvial .. ..	479.65
Dollied and Specimens .. ..	202.91
Ore Treated, Tons of 2,240lbs.	14,371.04
Gold therefrom, fine ozs.	20,222.32
Grand Total, fine ozs.	20,904.88

Average yield per ton of ore, exclusive of Alluvial, Dollied, and Specimens 1.40

Warrawoona Centre.

The examination of this centre was commenced at the north-west end, and the mines are taken in the order of their occurrence.

*The Bow Bells Mine.*—G.M.L. 505, is not now working, and with the exception of a few shallow surface workings no inspection could be made. On an adjoining machinery area is erected a 10-head battery and other plant, all apparently in good order. A considerable heap of sands has accumulated from ore treated from this and other neighbouring mines, the gross value of which is stated to be 5dwts. per ton. Mr. Frank Atkins informed me he had cyanided 100 tons for an extraction of 4dwts. per ton.

*The Gift Mine,* G.M.L. 595, lies on the south-west side of the large quartzite dyke and had been worked by Messrs. Richards and Bradley for three months at the time of my visit; the vein being followed was the well known Kopeke's leader. The lenses of ore were shown to be from three to four feet in length with a maximum width up to 18 inches. The first crushing taken out by the owners averaged 3ozs. per ton and the second barely one ounce. Owing to the small size of the reef, the hardness of the country and the strong inflow of water, this return was not considered payable and the claim was being thrown up. Sinking had been carried some distance below water level with the aid of a pump worked by a small oil engine. The inflow amounted to three or four thousand gallons per day.

*The Golden Gauntlet Mine,* G.M.L. 506, was not working. The depth of the shaft was given as 50ft. on a reef ranging from 24 to 30 inches wide, carrying a chute of ore 10ft. in length. A crushing taken from the dump at the shaft is said to have averaged .62oz. per ton.

On the *Gauntlet Mine,* G.M.L. 483, a good three-compartment shaft has been sunk to 140ft. on the hanging wall side of a large, but poor, reef. The plant on the mine consists of a winding engine, boiler etc., and steel head gear over the shaft.

The mine has recently been in the hands of tributers who have taken out the best of the stone down to water level. The tributers disregarded the large reef and confined operations to a dark-blue coloured quartz reef occurring on the southern side of the large reef. This originally had a bold outcrop showing coarse free gold and, in years past, gave very rich returns; why it was not followed down subsequently I do not know, but the omission was of benefit to the latter tribute workers.

They found that the richest ore occurred in pipes dipping at a high angle. Near the surface, the first pipe worked had a length of 16ft., but on being followed this increased to 30ft. with a width of 24in. Work was stopped at water level as no pump was available, but the value of the ore at that depth showed no falling off.

From the ore obtained by the tributers the first parcel of 39 tons yielded 101.40ozs. and the second,

of 30 tons yielded 76ozs. With a long-term tribute and a good pump these workers would have been glad to continue operations.

*The Klondyke Boulder*, G.M.L. 604, is the most important mine in the Warrawoona centre and has been worked for some years past. During the last two years it has been in the hands of Messrs. F. Atkins, Lynne, Cooke, and Cooper. Since they took possession a five-head battery has been erected, and the sinking of a main shaft has been commenced.

At the time of my visit the lowest workings were under water and though I twice visited the district and pumping was being continued, I was not able to get below. The older workings were mostly caved in and did not invite inspection. The water is being taken out by a steam pump at the rate of about 3,000 gallons per hour, and there is a considerable area of country to be drained before much effect is shown in the shaft.

I am indebted to the manager for the following information. The shaft on the south reef has a depth of 190ft. and the reef has been mined to 185ft. The last 60ft. of sinking gave 400 tons of ore yielding 1,050ozs. of gold worth over £4 per ounce—a value said to be considerably higher than what was met with in the upper workings. The ore chute has been stoped for a length of 55ft. and appears to be lengthening as greater depth is reached. At the surface the width of stone was 12 inches and at 185ft. it is 27 inches. It is intended to deepen this shaft so as to get control of the water and keep the mine drained while the main shaft is being sunk.

The Main, or Blue, Reef is the more northerly of the two. At 50 feet from the surface it was broken by a fault, but was again picked up at a very little distance from the break. The workings on this reef comprise some of the oldest on the lease and have mostly caved in.

The new main shaft has been placed in a position calculated to be convenient for the working of both reefs. It is 8ft. by 4ft. in the clear, and is now 56 feet deep. The country passed through is a rather soft schist requiring close timbering and the necessary sets have just recently come to hand. At a depth of 105ft. a crosscut will be driven to test the existence of a low-grade ore body believed to exist on the southern side. The south reef should be met with at about 300ft. from the surface. The northerly or blue reef will underlay away from the shaft. Since the erection of the battery the filling of some of the old stopes has been taken out and put through. From one parcel of 45 tons the yield was 25ozs. gold, and from another, 84 tons yielded 4ozs. gold. The battery and boiler is owned by a syndicate, some of the members of which are also shareholders in the Klondyke Boulder mine and in other claims round about. The mine pump is supplied with steam from a vertical boiler and there is also a small hoisting winch at the underlay shaft. The official record of gold won from this lease up to the end of July, 1909, is 959.79 tons for 1,824.65ozs. of fine gold, or an average of 1.90ozs. per ton.

*The Klondyke Queen*, G.M.L. 627, is owned by Royer and Atkins. The mine lies south east from the Klondyke Boulder and is in the same run of country. The reef outcrops along the crest of a high ridge formed by a dyke of banded quartzite.

In the past a fair amount of work has been done in sinking on pipes of rich ore. Concerning the value

of these I obtained some knowledge through insight into one of the ledgers of the old owners of the mine. The bank account shows that from June, 1898, to March, 1902, 819 tons of ore were crushed for gold valued at £19,834, or an average of slightly over £24 per ton. This was a portion of the total yield, said to have been over £28,000.

The reef varies in size from a few inches up to 36 inches in width, and dips almost vertically, in conformity to the country. The larger portions of the reef really form pipes of ore which dip at a high angle north-westerly on the line of reef. The length of these pipes is from 6ft. to 12ft. Between these richer portions the quartz is of very low grade.

The chief workings consist of a tunnel that has been driven on the course of the reef at a point about 20 to 30 feet above the bed of a creek which cuts through the easterly end of the lease. The tunnel is 340ft. in length and the reef is exposed for the whole distance. For about 70ft. in from the mouth of the tunnel stoping has been carried upwards to the surface and to a depth of about 80ft. below the level. A block of ground has also been stoped out above the level near its north-westerly end. Four winzes have been sunk, three to a depth of 80 feet and one to 60ft. In the one last-named work was going on at the time of my visit, and a drive was following the reef off the bottom. At this point a pipe of ore had been picked up which had been lost in the upper workings; it was calculated to be worth 30dwts. per ton.

On taking over the mine the present owners found that the filling of the stopes carried fair values. The filling has been withdrawn and crushed at the Klondyke Boulder battery. One parcel of 100 tons yielded 64.90ozs. gold and a second, of 87 tons, yielded 67.10ozs. gold.

Under its present title the records show a total to the end of 1908 of 75.75 tons, yielding 185.20ozs. fine gold, and for the seven months ending 31st July, 1909, 276.20 tons yielding 215.54ozs. fine, or a total of 351.95 tons for 400.74ozs. fine.

Pursuing a south-easterly course the workings of the St. George, the Cuban, and the Britannia mines were passed, but no work was in progress.

*The Reward Claim*, now G.M.L. 682, is being worked by Messrs. Daly, Fredricks, and Verco, who took it up a few weeks ago.

At the present time a shaft is 50ft. deep on Kopcke's leader and the stone is showing a fair amount of free gold. At bottom of the shaft the vein is only about 6 inches wide but swells to 12 inches in places. A crushing of 18.50 tons yielded 26.67ozs. fine gold.

Adjoining the Reward Claim is the Warrawoona Queen, a P.A. held by J. Connor. This also is on the famous leader. A shaft has been sunk 32ft. and some good-looking stone has been raised. In these workings the vein and the country showed a lower angle of inclination at the bottom than in any other instance that had come under my notice.

At about a quarter of a mile from Connor's claim and at the foot of the range on the southern side is a freshly pegged P.A. named The Koombana.

In this claim a fairly well defined outcrop of quartz can be traced for seven or eight hundred feet in length. Good prospects are said to have been obtained all along this line, but at present only a few pot-holes have been sunk at various points, the deepest being about 10ft.

The reef strikes about 10deg. south of east, but the dip is not yet very well determined.

The enclosing country is a soft schist, which at many points along the outcrop is seen to be very twisted. The long length of outcrop and the appearance of the quartz certainly should make it worth while for the owner to carefully prospect it. It has a very promising appearance.

### Gold Production.

I attach a statement showing the total production of gold from the Warrawoona Mining Centre as given in the official records.

It is noticeable that 36.94 per cent. of the ore treated and 28.97 per cent. of the gold therefrom was derived from two leases, the Bow Bells (505) and the Gauntlet (483), the last-named of the two having, apparently, made the highest yield per ton.

### WARRAWOONA MINING CENTRE.

Total Gold produced to 31st July, 1909.

No. of Lease.	Registered Name of Company or Lease.	Total Gold produced to 31st December, 1908.				Gold produced for 7 months to 31st July, 1909.			
		Alluvial.	Dollied and Specimens.	Ore Treated.	Gold therefrom.	Alluvial.	Dollied and Specimens.	Ore Treated.	Gold therefrom.
		fine ozs.	fine ozs.	Tons (2,240lbs.)	fine ozs.	fine ozs.	fine ozs.	tons (2,240lbs.)	fine ozs.
G.M.L. 505.	Bow Bells (Brit. Explor. of Australasia)	..	..	483.70	753.59	..	..	..	..
G.M.Ls. 505, 483	British Exploration of Australasia	..	..	1,413.00	1,112.85	..	..	..	..
G.M.L. 675	Britannia .. ..	..	..	11.50	17.81	..	..	..	..
G.M.L. 483	Gauntlet .. ..	..	..	1,128.30	3,124.40	..	..	..	..
G.M.L. 483	Gauntlet (British Expl. Aust.)	..	..	161.00	207.86	..	..	..	..
G.M.L. 665	Imperialist .. ..	..	..	13.00	6.66	..	..	..	..
G.M.L. 604	Klondyke Boulder ..	..	..	850.69	1,767.26	..	..	109.10	57.39
G.M.L. 650	Klondyke Boulder, East	..	8.33	14.00	43.43	..	..	..	..
G.M.L. 627	Klondyke Queen ..	..	..	75.75	185.20	..	..	276.20	215.54
	Voided Leases ..	..	4.86	2,981.11	8,306.82	..	..	..	..
	Sundry Claims ..	44.30	333.329	1,069.04	2,099.72	..	..	..	..
P.A. 175	Daley & Party ..	..	..	..	..	..	..	18.50	26.67
P.A. 185	Andrews & Party ..	..	..	..	..	..	..	5.00	3.41
P.A. 186	Berteau, F. ..	..	..	..	..	..	..	8.00	6.33
P.A. 203	Fredericks, W. ..	..	..	..	..	..	..	6.00	5.25
		44.30	346.48	8,201.09	17,625.60	..	..	422.80	314.59

### TOTAL GOLD PRODUCTION TO 31ST JULY, 1909.

Alluvial .. .. .	44.30
Dollied and Specimens .. .. .	346.48
Ore treated (tons 2,240 lbs.) .. .. .	8,623.89
Gold therefrom, fine ozs. .. .. .	17,940.19
Grand Total, fine ozs. .. .. .	18,330.97

Average yield per ton of ore, exclusive of Alluvial, Dollied and Specimens 2.08 ozs.

### Bamboo Creek Centre.

The *Bulletin Mine* (G.M.L. 161) has been worked by tributers for some time past. At the time of my visit only two men were at work at the 160ft. level. The whole mine, down to the deepest level—160ft.—has been very much rooted about by tributers, and the greater portion of the upper levels are so littered with waste rock that a thorough inspection was impossible. In those portions of the levels which could be seen some of the timbering was fairly good but much of it showed evidence of rot and was not very secure. The winzes, passes, and stopes were usually unprotected and will require to be attended to if and when work is resumed in the mine. The vertical shaft connecting with the reef at 160ft. is not centred. Some of the sets are giving away and, generally, it is not fit for use until overhauled. On the surface the ravages of the white-ants are remarkable. Two sets of oregon poppet legs have been eaten through and the legs have broken short off at about half way up. The foundation logs under the battery boxes have also suffered in the same way. I am informed that

an attempt is being made to get fresh capital in order to renovate the whole mine above and below ground. Judging by the past records of yields, by the present appearance of the reef at the lowest level, and the comparatively small amount of development work that has been done on the property, I should say that the expenditure of additional capital was fully justified and that, in all probability a very good mine might be opened up. The reef has been pretty well worked out from the surface down to the 160ft. level but, as well as I could see at various points, no attempt has been made to seek for new lenses after the original one tapered out longitudinally.

On the 160ft. level the reef is about 24 inches wide and the quartz showing free gold. The footwall is generally well defined but the hanging wall is not. From the reef many small veins and strings of quartz make outwards, and I am confident that the true hanging wall has not been touched. Crosscuts should be run out to test the full width of the ore channel; this, judging from surface indications, is fairly wide and other bodies of ore will likely be found in it,

lying parallel to the main reef. Some of the lenses of ore have been 5ft. in width. There is no reason to suppose that the reef will fail to make down, and further prospecting in this direction should be undertaken.

Up to the end of July, 1909, this mine has given 4,066.50 tons of ore yielding 7,808.21ozs. of fine gold, or an average of 1.92 fine ozs. per ton.

No other lease in the vicinity is being worked, though from information I could glean from residents of long standing there are several mines that are well worth being further developed. The cause of stoppage is ascribed to the high cost of crushing charges in the past, and the great expense of getting mining stores to the district. Both these items should

be much lightened when once the railway gets to Marble Bar, and the district may be expected to revive.

*The Bobby Burns.*—This is held by Messrs. Matheson, McKenzie, and Ball, and is situated about four miles west from the present Bamboo post office, in a locality known as Nuggety Gully.

An incline shaft has been sunk 85ft. on a four-inch leader of quartz which lies along the hanging wall of a diorite dyke. The value is very variable and sometimes very rich pockets are found where the vein has passed slightly into the diorite. All the gold is obtained by dollying and the owners say they are making good wages.

The following table shows the total gold production in this centre up to 31st July, 1909:—

#### BAMBOO CREEK MINING CENTRE.

*Total Gold produced to 31st July, 1909.*

No. of Lease.	Registered Name of Company or Lease.	Total Gold produced to 31st December, 1908.				Gold produced for 7 months to 31st July, 1909.			
		Alluvial.	Dollied and Specimens.	Ore Treated.	Gold therefrom.	Alluvial.	Dollied and Specimens.	Ore Treated.	Gold therefrom.
G.M.L. 161	Bamboo Consolidated G.M. Company, Ltd.	..	..	Tons (2,240lbs.) 1,579.50	2,995.85	..	..	..	..
G.M.L. 161	Bulletin .. ..	..	..	1,965.00	3,427.92	..	..	82.00	279.47
G.M.Ls. 161, 653	Bulletin Leases ..	..	..	440.00	1,104.97	..	..	..	..
	Voided Leases ..	..	..	7,202.75	10,818.50	..	..	..	..
	Sundry claims ..	..	158.54	144.00	454.40	..	..	..	..
P.A. 189	.. ..	..	..	..	..	..	49.14	4.75	52.87
P.A. 189	Slags .. ..	..	..	..	..	..	..	..	7.24
		..	158.54	11,331.25	18,801.64	..	49.14	86.75	339.58

#### TOTAL GOLD PRODUCED TO 31ST JULY, 1909.

	OZS.
Dollied and Specimens .. ..	207.68
Ore treated, tons 2,240 lbs. ..	11,418.00
Gold therefrom, fine ozs. (including slags) ..	19,141.22
<b>Grand Total, fine ozs. .. ..</b>	<b>19,348.90</b>

Average yield per ton of ore, exclusive of Dollied and Specimens 1.67ozs.

#### *Talga-Talga Centre.*

No reef mining is being done in this locality, but west of the alluvial workings on the western side of a high range of hills there are quartz outcroppings that are well worthy of attention.

In past years a prospector named McPhee worked one of these reefs to a slight extent, and is said to have found a very rich patch of stone therein. No further development appears to have been attempted.

The old alluvial claims are being fossicked by about 15 men, but none of them appear to be getting much gold.

The official record up to the end of 1908 shows the total output from this locality as follows:—

Alluvial .. ..	50.26 fine oz.
Dollied and specimens .. ..	152.82 „ „
Ore treated, tons (2,240lbs.)	779.15
Gold therefrom .. ..	1,496.63 „ „
<b>Grand total fine oz. .. ..</b>	<b>1,699.31</b>

Average per ton of ore (exclusive of alluvial, dollied, and specimens) .. .. 1.92 „ „

It may be taken for granted that the total alluvial gold quoted above is not the actual output, and that a portion of the 7,888.14oz. reported by the banks and gold buyers in the Marble Bar district may be credited to this field.

*McPhee's Claim.*—On my way to Wodgina I turned off the direct track to inspect a place commonly known as McPhee's Claim. It is situated on the western side of the Main Range, and lies about seven miles north of Green's Well, 20 to 25 miles southerly from Lallarookh, and about the same distance east from Wodgina.

A fair amount of prospecting has been done on the surface, but the deepest working is not more than 30ft. No work was in progress at the time of my visit. From a prospector who had been working there recently I understand that gold has been obtained for a consecutive width of over one and a half chains and a length of 60 chains, the values ranging from traces up to 8 and 10dwts. per ton. A good deal of dry-blowing has been done, and it is said that some very good patches were obtained.

The country appears to be a hornblende schist in which bars of actinolite occur, and it is near these bars that the best prospects are obtained. Several small quartz reefs outcrop at surface, and one of



Further prospecting in this manner will probably be taken in hand now that the construction of the railway to Marble Bar is assured. The field is very conveniently placed to the proposed terminus of the line.

The total yield of tin from this centre to date is 2,628.59 tons, of the value of £224,355.

#### *Cooglegong Centre.*

In this centre about 80 men are at present at work. The number, however, fluctuates considerably. Only alluvial ground is being worked, and this is mostly represented by abandoned ground.

No lode mining is in progress, although small lodes are known to exist. The reason given is that there is no plant at which to treat the ore. In the absence of this no lode is touched unless it shows ore worth dollying, and this condition does not appear to be often met with. The present workers are not making more than wages—some less than that—and evidently do not possess means to combine to erect a small dressing plant.

The Cooglegong Creek is proved to contain tin, and at a point about 10 miles below Lloyd's store one man has been dry-blowing the sand bed. It is said that the average yield obtained by him is four ounces of black tin per dish. Recent rains flooded him out, and he was not working at the time of my visit.

This creek should be worth prospecting with a view to working it in a large way. The simplest method would seem to be with a suction dredge working across the full width of the creek at various points. This would entail the expenditure of capital, and probably no person or syndicate would undertake the venture unless first assured of being able to secure and hold an extensive area of the creek bed.

This centre is not likely to make much further progress until some means of dressing ore, and dredging the bed of the creek is available.

The total yield of stream tin from this centre up to 31st August, 1909, is 1,236.29 tons, valued at £96,452.

#### *Wodgina Centre.*

*The Mount Cassiterite Claims* are owned by Messrs. Phippard Bros. At the present time a total of 22 men are employed. Owing to a want of water for the mill, operations on this mine have been greatly retarded. From the 3rd of February to 15th September, 1909, only 505 hours were run. In that period 1,987 tons of ore were treated for a yield of 59.60 tons of black tin.

At the time of my visit a new water shaft had been sunk 74½ft. This is situated at about half to three-quarters of a mile west of the mill. At the depth named a supply considered fairly good has been struck, but the shaft is to be deepened in order to increase it. A 3-inch main has been laid from the mill to the well, and a pump was being installed while I was there. The motive power will be electricity supplied by the motor at the mill. The shaft has been well timbered, with frame sets lagged with corrugated iron. The cost to the owners of sinking and equipping the water shaft has been upwards of £1,000.

On 1st June of this year an application for six months exemption (5 men) was granted; this, how-

ever, has not been availed of as it was found that the full number of required men could be profitably employed in connection with the water shaft and in mine development.

In regard to the water question, it will probably be found that the mine itself will ultimately provide large supplies of water. The winze from No. 2 level has been sunk 70ft.—a depth nearly equal to the level of the bed of the main watercourse which traverses the property, and further sinking was stopped owing to the presence of water. When this is deepened, or when the owners get a shaft down on one of the large lodes, the inflow of water will probably be found as large as will be required for all purposes.

Large quantities of water can also be conserved at no great cost by damming up one or more of the gullies on the lease, and impounding the storm waters caused by rain. Storage such as this could be profitably utilised for hydraulicising the slopes of the hills and winning from the surface soil the tin contained therein. Pan tests appear to have proved that considerable quantities of tin lie in the loose dirt, and this scheme would almost certainly be profitable; in addition to tin actually won, the rock would be bared and prospecting for additional lodes be facilitated.

So far, the known tin lodes have been prospected by means of three tunnels driven at different levels from the side of the hill, the lowest of these being about 200ft. below the summit. A few winzes have been sunk, but on the whole no large amount of development work has been carried out. A little stopping has lately been commenced. All the workings are well secured and timbered.

The ore hitherto sent to the mill has been derived from the waste heaps left by the former owners, and there is yet a good quantity of this to be dealt with. The owners state that up to date the tin won from the mine represents a value of £20,000, and that this sum has been again spent in the development of the property.

The mill was running on the day I left Wodgina, and I made an inspection of the plant. As a rule, all the working parts had been well protected, and only in one or two instances was it necessary to point out where extra guards would be required.

The power for the plant is derived from a Diesel oil engine of 65 h.p. With a full load, the consumption of oil is quoted at two gallons per hour, the cost equalling 16s. per eight hours run.

The ruling rates of wages are as follows:—

Hand miners, 13s. 4d.

Surface labourers and truckers. 11s. 8d.

Foreman blacksmith, 15s.

Boys, from 6s. 8d.

Telephone communication with Port Hedland is about to be established, and this will be of great convenience to the residents in the district.

*The Tinstone Lease*, adjoining the Mt. Cassiterite mine, is being worked by two men, and some other claims in the neighbourhood are also in work, but in each instance only the very best of the ore is taken, as owing to there being no dressing plant in the district the medium and low grade ore cannot be profitably dealt with.

About 10 miles direct south from Wodgina, and a little south-west of the Stannum Group, Siffleete's claim is being worked by the owner alone. Only



surfacing is being done, and the best bunches of ore are bagged for export. There are several lodes exposed on this claim, and the surface indications are apparently very favourable. The claim is stated to have yielded 7 tons of black tin by dry-blowing and dollying.

No work is going on in the Stannum Group of leases, and further south the Mt. Francisco and other claims are simply being fossicked by a few men.

The prospects of this centre appear to be very good, and if there was a dressing plant in the neighbourhood there is no doubt that the tin mining industry would quickly revive and a large export of tin result. Under present circumstances it is pos-

sible only to extract the very richest portions of the lodes for bagging, and this policy cannot long be continued. A central position for the erection of a plant would be in the neighbourhood of Siffleete's claim. This would serve the Wodgina, Stannum, and Mt. Francisco centres, and its erection would be a great boon to those places. The construction of the Port Hedland-Marble Bar railway will be of some assistance to these districts in reducing cost of transport to the sea-port, and the further south the line can be deflected the greater will be the advantage to these fields.

I attach the following table showing the total output of black tin in the Marble Bar district up to 31st August, 1909:—

PILBARA GOLDFIELD.

MARBLE BAR DISTRICT.

Table showing Quantity and Value of Black Tin produced up to 31st August, 1909.

Locality.	No. of Lease.	Registered Name of Company or Lease.	Total Produced up to 31st December, 1908.				Total produced for eight months to 31st August, 1909.			
			Quantity.				Quantity.			
			Lode.	Stream.	Total.	Value.	Lode.	Stream.	Total.	Value.
			tons.	tons.	tons.	£	tons.	tons.	tons.	£
Cooglegong ..	..	Sundry Claims ..	..	1,176·34	1,176·34	91,974	..	59·95	59·95	4,778
Mill's Find ..	..	Do. ..	..	·85	·85	69	..	..	..	..
Moolyella ..	..	Voided Leases ..	..	330·53	330·53	21,340	..	..	..	..
Do. ..	..	Sundry Claims ..	..	2,202·55	2,202·55	195,614	..	95·51	95·51	7,401
Old Shaw ..	..	Voided Leases ..	..	6·73	6·75	424	..	..	..	..
Do. ..	..	Sundry Claims ..	..	214·04	214·04	14,525	..	..	..	..
Wodgina ..	88	Chamberlain ..	..	·35	·35	60	..	..	..	..
Do. ..	85	Commonwealth ..	..	2·95	2·95	348	..	..	..	..
Do. ..	84	Mt. Cassiterite ..	146·02	13·85	159·87	14,996	69·50	..	69·50	4,865
Do. ..	93	Mt. Cassiterite North ..	9·67	..	9·67	971	..	..	..	..
Do. ..	89	Tinstone ..	11·95	..	11·95	1,170	2·75	..	2·75	220
Do. ..	..	Voided Leases ..	..	6·10	6·10	461	..	..	..	..
Do. ..	..	Sundry Claims ..	..	44·50	45·28	3,955	..	·50	·50	40
		Total ..	171·72	3,995·51	4,167·23	345,907	72·25	155·96	228·21	17,304

Total Black Tin produced to 31st August, 1909.

	Tons.	Value.
Lode .. ..	243·97	..
Stream .. ..	4,151·47	..
	<u>4,395·44</u>	<u>£363,211</u>

COPPER.

No copper mining is being carried on in the Pilbara Goldfield, but copper is known to exist in one or two localities.

The official records show that in 1907 a parcel of 7·77 tons of ore from the Roy Mine, M.L. 147, in the North Shaw centre, yielded 1·90 tons of metallic copper.

Warrawoona Centre.

At the south end of the main Warrawoona range of hills, near the old Ironlad battery, a vein of copper ore occurs in the schist lying along the northern side of the quartzite dyke. This has been traced for several miles in a south-westerly direction and in places has been slightly prospected. From what can be seen of it at surface the lode does not appear to have much width, but sufficient work has not been done to show whether it improves in depth. From some of the prospectors workings samples are stated to have assayed 30 per cent. copper. The ore does

not appear to have been tested for gold. It is probable, with the advent of the railway, that this lode will be further prospected.

SNELL'S CLAIMS.

I heard of these while at Marble Bar but as, on making inquiry, I found that no work was in progress and no prospectors on the ground, I did not proceed thither. I obtained the following information from Mr. W. A. Snell who has raised and exported a small parcel of ore from the lode, and who states that he is about to apply for a lease. The ore was transported to Port Hedland by camel team returning from the Eastern Creek district. The locality is described as about 90 miles E.N.E. from Marble Bar by way of Bamboo Creek and Warrawagine Station. The lode is described as being 7ft. wide, and having an approximately north and south course. The ore occurs in bunches varying from 5 to 20 tons in quantity, and assaying 30 per cent. copper. Mr.

Snell showed me account sales showing that in February, 1908, he shipped to H. A. Watson, of Liverpool, England, a parcel of 12 tons 18cwt. of ore, showing an assay value of 22.72 per cent. copper and 3.20ozs. silver per ton. This realised a net sum of £149.

#### TANTALITE.

The only output of tantalite in the Pilbara Goldfield, so far, has been in the Wodgina mining centre. The ore, however, is known to occur at a spot about 25 miles east of Wodgina, not far from Green's Well, but no mining has been done in that locality.

##### *Wodgina Centre.*

*The Anchorite and the M.H.*, M.Ls. 86 and 87, are held by Messrs. McInnes, Marshall, Mitchell, and Johannsen. On lease 86 a shaft has been sunk 35ft. on a lode dipping about 45deg. east and having a width of about 4½ft. The footwall is granite and the hanging wall greenstone. The lode is felspar, in

which nodules of tantalite are seen distributed. In sinking the shaft, 15cwt. of ore was picked from the broken rock, and it is estimated that there are 10 loads in the dump which will yield 5 per cent. of tantalite. Prior to the lode being found, 3 tons of ore were picked up on the surface. The ore is estimated to contain from 68 up to 72 per cent. tantalitic acid. The owners of these claims have been asked to quote a price for 100 tons of 65 per cent. ore. They have done this, but, at the time of my visit, they had not received any reply.

As, at present, there is no steady or regular demand for the ore, claim-holders find themselves faced with a rather serious difficulty. They are not, financially, in a position to raise and stack ore for which there is no immediate sale, and on the other hand they are liable to have their holdings "jumped" or forfeited if they are not careful to comply with the labour conditions of the lease.

The total output of tantalite ore is as follows:—

	Tons.	Value, £
From the above Leases, to 31st December, 1908 . . . . .	34.10	5,445
From Sundry Claims, to 31st December, 1908 . . . . .	51.50	6,124
<b>Total . . . . .</b>		<b>£11,569</b>
From H.M. and Anchorite Leases, for eight months ending 31st August, 1909 . . . . .	.45	113
<b>Gross Total . . . . .</b>		<b>£11,682</b>

#### ASBESTOS.

##### *Pilbara Asbestos Company's Claims.*

These are situated about 25 miles, by road, westerly from Cooglegong, in very rough, hilly country. Two lodes, known as A and B, have been discovered and have been prospected for a considerable length by a series of trenches, pits, and shafts, the latter ranging from 70 to 140 ft. in depth. The lodes occur in serpentine rock and lie parallel to one another, and are separated by a diorite bar which forms the footwall of one lode and the hanging wall of the other. The width of asbestos-bearing rock varies from 15 to 36 inches and the percentage of fibre from 10 to 30 per cent., in lengths ranging from half an inch to over six inches.

At the 140ft. level of the hauling shaft the lode has been driven upon for an aggregate length of 228ft. and its appearance here is superior to what it is on the surface and for a few feet down. In depth the lode has a tendency to increase in size.

At the time of my inspection no work was going on, operations having been suspended pending the Company obtaining expert advice in regard to the machinery to be installed for extracting the fibre from the rock.

##### *Marsh's Asbestos Claims.*

These are situated about seven miles south-west from Marble Bar in the rough hills forming the eastern edge of the Main Range, and to the west of the telegraph line from the Bar to Nullagine. They comprise M.Ls. Nos. 164, 165, 166, 167, 168, 169, and 176, aggregating 288 acres. At the present time very little prospecting work has been done in the way of sinking shafts or in tunnelling the hills. But in places where work has been initiated the rock is seen to carry good percentages of asbestos. The veins exposed vary in length of fibre and many are up to

half an inch and one inch; the quality appeared to be good.

The surface of the leases shows the asbestos to be distributed over a large area and there can be little doubt in the matter of quantity. Considerable preliminary expenditure, however, will be necessary for the formation of roads through very rough country, sinking wells or making dams for water supply, grading for machinery, and the installation of plant necessary for extracting the fibre.

In addition to the leases held by the Pilbara Asbestos Company and by Mr. Marsh, there are other localities known to prospectors at which the mineral occurs. But until the question in regard to the necessary plant required to extract the fibre has been settled there is no inducement to take up additional areas of ground.

Up to date no large quantity of asbestos has been exported, the only parcel recorded being 40 tons from the Pilbara Asbestos Company's leases, which was valued at £1,600.

#### SILVER-LEAD ORE.

There is no record of silver-lead mining in the Pilbara Goldfield but the existence of the ore is known. From Mr. W. A. Snell I learned of a lode having been discovered in the country lying between the Davis and Oakover Rivers at a point described as being, approximately, 90 miles from Marble Bar and 60 miles from Wallal, on the seaboard. He describes the lode as having been traced for a length of nine miles, and that the ore occurs in bunches. He cut into the lode for about 14ft. and took out a parcel of 3 tons 17cwt. which he shipped to H. A. Watson, of Liverpool, England. The account sales showed an assay value of 50 per cent. lead, 6.85ozs. silver per ton, and 2.62 per cent. copper, of the value per ton of £20 19s.

Table showing total quantity and value of minerals produced in the Marble Bar District of the Pilbara Goldfield.

	Fine ozs.	Value, £
Gold, from alluvial, dollied, specimens, and ore treated, to 31st July, 1909	90,688·69	385,221
	Tons.	
Black Tin, to 31st August, 1909	4,395·44	363,211
Tantalite	86·05	11,682
Asbestos	40·00	1,600
Total Value		£761,714

### PILBARA GOLDFIELD.

#### NULLAGINE DISTRICT.

##### Nullagine Centre.

G.M.Ls. Nos. 119, 120, 121, and 122, are held by the British Exploration of Australasia, Ltd., and are situated on the conglomerate beds. A good deal of prospecting by means of tunnels driven into the hills has been done in past times, but nothing in the way of mining is now going on. A few men are fossicking for gold-bearing veins in the old workings, and others are dry-blowing in the gullies. The occurrence of gold in the conglomerate appears to be very erratic, and nothing to indicate any regular run has been found. The highest values appear to mostly occur in those seams and veins that carry a good deal of iron oxide.

It is very possible that under a good system of prospecting these beds some more regular line of gold deposition might be discovered and proved to be payable.

The best system in this direction would appear to be that of sinking a series of shafts across the beds at certain intervals and from these—after bed-rock had been reached—run out drives and crosscuts and engage in careful sampling. The work so far done on the beds is by no means sufficient for thoroughly testing them, and in extent is very small in comparison to the great area covered by the conglomerate.

#### REEF MINING.

The country on the eastern side of the Nullagine River shows a large number of quartz reefs, but at the time of my visit no work of any kind was being done on any one of them. In past times fairly good returns were obtained from the Day Dawn and Victory lines of reefs, and elsewhere in the district. The old workings were practically inaccessible for purposes of examination underground, but from the appearance of the quartz at surface and from the stated yields one is led to think that further work might be undertaken with advantage.

In the country in the neighbourhood of the Two Dromedaries, and further south near Castle Creek, there are reefs outcropping which deserve to be prospected. Mining appears to have prospered while there were means at hand for crushing the stone raised; but for one reason or another the owners of batteries shifted on to other localities, and reef mining died a natural death.

It is not likely to recover until some crushing plant is erected; but there should be a good opening for the profitable running of one. The old-time charge for crushing was 27s. 6d. per ton, and only the very richest ore could be made to pay at this rate. Now that the railway will reduce cost of supplies, and power can be obtained by the use of oil or producer-gas engines in lieu of steam, there should come a revival in mining.

I attach a table showing the gold yield from this centre up to 31st July, 1909.

#### NULLAGINE CENTRE.

Total Gold produced to 31st July, 1909, was:—

No. of Lease.	Registered Name of Company or Lease.	Total Gold produced up to 31st December, 1908.				Gold produced for 7 months to 31st July, 1909.	
		Alluvial.	Dollied and Specimens.	Ore Treated.	Gold Therefrom.	Ore Treated.	Gold Therefrom.
		Fine ozs.	Fine ozs.	Long Tons.	Fine ozs.	Long Tons.	Fine ozs.
G.M.Ls. 119, 120, 121, 122	British Exploration of Australasia, Ltd.	..	..	777·00	88·93	..	..
G.M.L. 122	Grant's Hill	..	..	1,658·00	701·61	..	..
G.M.L. 119	Conglomerate	..	..	..	..	10·00	55·00
G.M.L. 156	Mundalla	..	..	45·50	340·38	..	..
	Voided Leases	..	13·96	4,946·25	10,065·42	..	..
	Sundry Claims	104·70	97·49	3,789·00	8,111·74	..	..
L.C. 371	Kelly and party (38·50T. Cyanide)	..	..	..	..	..	33·88
P.A. 71	Cook and party	..	..	..	..	5·00	7·20
P.A. 7	Baldwin (40 Ton Cynd.)	..	..	..	..	..	0·82
P.A. 8	Doherty	..	..	..	..	4·25	4·56
P.A. 8	Doherty (6·50 Ton Cy.)	..	..	..	..	..	1·55
	Totals	104·70	111·45	11,215·75	19,308·08	19·25	103·01

Total Gold produced to 31st July, 1909.		ozs.
Alluvial	..	104·70
Dollied and specimens	..	111·45
Ore treated, long tons, 11,235·00	..	..
Gold therefrom, fine ozs.	..	19,411·09
Total fine ozs.	..	19,627·24

Average yield per ton of stone treated (exclusive of alluvial, dollied, and specimens)—1·72 fine oz.

*Middle Creek Centre.*

*The Barton Mine.*—This mine is on a boldly defined line of reef which outcrops for over 1,200ft. in length along the surface. It has been worked to a depth of 150ft. and for over 350ft. in length at the lowest level. Other shafts and drives have been opened south of the main workings, and the principal work has been done in underlay shafts.

The main shaft, at which a small hoisting winch has been installed, has a depth of 173ft. and reef and lode formation at that depth are about 10 to 15 ft. wide in the aggregate.

No driving has been done in a north-easterly direction, but south-westerly a drive has been extended for 350ft. A strong quartz reef has been left standing on the westerly, or footwall side of the drive as it did not prove to be payable where prospected, though it carries gold throughout. Its actual width has not been determined. The country at this depth is a soft schist. This stands strongly and well while dry, as in the upper levels, but here below water level it is weak and the drive has had to be timbered with legs and cap sets.

At about 200ft. from the vertical shaft a crosscut was driven east 6ft. and another lens of stone was met with and proved to be 18 inches wide. This was stoped to the 110ft. level for a length of 200ft., giving 1,250 tons of ore of an average value of 27 to 28 dwts. per ton. This is distinctly a lens of quartz lying parallel to the main lens and separated from it by 6ft. of schist. A winze has been sunk on the reef for 26ft.; its width of 18 inches is maintained and the ore obtained from it is stated to have yielded 22dwts. by battery amalgamation, its gross assay value being given at 32 to 34 dwts. per ton.

At about 250ft. from the shaft the main drive has been deflected on to the course of the eastern reef and follows that to the end. The face exposes 4in. of quartz. This drive should be extended as, judging from the surface, it is almost certain that an additional lens will be found to extend south-westerly. The reef is portion of a lode formation composed of schist and small veins of quartz, but is reckoned too poor to pay the present owners under the existing conditions of work.

The inflow of water per day is estimated to be 1,500 gallons and is suitable for steam purposes. It forms a sediment but no scale. Each week two bags of Mountain Gum bark are thrown into the feed water. The boiler is cleaned out bi-weekly.

From the 110ft. level to surface a strong lens of stone has been stoped out at those points at which the highest values were met with, but there appears to be a good deal of stone remaining which is estimated to be worth 7 to 8 dwts per ton. In some places the reef was from 5 to 6 ft. wide.

Up to the end of July, 1909, this mine has yielded 5,973.56 fine ozs. gold from 4,581.65 tons of ore, or an average yield of 1.30 fine ozs. per ton. This includes the gold from scaling the plates, and from treating 400 tons of battery sands by cyaniding. The cyanide extraction from the above parcel was .26ozs. fine gold per ton.

A ten-head battery, with engine, berdan pans, etc., and a cyanide treatment plant consisting of four 20-ton vats, is situated on the highest point of the hill along which the reef outcrops. The main hauling shaft is at the foot of the outcrop, almost on a level

with the plain, and at some distance from the battery. All ore raised at the shaft had to be extensively handled into drays and carted to the battery, thus involving very considerable expense which might have been obviated quite easily. From the surface indications I should estimate that the ore channel on this mine was from 100 to 150 ft. in width. In addition to the main reef there are two or more well defined reefs outcropping to the eastward, and free gold has been prospected in at least one of these. The mine is one that should be well worth being properly developed and opened up by further sinking and cross-cutting. All the surface plant, also, requires to be re-arranged so as to secure economy in handling ore, etc.

At the time of my visit only two men were employed. Owing to the death of one of the owners and the necessity for realising his estate, an attempt was being made to dispose of the mine.

At about a quarter of a mile from the Barton mine, in a north-easterly direction, the line of reef is faulted by an intrusion of ironstone and copper ore, the latter showing freely as blue and green carbonate.

Beyond this the reef continues on to the old Hoptoun Mine. This is now being worked as a quartz claim, No. 397, by Kinsey and Nestid. Nothing more than surfacing is being done, and fossicking in the old workings. The outcrop of quartz is bold but an open-cut shows a series of small veins of quartz dipping easterly at a low angle. The country rock is schist, very twisted. The values met with by the present workers vary from 3 to 10 dwts. per ton, but it is said that in past times some very rich patches were obtained. The distance to the State battery is 5½ miles and cartage costs 2s. per ton per mile.

*The All Nations Extended.*—This is a quartz claim held by James Glen, who is working it single-handed. The reef has the usual north-east strike but where exposed in some workings it dips 65deg. west, and therefore across the dip of the country, which is easterly. The reef and lode formation has a width of from 4 to 5 ft. composed of quartz and ironstone veins. The owner is following a small vein along the footwall, which is stated to be worth 2ozs. gold per ton. At about 100ft. from the surface the lode becomes almost vertical.

*The Federation Mine* (G.M.L. 173L) is held by John S. Potts. The reef outcrops along the crest of a hill and is now being worked from a tunnel that has been driven from the northern side to crosscut it. The reef strikes north-east and dips easterly at about 60deg. In width it varies from a few inches up to 9ft. About 100ft. of driving on the reef has been done, and at the present time a winze is being sunk from the level and is down about 50ft. at which depth the reef maintains its width as in the upper level. The owner states that occasional shutes of ore, from 12 to 15 ft. in length, have yielded very well. In places the reef has been mined right up to the crest of the hill. At the present time there are about 40 to 50 tons of ore at grass estimated to be worth from 1 to 2 ozs. per ton. The official record of this mine, up to end of 1908, shows a yield of 154.70ozs. gold from 44.25 tons of ore.

Elsewhere in this centre very little work was going on in addition to the above mines, and what there was was chiefly in the form of fossicking in old workings.

I attach a table showing the total gold production from the mines hereabout up to 31st July, 1909:—

MIDDLE CREEK MINING CENTRE.  
Total Gold produced to 31st July, 1909.

No. of Lease.	Registered Name of Company or Lease.	Total Gold produced to 31st December, 1908.		Total Gold produced for 7 months to 31st July, 1909.		
		Ore treated.	Gold therefrom.	Cyanided.	Ore treated.	Gold therefrom.
106L .. ..	Barton (Plates) .. ..	Long Tons 4,530·65	Fine ozs. 5,395·41	Tons. ..	Long Tons 51·00	Fine ozs. 30·10
Do. .. ..	Do. .. ..	..	..	..	..	169·44
Do. .. ..	Do. .. ..	..	..	400·00	..	107·71
172L .. ..	Eureka .. ..	46·00	46·56	..	..	..
173L .. ..	Federation .. ..	44·25	154·70	..	..	..
136L .. ..	Little Wonder .. ..	751·00	3,215·58	..	..	..
138L .. ..	Little Wonder, West .. ..	195·50	471·36	..	..	..
168L .. ..	Yes-No .. ..	122·00	160·25	..	69·25	82·67
Do. .. ..	Do. .. ..	..	..	47·00	..	15·05
	Voided Leases .. ..	56·00	44·95	..	..	..
	Sundry Claims .. ..	25·50	53·83	..	..	..
Q. C. 391 ..	Groves & Party .. ..	..	..	..	5·00	2·35
L. C. 393 ..	Clarke & Party .. ..	..	..	..	7·75	7·90
	Totals .. ..	5,770·90	9,542·64	..	133·00	415·22

Total Gold produced to 31st July, 1909.

Alluvial .. ..	Nil
Dollied and specimens .. ..	Nil
Ore treated, long tons, 5,903·90	
Gold therefrom, fine ozs. .. ..	9,957·86
Total fine ozs. .. ..	9,957·86

Average yield per ton of ore treated—1.68 fine ozs.

Twenty-Mile Sandy Centre.

The *Mountain Maid Mine* lies about two miles easterly of the State Battery in this district.

The mine is situated at the top of a high hill in schist country, which is very much twisted and disturbed. The reef evidently conforms with the folds of the schist and forms a series of saddles and reverse-saddles which make it a rather perplexing proposition to work until thoroughly understood.

At the time of my visit apparently two reefs were exposed in one of the levels, which had the appearance of dipping towards one another. A crosscut had been driven at a lower level in the expectation of cutting into a large body of ore, but no sign

of reef was met with; the crosscut had evidently passed below the point representing the trough of reversed saddle.

The present owners, Triat and Son, have been only 12 months at work, and are getting out stone for crushing.

The official record for this mine shows that up to the end of July, 1909, 127·00 tons of stone had yielded 399·87ozs. of gold.

With the exception of some quartz claims and prospecting areas, there is no other mine working in this district.

I attach a table showing the total gold produced in the neighbourhood up to 31st July, 1909:—

TWENTY-MILE SANDY MINING CENTRE.

Total Gold produced to 31st July, 1909.

No. of Lease.	Registered Name of Company or Lease.	Total Gold produced to 31st Dec., 1908.			Gold produced for seven months to 31st July, 1909.		
		Dollied and Specimens.	Ore treated.	Gold therefrom.	Cyanided.	Ore treated.	Gold therefrom.
167L .. ..	Mountain Maid .. ..	..	Tons. (2,240lbs.) 107·00	Fine ozs. 268·70	Tons. (2,240lbs.) ..	Tons. (2,240lbs.) 20·00	Fine ozs. 105·48
Do. .. ..	Do. .. ..	..	..	..	14·00	..	25·69
	Voided leases .. ..	..	375·95	480·77	..	..	..
	Sundry Claims .. ..	14·36	1,671·90	2,901·55	..	..	..
L. C. 379 ..	Houlton & Party .. ..	..	..	..	..	20·25	19·63
Do. .. ..	Do. .. ..	..	..	..	..	39·0	16·87
Q. C. 391 ..	Groves & Party .. ..	..	..	..	..	5·00	2·35
Do. .. ..	Do. .. ..	..	..	..	44·0	..	19·20
L. C. 394 ..	Bower, B. .. ..	..	..	..	..	11·75	2·44
Do. .. ..	Do. .. ..	..	..	..	8·0	..	1·49
R. C. 395 ..	Dunn & Party .. ..	..	..	..	..	10·25	6·07
R. C. 396 ..	Reward Claim .. ..	..	..	..	..	30·25	12·76
P. A. 9 ..	Bice & Party .. ..	..	..	..	58·5	..	14·14
	Totals .. ..	14·36	2,154·85	3,651·02	..	99·50	226·12

Total Gold produced to 31st July, 1909.

Alluvial .. ..	Nil
Dollied and specimens .. ..	14·36
Ore treated, long tons, 2,254·35	
Gold therefrom, fine ozs. .. ..	3,877·14
Total .. ..	3,891·50

Average yield per ton of ore (exclusive of dollied and specimens)—  
1.72 fine oz.

*Mosquito Creek Centre.*

*The Ard Patrick Mine*, G.M.L. 143L.—The owners are Messrs. Boyer, Underwood, and Priest. Six men are employed inclusive of the manager. The reef strikes N.E. and S.W., and dips north-westerly 65 to 70deg. A vertical shaft has been sunk 260ft., and the lowest working level is at 250ft. At this point a drive on the reef in a north-easterly direction has been extended 35ft. The width of reef as exposed in the drive ranges from 24 to 36 inches, and appears to be widening underfoot. I was informed that from this level a crushing of unselected ore aggregating 27 tons yielded 2ozs. 16dwts. per ton by battery amalgamation, and the assay value of the sands was 27dwts. per ton. A second parcel of 52 tons yielded 2ozs. 1dwt. per ton, and the sands assayed 11dwts. 19grs. per ton.

At a depth of 80ft. from surface the length of ore mined for the battery was 20ft., and at 130ft. it was 70ft. in length. The length at the lowest level is not yet known.

The quartz is stained with iron oxide and also carries a little iron pyrites.

Scheelite is met with in the reef, but mostly towards the western end of the property. The enclosing country is a soft tough schist which stands well with a minimum of timber. But it is probable that if the mine was more vigorously worked and heavier and more frequent blasting carried on additional timbering would be found necessary. At present the workings are all well secured and apparently safe. The ladder way down the incline shaft and through the rearings at the ends of the stopes is in good condition.

The surface shows, by out-crops of quartz, that there are reefs parallel to the one now being worked. But no crosscut has been run out from any level in the mine to prospect any of these. It is curious that this development should be overlooked. In the very possible event of one or more of these reefs proving payable, the owners would greatly increase their possible output of ore and at very little additional expense for development. As evidenced by surface indications, the schist dips both east and west, and it is probable that the reefs occur in saddle-formation. A succession of saddles may be found as sinking is carried on.

The officially recorded out put from this mine is 637.75 tons of ore, yielding 2,127.91 fine ozs. of gold, or an average of 3.33 fine ozs. per ton.

*The Surprise Mine* lies to the West of the Ard Patrick, but was not being worked when I visited the district. Up to the end of last July the output is given as 246.25 fine ozs. of gold from 101.50 tons of ore, or an average of 2.42 fine ozs. per ton.

*The Galtee More Mine*, G.M.Ls. 79L and 145L.—Owned by Messrs. Boyer, Connelly, and Dunn. The main reef, or the one that has been most worked, presents the same strike and general characteristics as the Ard Patrick. It is lens-shaped and varies in width from a few inches up to 36 and 48 inches. What is known as the west shaft has been sunk

235ft., and the line of reef has been worked by a series of shafts and open-cuts along a length of about 600ft. At the present time a parallel reef is being worked. This is found to have an easterly dip, or the opposite to that shown in the main reef. It appears to be one side of a saddle, the apex of which has been broken away. A vertical shaft was sunk 100ft. to intersect it, and thence the shaft followed on its incline for a further 70ft. The width varies from 24 to 36 inches. From this shaft about 100 tons of ore were being carted to the State Battery; the owners estimate it to yield from 25 to 30dwts. per ton. The official records up to 31st July of this year show that the total output from these leases has been 1,682 tons for a yield of 3,817 fine ozs. of gold, or an average of 2.26 fine ozs. per ton. About four men are employed. The cost of cartage to the battery, a distance of 7 miles, is from 7s. 6d. to 10s. per ton.

At about three miles easterly from the Galtee More mine I visited a small group comprising the Off Chance, the Land's End, and the Belle Vue mines.

*The Off Chance*.—The old workings have been abandoned, but along the same line of reef Messrs. Martin, Finney, and Aikman are engaged in prospecting. At the time of my visit very little fresh work had been done. At one point a small, but perfect, saddle reef has been disclosed.

*The Land's End Mine*.—This is at present abandoned, but at one time some very rich ore was raised.

The reef shows strongly on the hill to the east of the main workings, but going westerly its course has been faulted and much disturbed. It was at this point that the rich ore was got, but the workers became disheartened at not being able to follow the reef, and stopped working.

*The Belle Vue Mine*.—This is practically abandoned, there being only one man fossicking in the old workings. The country hereabouts is greatly disturbed and faulted.

*The Parnell Group*.—These mines are quite abandoned. It is stated that there are large quantities of ore in sight, but that the value was too low to permit of profitable work without a battery on the ground.

## COOK'S CREEK.

I was not able to visit this locality, but gained the following information from Mr. Toohey, who, with Messrs. Wilson and Thompson, are working on P.A. 9. The claim is about six miles east of the Mosquito Well. A shaft has been sunk 20ft. on a reef varying from 4 to 36 inches in width. It has a nearly east and west course, and dips south about 45deg. One crushing of 15 tons is stated to have yielded at the rate of 2.10ozs. fine gold per ton. A second parcel is in course of being treated.

I attach a table showing total gold produced in this centre.

## MOSQUITO CREEK MINING CENTRE.

Total Gold produced to 31st July, 1909.

No. of Lease.	Registered Name of Company or Lease.	Total Gold produced to 31st December, 1908.				Total Gold produced for seven months to 31st July, 1909.		
		Alluvial.	Dollied and Specimens.	Ore Treated.	Gold Therefrom.	Cyanided.	Ore Treated.	Gold Therefrom.
143L .. ..	Ard Patrick .. ..	Fine ozs.	Fine ozs.	Long Tns.	Fine ozs.	Tons.	Long Tns.	Fine ozs.
Do. .. ..	do. .. ..	..	..	558·50	1,928·86	..	79·25	177·90
95L, 109L ..	Bell Extended Co., Ltd.	..	..	..	..·35	10·00	..	21·15
109L .. ..	Federal .. ..	..	..	48·00	56·46	..	..	..
79L .. ..	Galtee More .. ..	..	..	586·00	1,648·33	..	106·00	188·85
Do. .. ..	do. .. ..	..	..	..	..	76·00	..	19·84
79L, 145L ..	Galtee More Leases ..	..	..	990·00	1,959·98	..	..	..
159L .. ..	Land's End .. ..	1·07	..	96·70	327·71	19·00	..	3·91
171L .. ..	Latest Surprise .. ..	..	21·42	108·00	147·74	..	101·50	76·36
Do. .. ..	do. .. ..	..	..	..	..	67·50	..	22·15
95L .. ..	Parnell .. ..	..	..	357·35	366·08	..	..	..
95L .. ..	Parnell .. ..	..	..	196·50	87·75	..	..	..
95L, 109L ..	Parnell Leases .. ..	..	..	1,815·00	1,736·09	..	..	..
	Voided Leases .. ..	..	..	1,090·00	1,866·00	..	..	..
	Sundry Claims .. ..	..	166·47	1,860·44	2,633·65	..	..	..
L.C. 370 ..	Bill T. .. ..	..	..	..	..	12·75	..	1·63
L.C. 386 ..	Trean, R. .. ..	..	..	..	..	3·75	..	1·07
P.A. 5L ..	Baldwin & Cameron ..	..	..	..	..	..	5·00	4·70
P.A. 9 ..	Bice & Toohey .. ..	..	..	..	..	..	15·00	31·59
L.C. 391 ..	Groves & Party .. ..	..	..	..	..	3·50	..	·65
186L .. ..	Belle Vue .. ..	..	..	..	..	..	6·00	11·18
R.C. 388 ..	Litta .. ..	..	..	..	..	..	26·00	17·80
	Totals .. ..	1·07	187·89	7,706·49	12,759·00	..	338·75	578·78

## Total Gold produced to 31st July, 1909.

Alluvial .. ..	1·07
Dollied and specimens .. ..	187·89
Ore treated, long tons, 8,045·24.	
Gold therefrom, fine ozs. .. ..	13,337·78
Total .. ..	13,526·74

Average yield per ton of ore treated (exclusive of alluvial, dollied, and specimens)—1·65 fine oz.

## State Battery at Twenty-Mile Sandy.

This 10-head battery was erected in the hope that it would materially assist in the development of the mines in the surrounding districts. At the present time the total number of mines producing ore within range of the battery is 11, giving occupation to 27 men, inclusive of working owners and managers. Crushing commenced in May, 1905. Up to the 14th August, 1909, the total quantity of ore supplied to the battery was 5,357·60 long tons, or an average of 3·98 tons per working day over the whole of the period. For each year the supply works out as follows:—

Year.	Days.	Total tons supplied.	Average daily supply, tons.
1905 ..	209 ..	1,652·35	7·90
1906 ..	313 ..	1,141·50	3·64
1907 ..	313 ..	1,061·50	3·39
1908 ..	313 ..	820·25	2·62
1909 ..	196 ..	682·00	3·47
	1,344 ..	5,357·60	3·98

This is an absurd result in view of the ore that could have been supplied by the mine owners had

they undertaken their work seriously. Taking the days in 1909 it shows that the ore supplied by 27 men amounted to only 2·56cwt. per man per day! This does not look like arduous labour on their part nor economical management on the part of the owners and managers. To the State it signified a heavy loss in wages, fuel, and stores at the battery. Results such as these are not likely to make the Government respond eagerly to applications for the erection of crushing plants. Nor do they go to show that the installation of this particular battery has had any vital effect in promoting the development of the mines.

## Eastern Creek District.

This comparatively new mining centre lies about 16 miles distant by road from the Government well at Mosquito. A much shorter track, doubtless, could be found without much trouble. The road at present used follows King Creek in a N.N.E. direction for about nine miles, then N.E. for about three miles to where Cook's Creek is crossed, and thence almost due easterly for about four miles.

The country passed through from Mosquito to Cook's Creek comprises steep hills of schist, in which

occur numerous outcroppings of iron-stained quartz reefs. Of these very few have been even knapped, though their appearance should induce prospectors to carefully test them.

From Cook's Creek crossing the track runs sharply upward, and enters the belt of country in which the workings are to be met with. The hills are very steep, and are separated one from the other by deep gorges, and only are they in a few instances connected by saddles. The various workings are situated on, or near, the summits of these cones, and to visit each means a steep climb, and a descent which is less pleasant than the climb. The highest point in the ranges—just at the back of the camp—appears to be about 300 feet above the crossing at Cook's Creek, and the adjoining hills rise to one or two hundred feet more or less. The main lines of range have a trend about N.E. and S.W.

The strip of country in which the gold-bearing reefs have been located has a width of about half a mile, and is bounded on the northern and southern sides by high serrated ranges of quartzite with which are associated masses of conglomerate and ironstone. The quartzite shows, occasionally, a banded structure.

The conglomerate in places overlies the dykes, but as a rule it is found lying on the hanging wall side of the quartzite, and more or less fractured. To the north of the camp where the creek cuts through the hills, the conglomerate is seen resting on its edge on the schists.

The schists dip to the southward, and have a course a little north of east, and are traversed by small dykes of greenstone and sandstone striking a more northerly course.

The quartz reefs are numerous, and outcrop along the sides and tops of the hills. They dip southerly, but their strike does not closely conform to that of the country but takes a slightly more northerly direction.

On the northern side of the belt the reefs come in contact with the main dyke, and on the Reward lease the reef passes into the dyke, follows its course for some distance, and then passes out to the north-east through the dyke.

In width the reefs vary from a few inches up to three and four feet. The quartz carries a good deal of ironstone, some of which is haematite, but more frequently in the form of gossan. This last-named ore fills cavities in the quartz, and frequently is very rich in gold. The gold is very fine in form, more especially when in the gossan; it occurs also in solid quartz, and then is in much coarser particles.

Twenty-one men are in the camp, of whom 15 comprise some of the shareholders and employees of the Eastern Creek G.M. Co., and the balance are other claim holders, woodcarters, etc.

The company hold four leases, viz., the Rose, Harp, Crescent, and Reward, aggregating 30 acres. It has erected a 10-head battery of 800lbs. stamps, driven by an engine and Cornish boiler. The importation of this into such hilly country was a matter of difficulty and expense, but by its erection it was possible to treat a grade of ore that otherwise must have been thrown to one side, if carting to the 20-Mile Sandy State battery had been necessitated.

For some time past there has been a lack of water, and at one time the supply for the battery had to be supplemented by cartage by bullock teams from Cook's creek, four miles distant.

At the present time a cyanide plant is in course of erection, and the accumulated sands will be treated.

Owing to the steepness of the hills the transport of ore from the mines to the battery is a matter of some difficulty and expense. The flying-fox method is undoubtedly the best adapted to the situation, but considerable capital would be required to furnish each mine with this mode of conveyance. At present, camels are employed. Paths are cut along the sides of the hills on a suitable grade, and the camels carry five or six hundred weight of ore in green hide pack bags. At this work they have been found to be very sure footed, and only in one instance has a camel fallen. The cost of transport in this fashion is stated to be 7s. 6d. per ton.

Firewood is at present very plentiful, and is delivered at the battery at from 25s. to 30s. per cord.

*The Shamrock Mine* (G.M.L. 178L, 6 acres) is owned by Messrs. Edmen and Chavi.

A series of open cuts have been made on the reef to depths of 8 to 10 feet, showing widths of stone from 6 to 12 inches. The quartz is dark in colour, and in places carries fair sized crystals of pyrites, commonly known as "Devil's dice."

Towards the north-east boundary of the lease a pipe of ore 5 feet in length and from 3 to 4 feet wide was followed down for a depth of 10 or 15 feet, and is stated to have given good results. Up to the end of July, 1909, two crushings have been taken from this mine. The official records show, 14.25 tons for a yield of 71.55 fine ozs., and 80.00 tons for 103.01 fine ozs., a total of 94.25 tons for 174.56 fine ozs., or an average of 1.85 fine ozs. per ton.

The cost of crushing at the Eastern Creek G.M. Coy.'s battery is 30s. per ton. Cartage is low as the battery is only a few hundred yards or so from this mine.

At the foot of the hill a vertical shaft has been sunk 102 feet 6 inches by 3 feet 6 inches in the clear. The object of sinking was water, but none was met with at this depth. Down to 40 feet the schist was soft, and in colour brown. Below this it changed to an almost black colour. Boring was hard, but the rock broke well in firing. The shaft is timbered for about 9 feet from the top of the dump. The sinking was done by four men in 8½ weeks. Wages £4 10s. per week per man. Total cost of explosives for the total depth, £15.

*The Eastern Creek Gold Mining Co.*—The chief shareholders in this are Messrs. Garland, Walker, Nickols, Watson, and Doherty. The company own the Rose G.M.L. 179L, the Crescent 180L, the Harp, and the Reward 176L, having an aggregate area of 30 acres.

*The Rose Mine.*—The workings consist of a number of open cuts on a reef outcropping near the summit of the hill.

The quartz shows in small lenses. The country is faulted and disturbed. The maximum width of lens is about 12 inches.

The official returns to end of July, 1909, show that a total of 32 tons of ore yielded 23.54 fine ozs. of gold.



*The Thistle.*—This claim adjoins the Rose on the Western boundary. No work was going on at the time of my visit. The official records show that up to end of July this year 33.50 tons were treated for 25.84 fine ozs., and 22.50 tons of sand cyanided for 7.18 fine ozs., or a gross average yield of a little over one oz. per ton.

*The Crescent Mine* is the most westerly of the group. Near the summit of a hill an open cut exposes small veins of quartz in very disturbed country.

Towards the southern side of the lease at the foot of the hill a tunnel has been driven on the course of a reef for 64 feet. The reef is 6 to 15 inches wide, dipping easterly at an angle of 15 to 20 deg. The quartz shows characteristics similar to those of the reefs above described.

The official record at the end of July of this year shows a yield of 774.70 fine ozs. gold from 407.75 tons of stone crushed, and 8.03 ozs. fine gold from 8.50 tons of sand cyanided, or a total 752.73 ozs. fine gold.

*The Harp Mine.*—This is being worked by open cut on the reef outcropping along the northern slope of a hill, the reef dipping into the hill.

I was informed that five tons of stone had been crushed for a return of 27 dwts. per ton by amalgamation, and the gold contents of the sands not then known. This crushing must have been subsequent to end of July, as it is not included in the returns to that date.

*The Reward Claim.*—The chief reef on this claim outcrops along the south-easterly slope of a hill

which is crested with a banded quartzite dyke lying against which is a mass of conglomerate tilted in conformity with the incline of the dyke.

The reef is well defined for a width of 36 inches. Its course is N.N.E.-S.S.W., and dips south-easterly at rather a low angle. In its N.N.E. course it crosses a gully, and makes directly for the quartzite dyke on top of the hill. Upon touching this it appears to follow and become mixed with the dyke for some distance, ultimately passing through it, and continuing on into the Morning Star lease adjoining.

The quartz is of the same appearance as that in the above mines described.

The official records to end of July of this year show that 21.50 tons treated by amalgamation have yielded 68.07 fine ozs. of gold.

*The Morning Star Mine* (G.M.L. 182L) is held by Mr. Farley, and comprises 12 acres. It adjoins the Reward Claim on the north-east, and appears to be a continuation of the Reward reef.

On the crest of the hill the reef is in conjunction with the quartzite, and is considerably broken. But towards the further end of the claim another reef is being worked.

This outcrops on the northern slope of a hill, and it is much more settled and regular in its course than the Reward reef. This reef is being worked upwards from the level of a creek bed.

The official records show, to the end of 1908, that a crushing of 25 tons yielded 113 ozs. of fine gold.

I attach a table showing the total yield of gold from this centre up to 31st July, 1909.

## EASTERN CREEK MINING CENTRE.

Total Gold produced to 31st July.

No. of Lease.	Registered Name of Company or Lease.	Total Gold produced to 31st December, 1908.			Total Gold produced for seven months to 31st July, 1909.	
		Ore Treated.	Gold therefrom.	Cyanided.	Ore Treated.	Gold therefrom.
180L .. ..	Crescent .. ..	Long Tons. 82.75	Fine ozs. 355.49	..	Long Tons. 325.00	Fine ozs. 389.21
Do. .. ..	do. .. ..	..	..	6.50	..	8.03
176L .. ..	Doherty's Reward .. ..	13.00	59.39	8.50	..	8.68
182L .. ..	Morning Star .. ..	25.00	113.70	..	..	..
178L .. ..	Shamrock .. ..	14.25	71.55	..	80.00	103.01
187L .. ..	Olive .. ..	..	..	..	20.00	13.31
Do. .. ..	do. .. ..	..	..	14.50	..	5.45
179L .. ..	Rose .. ..	..	..	..	32.00	23.54
184L .. ..	Thistle .. ..	..	..	..	33.50	25.84
Do. .. ..	do. .. ..	..	..	22.50	..	7.18
R.C. 392 ..	Clifford and party .. ..	..	..	..	10.00	16.31
	Totals .. ..	135.00	600.13	..	500.50	600.56

Total Gold produced to 31st July, 1909.

Alluvial .. ..	.. ..	Nil
Dolled and Specimens .. ..	.. ..	Nil
Ore Treated (Long Tons), 635.50 .. ..	.. ..	..
Gold therefrom, fine ozs. .. ..	.. ..	1,200.69
Total ozs., fine gold .. ..	.. ..	1,200.69
Average yield per ton of ore treated .. ..	.. ..	1.88 fine ozs.

## PILBARA GOLDFIELDS.

## NULLAGINE DISTRICT.

Table showing Total Ounces of Gold produced in each Mining Centre up to 31st July, 1909.

Mining Centre.	Total Gold produced to 31st December, 1908.				Total Gold produced for seven months up to 31st July, 1909.		
	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Dollied and Specimens.	Ore treated.	Gold therefrom.
	Fine ozs.	Fine ozs.	Long tons.	Fine ozs.	Fine ozs.	Long tons.	Fine ozs.
Eastern Creek .. .. .	..	..	135·00	600·13	..	500·50	600·56
Elsie .. .. .	..	..	428·25	1,340·70	..	..	..
Middle Creek .. .. .	..	..	5,770·90	9,542·64	..	133·00	415·22
Mosquito Creek .. .. .	1·07	187·89	7,706·49	12,759·00	..	388·75	578·78
Nullagine .. .. .	104·70	111·45	11,215·75	19,308·08	..	19·25	103·01
20-Mile Sandy .. .. .	..	14·36	2,154·85	3,651·02	..	99·50	226·12
Sundry parcels treated at:—							
Enterprise Works .. .. .	..	..	..	199·99	..	..	..
Royer's Public Crushing Works .. .. .	..	..	..	7·53	..	..	..
State Battery, 20-Mile Sandy .. .. .	..	..	..	152·46	..	..	77·16
Various Works .. .. .	..	..	50·50	2,407·85	..	..	26·30
Reported by Banks and Gold Dealers .. .. .	4,502·45	22·50	..	..	173·01	..	..
Totals .. .. .	4,608·22	336·20	27,461·74	49,969·40	173·01	1,091·00	2,027·15

## Total Gold produced in Nullagine District to 31st July, 1909.

Alluvial .. .. .	4,781·23
Dollied and Specimens .. .. .	336·20
Ore Treated, Long Tons, 28,552·74 .. .. .	..
Gold therefrom, fine ozs. .. .. .	51,996·55
Total, fine ozs. .. .. .	57,113·98

Average yield per ton of ore treated, exclusive of Alluvial, Dollied and Specimens, 1.82 fine ozs.

## PILBARA GOLDFIELD.

Table showing Total Quantity and Value of Minerals produced.

Mineral.	Marble Bar District.		Nullagine District.		Totals.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Gold, from all sources to 31st July, 1909 .. .. .	Fine ozs. 90,888·69	£ 385,221	Fine ozs. 57,113·98	£ 242,604	Fine ozs. 147,802·67	£ 627,825
Black Tin, to 31st August, 1909 .. .. .	Tons. 4,395·44	363,211	..	..	Tons. 4,395·44	363,211
Tantalite, to 31st August, 1909 .. .. .	86·05	11,682	..	..	86·05	11,682
Asbestos, to 31st August, 1909 .. .. .	40·00	1,600	..	..	40·00	1,600
Totals .. .. .	..	..	..	..	..	£1,004,318

## WEST PILBARA GOLDFIELD.

On this field I visited the mining centres of Pilbara, Station Peak, Whim Creek, and Weerianna. In the remaining centres no mining of consequence was in progress.

## Pilbara Mining Centre.

The total number of men employed here is 13, of whom 11 are working on alluvial ground. The only lease being prospected was that known as Pilbara Broken Hill, G.M.L. 146 (20 acres), owned by Albert

Kost. The lease contains a low hill which is crowned with a wide mass of quartz. This appears to be the result of the overthrow of the outcrops of several medium-sized reefs, and is not the crest of one large reef. The course of the reefs is north-north-east and south-south-west with a westerly dip of about 40deg. They occur in greenstone country and close to the line of contact with the granite country. Tongues of granite have obtruded into the greenstone, and the whole hill shows signs of considerable disturbance.

A good deal of open-cut work and prospecting has been done in past times along the hill. It is said

that patches of very good stone were occasionally met with. The reef, as seen in open-cuts, has a width up to 36in.

Below one of the cuts the owner has sunk a shaft 30ft. vertical. The reef was passed through at about 20 to 25 feet from surface, and at that point was not as strong as at the surface. Below the reef was a lode formation consisting of small veins of quartz and ironstone. This is said to give fair prospects in free gold. From the bottom of the shaft a crosscut has been driven 15ft. and a rise put up to tap the

reef. At the point where touched by the rise coarse gold was met with.

This lease deserves to be carefully tested, and at present very little is known of the average value of the great quantity of quartz exposed on the surface. It is also probable that gold-bearing lodes will be discovered. It would be well to sink the shaft deeper and crosscut easterly into the hill.

The following table shows the total gold produced up to December 31, 1908:—

No. of Lease.	Registered Name of Company or Lease.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.
		Fine ozs.	Fine ozs.	Long tons	Fine ozs.
146 .. ..	Pilbara Broken Hill .. ..	..	48·12	..	..
	Voided Leases .. ..	..	..	148·00	293·42
	Sundry Claims .. ..	1·11	86·24	..	..
	Total .. ..	1·11	134·36	148·00	293·42

Total fine ozs., 428·89.

Average yield per ton of Ore treated, exclusive of alluvial, dollied and specimens, 2·89 fine ozs.

#### Station Peak Centre.

The only lease at which work was in progress was the Pilgrim's Rest, G.M.Ls. 117 and 118, owned by Messrs. Bull Bros. Up to the end of 1908 the official records show that from these leases 9,993 tons of ore were treated for a yield of 9,382.90 fine ozs. of gold, or an average of .93 fine oz. per ton. At the time of my visit no mining was in progress with the exception of treating the heap of battery tailings by cyanide. I did not ascertain the assay value of these, but one of the owners informed me that they were getting an extraction of 75 per cent. of the contents. On the ground is a good 20-head battery of 850lb. stamps, and other plant. The stoppage of this was caused, I was informed, by the scarcity of firewood, the cost of supply having risen to £400 per month, and by the sudden failure of the water supply. This last is obtained from a shaft 105ft. deep at the foot of the hill below the battery. The supply for the

cyanide plant was raised by bailing with a horse whip.

A good deal of work has been done on a large solid reef which outcrops for a good length along the side of a hill. The reef is a lens formation, and attains a maximum width of about 20ft. The greatest depth attained is in a vertical shaft sunk nearly at the foot of the hill to a depth of 132ft. The reef was passed through at 100ft. but no development has been carried on. The owners are now considering plans for more systematic development and the substitution of oil or gas engine power at the battery in lieu of steam. There is a large quantity of ore in sight, the value of which is estimated at 6 dwt. per ton. The mine appears to be one that would develop into a good paying proposition if properly handled. The fuel difficulty can be overcome with no great expense, and probably a plentiful supply of water will be obtained when the reef is opened at a greater depth.

Table showing the total Gold produced up to 31st July, 1909.

No. of Lease.	Registered Name of Company or Lease.	Total Gold produced to 31st December, 1908.		Gold produced for seven months up to 31st July, 1909.		
		Ore treated.	Gold therefrom.	Alluvial.	Ore treated.	Gold therefrom.
		Long tons	Fine ozs.	Fine ozs.	Tons.	Fine ozs.
117 .. ..	Pilgrim's Rest .. ..	395·00	230·27	..	..	..
117, 118 ..	Pilgrim's Rest Leases .. ..	9,598·00	9,151·73	..	..	..
	Sundry Claims .. ..	37·50	48·19	..	..	..
149 .. ..	Prince Regent .. ..	..	..	177·74	..	317·06
	Total .. ..	10,030·50	9,430·19	177·74	..	317·06

#### Total production to 31st July, 1909.

Alluvial .. ..	.. ..	.. ..	.. ..	.. ..	Fine ozs.	177·44
Dollied and Specimens..	.. ..	.. ..	.. ..	.. ..	..	..
Ore Treated, Long Tons	.. ..	.. ..	.. ..	.. ..	..	..
Gold therefrom, fine ozs.	.. ..	.. ..	.. ..	.. ..	..	9,747·25
Total, fine ozs. ..	.. ..	.. ..	.. ..	.. ..	..	9,924·69

*Weerianna Centre.*

In this centre no gold mining has been undertaken for a long time past notwithstanding that the country has good indications for gold-bearing reefs, and that its position in relation to the sea-board enables plant and stores, and mineral produced, to be imported and exported at very low cost. Recently, however, the resumption of work was commenced on the Porterminna Mine, at one time a portion of the property held by the Roebourne Copper and Gold Mines, W.A., N.L., and comprising G.M.Ls. 135, 136, 137, and 138. The Porterminna has been taken up by Messrs. Jas. Redmond and party, who intend to

give the lease a good trial. A 10-head battery is on the ground together with a gas-producer plant and other gear. This is now being overhauled and put into working order preparatory to crushing some dumps of low-grade ore on the surface and some which has been left lying in the mine. No work was being done underground, and I was not able to make an inspection. Mr. Redmond informed me that the reef varied from 12 to 14 inches in width, and that he anticipated that it would yield an average value of 7 to 8 dwts. per ton. It is intended also to cyanide the heap of battery sands; these are estimated to be worth 20s. to 21s. per ton.

Table showing the total Gold produced to 31st July, 1909.

No. of Lease.	Registered Name of Company or Lease.	Total Gold produced to 31st December, 1908.		Total Gold produced for seven months up to 31st July, 1909.	
		Ore treated.	Gold therefrom.	Ore treated.	Gold therefrom.
143	Early Morn	Long tons.	Fine ozs.	Tons.	Fine ozs.
135, 136, 137, 138	Roebourne Copper and Gold Mines of W.A., N.L.	11-00	3-87	..	..
		723-00	273-50	..	28-85
	Voided Leases	25-25	220-30	..	..
	Sundry Claims	4-00	25-30	..	..
	Total	763-25	522-97	..	28-85

Total Gold produced to 31st July, 1909:—

Ore treated, long tons .. .. . 763-25  
Gold therefrom, fine ozs. .. .. . 551-82

The following table shows the total gold production of the field from the various mining centres up to 31st July, 1909:—

## WEST PILBARA GOLDFIELD.

Table showing total ounces of Gold produced in each Mining Centre up to 31st July, 1909.

Mining Centre.	Total produced to 31st December, 1908.				Total produced for seven months up to 31st July, 1909.		
	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Alluvial.	Ore treated.	Gold therefrom.
	Fine ozs.	Fine ozs.	Long tons.	Fine ozs.	Fine ozs.	Tons.	Fine ozs.
Croydon	..	..	8-00	5-44	..	..	..
Hong Kong	21-40	0-2	340-00	445-60	..	..	..
Lower Nickol	10-44	3-81	604-10	381-23	..	..	..
Mallina	..	..	103-60	102-83	..	..	..
Pilbara	1-11	134-36	148-00	293-42	..	..	..
Roebourne	..	..	..	..	..	..	39-22
Station Peak	..	..	10,030-50	9,430-19	177-74	..	317-06
Towranna	..	..	1,934-80	2,088-26	..	..	..
Weerianna	..	..	763-25	522-97	..	..	28-85
From Goldfields generally, reported by Banks and Gold dealers	3,947-37	82-54	..	6-38	263-21	..	..
Totals	3,980-32	220-73	13,932-25	13,276-32	440-95	..	385-13

Total Gold production to 31st July, 1909:—

Alluvial .. .. . 4,421  
Dollied and Specimens .. .. . 220  
Ore treated, long tons, 13,932.  
Gold therefrom, fine ozs. .. .. . 13,661  
Total, fine ozs. .. .. . 18,303

Average yield per ton of Ore treated (exclusive of alluvial, dollied and specimens).

## COPPER MINING.

The chief copper-producing centre in the West Pilbara Goldfield is Whim Creek. Some of the Croydon mines were being worked by tributers, and some prospecting was being done in the neighbourhood of Roebourne. Elsewhere there was practically nothing

doing. I made an inspection of Whim Creek and Roebourne Centres.

*Whim Creek Centre.*

The Whim Well Copper Mines, Ltd., Location 71, are owned by a London company of which Mr. H. R. Sleeman is the General Manager in Western Aus-



*The Wait Awhile Mine*, originally known as the Carlow Castle, is a M.L. of 40 acres, held by Shaw, Whitelock, and Bowen.

The old workings are full of water, but at a depth of 40ft. the present owners have driven north-erly 25ft. along the footwall of the lode; the hanging wall has not been reached.

A parcel of from 14 to 15 tons of ore has been shipped to Newcastle, N.S.W., but the smelter returns

were not to hand when I was at the mine. The owners valued the ore at 20 per cent. and 20dwt. gold per ton.

The total ore produced in this centre up to 31st August, 1909, is 1,343 tons, of the value of £22,685.

I attach a table showing the total ore produced in the various centres of the West Pilbara Goldfield, the aggregate quantity being 22,818.80 tons, of the value of £239,682:—

The total quantity and value of Minerals produced in the West Pilbara Goldfield is:—

		Fine ozs.	Value, £
Gold, from all sources, to 31st July, 1909	.. .. .	18,303.45	69,668
Copper, to 31st August, 1909	.. .. .	22,818.80	239,682
Total Value	.. .. .		£309,350

#### WEST PILBARA GOLDFIELD.

*Quantity and Value of Copper Ore produced to 31st August, 1909.*

Locality.	No. of Lease or Claim.	Registered Name of Company or Lease.	Total produced to 31st December, 1908.			Total produced for seven months to 31st August, 1909.		
			Quantity.		Value.	Quantity.		Value.
			Ore.	Metallic Copper.		Ore.	Metallic Copper.	
Croydon .. ..	31	Evelyn, Brit. Ex. Australasia	Tons. 519.00	Tons. ..	£ 6,363	Tons. 30.00	Tons. 5.80	£ 100
Do. .. ..	103	Quamby .. ..	15.00	4.05	275	..	..	..
Do. .. ..	..	Voided Leases .. ..	40.00	..	595	..	..	..
Egina .. ..	91	Egina .. ..	12.00	1.20	72	..	..	..
Do. .. ..	..	Voided Leases .. ..	530.00	..	6,571	..	..	..
Roebourne ..	65	Carlow Castle .. ..	6.00	1.00	100	..	..	..
Do. .. ..	65	Carlow Castle, Roebourne Copper and Gold Mines W.A., N.L.	81.00	19.88	1,415	..	..	..
Do. .. ..	73	Ena Extended .. ..	6.50	.77	55	..	..	..
Do. .. ..	118	Ena Reward .. ..	20.00	2.87	150	..	..	..
Do. .. ..	64	Fortune .. ..	10.00	2.50	145	5.30	.90	51
Do. .. ..	77	Lily Blanche .. ..	997.00	186.99	17,541	..	..	..
Do. .. ..	P.A. 100	Smallpage, F. .. ..	..	..	..	37.00	8.43	482
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.	12,735.00	..	145,703	5,555.00	746.50	45,032
Do. .. ..	..	Voided Leases .. ..	30.00	..	250	..	..	..
Totals .. ..			17,191.50	..	194,017	5,627.30	..	45,665

*Total Quantity and Value produced to 31st August, 1909.*

Ore	Tons	Value	£
.. .. .	22,818.80	.. .. .	239,682

*Table showing the Quantity and Value of all Minerals produced on the Pilbara and West Pilbara Goldfields.*

Mineral.	Pilbara Goldfield.		West Pilbara Goldfield.		Gross Total.	
	Quantity.	£	Quantity.	£	Quantity.	£
Gold—From all sources, to 31st July, 1909..	Fine ozs. 147,802.67	Fine ozs. 627,825	Fine ozs. 18,303.45	Fine ozs. 69,668	Fine ozs. 166,106.12	Fine ozs. 697,493
Black Tin, to 31st August, 1909 .. ..	Tons. 4,395.44	Tons. 363,211	Tons. Nil	Tons. Nil	Tons. 4,395.44	Tons. 363,211
Copper, to 31st August, 1909 .. ..	Nil	Nil	22,818.80	239,682	22,818.80	239,682
Tantalite, to 31st August, 1909 .. ..	86.05	11,682	Nil	Nil	86.05	11,682
Asbestos, to 31st August, 1909 .. ..	40.00	1,600	Nil	Nil	40.00	1,600
Total Values .. ..	..	1,004,318	..	309,350	..	1,313,668

## CONCLUSION.

The foregoing report deals, with two exceptions, only with places actually visited. There were many others that, in the past, have given good returns in gold, tin, and copper, but as no mining was in progress I did not visit them.

The desertion of a centre does not necessarily indicate, on this field, that it has been worked out, but merely that the existing conditions were not in favour of mining and treating ore of medium and low-grade value. An instance of this may be shown in the tin fields south of Wodgina, where the prospects are really good, but mining is stopped for want of means to treat the ore economically.

Upon completion of the Port Hedland-Marble Bar railway it is believed that working conditions will be improved to an extent that will encourage miners and capitalists to again work these dormant districts.

In the above table it will be noted that, up to 31st July for gold, and to 31st August for all other minerals, the total value of all minerals produced on the Pilbara field was £1,004,318, and on the West Pilbara field £309,350, or a grand total value of £1,313,668.

Of the total gold value, the Pilbara field contributed 90.01 per cent., and of the grand total value of all minerals produced 76.46 per cent.

The value of the production is astonishing in view of the comparatively small amount of mining that has been done. It has been said that this can be

accounted for on the ground that very rich shoots of ore have been obtained at shallow depths. But, even so, those shoots have been worked only to water level—a shallow depth on these fields—and in few instances has more than one lens of ore been touched in any mine. Consequently, the mines are in no way exhausted and, to resume the rich output from these fields all that is required is further and more systematic development of the mines and economical management.

There can be no doubt as to the great possibilities of the fields, and by the commencement of the railway a good step is being taken in the direction of a revival of mining. It is probable that an extension of the line to other centres beyond Marble Bar will be called for at no distant date and, judging by the prospects shown, the extension will be justified.

At the present time there may not be many discoveries of a size attractive to companies possessed of ample capital for handling large ore-bodies, but there are a large number of mines that would well reward the enterprise of small companies and of parties of working miners. Following upon the efforts of these, the discovery of larger propositions will assuredly come to pass.

E. DAVENPORT CLELAND,

Inspector of Mines.

14th October, 1909.

## APPENDIX No. V.

## INSPECTOR CLELAND'S REPORT ON THE COSMO-NEWBERRY RANGES DISTRICT.

The State Mining Engineer Perth.

Acting under your instructions I left Perth on 20th April and proceeded, via Laverton, to the Cosmo-Newberry Ranges, and reached the Bulga Granites—or Split Rocks, as they are commonly known—on the evening of the 24th.

I was accompanied by Messrs. Carr-Boyd and P. D. Nash, both of whom hold interests in the district.

The Track.—From Laverton the track runs a little east of north for about 54 miles and, owing to the greater part being over sand and spinifex plains, the journey occupies about two days.

The sand and spinifex is first met with at about 14 to 15 miles from Laverton and, with occasional intervals of hard road, continues to the crest of the western hills of the range.

The sand plains are bare of trees for the most part, but are edged with spotted gum and mulga. The former does not grow to any great height, but the trunks range up to 36 inches in diameter. The mulga is well grown, and many trees have a diameter up to 8 and 9 inches. For the most part the thickets are so dense as to be impassable without clearing. The track keeps to the sand plains as having been originally the easier country to travel over with camels. Owing to the presence of gum trees and high mulga the general appearance of the country is pleasing.

The bare plains ringed with trees suggests that they were at one time granite outcrops, and that the trees represent the deeper and moister ground formed at their bases.

Game.—Turkeys, emus, parrots, crows, and many small birds were numerous. A few dingoes were seen, and many were heard round the camp at night. Rabbits were not noticeable until the Ranges were reached; near the Bulga granites two or more warrens are well stocked. Neither natives nor kangaroo were seen.

Water.—Supplies of water on the track were obtainable from gnamma holes and soaks.

The first of these after leaving Laverton is Belora, or Raine's Soak, reached in about 4½ hours driving; the second, Barbel, reached in about 2½ hours; the third, Mugga, in about 3½ hours; and Bulga Granites, or Split Rocks, Cosmo-Newberry Ranges, in about 3¾ hours.

On this occasion these soaks and holes held a plentiful supply owing to recent rains, but they could not be depended upon in dry weather, or if there came much traffic on the road.

It is most likely that good supplies could be obtained by sinking wells in the vicinity of the rocks. In two places where we expected to find water from the late rains, we were disappointed.

Mines Department,  
Perth, 13th May, 1909.

I made a camp at the Split Rocks, where there was an abundant supply of water in several holes.

Government Well and Soak.—The Government well is situated at the foot of the eastern slope of the Ranges, and is distant from the Split Rocks some three or four miles. The track to it is along a very rough gully and bad travelling.

I visited the well, but found it dry; the rope, bucket, and windlass are all in good order.

Southerly from the well, and about three miles easterly of the Split Rocks, is a soak which is said to yield up to 80 gallons per day in summer time. Its capacity has been tested by parties of three or four men and horses only, so not very much can be said as regards permanency. The track to this soak is very fair travelling and is well defined.

Both the Government well and the soak are inconveniently situated for the use of prospectors on the G.M. leases. A good supply might be obtained by sinking on the flats below the Split Rocks; this would be fairly central.

Country South of Split Rocks.—The ranges are massed together immediately to the north of the Split Rocks. At the rocks they separate into two distinct eastern and western ranges trending in a southerly direction. The western limb continues south a far greater distance than does the eastern. Both are of greenstone, and are rough and rugged.

The plain lying between is of granite formation, and, with the exception of occasional small sand and spinifex plains, is well timbered with stout and tall mulga. A considerable portion is well grassed, and at the time of my visit there was excellent feed for horses. Looking southwards from the rocks, this plain has a very attractive appearance.

I travelled south six miles to the Egidini Rocks, where there is a small soak. Beyond this the plains stretched southwards for miles, and appeared to be first-class pastoral country as far as feed was concerned. The same remark applies to the plains lying east from the Government well.

The plain between the two limbs of the range receives all the water gathered in the hills lying to the north, east, and west, and judging by the appearance of the watercourses very considerable quantities must flow down them at times of rainfall. There should be good subterranean supplies for wells.

Prospecting.—At the time of my visit six G.M. leases had been surveyed, and on five of these prospecting work had been undertaken. Some shallow shafts also had been sunk on two P.A.'s.

No work was in progress at the time of my visit, and no men were resident on the leases.



The leases upon which most work has been done lie to the north and north-east of the Split Rocks, the furthest out being three miles. The surrounding country consists of rough greenstone hills, some of which are capped with ironstone conglomerates. Dykes of granite are noticeable for some distance out from the main mass of the Rocks. A good deal of shed quartz and black ironstone lies on the surface.

Beds of cement are met with at very shallow depths, and as a rule the outcrops of the reefs that have been worked are not strongly marked.

The Mines.—Reckoning from the Split Rocks, the furthest workings to the northward are on:—

G.M.L. 1624T, known as "The Cosmo."—The reef strikes approximately N.W. and S.E., and dips 35deg. E.

The shaft is stated to be over 20ft. deep, but I was not able to get lower than 16ft. from surface owing to the lower workings having been filled with waste broken in the course of mining quartz for a trial crushing.

At the depth reached by me the reef had been driven on northward 17ft., the face showing a width of 10 inches of quartz. The south drive had been extended 12ft., and showed 3 inches of quartz in face. In and near the shaft the reef showed up to 18 inches wide.

The hanging-wall is quartzite, and on the foot-wall greenstone. The footwall is considerably crushed for a width of 24 inches from the reef.

From samples taken from the reef and footwall the assay results were 13 grains, and 2 dwts. 21 grs. per ton in the crushed country.

On the surface, immediately north of and almost adjoining the shaft, the reef has been mined for some number of feet in length. The quartzite forming the hanging wall assayed 7 grs. gold per ton.

From the shaft and from the open cut a parcel of 8 tons is stated to have been treated in a battery for a return of 29 ozs., or an average of 3 ozs. 12 dwts. 12 grs. per ton by amalgamation, and the sands assaying 3 dwts. per ton.

Northward from the shaft the reef has been exposed in three shallow holes in which the width of quartz and rotten diorite ranges from 12 to 14 inches, but is of low value.

At about 1½ chains north of the shaft a strong dyke of granite crosses the country almost at right angles to the course of the reef and has produced a fault.

At 4 chains north of the dyke a boldly outcropping quartz reef traverses the lease in a N.E. and S.W. direction, and to the westward, on the crest of the hill, becomes still more marked. Little prospecting has been done along this line so far, though the appearance of a vein of ironstone along its south edge suggests that a good trial might reveal values. Samples taken at various points along the outcrop yielded traces of gold on assay.

North of the last-mentioned reef a shaft has been sunk a depth of 21ft. in decomposed country through which run numerous veins of quartz. It was not expedient to go below. From a sample taken from a heap of quartz at grass a good trace of gold was obtained.

A trench to the north of the shaft, having a depth of 6ft., showed formation similar to that in the shaft. Samples from this showed the quartz veins

at 5dwts. per ton, and a trace of gold throughout the decomposed country for a width of 72 inches.

The foregoing represents the work done on this lease, and it is by no means sufficient to permit any definite opinion to be expressed in regard to the future of the mine. But I certainly consider that further exploration is warranted in more than one direction.

It is noted that a change of country, or preferably, a change in the appearance of the rock, occurs on the north end of the lease, and that it is found to be gold bearing, though in a slight degree.

Similar country occurs along the eastern side of the lease and just outside the boundary at a point about 4 chains from the S.E. corner peg a prospecting shaft has been sunk to a depth of 22ft. It was not possible, with the means available, to get down to the bottom. From the surface it was seen that numerous quartz veins traversed the decomposed country, and from these a heap had been accumulated at grass.

A grab sample taken from many parts of the heap yielded on assay 9dwts. 21grs. per ton.

Further prospecting of this line of country would be advisable.

At about half a mile from the Cosmo Lease, southerly, but on a different line of country, is:—

G.M.L. 1795T, known as the "Wanda."—The surface is covered with soil overlaying cement, and the indications of reef are not strong.

The reef on which prospecting has been commenced lies on the eastern side of the lease, and has a course about N.W. and S.E., with a dip of from 75deg. to 80deg. W.

At the southerly end of the reef a shaft has been sunk, and, owing to the sides having slightly caved was not more than 9ft. deep at time of my visit.

The quartz reef is seen to vary in width from 3 to 6 inches, but towards the bottom the full width, including lode formation, is about 14 inches.

From the south end a sample taken across a width of 6 inches yielded on assay 23dwts. 4grs. gold per ton, and one from the north end taken over a width of 14 inches yielded rather less than 2dwts. per ton.

The north shaft is about 2½ chains from the south shaft, and has a vertical depth of 18ft. in altered, but strong, country. This shaft was accessible.

The reef is well defined and assumes a course and underlay similar to the reef in the south shaft. It varies in width within short intervals; near the surface it is 24 inches, and elsewhere varies from 7 to 8 inches.

The quartz is promising in appearance, but the samples assayed yielded low values.

A crushing of 6 tons taken from the workings on this lease is stated to have yielded by battery treatment an average of 16dwts. per ton, and the sands to have assayed 2½dwts. per ton.

To the south and west of the workings the ground rises to a small hill, upon which is a bold outcrop of white quartz. No prospecting has been done here.

Lying south-east of the Wanda, and about midway between it and the Constance lease, a shaft has been sunk on a prospecting area to a depth of 21ft. vertical. There was no way of descending to closely examine.

From the appearance of the sides of the shaft and of the dump, the shaft has evidently been sunk in altered country of a character similar to

that noted at the north end of the Cosmo lease and in the shaft situated outside its eastern boundary.

A sample was taken from a heap of dark-coloured quartz at grass, but its assay value was less than 2dwts. per ton.

G.M.L. 1779T and 1807T, known as the "Constance," are situated about  $1\frac{1}{2}$  miles N.N.E. from the Split Rocks.

The workings are confined to lease 1779T. The course of the reef, as indicated by the workings, is approximately N.W. and S.E., dipping 45deg. W.

The north shaft has been sunk on the incline a depth of 36ft. from the surface. For that depth the reef is exposed to an average width of about 10 inches, with broken, lode-like material on both walls. The containing country rock is greenstone.

At the bottom of the shaft the reef appears to have become broken up. But on closer examination I found that in the south-east corner of the shaft the footwall was not exposed.

At this point there appears to be a solid body of quartz dipping more to the north-west than the vein followed from the surface.

I broke into the quartz to a depth of 11 inches, and no wall had then been exposed.

A sample tested in the pan gave a very good yield in free gold; and the remaining half of the sample yielded by assay 53dwts. 21grs. gold per ton.

It is possible that this may be a distinct reef from the one originally followed, and I have advised the owner, Mr. Nash, to put in a cross-cut east and west and clearly determine the size and value of this body. It will be a matter of great interest to learn the result of this proposed work. (Further later work on this reef resulted in 18 tons of quartz being mined, and treated by battery amalgamation for a yield of 17.21 fine ozs. of gold.)

Samples taken from the lode material forming the casing of the original quartz vein yielded traces of gold only.

On the surface, at about a chain south of the north shaft, the reef is exposed for a width of 24 inches, and continues at that width to another hole about 47ft. south of No. 1.

At 157ft. from the north shaft, the south shaft has been sunk on the incline of the reef to a depth of 16ft.

The reef has the same dip as in the north shaft, and in width varies from 14 inches near the surface to 6 and 4 inches at bottom of shaft. Both in the samples panned and those assayed the values were low.

From the north shaft a parcel of  $8\frac{1}{2}$  tons treated by battery amalgamation is stated to have yielded 29ozs. 13dwts. 6grs., or an average of 3ozs. 8dwts. 9grs. per ton, with an assay value of 12dwts per ton in the sands.

The two shafts have, evidently, been located almost at the extreme ends of a lens, the greater width lying about midway. In both shafts good values have been met with at certain depths, but the direction in which the shutes of ore dip has not been determined so far.

Subsequent to the testing by cross-cutting east and west from the bottom of the north shaft, a drive should be put in southerly to test the size and value of the reef lying between the two shafts.

The reef is on the eastern slope of a hill and the reef dips into it. On top of the hill and near the

western boundary of the lease, an intrusion of granite is noticeable; and near by is the outcrop of a white quartz reef. This has not yet been tested.

G.M.L. 1648T, known as the "Dixie," is located immediately westward of the Split Rocks, and the track from Laverton passes across its southern end.

Granite shows along the eastern side of the lease and greenstone on the western. Within the greenstone area and not far from the line of contact occur a series of quartz outcroppings having the appearance of a continuous reef, almost the whole length of the lease.

It is probable, however, that the line will be found to comprise a series of lens-shaped reefs, separated by greater or less lengths of blank country.

At various points along the outcrop 10 holes have been sunk, and these show the reef varying in width from 9 inches up to 48 inches, with 12 inches width occurring frequently.

Samples were obtained from holes Nos. 6, 7, 8, and 9. That from No. 7 yielded by assay over  $4\frac{1}{2}$  dwts. gold per ton, and the others were of low value.

From the appearance of the stone this reef deserves more, and careful, prospecting.

G.M.L. 1774T, known as the "Camarina," lies to the northward of the Dixie.

On this lease, on the top of the hill and close to the line of contact with the granite and the greenstone, some open cut work has been done for a length of about 63ft.

The bottom of the cut is hidden with broken waste rock. In the ends is seen a leader of quartz, about 2 inches wide, walled in very hard diorite.

It is stated that very rich results have been obtained from this vein, but it would appear that the values gave out as it was worked laterally. In view of the size of the vein and the hardness of the enclosing rock, the ore would require to be exceptionally rich to yield a profit over working costs.

No other prospecting appears to have been done on this lease, though the following of the small vein along the surface might possibly lead on to some larger body of ore.

No samples were taken from these workings.

To the south of the Split Rocks I travelled 6 miles to what are known as the Egidinni Rocks. These are granite and cover several acres of ground. Just to the right of the track, on the edge of the southern slope of the rocks, is a soak, said to yield a small supply of water during many months of the year.

On the way down, at about 3 miles south from the Split Rocks, a quartz reef outcrops boldly from a sand plain.

It has a N.E. and S.W. course with, apparently, a dip to the N.W.

At about two miles further on a second outcrop of reef was passed, also in sand, and not so bold as No. 1.

At about 200 yards south of No. 2, a third reef outcrops slightly

Practically no prospecting has been done on any one of the three, and I had no opportunity of following them to the point at which they might be supposed to enter the greenstone hill to the west.

Samples taken from various points along the three outcrops did not yield free gold by panning.

## SUMMARY.

The Cosmo-Newberry district can be reached in a distance of about 54 miles from the head of the railway line at Laverton.

The track followed by me is not in good traveling order, nor can it be considered to be well supplied with water unless after heavy rains, but neither of these drawbacks is serious and both can be greatly improved at moderate expense.

The country in which the gold mining leases have been granted is certainly gold-bearing over a large area; and the hills possess features to encourage miners to undertake careful and systematic prospecting.

The work so far done on the leases can in no way be regarded as a thorough, or sufficient, test of their value. But in two instances, as quoted above, the results obtained by battery treatment of fair sized parcels of quartz have been decidedly encouraging.

It is noted that a thick bed of cement lies over a large portion of the district, and the known reefs

are not distinguished by bold outcrops. Below the cement it is almost certain that numerous "blind" reefs will be found to exist, and it will be advisable for leaseholders to test their ground at depth by crosscutting.

In the course of this system of prospecting it is probable that the existence of gold-bearing lode formations will be proved, and that the quartz veins as now known will be seen to be parts of the larger ore-bodies.

To my mind, the district holds out a very fair promise of giving good results in return for prospecting and development.

The known water supply for domestic use is not to be too greatly depended upon. But it is certain that good and permanent supplies are obtainable.

Timber for ordinary mining requirements and for fuel is abundant.

E. DAVENPORT CLELAND,  
Inspector of Mines.

## Results of Samples Assayed at the Geological Laboratory.

No. of Sample.	No. of Lease.	Name of Mine, Locality, and Description of Sample.	Width Sampled.	Assay.
			Inches.	ozs. dwts. grs.
1	1624r	Cosmo—Quartz veins in costeen	4	0 5 2
2	"	Lode	72	0 0 4
3	"	North shaft. Quartz in dump	...	0 0 13
4	"	Quartz reef, bearing N.E.-S.W.	...	Nil
5	"	Quartz reef, bearing N.E.-S.W.	...	Trace
6	"	Centre hole of three, quartz and diorite dyke	...	Trace
7	"	South hole of three, quartz and diorite dyke	14	0 0 7
8	"	Main shaft, 16ft. level. Face of north drive	10	0 0 13
9	"	Main shaft, 16ft. level. Formation and footwall	24	0 2 21
10	"	Main shaft. Quartzite on dump	...	0 0 7
11	"	(Rejected)		
12	P.A.	Dale and McIntyre—On E. boundary of 1624r dump	...	0 9 21
13	1795r	Wanda—South shaft, 9ft. Quartz reef in N. end	3 to 15	0 1 20
14	"	South shaft, 9ft. Quartz reef in S. end	4-6	1 3 4
15	"	North shaft, 9ft. Upper half of N. end	15-14	Trace
16	"	North shaft, 9ft. Lower half of N. end	7-8	0 4 0
17	"	North shaft, 9ft. Lower half of S. end	7-8	0 0 9
18	"	North shaft, 9ft. Upper half of S. end	24	0 1 16
19	1648r	Dixie—No. 6 hole. Quartz reef	12	Trace
20	"	No. 7 hole. Quartz reef	48	0 4 14
21	"	No. 8 hole. Quartz reef	36	Nil
22	"	No. 9 hole. Quartz reef	36	Nil
23	1779r	Constance—M. incline shaft. Casing of reef at bottom	...	Trace
24	"	M. incline shaft. Decomposed country. Hanging wall	...	Trace
25	"	M. incline shaft. Quartz off hanging wall at bottom	...	Trace
26	"	M. incline shaft. Quartz over 1lin. thick on footwall	11	2 13 21
27	"	South shaft. Quartz reef at bottom	4	0 1 2
28	P.A.	Two miles N. of Split Rocks. Quartz from dump	...	0 1 19

## APPENDIX No. VI.

## REPORT ON A QUARTZ REEF IN THE DARLING RANGE, NEAR GOSNELLS.

Office of the State Mining Engineer,  
Mines Department, Perth,

5th July, 1909.

The Secretary for Mines.

On 22nd June I visited Ross & Rowland's P.As. Nos. 2H and 3H, Canning, to examine their workings.

The areas taken up are two Prospecting Areas of 6 acres each, forming part of Blocks 333 and 109, Canning, and each is one-fourth of an area of 24 acres, the balance of which has been reserved to the prospectors to be taken up later on lease. The areas are on private lands. They lie a little over two miles N.E. from Gosnells Railway Station, on the side of the Darling Range, above Gibb's old homestead. From the station to the homestead the country is flat agricultural land, from which the hills rise very steeply.

Ascending a steep spur of the range the country is seen to be granite, with a little micaceous schist or gneiss, and numerous greenstone dykes. Quartz is very plentiful, there being probably numerous reefs and veins besides the large reef which is being prospected. The general structure of the country here appears to be quite similar to that of the neighbouring Canning and Helena River valleys in the vicinity of the Mundaring and proposed Canning River reservoirs, described and mapped in the Progress Report of the Geological Survey of W.A. for 1903 (Annual Report, Dept. of Mines, 1903, pp. 147 to 149). The existence of large quartz reefs in this part of the Darling Range is shown on Geological Survey maps, and was referred to by myself in a previous report on Mead and West's reef in the Helena River Valley (Annual Report, Dept. of Mines, 1905, p. 81).

The reef on Ross and Rowland's P.As. is a very large and strong one, traceable for a long distance from the flat nearly to the top of the Darling Range and right through the length of the two 24 acre reserved areas. Its course in the part near the principal workings is about N. 74deg. E. The outcrop is very prominent, forming a rocky crest to one side of the spur down which it runs, and its width is at times very great being apparently as much as 150 feet opposite the shaft, and over 50 feet at the north-east end of the northern 24 acre block. In other places it is much narrower, but nowhere has it been cut through sufficiently to show its actual width with any certainty. The height above sea level is about 690 feet at the north-east end of the northern 24 acre block, and 480 feet on the ridge opposite the shaft. The outcrop further eastward in the range becomes covered with the ironstone (laterite) capping shown in the above-mentioned Geological maps as commonly existing in this neighbourhood. It is cut through by at least two greenstone dykes in the northern 24 acre block, one of them about 200 feet in width, the other much smaller. These dykes appear to be of much later age than the reef, cutting right through both it and the granite country enclosing it; they do not, however, appear to have heaved the reef to any marked extent.

The reef has long been known, and I understand that more or less attention has been given to it by

various prospectors for at least fourteen years past. The most systematic attempt to give it a working trial is, however, that of the present prospectors, Messrs. Ross and Son, and their backers, Messrs. Rowland and Lloyd, who have put in a tunnel 175 feet in length. Higher up the hill there is a shaft, said to be about 27 feet deep, but which was full of water when I made my visit. These workings are near the middle of the ground held as the two prospecting areas. Going E.N.E. along the outcrop very little work is seen to have been done, there being only a few small costeans and a little knapping of the outcrop. The outcrop rock is mostly somewhat dense quartz, with numerous vughs filled with brown oxide of iron, evidently formerly pyrites. Some of the quartz is granular and crystalline, and of a general appearance not unpromising for gold, so far as one can go by so indefinite a characteristic as the appearance. In the cuts on the outcrop the quartz is seen to contain pyrites at a very shallow depth. Mr. Ross informed me that he had got gold in tests of some of the outcrop quartz, and samples 1 and 2 were therefore taken from points where gold was said to have been obtained, it being at this stage more important to ascertain if there is any payable gold at all in the reef than to attempt any estimation of its general bulk value.

Sample 1, from a costean on the outcrop about 9 chains from the north-east boundary of the northern 24 acre block, gave the following return when assayed by the Government Mineralogist and Assayer:—Gold—Nil.

Sample 2, from the outcrop about 60 yards S.W. from the north-east boundary of P.A. 3H gave:—Gold—a trace.

The plan and section herewith, though from only a very rough survey with compass and tape, will serve to explain the position at the principal workings better than verbal description. The approach to the shaft is in soft weathered granite, and the wall of the quartz appears to be dipping northerly about 72deg. The shaft is all in quartz, which appears to continue all the way to point B on the plan and section, when the granite country is again seen. The dip of the quartz in the outcrop generally appears to be N.N.W., but as all the quartz layers in the tunnel dip in the opposite direction it seems most probable that this appearance of a N.N. Westerly dip is due to superficial disturbances, and that the real dip is S.S.E. If this be so, the wall of the reef cut in the approach to the shaft agrees fairly well with that cut in the tunnel below.

The quartz at the shaft contains a good deal of copper pyrites as well as iron pyrites. Two samples were taken, Nos. 3 and 4, and have been assayed in Geological Survey Laboratory:—

Sample 3, from heap of ore at shaft said to have been put to one side to be sent to the Fremantle Smelting Works for treatment, yielded:—Gold—Nil.

Sample No. 4, from quartz on the dump at the shaft, gave:—Gold—a trace.

The tunnel is about 55 feet below the shaft, and runs to the west of the latter. It is 175 feet in length. For 58 feet it passed through soft weathered granite, then struck hard quartz, in which it continues for the rest of its length. The section shows that it may yet have to be extended some distance to get right through the reef. The quartz is in veins or bands of fairly pure quartz, with often much iron and copper pyrites, alternating with others containing much felspar, and which seem to be highly silicified granite. At times there is a considerable amount of copper pyrites, but I saw nothing that would give any reasonable hope that the reef could be worked for copper alone by crushing and concentration. When making the tunnel Messrs. Ross saved a number of bags of the ore passed through as samples. Two of these were opened, and sample No. 5 taken from them for assay at the Government Survey Laboratory.

Sample 5, from tunnel, returned:—Gold—Nil.

Two other samples, Nos. 6 and 7, were taken of the more pyritic ore at the mouth of the tunnel, this being considered the most likely auriferous material. No. 6 was of pieces taken at the dump, and No. 7 from some that Messrs. Ross had in their camp

No. 6 gave:—Gold—Nil.

No. 7 gave:—Gold—Nil.

It will be seen that none of the seven samples assayed returned more than traces of gold. A number of assays have been made from time to time previously at the Geological Survey Laboratory of stone stated to be from this reef with quite similar results, except for three batches which gave good returns. Some of the samples showed free gold, but there was no proof that they had come from Ross' reef, and their genuineness was open to question. The following is a list of the assays recorded since beginning of 1906:—

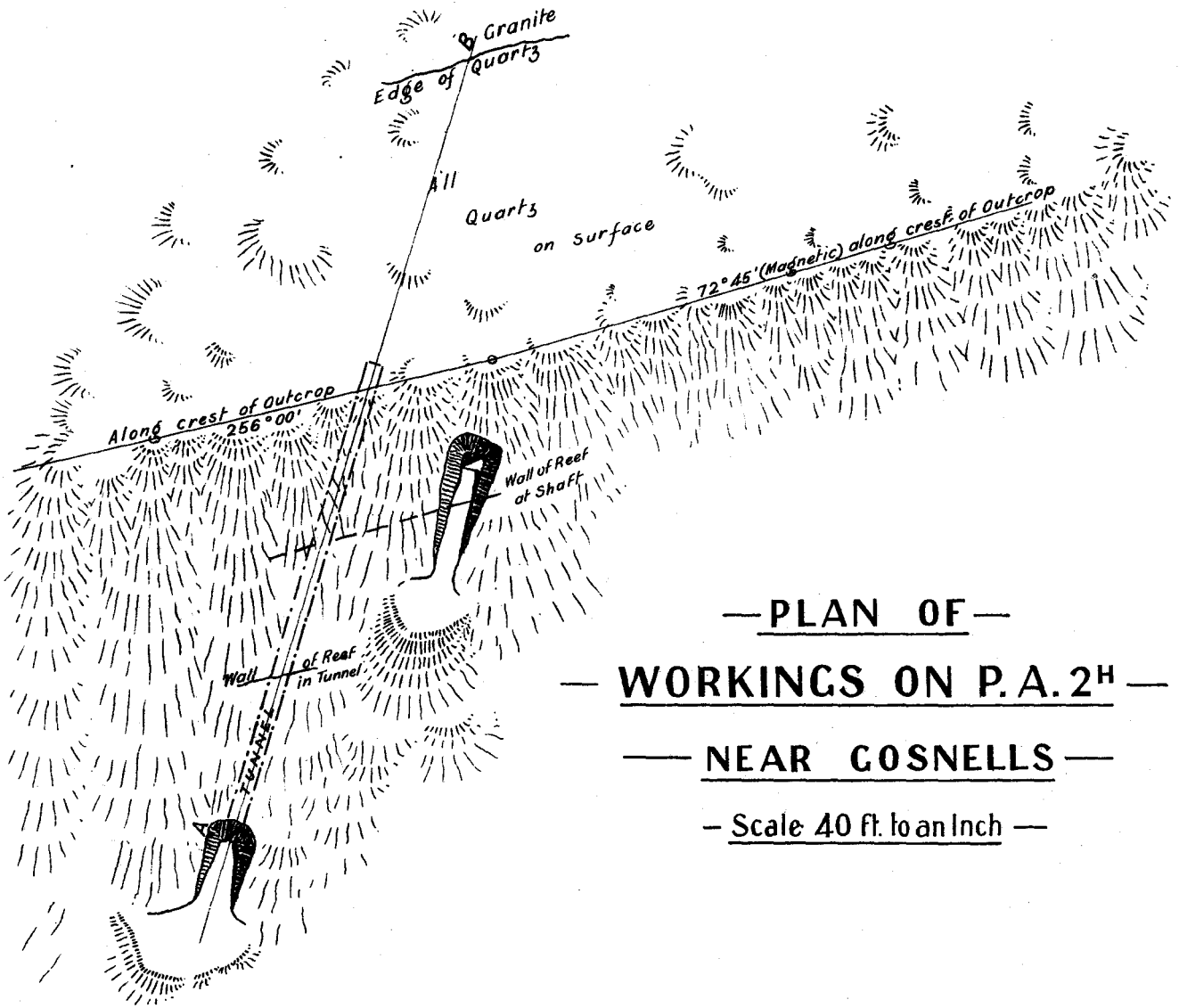
Date.	G.S. Lab. Number.	Result.
1906.		GOLD.
1st February	1688	Nil.
12th "	1728	"
26th March	1847	Ooz. 15dwts. 3grs. per ton.
26th "	1848	0 " 12 " 6 " "
15th May	1997	1 " 2 " 2 " "
15th "	1998	0 " 2 " 1 " "
15th "	1999	Trace.
15th "	2000	3oz. 16 " 18 " "
15th "	2001	2 " 18 " 19 " "
15th "	2002	2 " 5 " 22 " "
15th "	2004 (concentrates)	30 " 12 " 12 " "
20th July	2161	Nil.
20th "	2162	"
20th "	2163	"
20th "	2164	"
15th August	2279	Ooz. 10dwt. 15grs. per ton.
15th "	2280	1 " 3 " 2 " "
22nd "	2320	Nil.
22nd "	2321	"
22nd "	2322	"
22nd "	2323	Minute trace.
22nd "	2324	Nil.
10th September	2421	Minute trace.
10th "	2422	Trace.
10th "	2423	"
10th "	2424	"
10th "	2425	Minute trace.
12th "	2397	Nil.
12th "	2398	"
12th "	2399	"
15th "	2403	"
15th "	2404	Trace.
15th "	2405	Nil.
15th "	2406	"
1909.		
30th June	3537c	"
30th "	3538c	Trace.
30th "	3539c	Nil.
30th "	3540c	Trace.
30th "	3541c	Nil.
30th "	3542c	"
30th "	3543c	"

Discarding the high assays, as to which I have no faith whatever that the samples were genuinely from this reef, it will be seen that the reef is very poor indeed in gold and quite unpayable at present. It does not seem to me that there is any encouragement at all to persist in testing it further by continuing the work in the tunnel. It would be advisable for the prospectors to do a lot of testing by dollying and panning systematically along the outcrop to find out if there are any places in the

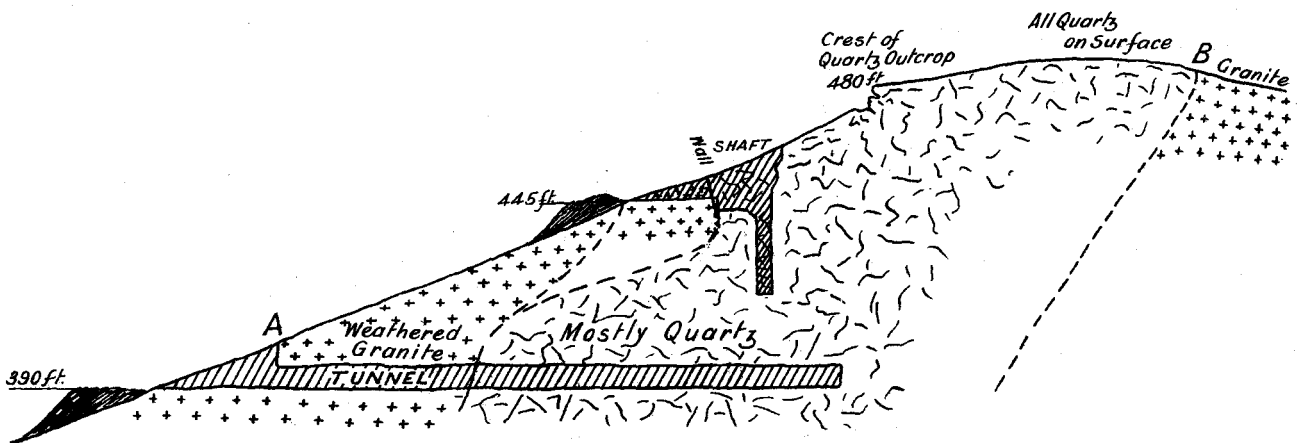
reef where gold in appreciable quantities can be obtained with some regularity, and if any such are discovered some sinking on them would be required. But until there is some demonstration that the reef contains values there is no use in going to the expense of underground prospecting.

I have, etc.,

A. MONTGOMERY, M.A., F.G.S.,  
State Mining Engineer.



— PLAN OF —  
 — WORKINGS ON P.A. 2<sup>H</sup> —  
 — NEAR COSNELLS —  
 — Scale 40 ft. to an Inch —



— LONGITUDINAL SECTION ON LINE A B —

**REPORT OF THE BOARD OF EXAMINERS FOR COLLIERY MANAGERS' AND UNDER-MANAGERS'  
CERTIFICATES UNDER "THE COAL MINES REGULATION ACT, 1902."**

*Secretary for Mines, Perth.*

Office of the State Mining Engineer,  
Department of Mines,  
Perth, 28th April, 1910.

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 1909.

The Board held two meetings during the year, 21st April and 27th October.

The application on the 7th August, 1908, by Mr. John McGeachie for a First Class Certificate of Service having again come up for consideration, it was decided at the October meeting to issue an endorsed certificate, subject to revocation and cancellation, and to be held in trust for the applicant for twelve months by the Inspector of Mines, Collie. The certificate was issued on the 4th June, 1909.

An application on the 24th September, 1908, for a Second Class Certificate of Service, which was postponed pending the receipt of further information with regard to the position the applicant held in collieries in England, was further discussed at the April meeting, and after careful consideration of all the evidence submitted in support of the application for a certificate it was decided that there was not quite sufficient to warrant the granting of his request; his application was therefore refused. The Board, however, agreed that they would be willing to allow the applicant to come forward for examination at the October sitting without payment of a further fee; but he did not present himself.

Application for a First Class Certificate of Competency, accompanied by one granted him in New South Wales, was received from Mr. William Harper, and after consideration his application was approved and certificate issued.

On 15th March an application was received from Thomas K. Chippington for a Second Class Certificate of Competency, and notification of his intention to present himself for examination. The examination took place in the office of the Inspector of Mines, Collie, on the 6th and 7th April, Mr. Briggs acting as supervisor. The necessary percentage of marks was obtained in both the written and oral examinations, and, the Board being also satisfied with the testimonials he submitted, it was agreed to grant Mr. Chippington a Second Class Certificate of Competency, which was duly issued to him.

A copy of the papers set at the examination in April, 1909, for Second Class Certificate of Competency is appended to this report.

We have, etc.,

A. MONTGOMERY, M.A., F.G.S.,  
State Mining Engineer,  
Chairman.

A. GIBB MAITLAND, F.G.S.,  
Government Geologist,  
Member.

T. D. BRIGGS,  
Inspector of Mines, Collie,  
Member.

JAMES H. DURES,  
Department of Mines, Perth,  
Secretary.

**EXAMINATION FOR SECOND CLASS CERTIFICATES OF COMPETENCY AS UNDER-MANAGER OR OVERMAN.**

*April, 1909.*

SUBJECT: MINING OF COAL.

Time allowed .. 1½ hours.

Possible marks—300.

1. What precautions would you take in a mine the coal of which was very liable to spontaneous combustion, and how would you prefer the workings laid out (45.)
2. Describe how you would fix wire rope guides in a shaft. (40.)
3. How would you determine whether a fault met with in a coal seam is an upthrow or a downthrow? (40.)
4. Under what conditions is the "main and tail-rope" system preferable to either the "endless rope" or "direct-haulage" systems? (45.)
5. Explain how the cleavage of the coal affects the working of it. (40.)
6. Compare the relative advantages of coal cutting by machinery and by hand labour. (45.)
7. If a district in a mine became fouled with fire-damp, how would you proceed to clear the gas from the workings, and what precautions would you take? (45.)

## COLLIERIES: BOARD OF EXAMINERS.

SUBJECT: VENTILATION.

Time allowed .. 1½ hours.

Possible marks—300.

1. How would you test for fire-damp, and how would you arrive at what were safe working conditions? (50.)
2. Describe an Anemometer, and explain how it is used in a mine. (50.)
3. Enumerate the dangerous gases met with in mines, and describe the effect of each on lights and life. (50.)
4. If the total pressure upon a ventilating door is 400 lbs. when the water-gauge is 2½ inches, what is the area of the opening, and what is the height of the door when its breadth is 5ft. 6in.? (50.)
5. A mine is ventilated by a fan: the fan engine is working at its full capacity and no additional ventilating power is available: more air is required to circulate through the workings. How would you endeavour to secure better ventilation? (50.)
6. Describe how you would construct an air-crossing, and a self-acting ventilating door. (50.)

SUBJECT: ARITHMETIC.

Time allowed .. One hour.

Possible marks—100.

1. A water dam is 95 yards long, 6½ feet wide, 7 feet deep at one end and 5 feet deep at the other. How many gallons of water does it contain? (15.)
2. How many tons of coal per acre are there in a seam 5 feet 9 inches thick, the coal weighing 84.375 lbs. per cubic foot? (15.)
3. Express 4 cwts. 1 qr. 14 lbs. as the decimal of a ton. (15.)
4. If the output of a mine is 1,039 tons of large coal and 87 tons of small coal per day, the former being sold at 11s. 4d. and the latter at 5s. 7d. per ton, what is the total value of the output per day? (15.)
5. What is the value of 695 tons 13 cwts. 3 qrs. at 9s. 11¾d. per ton? (15.)
6. If 138 gallons of oil cost £65 11s., what will 475 gallons cost? (13.)
7. Simplify  $\frac{2\frac{1}{3}}{2\frac{1}{4}} \times \frac{4\frac{1}{2}}{2\frac{1}{2}}$  (12.)

SUBJECT: ROADWAYS.

Time allowed .. One hour.

Possible marks—100.

1. What is "creep," and to what is it due? (10.)
2. Show by sketch and describe how you would arrange the roads on a flat just off a main tunnel, to deal with 400 tons in eight hours, grade of main tunnel being 1 in 6. (20.)
3. Describe the construction you would adopt and specify the materials you would require for laying 100 yards of skip track in an incline dipping 1 in 3 to be used for direct rope haulage of 200 tons of coal per day. (25.)

4. A level horse-road with single track is to be driven in a 6ft. seam dipping 1 in 6 in wet ground with weak roof and floor: describe and show by sketches, with figured dimensions, how you would timber the roadway and lay the track, providing for drainage, safety of men, and passing places for full and empty rakes of skips. (25.)

5. Describe how you would construct an underground stable, and what precautions should be taken to keep it in a sanitary condition and avoid nuisance in the mine. (20.)

SUBJECT: COAL MINES REGULATION ACT, 1902.

Time allowed .. One hour.

Possible marks—100.

What does the Act require regarding—

1. The supply of timber to workmen? (20.)
2. Daily personal supervision of a mine? (20.)
3. Division of mines into districts or splits? (20.)
4. The employment of boys and females? (20.)
5. Reporting accidents in a mine? (20.)

*The Coal Mines Regulation Act, 1902.*

CERTIFICATES OF MANAGERS AND UNDER MANAGERS.

*First Class Certificates of Competency.*

29/4/04—Bevan, Rees  
 28/5/06—Whitfield, James  
 29/8/02—Evans, John  
 14/1/04—Thomas, Reginald  
 1/6/05—White, Charles Edward  
 15/11/05—Hutchison, William  
 4/12/05—Wright, Henry  
 28/5/06—McDonald, Angus  
 31/8/06—Leitch, George  
 26/4/09—Harper, William  
 9/12/09—Drysdale, William

*First Class Certificates of Service.*

29/8/02—Woodward, Harry P.  
 29/8/02—Straw, Samuel  
 29/8/02—Bedlington, William D.  
 5/3/03—Briggs, Thomas D.  
 17/5/09—McGeachie, John (subject to revocation)

*Second Class Competency.*

26/4/09—Chippington, Thomas K.

*Second Class Service.*

29/8/02—Saunders, Arthur.  
 29/8/02—Bestwick, William  
 29/8/02—Millard, John  
 29/8/02—Lightfoot, John  
 1/11/02—Lawson, Charles  
 14/9/03—Shepherd, Edward  
 30/11/03—Robb, John  
 15/9/06—Baird, Oswald



### DIVISION III.

#### REPORT OF THE SUPERINTENDENT OF STATE BATTERIES FOR THE YEAR 1909.

*The Secretary for Mines.*

I have the honour to submit, for the information of the Hon. the Minister for Mines, the following report for the year 1909:—

During the year new and additional plants have been erected at seven centres, the following being the particulars:—

- Youanme—5 head mill and cyanide plant complete.
- Messenger's Patch—5 head mill complete.
- Desdemona—2 head mill complete.
- Boogardie—New cyanide plant.
- Linden—Small cyanide plant.
- Menzies—New vacuum slimes plant.
- Leonora—New vacuum slimes plant.

In addition to these (which have been paid from Loan funds), repairs, improvements, and renewals to the extent of £6,823 8s. 10d., have been paid for from revenue.

We now have thirty-five plants in operation (three of them being leased), totalling 294 head of stamps, and capable of crushing over 300,000 tons per year (10 head at Menzies put through 10,187 tons), but the tonnage offered for the year was only 94,218 tons, showing that our machinery is idle for want of stone over two-thirds of the time; and whilst we continue to add to the number of our plants without receiving a corresponding increase of tonnage, the cost of crushing on the average must be higher, and the only hope of further reducing our costs is either by closing down for fixed periods mills that are not kept constantly employed, or by the prospectors supplying the necessary tonnage to keep the plants more fully occupied. During the year under review we have managed to show a slight reduction in costs, which, considering the low tonnage, is very satisfactory. The following is a comparative synopsis of the two years 1908 and 1909:—

Operation.	1908.		1909.		Remarks.
	Tonnage.	Cost per ton.	Tonnage.	Cost per ton.	
		s. d.		s. d.	s. d.
Milling ... ..	95,623	12 1·92	94,218	11 1·71	Decrease 1 0·21 per ton
Cyaniding (Sands) ...	62,272	6 4·75	61,032	6 5·80	Increase 0 1·05 „
Slimes ... ..	5,818	12 0·91	16,848	10 0·74	Decrease 2 0·17 „
Tin ... ..	5,513	4 5·19	5,043	4 8·22	Increase 0 3·03 „

The above figures include all Head Office and General Expenses as well as—

Milling repairs and renewals—£5,762 11s. 3d. equals 1/1.9 per ton.

Cyanide repairs and renewals—1,060 17s. 7d. equals 0/3.3 per ton.

The plants that were well supplied with stone show fairly low costs. Those especially worth mentioning are:—

Menzies—10,187 tons milling costing 6/7.8 per ton.

Black Range—8,139 tons milling costing 6/10.9 per ton.

Burtville—2,969 tons milling costing 7/3.9 per ton.

Pig Well—3,061 tons milling costing 7/8.67 per ton.

Meekatharra—6,139 tons milling costing 8/3.4 per ton.

Youanme—2,153 tons milling costing 8/2.29 per ton.

Each of these mills shows a profit on milling and cyaniding.

The following remarks indicate generally the work done at the various batteries mentioned for the year under review:—

*Menzies.*—The work done at Menzies for the year has been good, combined costs of milling and cyaniding being 14/1.43 per ton.

*Black Range.*—The work done at this plant is very good, substantial profits being recorded in both departments. The plant is a good one, and if the tonnage is forthcoming profitable results can be maintained. I am afraid, however, that there is an indication of the tonnage falling off considerably.

*Yarri.*—The returns from this plant are incomplete for November and December, due to the lamentable death of Manager Twyford and the consequent change of management and staff.

*Burtville.*—Splendid work has been done on a very small tonnage, low costs being recorded, and profits being made in both milling and cyaniding operations. Manager Cale is a very capable officer.

*Youanme.*—A newly erected 5-head mill and cyanide plant occupies fifth place on the list of combined costs, showing a profit of £84 11s. 10d. on the seven months operation. Manager Lund has justified his

promotion from the position of assayer at Black Range to the management of this mill.

*Coolgardie.*—Milling costs show a reduction of over 1s. per ton for the year. During the half-year Manager Williamson has been in charge; a small profit was made in milling and costs greatly reduced. Cyanide costs are satisfactory, and a substantial profit was made in this department.

*Niagara.*—Costs at this mill have remained about the same, and a profit of £248 0s. 10d. recorded on combined operations. New battery boxes were installed towards the end of the year, and the mill and power plant thoroughly overhauled.

*Pinjin.*—The results from this plant (a 5-head mill) are fairly satisfactory. The tonnage fell away during the year, and a loss on all operations of £63 6s. 2d. has been recorded. Considering the remote locality and local conditions, Manager Browne has done good work at Pinjin.

*Meekatharra.*—There was a decrease of 2,000 tons in the tonnage as compared with 1908. A heavy expenditure was incurred in overhauling the mill, general repairs and renewals. The plant is now in a better condition than it has been for a long time, but is of a poor type and expensive to work; it will never do cheap work as it now stands.

*Pigwell.*—This is one of the seven mills which show a profit on milling operations, and also on cyaniding. On a small tonnage Manager Morris has once again done good work.

*Boogardie.*—The milling costs stand at 10/10.34 per ton, a reduction of 1/1.61 per ton as compared with 1908. The year's operations show a heavy loss, due principally to the amount of excessively hard but low grade ore crushed at a low rate with an expensive fuel account.

*Mulline.*—A good profit has been shown for the year, and Manager Fisher has reduced milling costs 3s. per ton, and deserves every credit.

*Norseman.*—Although milling costs show a reduction of 10.93 pence per ton, a loss is shown on milling, which has been materially increased by the expenditure of £361 8s. 9d. on various repairs and renewals. Cyaniding sands costs have gone up considerably owing to the necessity of re-treating a considerable amount of the sands which will not yield its gold in one treatment. The cost of re-treatment has to be borne by the original tonnage, but the Department is more than repaid for the outlay by the extra gold won. Since Manager Moyes took charge in June a small profit has been shown on milling, and costs were greatly reduced, and matters are now in a much more satisfactory state at Norseman than they have been in the past.

*Nannine.*—Milling costs at this plant show a reduction of 3.62 pence per ton.

*Darlôt.*—On a greatly reduced tonnage the milling and cyaniding costs are higher than usual, and a loss is shown on the year's operations.

*Leonora.*—The tonnage at Leonora fell away to 2,757 tons for the year, and costs went up in consequence, and a loss was made. The new vacuum slimes plant has treated 4,495 tons of slimes for a profit of £167 7s. 1d. Manager Buckley has done fair work at Leonora.

*Wiluna.*—In spite of a greatly reduced tonnage on the previous year's, a reduction of 1/9.5 per ton on milling costs was effected. Cyaniding costs were high owing to the use of a temporary plant, which was expensive to work. A new plant is now in course of erection,

*Laverton.*—Just over 1,000 tons were milled, and 862 tons cyanided for a small loss. This mill is run in conjunction with Burtville by Manager Cale.

*Siberia.*—This mill shows a loss on the year's operation, but the tonnage was small, only 1,339 tons being crushed, and 601 tons cyanided. Without tonnage there is no chance of getting good results from 5-head mills.

*Mulwarrie.*—1,033 tons were milled, and 775 tons cyanided, showing a loss for the year. This is another instance of a low tonnage producing a loss. The plant is run in conjunction with Mulline.

*Yerilla.*—Only 966 tons were crushed, and this being a 5-head mill of a poor type, it is impossible not to make a loss while crushing at the rates charged by the Department.

*Sandy Creek.*—1,213 tons were crushed, and 1,709 tons cyanided, showing a heavy loss, which is unavoidable in such a place as the North-West unless the plants are kept fully occupied.

*Linden.*—1,987 tons were milled and 2,194 tons cyanided for a net loss of £985 18s. This is mainly due to the action of the prospectors in refusing to deliver the stone to the hoppers of the mill as was anticipated when this 2-head mill was erected. Being a very small plant and capable only of handling small tonnage, it is necessarily expensive, and as Linden has kept this small plant going for a considerable time, thus proving that there is a fair quantity of stone in the district, the Department might justly get a thorough report on the outlook of the field with a view to erecting a larger plant.

*Desdemona.*—477 tons is all that has been offered for treatment in this district, and the 2-head mill has been idle for want of stone for some considerable time. A good deal of difficulty was experienced in getting a good water supply, this has now been overcome; but there is practically no stone being raised in the district.

*Mt. Ida.*—2,102 tons of stone were crushed, showing a profit of £10 4s. 7d., which is very satisfactory, considering the small tonnage and the fact that there is no cyanide plant to share the managerial and other incidental charges.

*Messenger's Patch.*—This newly erected 5-head plant commenced work in November and closed down towards the end of December. Several of the leases which had promised supplies for this mill proved on their first crushing to be unprofitable, and were therefore abandoned. One or two of the leases at present held may develop into payable propositions, and if so the reefs are large enough to keep the plant fully employed.

*Kalpini, Ravelstone, and Widgiemooltha* plants were opened for customers under special arrangements when ore was available, but the three districts supplied only 1,356 tons for the whole year.

*Lennonville, Tuckanarra, and Randalls* plants were worked under the control of the lessees.

#### TIN PLANTS.

*Greenbushes, North End.*—This plant treated 1,350 tons of tin ore at a cost of 6/4.26 per ton.

*Greenbushes, Bunbury End.*—3,693 tons were treated at this plant, which is equipped with a 5-head mill and a Huntingdon mill, at a cost of 4/0.9 per ton. The revenue received from these plants is low, owing to small tonnage, and unless the charges are raised a loss must continue to be made.

## SAND TREATMENT.

During the year sands and slimes have been purchased, for which the customers have received in cash £38,608. 61,032 tons of sands have been treated at a cost of £19,786 15s. 3d. The revenue from the treatment amounts to £26,883 1s. 5d.

## SLIMES PLANTS.

Two new plants have been erected, one at Menzies, the other at Leonora, for treating slimes by what is known as the vacuum process, and, together with the filter presses and other methods at the various batteries, we have put through 16,848 tons of slimes at a cost of £8,476 2s.

## MANAGEMENT.

A considerable improvement has been shown in the management of the batteries generally. This is partly due to the managers' knowledge of their work being closely scrutinised and comparisons being made against their former work, and the work of other managers; also to the fact that better men have been appointed to take the place of those who have left or have been retired. Milling incurs the chief expenditure in connection with the treatment of ore handled at State batteries, and it is pleasing to note that the cost of milling for 1909 is 1s. less than that for the previous year, although up to that time the 1908 figures constituted a record.

In this connection I desire to record the assistance rendered by the managers at the various mills, also the valuable services of Inspector Howe.

I regret having to report the death of one of the Department's oldest managers (Mr. John Twyford), who had been ailing for some time previous to his decease at Leonora.

J. DUNSTAN,  
Superintendent State Batteries.

20th April, 1910.

## YEARLY OUTPUT.

## Milling.

	Tons.	Ozs.
Up to 1901 (3 years) ..	68,791	77,533
Year 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
" 1908 .. ..	95,624	89,875
" 1909 .. ..	94,218	83,127

## Cyaniding (Sands).

	Tons.
Up to 1902 .. ..	29,255
Year 1903 .. ..	32,369
" 1904 .. ..	42,559
" 1905 .. ..	54,420
" 1906 .. ..	60,422
" 1907 .. ..	63,778
" 1908 .. ..	62,081
" 1909 .. ..	61,265

## Slimes Treatment.

	Tons.
Up to 1904 .. ..	691
Year 1905 .. ..	7,028
" 1906 .. ..	4,737
" 1907 .. ..	8,220
" 1908 .. ..	5,818
" 1909 .. ..	16,848

The 94,218 tons of ore milled entailed a working cost of £52,494 19s. 5d., and yielded a revenue of £44,926 13s. 10d.

The total tonnage of sands cyanided for the year was 61,032 for a yield of 12,957.14 ounces of gold, valued at £55,042 0s. 7d. The cost of treatment was £19,786 15s. 3d., whilst the revenue amounted to £26,883 1s. 5d.

Sixteen thousand eight hundred and forty-eight tons of slimes were treated for a yield of 3,258.16 ounces of gold, valued at £13,841 1s. 3d., the cost of treatment being £8,476 2s., and the revenue £8,052 1s. 2d.

Five thousand and forty-three tons of tin ore were treated, at a cost of £1,181 10s. 7d., and the revenue amounted to £914 14s. 4d.

	Exp.		Rev.	
	s.	d.	s.	d.
Milling, per ton ..	11	1.71	9	6.4
Cyaniding, per ton ..	6	5.8	8	9.7
Slimes, per ton ..	10	0.74	9	6.71
Tin, per ton ..	4	8.22	3	7.5

	Exp.			Rev.		
	£	s.	d.	£	s.	d.
Batteries ..	52,494	19	5	44,926	13	10
Cyanide Plants ..	19,786	15	3	26,883	1	5
Slimes Plants ..	8,476	2	0	8,052	7	2
Tin Plants ..	1,181	10	7	914	14	4
	£81,939	7	3	£80,776	16	9
Balance, being loss ..				1,162	10	6
				£81,939	7	3

FORM 1.—Expenditure from "Consolidated Revenue Vote," and "Loan Funds" on Erection of State Batteries for Year ending 31st December, 1909, and Totals since Inception.

Batteries.	From Revenue.		From Loan.		Total.	
	£	s. d.	£	s. d.	£	s. d.
Norseman Condenser .. .. .			2	5 0	2	5 0
Black Range—Dismantling, etc., Duketon .. .. .			1,254	13 11	1,254	13 11
Coolgardie Battery—Remodelling .. .. .			45	4 9	45	4 9
Desdemona Battery, Erection .. .. .			1,225	1 8	1,225	1 8
Mount Ida Water Supply—Boring .. .. .			2	14 9	2	14 9
Wiluna Cyanide Plant .. .. .			11	17 2	11	17 2
Menzies Cyanide Plant .. .. .			54	6 1	54	6 1
Callion Water Supply .. .. .			14	7 2	14	7 2
Loan Suspense Account .. .. .			25	3 0	25	3 0
Widgiemooltha Water Supply .. .. .			98	15 3	98	15 3
Youanme Battery, Erection .. .. .			4,621	0 9	4,621	0 8
Boogardie Cyanide Plant .. .. .			1,032	15 1	1,032	15 1
Coolgardie Cyanide Plant .. .. .			1,164	19 9	1,164	19 9
Youanme Water Supply .. .. .			505	9 3	505	9 3
Leonora Slimes Plant .. .. .			2,836	16 10	2,836	16 10
Menzies Slimes Plant .. .. .			2,780	3 11	2,780	3 11
Desdemona Water Supply .. .. .			752	17 9	752	17 9
Linden Cyanide Plant .. .. .			347	17 11	347	17 11
Messenger's Patch Water Supply .. .. .			435	13 9	435	13 9
Mount Ida Battery, Water Supply .. .. .			1,198	16 9	1,198	16 9
Siberia—New Cyanide Vats .. .. .			377	15 3	377	15 3
Mulwarrie Cyanide Plant .. .. .			92	4 10	92	4 10
Messenger's Patch Battery, Erection .. .. .			2,554	7 4	2,554	7 4
Mount Sir Samuel Battery, Erection .. .. .			626	15 10	626	15 10
Marble Bar Battery, Erection .. .. .			423	4 10	423	4 10
			22,485	8 6	22,485	8 6
<i>Erection of State Batteries.</i>						
Expenditure, 31st December, 1907 .. .. .			91,981	1 8		
Loan Expenditure, 31st December, 1908 .. .. .					160,853	3 3
					251,084	10 5
Gross Totals .. .. .			£91,981	1 8	£183,338	11 9
					£275,319	13 5

FORM 2.—Return showing the Number of Tons crushed, Gold Yield, Average Value per ton, and Total Value for Year ending 31st December, 1909.

Battery.	Tons Crushed.	Gold Yield.	Average	Total
		ozs.	in shillings.	£
Black Range ..	8,139.00	6,716.72	59.42	24,180.19
Boogardie ..	6,153.90	3,431.33	40.14	12,352.78
Burtville ..	2,969.50	4,289.04	103.99	15,440.54
Coolgardie ..	5,752.50	5,213.33	65.26	18,767.97
Darlot ..	2,413.50	1,509.45	45.03	5,434.02
Desdemona ..	477.00	221.00	33.34	795.60
Kalpini ..	176.00	126.00	51.54	453.60
Laverton ..	1,007.00	1,213.50	86.76	4,368.59
Lennonville ..	1,317.80	875.96	47.84	3,153.45
Leonora ..	2,757.95	4,026.12	105.10	14,494.03
Linden ..	1,987.25	2,515.25	91.12	9,054.90
Meekatharra ..	6,139.00	4,603.16	53.98	16,571.36
Menzies ..	10,187.75	7,358.22	52.00	26,489.58
Messenger's Patch ..	448.50	227.10	36.44	817.56
Mt. Ida ..	2,102.00	3,196.40	109.48	11,507.04
Mulline ..	4,007.00	4,788.70	86.04	17,239.32
Mulwarrie ..	1,033.50	1,592.70	110.95	5,733.72
Nannine ..	3,142.00	1,803.11	41.32	6,491.18
Niagara ..	4,830.00	3,628.17	54.08	13,061.41
Norseman ..	7,159.50	6,742.11	67.80	24,271.59
Pig Well ..	3,061.50	3,290.15	77.36	11,844.54
Pinjin ..	2,159.50	1,290.60	43.02	4,646.16
Randall's ..	1,200.25	338.67	20.31	1,219.21
Ravelstone ..	623.00	502.20	58.02	1,807.92
Sandy Creek ..	1,213.75	1,586.99	94.14	5,713.16
Siberia ..	1,339.00	1,981.15	106.52	7,132.14
Tuckanarra ..	1,485.50	2,426.04	117.58	8,733.74
Widgiemooltha ..	557.50	193.29	24.96	695.85
Wiluna ..	2,980.50	2,154.80	52.04	7,757.28
Yarri ..	4,278.00	2,778.80	46.76	10,003.68
Yerilla ..	966.00	742.60	55.34	2,673.36
Youanme ..	2,153.75	1,765.00	59.00	6,354.01
	94,218.90	83,127.66	63.54	299,259.48

FORM 2A.—Return showing Number of Tons of Sands and Slimes treated, Yield therefrom, and Value for Year ending 31st December, 1909.

Plant.	SANDS.		
	Tons treated.	Yield. Fine ozs.	Value. £
Black Range ..	5,078	925.83	3,933.20
Boogardie ..	3,802	863.82	3,669.71
Burtville ..	2,176	534.92	2,272.45
Coolgardie ..	2,828	425.46	1,807.57
Darlot ..	2,267	173.00	733.91
Laverton ..	862	113.39	481.79
Leonora ..	1,975	388.44	1,650.21
Linden ..	2,146	735.13	3,122.99
Meekatharra ..	7,035	1,284.96	5,456.81
Menzies ..	5,045	1,304.11	5,540.16
Mulline ..	2,081	689.23	2,927.98
Mulwarrie ..	751	123.79	526.06
Nannine ..	1,026	81.89	347.92
Niagara ..	3,509	409.82	1,741.18
Norseman ..	5,349	1,239.83	5,267.03
Pig Well ..	2,112	486.74	2,067.76
Pinjin ..	1,493	157.01	666.96
Sandy Creek ..	1,564¾	500.73	2,127.23
Siberia ..	601	188.82	802.17
Wiluna ..	3,453	1,547.94	6,575.83
Yarri ..	3,502	223.56	949.77
Yerilla ..	1,495	102.23	434.48
Youanme ..	1,115	456.49	1,938.86
	61,265¾	12,957.14	55,042.03
Includes 233 tons under treatment at end of December, 1909.			
Plant.	SLIMES.		
	Tons treated.	Yield.	Value.
Burtville ..	142	54.29	230.67
Darlot ..	332	32.06	136.23
Leonora ..	4,495	501.41	2,130.13
Menzies ..	4,172½	913.88	3,882.29
Meekatharra ..	1,125	254.33	1,080.40
Norseman ..	4,220	1,080.81	4,591.21
Niagara ..	1,724	238.93	1,015.01
Wiluna ..	484	170.20	723.06
Yerilla ..	154	12.25	52.06
	16,848½	3,258.16	13,841.06



FORM 4.—State Batteries, Tin, Cyanide, and Slimes Plants. Costs per ton for Year ending 31st December, 1909.

Plant.	Tons Crushed.	MILLING AND TIN.			Plant.	Tons Treated.	CYANIDING AND SLIMES.		
		Wages.	Repairs and Maintenance.	Total.			Wages.	Repairs and Maintenance.	Total.
		s. d.	s. d.	s. d.			s. d.	s. d.	s. d.
Black Range ...	8,139·00	3 11·35	4 4·97	8 4·32	Black Range ...	5,078	2 3·73	2 4·45	4 8·18
Boogardie ...	6,153·90	4 10·05	6 0·29	10 10·34	Boogardie ...	3,802	3 7·91	3 4·04	6 11·95
Burtville ...	2,969·50	4 7·90	4 7·21	9 3·11	Burtville ...	2,226	2 8·83	2 2·26	4 11·09
Coolgardie ...	5,752·50	3 11·99	5 11·84	9 11·83	Coolgardie ...	2,828	2 8·86	2 7·73	5 4·59
Darlot ...	2,413·50	4 11·15	8 1·83	13 0·98	Darlot ...	2,267	4 0·91	2 7·55	6 8·46
Desdemona ...	477·00	16 7·00	14 3·72	30 10·72	Laverton ...	862	3 2·76	2 7·42	5 10·18
Kalpini ...	...	...	...	...	Leonora ...	1,975	4 6·70	2 2·75	6 9·45
Laverton ...	1,007·00	9 7·95	5 9·54	15 5·49	Linden ...	2,194	2 10·94	3 8·42	6 7·36
Lennonville ...	1,317·00	1 5·63	5 1·42	6 7·05	Meekatharra ...	6,915	3 4·45	2 2·75	5 7·20
Leonora ...	2,757·95	5 7·57	6 11·25	12 6·82	Menzies ...	5,055	2 4·02	3 4·99	5 9·01
Linden ...	1,987·25	12 11·55	12 3·17	25 2·72	Mulline ...	2,078	4 4·20	4 6·82	8 11·02
Meekatharra ...	6,139·00	3 9·60	7 4·82	11 2·42	Mulwarrie ...	775	2 6·72	7 6·88	10 1·60
Messenger's Patch ...	448·50	11 9·36	5 0·27	16 9·63	Nannine ...	986	2 10·94	3 11·68	6 10·62
Menzies ...	10,187·75	3 6·85	4 9·58	8 4·43	Niagara ...	3,509	2 7·93	2 8·22	5 4·15
Mount Ida ...	2,102·00	8 0·84	4 0·83	12 1·67	Norseman ...	5,349·5	3 5·78	3 11·42	7 5·20
Mulline ...	4,007·00	4 9·99	5 3·93	10 1·92	Pig Well ...	2,112	4 4·82	2 8·49	7 1·31
Mulwarrie ...	1,033·50	8 9·36	8 8·62	17 5·98	Pinjin ...	1,567	3 0·45	2 3·50	5 3·95
Nannine ...	3,142·00	7 8·50	5 0·40	12 8·90	Sandy Creek ...	1,709	9 8·60	4 0·38	13 8·98
Niagara ...	4,830·00	5 1·03	6 5·27	11 6·30	Siberia ...	601	3 6·81	3 10·54	7 5·35
Norseman ...	7,159·50	5 0·29	6 9·03	11 9·32	Wiluna ...	2,924	4 8·43	3 11·56	8 7·99
Pig Well ...	3,061·50	4 10·33	5 7·11	10 5·44	Yarri ...	3,610	2 0·73	2 2·13	4 2·86
Pinjin ...	2,159·50	5 9·70	5 9·72	11 7·42	Yerilla ...	1,495	5 2·47	3 3·74	8 6·21
Sandy Creek ...	1,213·75	10 11·66	12 10·59	23 10·25	Youanme ...	1,115	2 5·39	3 2·38	5 7·77
Siberia ...	1,339·00	8 6·84	6 3·00	14 9·84					
Wiluna ...	2,980·50	6 3·16	5 3·96	11 7·12	<i>Slimes Plants.</i>				
Yarri ...	4,278·00	3 8·65	5 6·56	9 3·21	Burtville ...	142	10 2·25	3 6·93	13 9·18
Yerilla ...	966·00	13 2·96	8 5·63	21 8·59	Darlot ...	332	4 1·89	2 3·60	6 5·49
Youanme ...	2,153·75	5 6·07	3 7·49	9 1·56	Leonora ...	4,495	4 5·15	5 2·79	9 7·94
					Meekatharra ...	1,125	7 9·25	3 3·15	11 0·40
<i>Tin Plants.</i>					Menzies ...	4,172·5	5 4·01	4 8·22	10 0·23
Greenbushes (Bunbury end)	3,693·00	1 11·87	2 1·03	4 0·90	Niagara ...	1,724	6 9·17	3 1·61	9 10·78
Greenbushes (North end)	1,350·00	4 5·68	1 10·58	6 4·26	Norseman ...	4,220	5 0·65	3 11·31	8 11·96
					Wiluna ...	484	9 5·55	4 4·86	13 10·41
					Yerilla ...	154	4 5·73	1 3·23	5 8·96



WESTERN AUSTRALIA.

State Batteries and Tin Plants.—Statement of Receipts and Expenditure for Year 1909.

Plant.	No. of Stamps.	MILLING AND TIN.												
		Tonnage.	Management.	Wages.	Supplies.	Total Working Expenditure.	Per Ton.	Repairs and Renewals.	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 .. ..	10	8,139-00	236 0 10	1,501 14 4	1,073 17 11	2,811 13 1	6 10-91	292 8 10	298 0 2	3,402 2 1	8 4-32	4,105 13 8	10 1-06	
Boogardie .. ..	10	6,153-90	246 16 1	1,246 15 5	1,242 11 9	2,736 3 3	8 10-78	398 7 5	207 14 7	3,342 5 3	10 10-34	2,558 10 3	8 3-78	
Burtville .. ..	10	2,969-50	114 0 0	597 8 2	376 16 3	1,088 4 5	7 3-95	182 3 6	104 9 4	1,374 17 3	9 3-11	1,489 15 0	10 0-40	
Coolgardie .. ..	10	5,752-50	305 5 6	844 18 2	1,301 9 8	2,451 13 4	8 6-28	260 2 5	160 9 1	2,872 4 10	9 11-83	2,439 7 6	8 5-77	
Darlot .. ..	10	2,413-50	172 12 0	422 6 3	497 18 8	1,092 16 11	9 0-69	396 2 9	89 14 2	1,578 13 10	13 0-98	1,209 1 8	10 0-23	
Desdemona .. ..	2	477-00	148 0 0	258 4 11	230 6 7	636 11 6	26 8-29	38 1 6	62 3 2	736 16 2	30 10-72	236 16 0	9 11-14	
Devon .. ..	5	..	..	..	..	..	..	..	55 15 0	55 15 0	..	..	..	
Kalpini .. ..	10	176-00	..	185 12 4	6 1 6	191 13 10	21 9-40	..	5 2 6	196 16 4	22 4-38	66 5 6	7 6-37	
Laverton .. ..	10	1,007-00	92 0 0	394 10 0	189 12 2	676 2 2	13 5-13	25 4 7	76 19 5	778 6 2	15 5-49	578 8 9	11 5-86	
Lennonville .. ..	10	1,317-80	70 3 7	35 15 10	302 5 0	408 4 5	6 2-34	..	25 17 6	434 1 11	6 7-05	375 10 1	5 8-38	
Leonora .. ..	10	2,757-95	136 0 0	641 19 7	551 18 9	1,329 18 4	9 7-73	319 6 9	83 19 6	1,733 4 7	12 6-82	1,249 9 2	9 0-72	
Linden .. ..	2	1,987-25	223 18 3	1,065 7 8	855 10 10	2,144 16 9	21 7-02	252 12 2	109 3 4	2,506 12 3	25 2-72	1,166 8 9	11 8-87	
Meekatharra .. ..	10	6,139-00	175 13 6	1,027 14 3	1,340 0 1	2,543 7 10	8 3-43	686 9 5	208 2 7	3,437 19 10	11 2-42	3,325 2 1	10 9-99	
Messenger's Patch .. ..	5	448-50	75 0 0	189 3 10	73 9 10	337 13 8	15 0-70	..	39 2 8	376 16 4	16 9-63	191 11 0	8 6-50	
Menzies .. ..	10	10,187-75	223 2 10	1,595 12 7	1,572 6 6	3,391 1 11	6 7-88	465 10 8	406 11 3	4,263 3 10	8 4-43	4,456 10 1	8 8-98	
Mount Ida .. ..	10	2,102-00	312 0 0	536 3 4	331 7 1	1,179 10 5	11 2-67	30 7 11	65 19 1	1,275 17 5	12 1-67	1,286 2 0	12 2-84	
Mulline .. ..	20	4,007-00	158 10 0	835 3 7	735 0 11	1,728 14 6	8 7-54	155 14 7	151 3 5	2,035 12 6	10 1-92	2,301 10 4	11 4-87	
Mulwarrie .. ..	10	1,033-50	45 10 0	434 18 0	220 3 8	700 11 8	13 6-68	54 2 6	149 11 7	904 5 9	17 5-98	572 19 7	11 1-05	
Nannine .. ..	5	3,142-00	312 12 4	927 4 1	548 6 0	1,788 2 5	11 4-58	85 19 5	127 13 10	2,001 15 8	12 8-90	1,518 7 3	9 7-97	
Niagara .. ..	10	4,830-00	292 1 8	965 9 0	931 2 6	2,188 13 2	9 0-75	432 18 2	161 14 1	2,783 5 5	11 6-30	2,598 12 11	10 9-12	
Norseman .. ..	10	7,159-50	227 6 2	1,571 4 1	1,781 12 7	3,580 2 10	10 0-01	361 8 9	274 5 1	4,215 16 8	11 9-32	3,732 4 3	10 5-11	
Pig Well .. ..	10	3,061-50	177 0 0	567 0 10	438 3 7	1,182 4 5	7 8-67	336 2 3	81 17 0	1,600 3 8	10 5-44	1,741 7 6	11 4-50	
Pinjin .. ..	5	2,159-50	134 9 0	494 10 2	394 2 11	1,023 2 1	9 5-70	156 4 8	75 3 4	1,254 10 1	11 7-42	925 8 6	8 6-84	
Sandy Creek, N.W. .. ..	10	1,213-75	174 0 0	537 19 0	591 12 4	1,303 11 4	21 5-76	108 14 9	35 6 9	1,447 12 10	23 10-25	1,033 12 6	17 0-37	
Siberia .. ..	5	1,339-00	163 16 1	417 12 5	258 2 5	839 10 11	12 6-47	111 17 0	40 15 10	992 3 9	4 9-84	638 11 6	9 6-45	
Wiluna .. ..	10	2,980-50	135 15 11	804 13 10	621 2 11	1,561 12 8	10 5-74	77 3 0	88 19 2	1,727 14 10	11 7-12	1,507 1 4	10 1-35	
Yarri .. ..	10	4,278-00	313 2 3	743 0 9	573 13 6	1,629 16 6	7 7-43	219 8 5	133 2 2	1,982 7 1	9 3-21	1,637 19 5	7 7-89	
Yerilla .. ..	5	966-00	152 0 0	495 5 3	245 6 5	892 11 8	18 5-76	120 16 10	35 9 3	1,048 17 9	21 8-59	497 15 6	10 3-67	
Youanme .. ..	5	2,153-75	122 0 0	484 10 2	275 11 0	882 1 2	8 2-29	16 14 4	84 8 9	983 4 3	9 1-56	877 12 6	8 1-79	
Randall's .. ..	10	1,200-25	..	78 16 8	..	78 16 8	..	43 0 0	19 4 6	141 1 2	..	..	..	
Ravelstone .. ..	10	623-00	..	374 0 9	304 18 2	678 18 11	..	..	..	678 18 11	..	349 16 0	..	
Widgiemooltha .. ..	10	557-50	..	241 4 5	0 12 0	241 16 5	..	1 4 0	68 15 7	311 16 0	..	145 7 0	..	
Tukanarra .. ..	10	1,485-50	..	..	..	..	..	..	..	..	..	87 6 3	..	
Southern Cross .. ..	..	..	..	..	..	..	..	..	20 0 0	20 0 0	..	26 10 0	..	
Totals .. ..	..	94,218-9	4,938 16 0	20,515 19 8	17,865 3 6	43,319 19 2	9 2-34	5,628 6 7	3,546 13 8	52,494 19 5	11 1-71	44,926 13 10	9 6-44	
TIN PLANTS.														
Greenbushes, B. End .. ..	..	3,693-	180 0 0	187 6 0	216 13 4	583 19 4	3 1-95	85 11 4	83 0 7	752 11 3	4 0-90	611 0 4	3 3-71	
„ N. End .. ..	..	1,350-	180 0 0	121 19 0	59 12 9	361 11 9	5 4-28	48 13 4	18 14 3	428 19 4	6 4-26	303 14 0	4 5-99	
Totals .. ..	..	99,261-9	5,298 16 0	20,825 4 8	18,141 9 7	44,265 10 3	8 11-02	5,762 11 3	3,648 8 6	53,676 10 0	10 9-78	45,841 8 2	9 2-83	



WESTERN AUSTRALIA.

Cyanide and Slimes Plants.—Statement of Receipts and Expenditure for Year 1909.

Plant.	CYANIDING SANDS AND SLIMES.												
	Tonnage.	Management.	Wages.	Assays.	Supplies.	Total Working Expenditure.	Per Ton.	Renewals.	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.	s. d.
Black Range .. ..	5,078	134 18 2	365 13 5	158 0 11	298 12 10	957 5 4	3 9-24	31 7 5	200 0 7	1,188 13 4	4 8-18	2,077 2 7	8 2-22
Boogardie .. ..	3,802	130 4 3	375 0 8	267 7 6	307 8 1	1,080 0 6	5 8-17	81 11 0	168 7 2	1,329 18 8	6 11-95	1,965 0 10	10 4-04
Burtville .. ..	3,226	85 0 0	214 11 0	37 9 11	107 5 4	444 6 3	3 11-90	5 13 4	98 2 8	548 2 3	4 11-09	991 15 5	8 10-92
Coolgardie .. ..	2,828	142 15 9	219 0 10	78 1 4	209 6 0	649 3 11	4 7-09	10 6 1	101 11 8	761 1 8	5 4-59	1,027 15 9	7 3-22
Darlot .. ..	2,267	155 12 0	300 8 4	50 2 4	160 5 5	666 8 1	5 10-55	13 18 0	79 15 5	760 1 6	6 8-46	650 1 4	5 8-82
Devon .. ..			6 18 4			6 18 4				6 18 4			
Laverton .. ..	862	31 0 0	108 4 9	13 6 11	44 1 4	196 13 0	4 6-75	18 11 1	36 17 3	252 1 4	5 10-18	350 3 10	8 1-50
Lennonville .. ..		7 10 0		10 11 3		18 1 3			0 8 8	18 9 11			
Leonora .. ..	1,975	106 0 0	252 18 11	91 19 2	136 8 7	587 6 8	5 11-37	2 9 11	80 8 8	670 5 3	6 9-45	879 15 3	8 10-90
Linden .. ..	2,194	138 7 1	179 1 0	43 15 2	254 8 5	615 11 8	5 7-33	12 11 6	97 7 4	725 10 6	6 7-36	1,079 16 0	9 10-11
Meekatharra .. ..	6,915	151 0 6	948 12 5	73 5 1	452 18 1	1,625 16 1	4 8-43	47 7 8	263 1 9	1,936 5 6	5 7-20	3,197 2 1	9 2-96
Menzies .. ..	5,055	114 0 9	375 1 5	142 5 3	584 6 11	1,215 14 4	4 9-71	18 18 10	219 0 5	1,453 13 7	5 9-01	2,359 5 4	9 4-01
Mulline .. ..	2,078	104 10 0	288 7 3	163 8 5	232 6 10	788 12 6	7 7-08	6 6 8	131 13 11	926 13 1	8 11-02	1,296 5 1	12 5-71
Mulwarrie .. ..	775	17 10 0	81 14 6	63 12 11	126 10 8	289 8 1	7 5-62	30 15 3	72 10 5	392 13 9	10 1-60	415 16 4	10 8-76
Nannine .. ..	986	60 8 8	80 4 10	24 4 3	115 6 9	280 4 6	5 8-20	7 18 9	51 5 11	339 9 2	6 10-62	360 15 5	7 3-81
Niagara .. ..	3,509	202 3 4	252 3 7	61 12 8	203 18 0	719 17 7	4 1-23	95 15 6	122 5 6	937 18 7	5 4-15	1,377 10 3	7 10-21
Norseman .. ..	5,349.5	188 1 5	438 12 10	492 0 4	571 16 9	1,690 11 4	6 3-84	38 10 11	259 5 6	1,988 7 9	7 5-20	2,683 18 1	10 0-41
Pig Well .. ..	2,112	132 0 0	300 14 0	29 12 9	156 16 9	619 3 6	5 10-36	60 9 2	71 3 1	750 15 9	7 1-31	940 9 3	8 10-87
Pinjin .. ..	1,567	84 9 0	153 10 11	17 6 0	95 8 10	350 14 9	4 5-71	11 16 10	55 0 3	417 11 10	5 3-95	809 19 7	10 4-05
Sandy Creek, N.W. ..	1,709	222 0 0	552 9 6	127 16 0	126 2 7	1,028 8 1	12 0-42	49 10 0	96 18 0	1,174 16 1	13 8-98	854 10 0	10 0-00
Siberia .. ..	601	40 3 11	64 9 8	23 18 8	72 2 6	200 14 9	6 8-16		23 0 3	223 15 0	7 5-35	344 16 2	11 5-69
Wiluna .. ..	2,924	165 13 3	515 1 10	70 19 7	288 3 1	1,039 17 9	7 1-35	20 18 7	206 3 1	1,266 19 5	8 7-99	1,475 0 0	10 1-06
Yarri .. ..	3,610	102 6 1	299 1 7	89 5 4	144 3 2	634 16 2	3 6-20	26 14 10	103 11 3	765 2 3	4 2-86	857 2 1	4 9-00
Yerilla .. ..	1,495	144 0 0	183 2 4	33 7 11	163 15 10	524 6 1	7 0-17	49 9 5	62 18 0	636 13 6	8 6-21	383 19 11	5 1-64
Youanme .. ..	1,115	49 10 0	85 9 10	33 9 8	96 19 3	265 8 9	4 9-13	0 5 0	49 3 6	314 17 3	5 7-77	505 0 10	9 0-71
Totals .. ..	61,032.5	2,709 4 2	6,640 13 9	2,196 19 4	4,948 12 0	16,495 9 3	5 4-86	641 5 9	2,650 0 3	19,786 15 3	6 5-80	26,883 1 5	8 9-71
SLIMES PLANT.													
Burtville .. ..	142	18 0 0	54 6 8	4 2 8	16 8 11	92 18 3	13 1-03		4 16 6	97 14 9	13 9-18	71 0 0	10 0-00
Darlot .. ..	332	19 16 0	50 4 2	0 10 0	27 13 6	98 3 8	5 10-97		9 0 3	107 3 11	6 5-49	137 8 8	8 3-35
Leonora .. ..	4,495	107 11 3	835 8 8	46 6 2	873 2 5	1,862 8 6	8 3-44	160 6 3	148 15 7	2,171 10 4	9 7-94	2,004 3 3	8 11-00
Meekatharra .. ..	1,125	41 18 7	385 0 5		155 11 7	582 10 7	10 4-27	3 2 11	34 19 4	620 12 10	11 0-40	562 10 0	10 0-00
Menzies .. ..	4,172.5	93 9 9	847 13 7	70 16 1	887 15 9	1,899 15 2	9 1-27	80 13 3	109 17 11	2,090 6 4	10 0-23	2,036 5 0	9 9-12
Mulline .. ..					6 15 0	6 15 0		33 17 8	216 10 4	257 3 0		2 11 0	
Niagara .. ..	1,724	114 18 4	459 12 0	8 11 4	194 0 6	777 2 2	9 0-18	17 0 1	59 3 9	853 6 0	9 10-78	846 7 8	9 9-82
Norseman .. ..	4,220	115 5 0	929 13 11	21 10 0	582 10 3	1,648 19 2	7 9-78	123 6 8	126 1 8	1,898 7 6	8 11-96	2,110 0 0	10 0-00
Wiluna .. ..	484	47 15 10	179 16 3	7 5 9	81 14 5	316 12 3	13 1-00	1 5 0	17 15 0	335 12 3	13 10-41	230 0 0	9 6-05
Yerilla .. ..	154		33 8 9		10 0 7	43 9 4	5 7-74		0 15 9	44 5 1	5 8-96	52 1 7	6 9-16
Totals .. ..	77,881	3,267 18 11	10,415 18 2	2,356 1 4	7,784 4 11	23,824 3 4	6 1-42	1,060 17. 7	3,377 16 4	28,262 17 3	7 3-09	34,935 8 7	8 11-65

## STATE BATTERIES.

*Balance Sheet from Inception of Scheme to 31st December, 1909.*

	£	s.	d.		£	s.	d.
To Capital Expenditure—				By Batteries, Cyanide Plants, etc., as per			
From Loan Fund .. .. .	183,338	11	9	valuation (approx.), 31st December, 1909	122,944	0	0
From Revenue .. .. .	91,981	1	8	Gross Loss (including depreciation)	257,786	15	8
Net Loss (excluding depreciation) ..	105,411	2	3				
	<u>£380,730</u>	<u>15</u>	<u>8</u>		<u>£380,730</u>	<u>15</u>	<u>8</u>

*Profit and Loss Account.*

	£	s.	d.		£	s.	d.
To Working Expenses—				By Stock on hand .. .. .	9,091	0	8
Head Office and all Batteries as per				By Revenue received .. .. .	649,852	7	2
Treasury .. .. .	684,013	13	7	By Sundry Debtors .. .. .	11,204	13	1
To Sundry Creditors .. .. .	5,149	16	9	Gross Loss (including depreciation)	257,786	15	8
To Interest at 3½ % and Sinking Fund at							
1% on Capital Expenditure ..	86,395	12	10				
Depreciation as per Balance Sheet ..	152,375	13	5				
	<u>£927,934</u>	<u>16</u>	<u>7</u>		<u>£927,934</u>	<u>16</u>	<u>7</u>



DIVISION IV.

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REPORT OF THE ENGINEER FOR MINES WATER SUPPLY.

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*The Under Secretary for Mines.*

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ANNUAL REPORT, 1909.

Mines Department, Water Supply Branch,  
Perth, 26th April, 1910.

Sir,

I have the honour to submit, for the information of the Hon. Minister for Mines, my report for the year 1909.

The work of this Branch includes the surveys for and construction of reservoirs for conservation of water, boring for water and for minerals, sinking wells for towns and roads, construction of stock routes, improvements to soaks, lagoons, etc., clearing tracks and roads, maintenance of works constructed, collection of revenue from sales of water, investigating and reporting on requests and petitions relating to water supply on or about the mineral belts of the State.

The attached tabulated statements show briefly the principal works done.

Capital, revenue, and expenditure on six of the principal revenue-producing works given hereunder. Over 90 per cent. of the water stations under control of this Department are non revenue-producing.

Hand-boring plants.—The summary shows 80 holes equal to 6,744 feet.

Diamond drilling at Morgans continued from 1908 report, completed in 1909. Number of bores, 8; total depth, 3,698 feet; cost 11s. per foot.

This work commenced in 1908, and was carried out for the Mt. Morgans Diamond Drilling Syndicate. The object of the work was to trace the run of gold-bearing lodes northwards of the Mt. Morgan's mine. The Syndicate paid one-third of the cost, the Government subsidy amounted to two-thirds.

At the Great Fingall mine near Day Dawn, boring was undertaken for the company in August, 1909. Three horizontal holes from 13th and 9th levels, aggregate length 1,745 feet, cost 18s. per foot. One bore hole (horizontal) measured 1,204 feet, and is, I believe, a record for an "H" drill. "E" rods were used from 500 feet to 1,204 feet.

Boring for Coal, Collie Field.—Under agreement with the Premier Coal Mining Syndicate, one bore, 500 feet, was sunk. A Calyx plant was used. Cost per foot 10s. 10d. The syndicate paid half cost.

Boring for Coal, Tenindewa (Kokatea).—13 bores, extending for 12 miles along Kokatea Creek. Aggregate depth, 2,033 feet 6 inches. All bores had to be cased. Samples of cores from each bore sent to the Government Geologist.

New wells were sunk as follows:—10 for State Battery and Town Water Supply; four bore wells for prospectors; and 32 wells on new stock route. All of these yield from fair to very good supplies of fresh water.

Stock Routes.—Good progress has been made in construction of Wiluna-East Kimberley Stock Route. At the end of 1909, about 40 water stations were completed. The work will be completed about April, 1910.

Between Leonora and Wiluna all water stations have been improved, and the route is now safe for mobs of 500 to 600 head. The balance of this route *via* Peak Hill to Nullagine will be made good for mobs of 400 head as money is made available.

East Kimberley and Tanami Road Water Supply.—A party of four men and 19 camels left the Eastern Fields on September 17th, 1909, and arrived at Hall's Creek in December. This party is now busy boring and well sinking between Mt. Brophy and Tanami.

Construction of Tanks.—During the year the following tanks were completed:—Kanowna-Gindalbie Tank, Randall's, Carbine, and Yerbillon. Siberia Tank lined with asphalt, and at the close of the year Nevoria and Chadwin Tanks in progress. The capacities of these vary from 50,000 gallons (roofed and lined) to three million gallons.

Miscellaneous small works do not call for special mention, except perhaps the construction of water stations west of Mulline, and from Mt. Jackson to Youanme.

The country is known to be auriferous, but owing to want of water it has not been thoroughly prospected. It is expected some new finds will be made as water supply now in hand progresses.

Loan of Boring Plants.—Diamond drill plants, 2; Calyx drill, 1; Hand-boring plants, 15. Water stations leased, 50; Caretakers employed, 13; Pumpers employed, 10. Number of watering stations on our lists, 1,201. Average number of men employed, 150.

Correspondence.—Letters (inward), 3,329; (outward), 2,930. Wires (inward), 486; (outward), 423.

I have, etc.,

P. V. O'BRIEN,  
Engineer for Mines Water Supply.

MINES DEPARTMENT.  
WATER SUPPLY BRANCH.  
ANNUAL REPORT, 1909.  
WORKS COMPLETED, UNDERTAKEN, AND INITIATED.  
BORING.

Item.	Boring for Water.	Locality.	General Description.	Remarks.
<i>Eastern Goldfields.</i>				
1	For Prospectors..	Shearer's Find, 6 miles N.W. of Tampa	3 bores, totalling 402ft. ..	One equipped as Bore Well. Fair supply fresh water.
2	Mines Supply ..	Koolyanobbing .. .. .	5 bores, totalling 650ft. ..	Salt water struck in all bores. No. 5 selected as well site.
3	For Battery Purposes	Ora Banda .. .. .	8 ,, ,, 1,066ft. ..	Small supply of salt water in Bores 3 and 8.
4	For Prospectors..	Binty Binty .. .. .	3 ,, ,, 340ft. ..	No. 2 Bore cased and equipped as Bore Well. Water fresh.
5	Domestic Supply	Pig Well .. .. .	2 ,, ,, 239ft. ..	Small supply of fresh water.
6	For Town Supply	Mt. Morgans .. .. .	13 ,, ,, 1,017ft. ..	In 10 of these Bores fresh water struck.
7	Domestic Supply	Copperfield .. .. .	9 ,, ,, 587ft. ..	Fresh water struck in four bores. Stock water in one.
8	Do. .. .	Chadwin .. .. .	12 ,, ,, 848ft. ..	Salt water struck in one bore.
			Total 55 bores = 5,149ft.	
<i>Murchison District.</i>				
9	For Prospectors..	Sugarstone .. .. .	5 bores, totalling 572ft. ..	Bore No. 5 equipped as Bore Well.
10	Stock Route ..	Oasis Spring .. .. .	7 ,, ,, 343ft. ..	Well sunk on No. 5 Bore; good supply fresh water.
11	Battery Water Supply	Messenger's Patch .. .. .	2 ,, ,, 216ft. ..	Well sunk on No. 2 Bore.
12	Road Supply ..	Darlot-New England Road ..	6 ,, ,, 163ft. ..	Well sunk on No. 6 Bore; fresh water.
			Total 20 bores = 1,294ft.	
<i>Pilbara District.</i>				
13	Road Supply ..	Port Hedland-Woodstock Road	4 bores, totalling 193ft. ..	Well sunk on No. 4 Bore; good supply fresh water
14	Battery Supply ..	Wodgina .. .. .	1 ,, ,, 108ft. ..	Large supply fresh water.
			Total 5 bores = 301ft.	
<i>Summary.</i>				
	Hand Boring Plants	Eastern Goldfields .. .. .	55 bores = 5,149ft. ..	Average cost per foot about 6s. 6d.
	Do. ..	Murchison District .. .. .	20 bores = 1,294ft. ..	Average cost per foot about 7s. 6d.
	Do. ..	Pilbara District .. .. .	5 bores = 301ft. ..	Average cost per foot about 14s. 9d.
			Total 80 bores = 6,744ft.	
DIAMOND AND CALYX DRILL.				
15	Diamond Drill ..	Mt. Morgans .. .. .	5 bores, totalling 2,137ft.	This work started in 1908 for the Mt. Morgans Diamond Drilling Syndicate. Three bores put down during that year. Eight holes have been bored to a total depth of 3,698 feet at an average cost of about 11s. per foot, the Syndicate paying one-third of cost of same.
16	Do. ..	Day Dawn .. .. .	3 bores, totalling 1,745ft.	This boring carried out for the Great Fingall Consolidated, Ltd. Bores Nos. 1 and 2 from the No. 13 Level, Bore No. 3 from the No. 9 Level, all horizontal. The Company paid all working expenses. Cost of actual boring averaged about 18s. per foot.
17	Calyx Drill ..	Collie .. .. .	1 bore, totalling 500ft. ..	Boring for coal for the Premier Coal Mining Syndicate. 500 feet boring done at a cost of about 10s. 10d. per foot, the Syndicate paying half the cost.
18	Do. ..	Tenindewa .. .. .	13 bores, totalling 2,033ft. 6in.	Boring for coal in Kookatea Valley, near Mullewa.

WORKS COMPLETED, Etc.—*continued.*

## WELL SINKING.

Item.	Boring for Water.	Locality.	General Description.	Remarks.
<i>Eastern Goldfields.</i>				
19	State Battery Well	Mt. Ida .. .. .	6ft. x 3ft. x 120ft. deep, with 2 drives 6ft x 4ft., totalling 40ft.	Supply 800 gallons per hour fresh water.
20	Well .. .. .	On Menzies-Ida Track ..	5ft. x 3ft. x 106ft. deep, with 2 6ft. x 3ft. drives, totalling 20ft.	Fair supply fresh water.
21	Domestic Well ..	Pig Well (Gwalia Bach) ..	6ft. x 3ft. x 130ft. ..	100 gallons per hour, fresh water.
22	Well .. .. .	Yundamindera-Linden Road ..	5ft x 3ft x 100ft. ..	80 gallons per hour, good stock water.
23	State Battery Well	Armadale .. .. .	6ft. x 4ft. x 114ft., with 19ft. of 6ft. x 3ft. drives	500 gallons per hour, fresh water.

*Murchison District.*

24	State Battery Well	Youanme .. .. .	6ft. x 3ft. x 129ft. deep, with 21ft. of 6ft. x 3ft. drives	Supply 350 gallons per hour, fresh water.
25	Well .. .. .	Darlot-New England Road ..	5ft. x 3ft. x 52ft. deep ..	Good supply fresh water.
26	State Battery Well	Messenger's Patch .. ..	6ft x 3ft. x 110ft. deep ..	600 gallons per hour, fresh water.
27	Well .. .. .	Barlow's-Wiluna Track .. ..	5ft. x 3ft. x 54ft. deep ..	Good supply fresh water.

*Pilbara District.*

28	Well .. .. .	Wodgina-Port Hedland Road ..	5ft 6in. x 3ft. 6in. x 58ft. 6in.	Good supply fresh water.
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*Summary.*

10 Wells = 973 feet.  
4 Bore Wells = 440 feet.

## WELLS—GENERAL MAINTENANCE.

This covers repairs and additions, such as cleaning out, putting in new ropes and buckets, etc. The following wells have received attention:—

29. *On the Eastern Goldfields*:—Wells on Leonora-Darlot Road, Lawlers-Darlot Road, Leonora-Lawlers Road, Leonora-Menzies Road, Laverton, Old Battery, Walgi, Kirkpatrick's, Swanston Creek, Duketon, Mulga Queen, Cork Tree, Burtville, Golden Ring, Hack's, Windich Brook, King's, Old Brewery.
30. *In the Murchison District*:—Day Dawn-Mindoolah Road, Cue-Meekatharra, Cue-Erroll's, Meekatharra-Peak Hill, Mt. Magnet-Black Range-Lawlers, Lawlers-Perrigrin, Montague-Sandstone, Yalogindat, Paynesville, Bignell's, Star of the East.
31. *In the Pilbara District*:—One-Mile, 4-Mile, 5-Mile, Pippingarra, Pindan, Gorge Creek, Robinson's 5-Mile, 3-Mile, Marble Bar, Tabba Tabba, Condon, Condon 12-Mile, Ellerine, Mulyie 6-Mile, Big Schist, Wyman's, Warrawoona, Sandy Creek, Carbara, Spinaway's, Hale's Grave, Dewhurst's, Box Creek, Finger Post, No. 3 Johansen's, Eley's Old Shaw, Farwig's, Shaw Patch, Smith's, Western Shaw, Eastern Creek.

## STOCK ROUTES.

32. *Wiluna-Sturt Creek Stock Route*:—To connect East Kimberley with Eastern and Murchison Goldfields. Report received dated August, 1909, stated 32 wells sunk, leaving about 220 miles to be done. Work should be completed early in 1910.
33. *Peak Hill-Leonora Stock Route*:—New well sunk, and improvements to water stations carried out between Leonora and Wiluna. Work beyond Wiluna in progress.

WORKS COMPLETED, Etc.—*continued.*

## MISCELLANEOUS WORKS.

Item.	Class of Work.	Locality.	General Description.	Remarks.
<i>Eastern Goldfield.</i>				
34	Battery Water Supply	Jaurdie Hills .. ..	2in. pipe from Jaurdie Hills Tank to Well. Deep Well Pump and Oil Engine installed, also 5,000 gallon tank	
35	Boiler Water Supply	Do. .. ..	Windmill and Tank erected, also Surface Pump	
36	Battery Water Supply	Armadale (Desdemona) ..	Pipe Line .. ..	3,150 feet of 4in. Mannesmann pipe laid from Well to State Battery.
37	Water Supply ..	Norseman .. ..	About 1½ miles of 4in. W.I. pipe with Albion joints	This pipe was taken over from the Lady Miller Gold Mining Co., and has since been repaired and placed in fair order.
38	Water Supply to Railways, etc.	Wingarnie .. ..	12ft. Samson Windmill on 30ft. Tower erected and a 4in. Gould's Pump fixed	At the "Pioneer Tank," Wingarnie.
39	Battery Water Supply	Mt. Ida .. ..	About 1½ miles 4in. Mannesmann pipe laid between Well and Battery. Crossley Oil Engine and 5in. x 8in. Duplex Deep Well Pump installed. Pump House erected.	Works handed over to Batteries Branch on completion.
40	Domestic Water Supply	Comet Vale .. ..	3,000 gallon G.I. Tank at Comet Vale Railway Siding, and Pipe Line from Service Tank to Goongarrie Station Yard	Water is obtained from Goongarrie Tank, thence trucked to Comet Vale.
41	Domestic Supply	Lawlers .. ..	12ft. Samson Windmill, 5,000 gal. G.I. Tank on Jarrah Stand, Windlass, etc.	Erected on Lawlers Town Well.
42	Do. ..	Pinjin Tank .. ..	Tank fenced with wire netting	
43	Water Supply ..	Davyhurst .. ..	Remodelling Pumping Plant	
44	Do. ..	Menzies .. ..	A new 10,000 gallon Tank on 20ft. Timber Stand erected	This Tank erected on Harcourt Hill to give better service.
45	Water Supply for Prospectors	W. of Mulline .. ..	Boring for water, etc. ..	Party sent out to bore for water and open up track from Mulline to Deimel's Find.
46	Do. ..	N. of Mt. Jackson .. ..	do. .. ..	Boring for water to open up track for prospectors from Mt. Jackson <i>via</i> Field's Find and Youanme.
47	Surveys and Boring	Norseman .. ..	Conservation scheme to improve present supply	Surveys made of a rock catchment at the 3-Mile Rock about 18 miles S. of Norseman. Site selected for a 13,000,000 gallon tank, and boring carried out to test site.
48	Do. ..	Mt. Morgans .. ..	1,235 feet of boring done to locate supply of fresh water	Fresh water found. Report and estimate prepared.
<i>Murchison District.</i>				
49	Water Supply ..	Meekatharra .. ..	Crown Shaft sunk a further depth of 20ft., total depth 99ft. Extension of reticulation ¼-mile 4in. Mannesmann pipe from Service Tank to Town; also taking up and re-laying about 20 chains of 2in. pipe	Yield* at present 20,000 gallons per day. Extensions and additions to reticulation carried out to give better service in town.
50	Do. ..	Nannine .. ..	½ mile 2in. G.I. pipe ..	Extension to Railway Yard.
51	Cue-Cuddingwarra Road	Cuddingwarra .. ..	Forming and repairs to road	Work carried out for the Public Works Department.
<i>East Kimberley District.</i>				
52	Water Supply ..	Hall's Creek to Tanami ..	Boring and well sinking and opening up track from Hall's Creek to Tanami	Work in progress.

WORKS COMPLETED, ETC.—*continued.*

## WORK FOR CONSERVATION OF WATER.

Item.	Class of Work.	Locality.	General Description.	Remarks.
53	Kanowna-Gindalbie Road Tank	About 10½ miles from Kanowna	An excavated, lined, and roofed tank of about 30,000 gals. capacity	Completed.
54	Randall's Tank ..	About 50 miles S.E. from Kalgoorlie	An excavated, lined, and roofed tank of 50,000 gals. capacity	Tank completed and fenced, and about 50 chains of drains also constructed.
55	Carbine Tank ..	About ½-mile N.W. of Carbine	An excavated, lined and roofed tank of 200,000 gals. capacity	Tank completed, and about 50 chains of fencing erected; 78 chains of drains constructed. Force pump, stand pipe, and trough also provided.
56	Chadwin Tank ..	About 13 miles S.W. of Waverley	An excavated tank lined with reinforced concrete and roofed; capacity 50,000 gallons	In progress.
57	Nevoria Tank ..	1½ miles from Nevoria and about 3½ miles from Marvel Loch	An excavated tank of 2,000,000 gallons capacity	In progress.
58	Yerbillon, No. 2 Tank	At No. 5 Pumping Station ..	An excavated tank lined with Asphalt compo.; capacity 1,000,000 gals.	This tank constructed for the Goldfields Water Supply Administration; completed with the exception of C.I. Syphon to No. 1 Tank.
59	Siberia Tank ..	Siberia .. .. .	Bottom of existing tank and 10ft. up sides lined with Asphalt; sides also coated with linen and carbon paint	About 400 c. yds. of silt removed prior to lining.

## WORK DONE FOR ARCHITECTURAL DIVISION, PUBLIC WORKS DEPARTMENT.

60. Nullagine Police Station—Additions completed.
61. District Medical Officer's Quarters, Marble Bar—Repairs.
62. District Engineer's Quarters, Marble Bar—Repairs.
63. Marble Bar Hospital and School—Minor additions..

## MINES WATER SUPPLY BRANCH.

## RETURN OF REVENUE AND EXPENDITURE FOR THE 12 MONTHS, JANUARY TO DECEMBER, 1909.

Name of Watering Station.	Capital Cost.	Revenue.	Working Expenses + 8 % Interest and Sinking Fund.
	£	£ s. d.	£ s. d.
1. Davyhurst Water Supply .. .. .	18,085	856 3 2	2,211 13 11
2. Menzies Water Supply .. .. .	33,137	3,408 8 3	3,540 12 8
3. Norseman Water Supply .. .. .	33,117	2,353 12 4	3,948 3 3
4. Jaurdie Hills Water Supply .. .. .	6,193	362 10 5	985 11 0
5. Meekatharra Water Supply .. .. .	14,307	1,596 6 8	2,221 6 5
6. Ravensthorpe Water Supply .. .. .	7,626	1,060 11 0	1,121 4 6
		9,637 11 10	14,028 11 9
7. Minor Water Stations numbering 230 on which 8 % Interest and Sinking Fund are not added	..	2,996 1 7	5,850 12 5
		£12,633 13 5	19,879 4 2



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ANNUAL PROGRESS REPORT

OF THE

GEOLOGICAL SURVEY

FOR THE YEAR 1909.

WITH FOUR MAPS AND THREE FIGURES.

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## ANNUAL PROGRESS REPORT OF THE GEOLOGICAL SURVEY FOR THE YEAR 1909.

*The Secretary for Mines.*

Geological Survey Office,  
Perth, 28th February, 1910.

A summary report on the operations of the Geological Survey for the calendar year 1909 is submitted herewith for the information of the Hon. The Minister for Mines.

The report, which has been arranged approximately on the lines of that usually adopted, contains a succinct account of the work carried out by the various members of the survey staff.

### THE STAFF.

The official work of the Department has been carried out during the year 1909 by 15 officers.

Some changes have taken place in the personnel during the period under review.

Mr. W. D. Campbell, the Senior Assistant Geologist, retired on the 21st August, by virtue of the age limit laid down in the Public Service Act, whilst Mr. J. S. Brooking, Assistant Mineralogist and Assayer, severed his connection with the Department at the end of December to improve his position by engaging in private practice. In filling the vacant appointments it is to be hoped that such salaries are offered as will enable the Department to not only secure but retain the services of properly qualified and efficient officers; failing this course, the proper class of man will not be attracted to the service, which will always be in danger of losing its effective officers with the inevitable result of a decrease in efficiency.

As at present constituted the strength of the staff is hardly capable of efficiently meeting the requirements of the day, and it is to be hoped the Government will see its way to sanction the addition to the staff of an officer skilled in modern methods of petrography.

### FIELD WORK.

The field work during the year under review has been carried out in various portions of the State, such as the exigencies of the public requirements demanded.

A. GIBB MAITLAND.—I returned from England on the 2nd of February, where I had been representing the mining interests of the State at the Franco-British Exhibition, and resumed my ordinary official duties on the 8th of the month. From that date the greater portion of the year was devoted to that multifarious administrative work inseparable from an office of this nature. A good deal of my time has been taken up in the reading and revision of manuscript reports and maps, and other editorial work. The tenth Annual Meeting of the Australian Institute of Mining Engineers was held at Kalgoorlie in the month of May, and afforded me an opportunity, in company with Mr. Gibson, of attending and taking part in the proceedings. Short visits were paid by myself to Leo-

nora, Greenbushes, Donnybrook, and Collie in connection with various departmental matters, to which reference is made later on.

H. P. WOODWARD.—During the year 1909 the Assistant Government Geologist spent 224 days in the field, 127 at the head office, and 14 days on leave. From the 1st of January to the 2nd of February this officer's time was devoted to acting as my deputy, and in the preparing of the summary report for the calendar year 1908. About the middle of February a visit was paid to Collie with the object of carrying on certain investigations with regard to the liability of Collie Coal to ignite spontaneously. These investigations unfortunately could not be concluded owing to the fact that tests under similar conditions to those which exist in ships' holds and bunkers could not be carried out unless at considerable expense. In the month of March a visit was paid to Mount Morgans in connection with the State-aided boring operations being carried out at that centre. On April the 13th that officer left for Roebourne with the object of making a reasonably detailed geological examination of the West Pilbara Goldfields and a traverse from there via the Ophthalmia Range to Peak Hill. While in the West Pilbara Goldfield Mr. Woodward was instructed to proceed to Wodgina to report upon an application from the owners of the Cassiterite mine for State aid in connection with a water supply. The examination of West Pilbara, including the trip to Wodgina, occupied Mr. Woodward up to the 31st of August; whilst the traverse to Peak Hill was not completed until the 13th of October. A short time was devoted to an examination of the ore deposits of Meekatharra, and an investigation into the supposed faulting in the lower levels of the Great Fingall mine at Day Dawn. The remainder of the year, *i.e.*, from the 13th of November, upon which date Mr. Woodward returned to headquarters, was devoted to office work connected with his late journey.

W. D. CAMPBELL.—This officer left Perth for Mingenew on the 18th of February to complete his survey of the Irwin River District, and returned to Perth on the 17th of May, having been absent in the field 89 days. This officer retired from the service on the 21st of August.

CHAS. G. GIBSON.—Up to the 5th of April this officer was at headquarters engaged in the preparation of his work in connection with the report on the geology of the Trans-Continental Railway Survey route, to which reference was made in last year's Annual Report. A short visit was paid to York in April in connection with a supposed silver find in the locality. On the 4th of May Mr. Gibson proceeded to Kalgoorlie to assist in carrying out some geological work at that

centre, which employed him until the 26th of November. This officer was engaged in field work 210 days in the year.

H. W. B. TALBOT.—From the 1st of January to the 1st of August, 1909, this officer was temporarily attached to the party under the command of Mr. Inspecting-Surveyor Canning, which was engaged in sinking wells on the Wiluna-Kimberley stock route. On the 1st of August Mr. Talbot left the well-sinking party and proceeded to Hall's Creek, where telegraphic instructions had been sent to him to visit the recently discovered gold-mining centre of Tanami in the Northern Territory and endeavour to trace the extension of the mineral belt into Western Australia. Hall's Creek was left on the 13th of August, and after visiting Tanami and district Mr. Talbot found himself again at Hall's Creek on the 13th of September. Up to the 11th of October this officer was travelling to Wyndham, where he caught the s.s. "Koombana," which arrived at Fremantle on the 25th of October, having been engaged during the year 297 days in the field, or, including that in 1908, 426 days on this special expedition.

LUDWIG GLAUERT.—During the month of January this officer was at headquarters, engaged, *inter alia*, in identifying the Mesozoic and Post Tertiary fossils collected by Mr. Campbell during his investigations on the Irwin River field, and in describing a number of rock slides prepared from material collected in the district in illustration of Mr. Campbell's report and maps. Towards the end of January and early in February this officer was engaged in the preparation of material for a forthcoming Palæontological Bulletin, and arranging specimens in the Geological Gallery of

the Museum. Three weeks' leave of absence was granted to Mr. Glauert to enable him to conduct and superintend excavations in the Mammoth Cave near the Margaret River, some few miles from Cape Leeuwin. A large number of fossil bones were collected, and are being described by Mr. Glauert. Up to the end of May this officer rendered assistance in the office in many ways, and amongst other things examined and reported on numerous bore cores from various portions of the State, and prepared a report upon the suitability for railway ballast of a number of samples collected on the proposed route of the Transcontinental Railway. Eighteen days in June were devoted to an examination of the so-called Chalk at Gingin. Between the 28th of July and the 3rd of November Mr. Glauert was at Kalgoorlie, assisting Mr. Gibson in his work at that centre. During 1909 this officer spent 154 days in field work.

#### LABORATORY WORK.

Mr. E. S. Simpson has, as usual, continued in charge of the Survey Laboratory, where all the chemical and other analytical work, etc., required by the Department is carried out. During the year 1909 the total number of determinations made in the Laboratory amounted to 2,755 as against 2,504 in 1908. The whole of the assay work required by the State Battery Branch is carried out in the Survey Laboratory, and by an officer, Mr. Murray, whose salary becomes a charge upon the State Battery estimates: the total number of assays performed in this connection is included in the table showing the routine work performed during the year.

Table showing the Routine Work of the Geological Survey Laboratory during 1909.

	Public.		Official.		Unclassified. (b)	Total.
	Pay.	Free.	Geol. Surv. (a)	Other Depts.		
Total samples dealt with .. .. .	122	310	176	1,572	128	2,308
Assays for Gold .. .. .	72	141	35	1,527	53	1,928
Silver .. .. .	5	55	30	15	19	124
Copper .. .. .	2	40	9	6	21	78
Tin .. .. .	4	29	10	3	8	54
Lead .. .. .	3	10	3	6	6	28
Zinc .. .. .	1	..	1	..	..	2
Iron .. .. .	1	3	2	1	5	12
Nickel .. .. .	..	3	3	..	..	6
Cobalt .. .. .	..	2	3	..	..	5
Manganese .. .. .	..	2	..	1	..	3
Chromium .. .. .	..	1	3	..	..	4
Vanadium .. .. .	..	..	3	..	..	3
Thorium .. .. .	..	1	4	..	..	5
Cerium and rare earths .. .. .	..	..	4	..	..	4
Tantalum .. .. .	4	5	..	..	..	9
Niobium .. .. .	4	..	..	..	..	4
Tungsten .. .. .	..	6	1	1	..	8
Bismuth .. .. .	..	5	1	..	..	6
Antimony .. .. .	..	3	..	..	..	3
Lime .. .. .	8	..	..	3	..	11
Phosphoric oxide .. .. .	22	12	2	..	..	36
Analyses complete .. .. .	..	3	34	5	..	42
Do. partial .. .. .	7	2	8	1	..	18
Do. proximate .. .. .	2	6	9	8	9	34
Determinations of rocks and minerals .. .. .	2	151	59	29	63	304
Petrographical descriptions .. .. .	..	..	17	..	..	17
Caloric values .. .. .	2	4	9	6	8	29
Valuation of gold specimens .. .. .	..	..	15	4	..	19
Miscellaneous .. .. .	10	6	28	14	1	59
Totals .. .. .	149	490	293	1,630	193	2,755

(a.) The results under this column only include work done for field officers of the Survey actually entered in the Laboratory books. It does not include all those determinations necessarily made in connection with the National Mineral Collection, or petrographical work, the results of which were given by word of mouth, nor does it give any idea of the time expended on Geological Survey work incapable of tabulation.

(b.) Samples received through Head Office without any information as to source.

Reporting upon the work carried out under his more immediate supervision in the Laboratory, Mr. Simpson remarks:—

I regret that during the year two members of the staff have resigned owing to the inadequate salaries fixed for the professional officers. So long as the value to the State of the services rendered by these officers remains unrecognised by the authorities and the maximum salaries to which they may hope to attain remain so low it will be impossible to retain in the Service officers of the necessary professional qualifications, and, having lost them, to replace them satisfactorily. Better results would be attained by means of a smaller staff of more highly qualified officers, remunerated at a rate befitting their qualifications. Much time is lost in filling vacancies, and yet the volume of material submitted for examination steadily increases. The only way out of such an impasse has been to devote less time to each examination and issue in consequence less detailed and therefore less valuable reports.

The Survey Laboratory is rightly looked to to carry out (in addition to the routine work for field officers of the Survey and others, inseparable from it) research work destined to enlarge the available information with regard to the State's mineral resources, and to assist in applying them to useful purposes to the advantage of the community. Avenues for research abound, and would doubtless, if followed, lead in some instances at least to results of far-reaching effect upon the State. As an example I need only instance the large deposits of phosphates of iron, aluminium, and lime in the Dandarragan District, which, once a suitable method has been discovered for rendering the phosphoric oxide available, should form the basis for supplying cheap fertiliser to the whole of the agricultural districts. A second field for research which would amply repay the time devoted to it is the granites of the State, of which at least three types occur, one seemingly always barren of minerals of value, the second associated with ores of tin and tantalum, the third with ores of gold and copper. Under the conditions, however, outlined above, it has been found impossible to do almost any research other than to bring to a temporary conclusion the detailed examination of the Collie coals commenced in the previous year, and to resume as opportunity offered a critical examination of the ores and rocks of Kalgoorlie. In going into the commercial importance of the deposits of monazite in the Pilbarra Goldfield information as to mode of occurrence of thoria in this mineral and the methods of estimating it, was found to be both meagre and contradictory. An endeavour was made to go into this matter somewhat fully and first results were encouraging, but increase of other work combined with the resignation of a member of the staff effectually put an end to the investigation.

The Laboratory continues to undertake all of the check and umpire assays required by the State Batteries Branch, this work being done at a very low cost to that Branch and the Government generally.

One of the most important functions of the Laboratory is the authoritative determination and commercial valuation of new finds of minerals made by prospectors throughout the country. The finders are supplied within a few days with information which enables them to decide whether a discovery is of any value or not, and in the former case (when required) in what form the material should be put upon the market, and where markets are to be found. This work is of growing importance at the present time when the mineral industry shows a tendency to decline. On the other hand the Geological Survey obtains at the same time valuable information as to the distribution of minerals in the State which would be otherwise perhaps wholly lost to it, or which at least would take many years to acquire. A large proportion of the mineral specimens (other than gold) at present in the Geological Collection have been obtained also by this means.

Details of the samples received under the Government Assays Regulations are shown in the accompanying table. The total fees received in connection therewith amounted to £124 4s. 3d., which includes £10 10s. received through the Batteries Branch from August to November.

It was hoped to inaugurate during this year a card system of keeping the Laboratory records. This would

facilitate reference to past work, show at a glance what was pending, and be an improvement in many other ways. The lack of the necessary funds has, however, prevented this.

#### PETROGRAPHICAL WORK.

During the year a good deal of petrographical work has been carried out in connection with the field operations of the various officers, details of which will be found included in their different reports, and to which no reference need be made in this place. The total number of rock sections cut during the year amounted to 222, bringing the total number up to 1,060.

One of the most important contributions is that from the pen of Mr. J. Allan Thomson, B.A., B.Sc., F.G.S., which has been included in Bulletin No. 33. Mr. Thomson's observations make by far the most important contribution to the petrology of the fundamental rocks of the State which has yet been issued, and will doubtless prove of more than mere local importance.

Messrs. Simpson and Glauert have also contributed petrological notes on many of the specimens acquired during the field work of Mr. W. D. Campbell in the Irwin River district, which will be given *in extenso* in Bulletin 38, which is now ready for press.

There are so many practical problems requiring special investigation in connection with the rocks of the Auriferous Series of the State, that it has now become essential that a specially trained petrographer should be added to the strength of the staff, who, amongst other things, will undertake the whole of the microscopic work required in connection with the field operations upon which latter the field geologists can always be most profitably employed.

#### PALÆONTOLOGICAL WORK.

As in past years Mr. Robert Etheridge, the Curator of the Australian Museum, continues to act in an honorary capacity as Consulting Palæontologist to the Survey and from time to time consignments of fossils have been despatched to him for determination and description. He has furnished a description of the Oolitic Fossils collected by Mr. W. D. Campbell in the Greenough River District, which will be published in Bulletin 36, which is ready for the printer.

Dr. Geo. J. Hinde, F.R.S., contributes a detailed report on the sponge spicules in a rock from the Deep Lead (?) at Princess Royal Township, Norseman. The rock in which the sponge spicules are contained is white and silicious and consists almost entirely of the spicular remains of silicious sponges, and neither radiolaria nor datoms were detected. In addition to the spicules which resemble those of existing sponges, there are many similar to those dredged from a depth of 3,000 fathoms off the southwest coast of Australia, and similar to the eocene fossil sponges in the deposit at Oamaru, in New Zealand. Dr. Hinde concludes that the Norseman sponge rock is not merely a local deposit, but that it was formed in the open ocean, and probably at a considerable depth, and that its age is newer than the Cretaceous, but there are no data to indicate the particular periods of the Tertiary and Post Tertiary in which it may have been formed.

Mr. E. A. Newell Arber, M.A., F.L.S., F.G.S., of Trinity College, Cambridge, furnished a report upon some fossil plants collected in the course of Mr. Campbell's field work in the Irwin River District, and concludes that the beds are of Jurassic Age, and may be correlated with the Jurassic plants beds of Queensland, viz., of Talgai, the Darling Downs, and Rosewood, West of Rockhampton.

Mr. L. Glauert has described a new species of *Sthenurus*, *S. occidentalis*, from the Mammoth Cave, in the Margaret River. This officer has also prepared a list of Western Australian Fossils, stratigraphically and zoologically arranged, in order to facilitate the field work of the Department, on account of the new Devonian fossils from the Barker Gorge, Napier Range, in the Kimberley Division; and some notes on the geological age and organic remains of the Gingen Chalk.

These various reports will be embodied in Bulletin 36, which is now ready for press.

The following is a list of the type fossils in the Geological Survey Collection drawn up by Mr. Glauert.

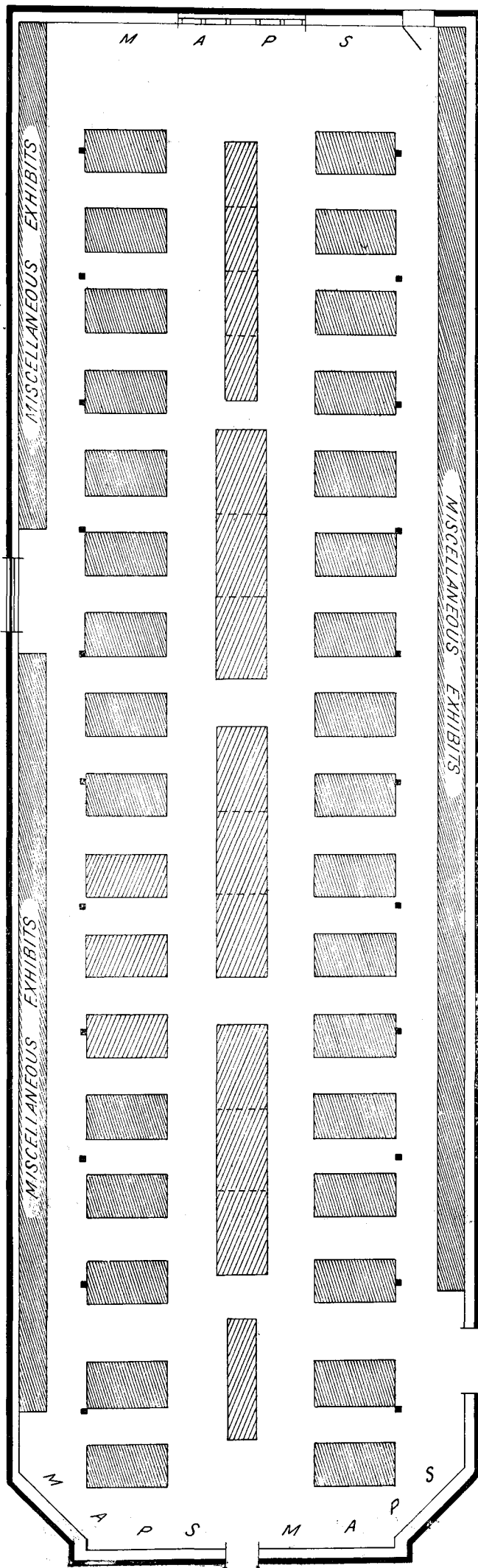
"A 'type' is the identical individual specimen from which a species (or variety) has been described." Palmer, Index Gen., Mamm., page 20 (1904).

The figures in brackets [10035] correspond to the number in the Department's Museum Register.

Registered Number.	List of Types.
	<b>CŒLENTERATA.</b> <b>ANTHOZOA (ACTINOZOA).</b> <i>Tetracoralla.</i>
[(?) 10035]	<i>Amplexus pustulosus</i> , W. H. Hudleston, Q.J.G.S., Vol. XXXIX. (1883), p. 591, Pl. XXIII., figs. 1a, 1b, 1c. Carboniferous. Fossil Range N. and S. of the Lyons River, Gascoyne R. Collected by Sir John Forrest.
[10039]	<i>Cyathophyllum depressum</i> , G. J. Hinde, Geol. Mag. Dec. III., Vol. VII. (1890), p. 195, Pl. VIII., figs. 2a and 2b. Devonian (?) Gascoyne River. Collected by Mr. H. P. Woodward.
[10038]	<i>Cyathophyllum virgatum</i> , G. J. Hinde, Geol. Mag., Dec. III., Vol. VII. (1890), p. 194, pl. VIII., figs. 1a and 1b. Devonian (?), Gascoyne River. Collected by Mr. H. P. Woodward.
[10019] and [10040]	<i>Pleurophyllum Australe</i> , G. J. Hinde, Geol. Mag., Dec. III., Vol. VII. (1890), p. 196, pl. VIIIa. figs. 1a-1f. Carboniferous. Gascoyne R. and Irwin River. Collected by Mr. H. P. Woodward.
[10023] and [10041]	<i>Pleurophyllum sulcatum</i> , G. J. Hinde, Geol. Mag., Dec. III., Vol. VII. (1890), p. 197, pl. VIIIa, figs. 2 and 2a. Carboniferous. Irwin River. Collected by Mr. H. P. Woodward.
	<i>Hexacoralla.</i>
[10016c]	<i>Hexagonella (Ervactinopora) crucialis</i> , W. H. Hudleston, Q. J. G. S., Vol. XXXIX. (1883), p. 593, pl. XXIII., figs. 2a, 2b, 2c. Carboniferous. Fossil Range, North of the Lyons River, Gascoyne R. Collected by Sir John Forrest.
[10016b]	<i>Hexagonella (Ervactinopora) dendroidea</i> , W. H. Hudleston, Q. J. G. S., Vol. XXXIX. (1883), p. 594., pl. XXIII., figs. 3a-3d. Carboniferous. Fossil Range North of the Lyons River, Gascoyne. Collected by Sir John Forrest.
[10054]	<i>Syringopora reticulata</i> var. <i>petula</i> , G. J. Hinde, Geol. Mag., Dec. III., Vol. VII. (1890), p. 198, pl. VIII., fig. 4. Devonian or Carboniferous. Gascoyne R. Collected by Mr. H. P. Woodward.

Registered Number.	List of Types.
	<b>MOLLUSCOIDEA.</b> <b>BRYOZOA.</b> <i>Polypora Australis</i> , G. J. Hinde, Geol. Mag., Dec. III., Vol. VII. (1890), p. 199, Pl. VIIIa., figs. 3 and 3a. Carboniferous Gascoyne River. Collected by Mr. H. P. Woodward. <i>Rhombopora tenuis</i> , G. J. Hinde, Geol. Mag., Dec. III., Vol. VII. (1890), p. 203, Pl. VIIIa., figs. 4 and 4a. Carboniferous, Gascoyne River. Collected by Mr. H. P. Woodward.
	<b>BRACHIOPODA.</b> <i>Protremata.</i>
[4760] (F178)	<i>Aulosteges Baracoodensis</i> , R. Etheridge, jun., Geol. Surv., Bulletin 10 (1903), p. 22, Pl. II., figs. 1-2a. Carboniferous. Baracooda Pool, Arthur River. Collected by Mr. A. Gibb Maitland, Government Geologist.
[4732] (F156)	<i>Productus tenuistriatus</i> var. <i>Foordi</i> , R. Etheridge jun., Geol. Surv. Bulletin 10 (1903), p. 19, Pl. III., fig. 22. Carboniferous. Fossil Hill, Wyndham River. Collected by Mr. A. Gibb Maitland, Government Geologist.
	<i>Telotremata.</i>
[4764] (F179)	<i>Oleiothyris Macleayana</i> var. <i>Baracoodensis</i> , R. Etheridge, jun., Geol. Surv. Bulletin 10 (1903), p. 17, Pl. III., figs. 5-9. Carboniferous. Baracooda Pool, Arthur River. Collected by Mr. A. Gibb Maitland, Government Geologist.
[4946] (F229)	<i>Dielasma nobilis</i> , R. Etheridge, jun., Geol. Surv. Bulletin 27 (1907), p. 19, Pl. IV., figs. 2-4, and Pl. VI., figs. 1 and 2. Permo-Carboniferous. Mingenew. Collected by Mr. E. S. Simpson.
[10031]	<i>Spirifera Hardmani</i> , A. H. Foord, Geol. Mag., Dec. III., Vol. VII. (1890), p. 146, Pl. VII., figs. 1 and 1a. Carboniferous. Gascoyne River. Collected by Mr. H. P. Woodward.
[10077]	<i>Spirifera Kimberleyensis</i> , A. H. Foord, Geol. Mag., Dec. III., Vol. VII. (1890), p. 106, Pl. V., fig. 11. Carboniferous. Collected by Mr. H. P. Woodward.
[10078]	<i>Spirifera Musakheylensis</i> var. <i>Australis</i> , A. H. Foord, Geol. Mag. Dec. III., Vol. VII. (1890), p. 147, Pl. VII., fig. 2, and Pl. V., fig 12 (?). Carboniferous. Gascoyne River. Collected by Mr. H. P. Woodward.
	<b>MOLLUSCA.</b> <b>PELECYPODA.</b>
[4927] (F220)	<i>Myalina</i> (?) <i>Mingenewensis</i> , R. Etheridge, jun., Geol. Surv. Bulletin 27 (1907), p. 24, Pl. V., fig. 4, and Pl. VI., figs. 3 and 4. Permo-Carboniferous. Mingenew. Collected by Mr. E. S. Simpson.
	<b>GASTROPODA.</b>
[4960] (F438)	<i>Ptychomphalina Maitlandi</i> , R. Etheridge, jun., Geol. Surv. Bulletin 10 (1903), p. 24, Pl. I., figs. 13-15. Carboniferous. Wandagee Station, Minilya River. Collected by A. Gibb Maitland, Government Geologist.
[5714] (F275)	<i>Gastrioceras Jacksoni</i> , R. Etheridge, jun., Geol. Surv. Bulletin 27 (1907), p. 36, Pl. IX., figs. 1-3. Carboniferous. Irwin River. Collected by Mr. C. F. V. Jackson.
	<b>PISCES.</b> <i>Selachii.</i>
	<i>Edestus Davisii</i> , Henry Woodward, Geol. Mag., Dec. III., Vol. III. (1886), p. 1, Pl. I. Carboniferous. Arthur River, Gascoyne River. Collected by Mr. Davis.

Fig. 1.



PLAN OF GEOLOGICAL SURVEY MUSEUM.



### MISCELLANEOUS MINERAL NOTES.

Many interesting and important mineral discoveries were noted during the year. Mr. Simpson refers to these as follows:—

**Tin ores.**—Cassiterite (tin oxide) at Poona Walloo Hill, Bullabulling, and Londonderry. In this connection it is interesting to note that in 1902 I wrote in Bulletin VI. the following:—

“Silicates containing lithium and fluorine are so frequently associated with tin ores that it is interesting to note that topaz and lepidolite occur in large quantities at the mica mine near Londonderry; and lepidolite, tourmaline, and spodumene near Ravensthorpe. Tin ore has not up to the present been detected at either of these localities, though the presence of these minerals would point to the probability of its occurrence there.”

**Tantalum ores.**—Manganotantalite (tantallite of manganese) and Manganocolumbite (niobate of manganese) in alluvial deposits with cassiterite at Poona and Londonderry. Manganixiolite (tantallate and stannate of manganese) at Londonderry.

**Bismuth ores.**—Bismutite (hydrated carbonate of bismuth) with gold at Salgash and North Pole (Pilbara G.F.). Samples of lodestuff from the latter assayed bismuth 7.58 per cent. and 14.83 per cent.

**Tungsten ores.**—Wolfram (tungstate of iron and manganese) at Collie's Soak, Murchison G.F. Scheelite (tungstate of calcium) at Poona.

**Chrome ore.**—Chromite (oxide of iron and chromium) at Cooglegong and 10 miles east of Bunyongia Spring, N.E. Coolgardie G.F.

**Miscellaneous.**—Rutile (oxide of titanium) at Balbarup. Cerargyrite (chloride of silver) at North Pole. A sample of quartz assayed:—

Silver, 242ozs. 14dwts. per ton.

Gold, 15dwts per ton.

Bismuth, 7.58 per cent.

Symplesite (hydrous arsenae of iron) at Kundip. Monazite (phosphate of cerium, thorium, etc.) at Poona. Cobaltite (sulpharsenide of cobalt) at Kundip. Beryl (silicate of Beryllium) at Poona, Greenbushes, and Ravensthorpe. Pickeringite (magnesia alum) and Copiapite (hydrous iron sulphate) at Glen Ross, Upper Ashburton. Andradite (calcium-iron garnet) at Cooglegong. Meteoric iron at Lake Giles (approx. loc.).

**Coal.**—Lignite at Point Cloates. Brown coal at Donnybrook. Hydrous-bituminous coal in seams up to ½ inch in a bore at Liverynga Station, West Kimberley.

### GEOLOGICAL MUSEUM.

In last year's annual report reference was made to the decision of the Government in connection with the transfer of the National Geological Collection to the Geological Survey. Owing, however, to reasons for which the Survey is in no way responsible, no effective work has been possible.

A very large part of the Survey Collection was thoroughly overhauled in 1908, and during the year under review 826 new specimens were added thereto, bringing the total number at present registered up to 10,912. These included the valuable specimens purchased from the Western Australian Commissions for the sum of £2,497 12s. 2d.

Of microslides there have been added 222, bringing the total number up to 1,060. The officers of the Department have in the ordinary course of their duties taken 145 photographs of geological and mining subjects, bringing the total number registered up to 593.

In the general scheme which it is proposed to ultimately adopt in connection with the arrangements of the geological collections I have decided upon a plan which seems to me to meet the requirements of four totally distinct classes of visitors to the Department, viz.: (a) the general public; (b) the average student; (c) the practical man, prospectors, miners, engineers, etc., etc., and (d) the scientific enquirer.

Naturally in a Geological Museum in such an important mining country as Western Australia, the guiding principle should be that of illustrating the geological structure, mineral resources, underground water supplies of the State, in addition to the application of geology to various industrial pursuits as well as the more systematic treatment of the science of geology in general. Limitations of space under present conditions naturally preclude undue prominence being given to much else than the above.

The arrangement of the show cases in the Geological Gallery is as is shown in the plan which forms Fig. I. The upright cases which are arranged along the walls of the gallery are occupied with Zoological, Art, and other specimens. It is essential, if the Gallery is to be made at all representative, that steps should be taken to place the whole of the room at the disposal of the Department.

To this end the minerals, rocks, and fossils of Western Australia will be properly displayed, and as far as space will admit an endeavour will be made to display specimens which are specially characteristic of Australasia and elsewhere. The fossils which have been almost entirely collected by the Survey Staff in the ordinary course of their duties, from the different geological formations in the State, will be displayed and arranged primarily in stratigraphical and secondly in zoological sequence; these in conjunction with the geological maps of the district from which they were obtained will be designed to illustrate the coal-bearing strata, the artesian water-bearing beds, the phosphatic deposits and other economic products.

The rock specimens will be systematically arranged in such a way as to illustrate the geological and mining maps of the various districts of the State.

The minerals and metallic ores will be primarily arranged on a metallic basis in such a way as to illustrate the type, mode of occurrence, and geographical distribution of the mineral resources of Western Australia. In the case of metallic ores and minerals typical specimens of nearly uniform size will be arranged, with illustrative maps, plans, diagrams, and photographs, such being of much greater scientific, commercial, and educational value than large trophies or bulk samples from individual mines or districts.

In all cases care will be taken to preserve and exhibit only such specimens as are of permanent and real value. Carried out on these lines the Geological Museum will then be, as it ought to be, primarily a collection illustrating in its widest sense the geological structure of Western Australia, in its relation to geological science in general.

### PUBLICATIONS.

During the year the following official publications have been issued:—

Annual Progress Report for the year 1908.

Bulletin 33: Geological Investigations in the Country lying between 21deg. 30min. and 25deg. 30min. S. Lat. and 113deg. 30min. and 118deg. 30 min. E. Long., embracing parts of the Gascoyne, Ashburton, and West Pilbara Goldfields.

Bulletin 35: Geological Report upon the Gold and Copper Deposits of the Phillips River Goldfield.

Bulletin 37: The Geological Features of the Country lying along the route of the Proposed Transcontinental Railway in Western Australia.

Whilst Bulletin 38: The Irwin River Coalfield and the adjacent districts from Arrino to Northampton; and

Bulletin 36: Palaeontological Contributions to the Geology of Western Australia, III., are ready for the printer.

In addition—Bulletin 39: The Country between Wiluna, Hall's Creek, and Tanami,

Bulletin 41: The West Pilbara Goldfield, and

Bulletin 42: Kalgoorlie, Its Geology, Ore Deposits, and Mines, are in course of preparation and rapidly approaching completion.

#### LIBRARY.

The library of the Geological Survey consists of 4,294 volumes on geology, mining, and cognate subjects, having been increased during the year by 603 presentations, whilst 45 were acquired by purchase.

As opportunity offers and the state of the Survey Vote permits, efforts are being made to make the geological library as complete and representative as possible in respect to the official publications of Geological Surveys and kindred institutions of other countries. The library is at the disposal of the scientific and professional public, a privilege which has been largely availed of in the past.

One hundred geological maps issued by the Geological Survey of the United States of America; thirty of the Geological Surveys of Great Britain and Ireland; twenty by the Geological Survey of Canada, and ten from the Geological Survey of Japan have been added to the collection of Geological Maps already in the possession of the Department.

#### GEOLOGICAL MAP OF WESTERN AUSTRALIA.

The preparation of a geological map of Western Australia has been steadily kept in view for a number of years past. Several important traverses have been made in hitherto (geologically) unknown portions of the State, and afford the means of connecting the work which has been carried out during recent years in the Northern district, and that of the Central and Eastern Goldfields, thus tending to bridge over many important gaps.

Much of this information has been gained when engaged on other work in different and widely separated portions of the State, and has added considerably to our knowledge of the geological features of Western Australia.

All this information it is contemplated embodying in the Geological Sketch Map which will be based

upon the four sheet map of the State, issued by the Department of Lands and Surveys on the scale of 25 miles to the inch.

Unless anything unforeseen happens it is hoped that the much-needed Geological Sketch Map of the State will be available for the lithographer at the close of the year 1910.

It is contemplated issuing in conjunction with it a special bulletin on the geology and economic resources of the State, which will summarise the information which the Department has acquired during the last twenty years.

#### PRINCIPAL RESULTS OF THE FIELD OPERATIONS.

A general review of the principal results of the field work during the year shows that a considerable advance has been made in our knowledge of wide tracts of country, more especially in the portion of the State lying north of the latitude of Wiluna; whilst considerable progress has been made with the detailed investigations in connection with the geological structure, ore deposits and mines of Kalgoorlie.

The following reports by the different field officers give a brief *aperçu* of the work each has been carrying out.

##### A. GIBB MAITLAND, GOVERNMENT GEOLOGIST.

##### (1.) Occurrence of Coal Measures near Perth.

The possibility of the occurrence of coal measures within 20 miles of the metropolis having been brought under the notice of the Government, the evidence as to the probability of such was investigated and the following report submitted to the Minister in November last:—

In 1872, Mr. H. Y. L. Brown in his report to His Excellency the Governor on the Geological Exploration of Western Australia\* refers to the Carboniferous rocks in the vicinity of Perth as follows:—

Again at the Canning River, a few miles south-east of Perth and close to the foot of the Darling Range, strata composed of black shale (containing fragments of coal and much iron pyrites), sandstone, grit, etc., have been found by sinking through the deposit of sand, clay, and gravel which overlies it. As the occurrence of this shale indicates the presence of a formation previously unknown in the district, I consider it probable that there may be a large area of the same deposit, extending westwards below the sea level, and also that it may possibly contain beds of coal at a greater depth. Boring operations were undertaken a few months ago, and a depth of 171 feet attained about a quarter of a mile westward of the spot where the shale was first observed.

The following is a description of the material brought up from time to time, as determined by Mr. Brown:—

##### Canning River Bore.

Nature of Strata.	Thickness.	Depth.	Remarks.
	ft. in.	ft. in.	
Sand, gravel, sandy clay, and small boulders of igneous rocks, clay containing pyrites	16 0	..	"The sand and gravel in the above list, with the exception of that near the surface, must be considered mostly as coming from beds of sandstone and conglomerate which have been worked up by the actions of the boring tools. In the same way the black and blue clay, when <i>in situ</i> , existed as shale. It is more than probable again that the rounded fragments brought up from certain depths had previously fallen down from a higher position."* Artesian water is still flowing from this bore.
Rounded granite pebbles, and gravel, grit, blue clay and shale containing carbonised matter	25 0	16 0	
Gravel, sand, and pieces of quartz and granite; black clay with pyrites	23 0	41 0	
Rounded quartz, granite, grit, quartzite, and black clay with pyrites	29 0	64 0	
Rounded pieces of granite, and igneous rocks, gravel, sand, quartz, etc., with fragments of lignite	33 0	93 0	
Rounded fragments of igneous rocks, sand, etc.; yellow sandstone at 139 feet; coarse grit and sand at 171 feet	45 0	126 0	
Total .. .. .	171 0	171 0	

\* General Report on a Geological Exploration of that Portion of the Colony of Western Australia lying Southward of the Murchison River and Westward of Esperance Bay. Perth: By Authority, 1873, pp. 10-11.

In the year 1903 a specimen of black carbonaceous shale [4517] containing what are believed to be the rootlets of *Glossopteris* was presented to the Departmental Museum, with an intimation that it came from "17 miles north of Midland, not far from Bullsbrook."

This specimen was duly forwarded to Mr. Robert Etheridge of Sydney, who acts as Hon. Consulting Paleontologist to the Geological Survey of Western Australia, and in 1907 reported on it as follows:—

The presence of that peculiar semi-jointed organism known as *Vertebraria* at the fourth locality (near Bullsbrook) is interesting. The plant remains known under this name are constantly associated in our Eastern Coal Measures with the leaves of *Glossopteris*.\*

The importance of this specimen [4517] in regard to the possible occurrence of Carboniferous Rocks (possibly containing coal seams) in the vicinity of Perth is very great. A recent re-examination of it indicates quite clearly that it could not have been derived from the outcrop of any strata which had been exposed to the weather, but must have been obtained from material exposed in shaft sinking, etc., at some distance from the surface. No shales of the kind are, so far as I am aware, found to occur anywhere near Bullsbrook, nor do I know of any wells, etc., in that locality which passed through strata of a similar kind.

Unfortunately the history of the specimen was never furnished to the Department and all that is known about it is that it was labelled as coming from Bullsbrook. If the locality is authentic, the probability of Coal Measures occurring in the district is more than probable, but in the light of all the information available to me I am inclined to disregard the important evidence which the specimen would otherwise afford on the grounds that it has been obtained from a locality which is at present unidentifiable.

The specimen is totally unlike any occurring in any of the Western Australian Coal Measures known to me, but has more of the characteristics of those associated with the measures in Eastern Australia.

During the last few months I have received verbal intimation that on Mr. Gibbs' Location 832, on the Canning River, fragments of coal were found in a ploughed field over 25 years ago. A very small fragment of coal said to have been obtained from the same locality was recently shown to me, but its characteristics indicated clearly that it could not have been exposed to the weather; it resembled in its essential characteristics some of the coals which are used on the Government Railways. This location is that upon which the auriferous quartz reef at Gosnells occurs, and is in close proximity to the bore put down in 1872, under the supervision of the then Government Geologist alluded to above.

The Irwin River Coal Measures which outcrop on the Coastal Plain to the north plunge beneath the Jurassic and more recent strata in the neighbourhood of Yandanooka, and do not, so far as is yet known, reappear at the surface.

In a geological map (a copy of which is to be seen in the Geological Museum) issued in 1860, by Mr. Gregory, Carboniferous rocks are shown as occurring in the vicinity of Gingin, an observation which, if capable of substantiation, is of the utmost importance.

The Irwin River beds are arranged in a series of folds of such a nature as might be expected to bring

them near the surface at some points beneath the Coastal Plain, but in any of the bores put down within the Metropolitan area in the search for Artesian water, no sign has yet been met with of Carboniferous Rocks.

In the light of all the evidence now available I am inclined to regard the term Carboniferous used both by Mr. Gregory and Mr. Brown in this connection as being of mineralogical rather than of geological significance.

So far as any data at present go it does not yet appear that the occurrence of strata of Carboniferous, and possibly coal-bearing, age within 20 miles of Perth has any very sound geological reasons for its belief.

It may be noticed in this connection that in the bores put down on the Royal Agricultural Show Ground, and the Hospital for the Insane, at Claremont, a considerable thickness of solid crystalline limestone associated with glauconitic sands or sandstones was encountered. Lithologically these limestones bear a close resemblance to those occurring in the Lower Carboniferous strata of the Irwin River valley; their stratigraphical position, however, is not favourable to the occurrence of coal seams.

#### 2. Coal on Prospecting Area 155H, Donnybrook.

On the 11th of June, 1909, Mr. O'Grady called at this office and handed in a sample of brown coal for analysis, coupled with the statement that the specimen did not represent a fair average of the whole seam, but was merely a piece from one portion, and was not particularly good.

According to the information furnished in an official memo. of the 2nd of June, the coal was obtained from the 70ft. level in the shaft in the prospecting area 155H, of 3,000 acres. About 25 feet of driving is said to have been done at that level. This seam, from Mr. O'Grady's information, was 4ft. 10in. in thickness, and made up of three bands of coal—top band 6in., middle band 1ft. 6in. to 2ft., and bottom band 7in.

This sample proved to be a brown coal of no particular value, and the Laboratory report (3441c) showed it to be of low calorific value, and to contain over 52 per cent. of ash and moisture.

#### Analysis 3441c.

	Per cent.
Moisture .. ..	26.95
Volatile Hydrocarbons .. ..	25.46
Fixed Carbon .. ..	21.98
Ash .. ..	25.61
	100.00

Calorific Value, 5,710 B.T.U.

On the 15th of last month Mr. O'Grady again called at this office and handed in a sample of bright bituminous coal for analysis.

According to the information supplied to me by Mr. O'Grady the coal was stated to have been obtained from the same seam as that from which his previous sample was obtained, and was made up as follows:—

Shale.	(Roof).
A. Brown Coal .. ..	1 foot. Analysis 3441c.
B. Bituminous Coal .. ..	1 foot (about). Analysis 4108c.
C. Brown Coal .. ..	6 to 8 inches.
D. Coal (said to resemble B.) .. ..	5 inches.
E. Inferior Coal .. ..	1 foot (about).
	Thickness, 4 feet 2 inches.

\* Paleontological Contributions to the Geology of Western Australia, II. (a.) Plant Remains from the Collie Coalfield. E. Etheridge. Geol. Surv. Bull. 27, p. 8.

The sample submitted for analysis is stated to have been obtained from band (B).

The Analysis 4108c of this sample is as follows:—

	Per cent.
Moisture .. .. .	2.75
Volatile Hydrocarbons .. .. .	41.01
Fixed Carbon .. .. .	47.03
Ash .. .. .	9.21
	100.00

Calorific Value, 13,120 B.T.U.

It was deemed advisable for the Inspector of Mines to visit the locality for the purpose of sampling the seam, and on the 3rd instant he gave the following particulars regarding it:—

Sample 1. Ligneous Coal or brown carbonaceous shale, 8in., claimed by Mr. O'Grady to burn well.

Sample 2. Black hydrous Coal with a brown streak, 5in. Turns brownish on exposure and on being crushed.

Clayshale, 12in.

Sample 3. Black Hydrous Coal similar to 2, 3in. Shale, 16in.

Thickness, 3ft. 8in.

The Inspector states that

"All these samples were taken from the face of the drive. Samples 2 and 3 were mixed together as they are very similar. Sample No. 4 was taken from the top coal of the drive but near to the bottom of the shaft. I have four pieces of the hard black bituminous coal of splendid quality, which I took from the floor of the drive and the log on the surface, which I state are foreign to the locality."

The samples collected by Mr. Briggs have been analysed with the results given below:—

	No. 4169.
No. 4169—Donnybrook No. 1 ..	%
Moisture .. .. .	31.34
Volatile hydrocarbons .. .. .	28.43
Fixed carbon .. .. .	24.37
Ash .. .. .	15.86
	100.00
B.T.U. .. .. .	6315.
No. 4170—Donnybrook 2 and 3 mixed	
Moisture .. .. .	31.28
Volatile hydrocarbons .. .. .	31.57
Fixed carbon .. .. .	26.12
Ash .. .. .	11.03
	100.00
B.T.U. .. .. .	6928.
No. 4171—Donnybrook No. 4 ..	
Moisture .. .. .	35.00
Volatile hydrocarbons .. .. .	28.60
Fixed carbon .. .. .	24.70
Ash .. .. .	11.70
	100.00
B.T.U. .. .. .	6429.

These samples were all non-caking brown coal.

These figures demonstrate perfectly clearly that the coal handed in by Mr. O'Grady on the 15th of last month differs very materially from that collected by Mr. Inspector Briggs; the former bears a marked resemblance to that of some of the New South Wales coal.

A special visit to Donnybrook and a portion of the period between the 23rd and the 25th of October were devoted to investigations in connection with the authenticity of the find of high-class bituminous coal reported by Mr. O'Grady on the 15th of September.

The coal in question was said to have been obtained from the seam exposed in the drive in a shaft, No. 1, 210ft. deep, better known as Murphy's Shaft.

In September, 1906, Mr. Campbell visited the locality and reported the strata exposed therein as follows:—

	From	to
Gravel and laterite .. .. .	0'	8'
Pipeclay ( ? Shale) .. .. .	8'	23'
Grey clay ( ? Shale) .. .. .	23'	33'
Dark grey clay ( ? Shale) .. .. .	33'	73'
Lignite .. .. .	73'	77'
Clays ( ? Shales) and sandy grits with pyriteous lignite .. .. .	77'	180'
Sandstone .. .. .	180'	190'
Loose sandy grit .. .. .	190'	202'

A bore was put down from the bottom of the shaft to a depth of 18 feet and passed through nothing but sandy grit.

3. This shaft was not accessible to me below the depth at which a drive had been put in on the seam of brown coal referred to in the above table.

4. A few feet from the shaft a fault of unknown downthrow exposes a thin seam of brown coal, associated with very earthy brown coal or carbonaceous shale.

An analysis (4302) of this brown coal yielded the following results:—

Moisture .. .. .	36.28
Volatile hydrocarbons .. .. .	27.67
Fixed carbon .. .. .	22.60
Ash .. .. .	13.45
	100.00

Calorific value .. .. . 6072 B.T.U.

5. On the western side of the fault is the seam from which Mr. O'Grady claimed to have obtained the sample of high grade bituminous coal, submitted for analysis; and from which Mr. Inspector Briggs obtained the samples on the 3rd of October.

The section of this seam as showing at the face of the drive is given in my report of the 8th of last month and need not be repeated.

Owing to the foul air it was impossible for me to get access to the face on the two occasions upon which I visited the shaft.

A sample of the brown coal forming the upper portion of the seam was carefully taken from a freshly broken face and an analysis of it (4303) gave the following figures:—

Moisture .. .. .	33.48
Volatile hydrocarbons .. .. .	29.12
Fixed carbon .. .. .	22.66
Ash .. .. .	14.74
	100.00

Calorific value .. .. . 6364 B.T.U.

This analysis is practically identical with that of the sample obtained by Mr. Briggs, and better than

that (3441c) of the original sample received from Mr. O'Grady in June last.

Careful search was made to find any traces of the high grade coal, fragments of which were picked up from the floor of the drive and a log on the surface by Mr. Briggs, but none could be found.

According to the tenour of a telegram received by myself while at Donnybrook from the Department, it appears that Mr. O'Grady still asserts that he can point out the seam from which he obtained the coal (4108c) handed in on the 15th of September.

From a knowledge of the geological constitution of the district I am hardly of opinion that he can do so, because the coal in question is obviously of foreign origin and came from a distant source.

### (3.) *Subsidised Boring Operations at Leonora.*

In June, 1908, a limited liability company was formed for the purpose of prospecting the country around Leonora, by means of a diamond drill.

On the first of June, 1908, a deputation waited on the Minister for Mines in connection with the project, and the latter intimated that the Government Geologist or the State Mining Engineer would be specially instructed to visit the district and point out sites where boring operations would have reasonable prospects of success, and that the Government would pay three-fifths of the expenditure.

In December, 1908, the State Mining Engineer visited Leonora, and selected the site of three bores referred to in his report of the 7th December, 1908, and shown on the plan attached. (*Not reproduced.*)

Operations were carried out at sites 1 and 3, and were uniformly unsuccessful.

On the 28th of April, 1909, the syndicate again approached the Government with the view to geological advice being obtained before any further operations were undertaken.

The geological features of the auriferous deposits of Leonora had been investigated by Mr. Jackson in 1903, and his results embodied in Bulletin No. 13, thus rendering assistance in this direction comparatively easy.

A reference to the Geological Map of Leonora shows that practically the auriferous belts are two in number; the westernmost being that along the contact between the granitic rocks and the schists, and includes the Tower Hill, the Main Reef and Trump groups; whilst the easternmost includes what may be called the Gwalia group. All the auriferous deposits of the latter group are in schist country intersected by massive greenstone.

The massive greenstone contains crush lines, which in many cases carry quartz veins, but so far none of these have proved sufficiently rich in gold to warrant any serious attention being paid to them.

The site of No. 1 bore hole (of the State Mining Engineer) is as may be seen in the massive greenstone, and was designed to intersect a crush line ("schist lode") underlying easterly at about 65deg., and having an average strike of about north 10deg. west. The bore was put down to the westward inclined at an angle of 45deg. at a spot about 165 feet east of the outcrop of the crush line, and was continued to a depth of 470 feet. The bore pierced nothing but massive greenstone, with a thin vein of ferruginous quartz at about 133 feet, and another at 317 feet; neither, however, proved to be auriferous. So far as may

be judged from the cores up to a depth of about 223 feet the hole was carried down through more or less weathered rock.

From 223 feet to the end Mr. Glauert gives the following details of the cores he examined:—

Throughout this section the rock seems to be very hard and compact, differing in this respect from No. 1 Bore, where a great deal of broken material was encountered. The rock is a typical greenstone which has undergone a certain amount of metamorphism; chloritic, talcose, and micaceous bands are common though the rock does not split readily along the lines of schistosity.

At 228ft. occasional veins of calcite and quartz are met with, generally only of limited thickness. The calcite becomes more and more plentiful though it seems to be confined to the veins and is not disseminated throughout the rock (240ft.).

At 261ft. the nature is brittle, for an abundance of planes of chlorite and silvery mica is quite striking. A few feet further on the schistose structure vanishes, and we again have many small veins of quartz and principally calcite.

In the neighbourhood of 317ft. a quartz vein of some size is struck, which, however, showed no visible traces of gold.

Soon after this the rock loses much of its schistose structure, becoming almost an amphibolite with long slender crystals of hornblende at 337ft. A thin band of chloritic and micaceous rock is encountered, but the amphibolite type is again present at 341ft. The mass then becomes finely and evenly grained, is very compact and solid, and shows very small traces of effervescence when treated with acid. Quartz veins are rare, though the mineral is present as a constituent of the rock. Gradually the rock becomes increasingly chloritic and micaceous, changing at 365ft. into a somewhat darker tint with an absence of the chloritic and micaceous planes. It gradually gains in quartz and pale or white felspar until the normal colour is once more attained. This fine-grained and evenly-grained type persists to the end of the bore, a variation in the size and number of the calcite and quartz veins being the only changes to be noticed with the naked eye.

Pyrites in small masses and crystals more or less abundant throughout.

It would seem that the rock is an "amphibolite" which has undergone various changes owing to weathering, pressure, etc., etc.

The cores were carefully sampled, 49 assays being made, of these two gave 13grs. of gold per ton, 10 "traces," whilst the remaining 37 were barren.

The intermediate, or No. 2 hole, was not bored, but the third hole passed through nothing but more or less massive greenstone, traversed at 70 feet by a band of more or less shattered rock, which may possibly represent a crush line ("schist lode"). A trace of gold was found on assay at this depth.

An examination of the cores showed:—

At the surface the rock is ferruginous and weathered; it contains a fair amount of chlorite and occasional veins of secondary calcite.

At 27ft. it becomes more solid, but is still very iron-stained, calcite being present.

At 54ft. it is very massive and has lost practically every trace of ironstaining; the calcite veins are now slightly more numerous.

At 70ft. is a dislocation or fault, the rock is very much shattered for two or three feet.

At 110ft. the character of the rock changes somewhat. It becomes micaceous and has very frequent and abundant narrow veins of calcite ( $\frac{1}{8}$ in.- $\frac{1}{4}$ in.) running through it at distances of  $\frac{3}{8}$ in. or  $\frac{1}{2}$ in. apart. In consequence of the abundant mica the rock is very schistose.

At 156ft. a vein of white quartz is met with; it is only an inch or two in thickness.

At 174ft. the character of the rock again changes to a chloritic greenstone, the mica is practically absent. The calcite veins, etc., are less frequent but of greater size.

At 316ft. (odd) another quartz vein is met with which is of rather greater extent, being several inches in thickness.

At 340ft. to 370ft. we have alternations of rock with numerous fine veins or bands of calcite and rock with fewer but thicker veins of the same secondary mineral.

370ft. to 414ft. consists entirely of greenstone with coarse veins of calcite.

The last section of the bore, 414ft. to 470ft., calls for little comment. It is a solid greenstone with veins of calcite and occasional ones of quartz. At 425ft. the rock becomes somewhat more schistose, and shows greater development of chlorite, etc., along the lines of schistosity.

"Traces" of gold were found at seven depths; "minute traces" at two others, whilst the other 24 assays gave negative results.

After an examination of the localities, I cannot see much evidence to warrant the drilling of the second bore hole.

Should it be ultimately decided to continue operations, I would advise a series of bores along the line selected by the State Mining Engineer, but on the western side of the railway line; boring in this locality would be expected to intersect the Harbour Lights and other groups in the schist belt along the western contact of the granite.

In the event of anything of value being struck in any hole, it would be better to bore north and south at right angles to the line of bores, with the object of testing the deposit at three localities before proceeding with active exploitation.

Boring operations, however, should not, under any circumstances, be carried out in the massive greenstone belt, for experience has shown that the payable lodes are practically confined to the foliated rocks.

#### (4.) *Leonora Gold Blocks, G.M.L. 195.*

During recent visit to Leonora (October, 1909), a visit was paid to the mine for the purpose of inquiring into the question of the subsidy (or bonus) asked for by Mr. Cale, in his communication to the Government of the 14th August.

Mr. Cale originally (22nd May, 1909) applied for a subsidy of £3,800, under Part 6 of the Mining Development Act, but investigations showed that there is a debt of £3,000 on the mine to the Western Australian Bank. On being asked to make an application for an advance for pioneer mining, as laid down in Part 2 of the Mining Development Act, Mr. Cale replied (31st July, 1909) that such would not result in success, and that he did not want a loan.

On the 14th of August, Mr. Cale communicated further with the Government, and asks for £750 as a subsidy or bonus for the purpose of sinking the main (No. 1) incline shaft a further depth of 100 feet, and such to be continued to a depth of 500 feet if the developments in the first 100 feet so warranted. Mr. Cale, however, does not clearly state whether his company is prepared to bear any portion of the cost of the exploratory work he outlines, though his letter makes it quite evident that a subsidy or bonus is required and not a loan.

A full description of the essential geological features of the mine has already been given by Mr. Jackson, in Bulletin No. 13, pp. 33-35, and need not be repeated. The work done since that time has added little, if anything, new to the facts already accumulated.

There are, however, no scientific reasons for the belief that either the reefs or the values in the mine will not continue if judiciously followed.

An initial expenditure of about £500 would be required to put the mine in proper order before the sinking of the main (No. 1) incline shaft, as proposed by Mr. Cale, could be commenced, and it does not seem to me to be quite equitable to expect the

State to bear any portion of the expense other than that actually involved in continuing the shaft from its present depth.

On the whole the application is not one which commends itself to my judgment, whilst the fact that a subsidy or bonus of £750 is wanted, and not a loan under Part 2, should, I think, preclude the proposition now put forward being entertained.

#### (5.) *Notes on the Geology of Leonora.*

A full account of the geology of Leonora was given by Mr. C. F. V. Jackson in Bulletin No. 13. In that report it was shown that the district consisted of a complex of crystalline schists, which comprised both basic and acidic rocks.

The acid schists, on the evidence available at the time, were assumed to have owed their origin to the transmutation of granitic rocks. A reinvestigation of the salient features of the field, during a short stay at that locality in August, 1909, showed that Mount Leonora, the highest and most conspicuous summit in the field, is made up of distinctly bedded rocks—quartz schists [10880, 10883], dipping at a fairly high angle 55° to the west. These beds are well exposed to the south of Mount Leonora, where they have been quarried for road-making, etc.

The field evidence seems to point conclusively to the Mount Leonora quartz schists being of sedimentary origin and not metamorphosed granite.

A chemical analysis of a sample of this "crushed granite" [5084], is quoted by Mr. Jackson on page 19 of the Bulletin in question: the figures seem rather to be those of a metamorphosed sediment than of a granite. The quartz schists, etc., of the Mount Leonora type extend without any interruption as far north as Mount George, and form a very important feature in the geology of the field, as well as being of some considerable economic importance.

The mapping in the neighbourhood of the Harbour Lights property requires a little modification: the two lodes, which are about 100 feet apart, are not in greenstone schists, but appear to be along shear-zones in crushed granite (?) or quartz schists.

To the west of Leonora Gold Blocks is a prospecting shaft 51 feet in depth; the shaft was put down through cement (laterite), which was worked in the hope of it being a deep lead. The shaft, however, was not carried deep enough to reach bed-rock.

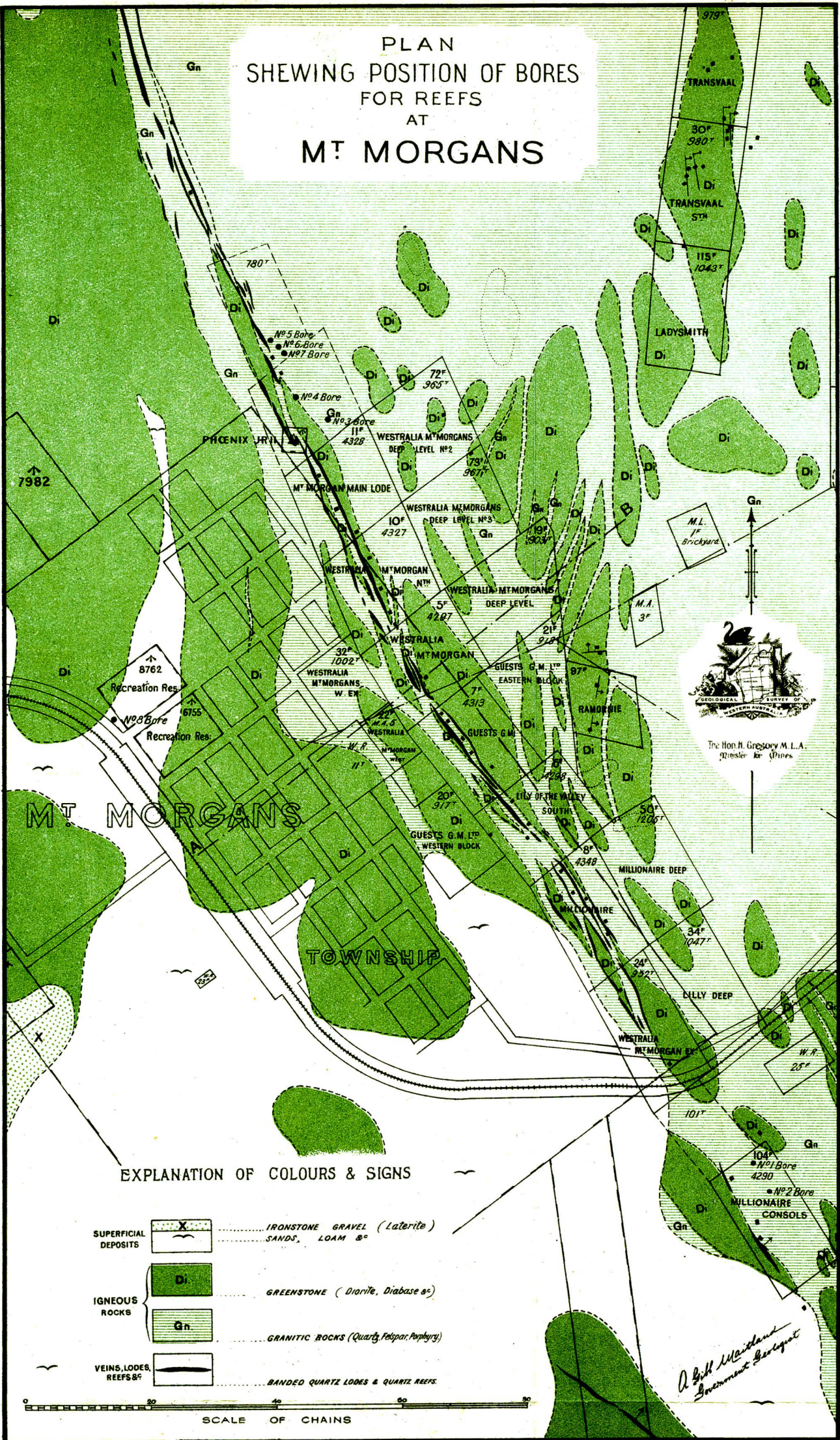
Adjoining the Leonora Main Reefs, and near the main shaft, are some workings in an auriferous wash, 35 feet below the surface. The wash, which is made up of white quartz boulders in a clayey matrix, is said to have been highly auriferous, and is reached by an incline shaft. The wash is covered by a greater or less thickness of cement (laterite). The mutual relationship of this deposit to that in the 51 feet shaft previously mentioned has not yet been clearly established.

It is proposed, when opportunity offers, having a reinvestigation made into the Leonora District, when many of the things which are not yet clear may be definitely set at rest.





#### (6.) *The Condition of Mining on the Greenbushes Tinfield.*

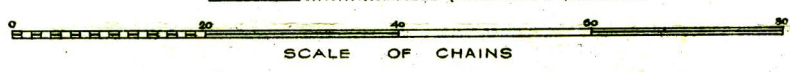
In the years 1899 and 1900, the condition of mining in, and the future prospects of, the Greenbushes Tinfield were fully set out in two reports by myself, and

# PLAN SHEWING POSITION OF BORES FOR REEFS AT MT MORGANS



### EXPLANATION OF COLOURS & SIGNS

- 
IRONSTONE GRAVEL (Laterite)  
SANDS, LOAM &c
- 
GREENSTONE (Diorite, Diabase &c)
- 
GRANITIC ROCKS (Quartz, Feldspar, Porphyry)
- 
BANDED QUARTZ LODS & QUARTZ REEFS



*A. Gill Macdonald  
Government Geologist*

it was then pointed out that the tin ores fell into two distinct categories:—

- (1.) Superficial deposits—
  - (a.) Alluvial deposits,
  - (b.) Residual deposits.
- (2.) Deposits in country rock—
  - (a.) Tin-bearing granites,
  - (b.) Tin-bearing dykes,

and that the future of the field, after the exhaustion of the superficial deposits, would depend upon the economical working of the deposits occurring in the country rock.

This report was followed by a very voluminous one, prepared by Mr. H. P. Woodward in the year 1908, which, in addition to his own observations, summarised all the information prepared by previous geologists.

The Greenbushes field is the oldest tinfield of the State, having turned out, up to the close of 1909, 7,318.2 tons of black tin, valued at £510,682. The principal source of the tin ore raised at Greenbushes is the alluvial deposits, which are fairly widespread, having been worked in many of the gullies which traverse the field. These are divided into the deep leads and the alluvial of the existing water channels. In the latter the tin wash often lies at depths varying from 10 to 40 feet beneath the present stream bottoms; whilst the deep leads have been found to reach at least 100 feet in depth.

The residual deposits, which contain sharp, angular tin, very little removed from the position in which it was originally deposited, are of minor importance.

At the time of my visit to the field there were eight dredging and sluicing plants at work on the alluvial deposits, and there was still a good deal of alluvial and residual ground to be exploited.

On M.L. 460, Mount Jones, was a patch of residual sands, about 170 feet above the junction of Jones's Creek and the main watercourse which was being hydraulic sluiced. There was very little "over-burden," which was only about 3 or 4 feet thick, the tin-bearing was "free," being practically pure sand. The tin was very fine and angular, and obviously could not have travelled very far from its parent source: it very likely owes its origin to the decomposition of a granite *in situ*. The sand patch is hemmed in by granite.

All deposits of this nature naturally become depleted in course of time, and after their exhaustion, the future of the field must perforce depend upon the possibility of the deposits in Class 2 being able to be worked in bulk. As far as any work has at present been carried it appears that, when viewed on the whole these deposits are too low grade, and of such an irregular nature, to be followed by systematic mining.

H. P. WOODWARD, ASSISTANT GOVERNMENT  
GEOLOGIST.

(7.) *Discovery of New Minerals on the Phillips River Goldfield.*

I have very great pleasure in reporting the discovery of certain new minerals near Kundip, upon the Phillips River Goldfield, which may, in the near future, prove to be of considerable value to this State.

The facts are briefly as follow:—Whilst engaged upon the recent examination of this field I was struck by the appearance of certain minerals in the ore from the Alice Mary, M.L. 99, owned by Mr. Ellis, which were supposed to be Cuprite and Azurite, but did not answer to the description of these minerals. I therefore collected as many as I could carry, and upon my return to Perth submitted these to Mr. Simpson for

determination, when they proved to be Olivenite (hydrated arsenate of copper) and Erythrite (hydrous arsenate of cobalt); he also detected the presence of another mineral, but the quantity was too small for determination. I therefore communicated with Mr. Ellis, who kindly furnished me with a further supply, which has now been examined in the Departmental Laboratory, the following report upon which has been handed in by Mr. Simpson:—

"Some little time ago Mr. Woodward brought to Perth some samples of ore from this lease which contained streaks of a pink mineral which proved to be Erythrite (hydrous arsenate of cobalt). Associated with it was a green copper mineral which was found to be Olivenite (hydrated arsenate of copper). Both these minerals being new to the State a further supply of ore was obtained from the mine. In this second lot of ore two more minerals hitherto unrecorded in this State have been detected, viz.: Symplectite (hydrous arsenate of iron) and Cobaltite (sulphuride of cobalt). The two latter minerals are in intimate admixture in the form of veins and nodules of massive black or dark green Symplectite impregnated with finely granular Cobaltite and occasionally Arsenopyrite. A sample made up of a number of lumps of ore showing much Symplectite gave the following assay results (undried):—

Insoluble ... ..	5.08 per cent.
Lime and magnesia ... ..	Strong traces
Manganese oxide ... ..	Trace
Iron... ..	14.98 per cent.
Copper ... ..	4.76
Cobalt ... ..	0.95
Nickel ... ..	Slight trace
Silver ... ..	1oz. 12dwts. 21grs. per ton
Gold ... ..	6dwts. 13grs. per ton

"The iron in this sample was equal to 53 per cent. of Symplectite ( $\text{Fe}_3\text{As}_2\text{O}_8 + 8 \text{H}_2\text{O}$ ). One lump of ore not included in this sample appeared to consist of about equal proportions of Cobaltite and Symplectite and may therefore be expected to assay over 10 per cent. of cobalt. In view of the high price of cobalt and its increasing use in the arts, the Mineral Industry for 1907 speaks of an American ore assaying 6 per cent. of copper and 3 per cent. of nickel and cobalt as 'obviously a high grade of ore.'"

Cobalt is put on the market in the form of oxide, which has recently been quoted at from 6s. to 10s. per lb. White arsenic which would be produced in treating such an ore is at present quoted in Europe at about 1½d. to 2d. per lb.

From this it will be noticed that it is a Cobalt ore of high grade and therefore should it prove to occur in any appreciable quantity it will be of very considerable value, the only reason for regret is that this mineral was not detected sooner, for some eight tons of this ore have been disposed of to the local smelting works as copper ore, the metallic contents of which were only valued at £10 per ton.

The discovery is, however, of considerable importance for even should no large quantity exist in this particular lode the presence of cobalt having been proved in this district may lead to further discoveries of even greater value.

(8.) *The Mount Morgans District of the Mount Margaret Goldfield.*

The mines of this district are situated for the most part along one of the razor-backed ridges consisting of typical banded ferruginous quartzites so common upon the Murchison and Yilgarn Goldfields. This ridge stretches for 4½ miles in a north-westerly direction following the contact of the greenstones upon the west with the granites upon the east. The greenstones as far as visible are of the usual highly-



weathered and altered schistose character, whilst in the granite area the rocks consist mostly of felspar porphyry with dykes of hornblendic porphyry in places near the contact.

These acidic rocks are clearly of igneous origin, their intrusion taking place subsequently to the laying down of the greenstone, the origin of which is obscure. This deduction is arrived at from the fact that a considerable number of greenstone masses have become entangled within the acidic magna, these being particularly numerous near the contact, whilst further a few acidic minor dykes are met with in the greenstone area, but no basic ones were observed in the granite, the whole of the rocks of this class clearly being only entangled masses.

The main fissure line does not consist of one continuous reef but of a large number of lenticular bodies which apparently follow a fault or shearing plane, they vary considerably in character from pure white quartz, various banded highly siliceous rocks having a quartzite texture, banded jaspers to ferruginous gossans, the latter of which, according to the local authorities are the only ones that are auriferous.

An inspection of the working plans of the W. A. Mt. Morgans mine reveals the fact that a series of these bodies have been worked, and they were of a lens or pipe-like character with a pitch at a low angle to the south. With depth, the number of these parallel lenses decreased as did also their horizontal extent, their maximum development occurring at about the 200-foot level.

These ore bodies have apparently been intersected horizontally by tabular porphyritic dykes, thus indicating that the mineralisation of this fracture zone took place prior to the final efforts of vulcanism, possibly due to contraction and fissuring allowing of the flow from the still molten magma to the east.

With the exception of this one mine no payable auriferous shoots have been discovered upon this line, and since the highest values in it occurred between the surface and a depth of 200 feet, testing by boring upon this line with the object of cutting possible pipes or ore at a depth presents very slight prospects of success.

It will be noticed (see Map, Bulletin No. XVIII.) that the fracture zone does not consistently follow the contact of the two rocks, but in the central portion, where the principal mine is situated, it follows a line of inclusions of schist within the granite area which at this point are in great number and extend in a northerly direction to the Transvaal mine, which is situated entirely within one of these bodies.

Upon the Ramornie, which may be said to lie at the juncture of the north and south belt of enclosure with the main fissure line, the gold occurred in fracture dyke composed of crushed rock fragments. This carried good value in places, but was very patchy.

Without an exhaustive examination of the only mine worked to a depth it would be impossible to attempt to draw any conclusion, whilst this examination is of very considerable importance as this is one of the solitary instances in which lodes of considerable size and richness have been worked to a depth in these banded quartzites, therefore the opportunity should be seized if this Company is successfully reconstructed to make an inspection when the lower levels are unwatered.

(9.) *Boring for Reefs at Mt. Morgans.*  
(With a Plan, Plate I.)

Upon receipt of instructions I proceeded to Mt. Morgans on the 2nd of March, and made a general examination of the auriferous belt at that centre, with the object of selecting further sites for bores which were being put down in this locality by a local syndicate with State assistance. Upon my arrival I found that three bores had already been completed, viz., Nos. 1 and 2 upon the Millionaire Consols at the south end of the line, and No. 3 near the Phoenix trig. at the north end, whilst No. 4 in the same locality was approaching completion (See plan).

These bores had all been put down at an angle upon the east or hanging wall side of the lode with the object of intersecting it at a depth of about 400 feet but, owing to the distance of Nos. 1 and 2 from it, it is extremely doubtful whether either of them cut the reef.

No. 1 bore was down a depth of 564 feet and from it 18 core samples had been assayed, the highest of which yielded gold at the rate of 1dwt. 2grs. per ton, whilst from No. 2, down 493 feet, none of the 23 samples assayed more than a trace.

The plant was then removed to the north end of the line and No. 3 bore put down to a depth of 496 feet (?) from which 28 samples were assayed, none of which exceeded a trace, whilst from No. 4 bore, which was 832 feet in depth, 94 assays were made of the various reefs passed through, the highest of which was only 7 grains.

I then selected sites for Nos. 5 and 6 at a point a little further south where good values were said to have been obtained near the surface, fixing the positions closer to the reef outcrop with the object of intersecting it at a depth of between 200 to 250 feet, since at this level the other mines upon this line had obtained their highest values.

No. 5 bore was sunk to a depth of 303 feet and 34 assays made from the various ore bodies encountered, the highest of which only yielded gold at the rate of 2dwts. 4grs. to the ton; therefore the plant was removed to site No. 6 and the bore put down 310 feet. In this several low-grade ore bodies were cut from which 34 samples were taken, one of which gave the results of 9dwts. 10grs. for 12 inches in thickness.

No. 7 bore hole was then put down between Nos. 6 and 4 to a depth of 310 feet and from it out of the 25 samples tested the highest return was only 4dwts. 22grs.

The unsatisfactory result obtained both at the north and south end of the line caused the syndicate to abandon further idea of prospecting it, therefore the plant was removed about three-quarters of a mile in a south-easterly direction to a position between the railway and recreation Reserve No. 8762, when at last their enterprise was rewarded by the discovery of a formation, 15 feet in thickness, at a depth of 218 feet, which averaged 9dwts. 4grs. of gold per ton. A total of 18 assays were made from this bore, but with the exception of the seven from the before-mentioned lode, they were of low value.

It is most satisfactory to note this result, for not only has a very considerable sum of money been expended by the local people, but an equal amount has been granted by the Government, who, in addition, made 275 assays free of cost.



Geological Survey of Western Australia  
Dept. of Mines

# PLAN & SECTIONS OF THE CASSITERITE TIN MINE WODGINA PILBARA G.F.

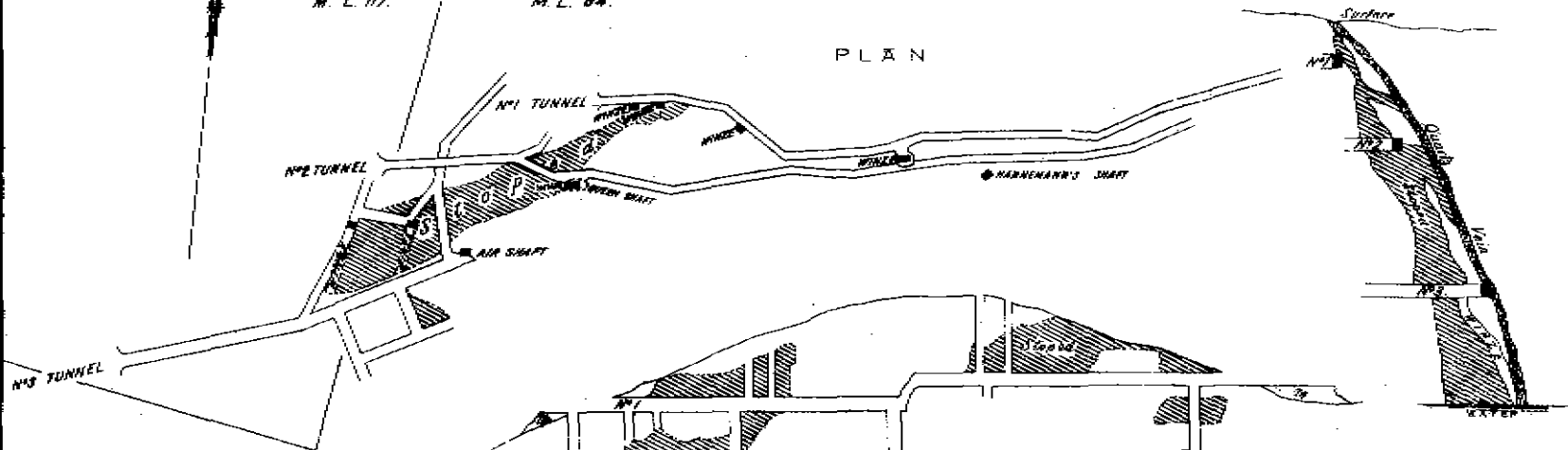
Scale of Feet  
0 10 20 30 40 50

TO ACCOMPANY ANNUAL PROGRESS REPORT OF THE GEOLOGICAL SURVEY FOR 1900.

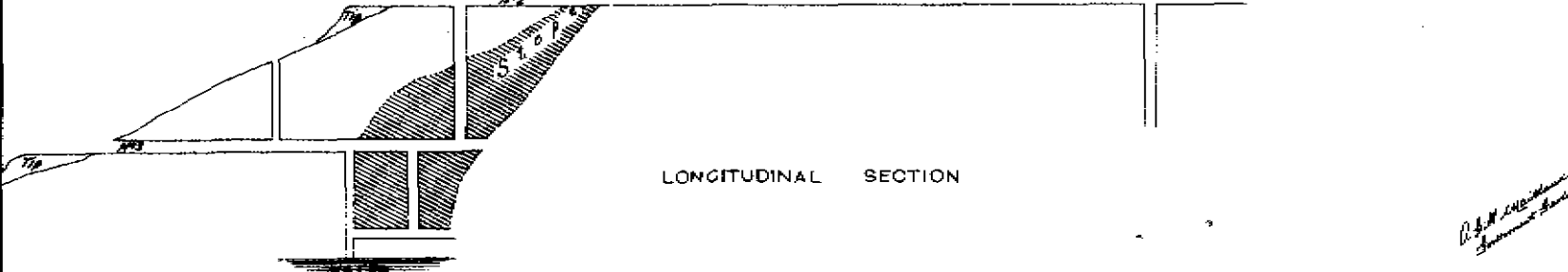
M. L. 117.

M. L. 84.

PLAN



CROSS SECTION



LONGITUDINAL SECTION

*A. M. Cassin*  
Geological Survey of Western Australia

(10.) *Wodgina Tin-mining Centre.*

(With a plan Plate II.)

*Physical Features.*—Wodgina is situated in a hilly triangular-shaped tract of country the apex of which points southward and, being the highest point (about 350 feet above the surrounding plain), is marked by a cairn locally known as Mt. Kettle. The two ranges are in the form of a V, the western of which runs roughly speaking north and south, whilst the eastern has a more north-easterly course. The former of these ranges runs for a distance of about five miles, gradually rising in altitude and terminating in a series of broken ridges, whilst the latter maintains its general altitude for a distance of four miles and terminates abruptly.

Between these ranges is a rough, broken valley traversed by a main watercourse and its branches, which flow in a north-easterly direction to the Turner River.

*Geology.\**—The rocks forming these ranges are schistose greenstones (dolerites?) of a highly siliceous and ferruginous character, much contorted, plicated, and faulted, the detrital matter from which and also the surface are extremely hard whilst a few feet below and down to the water-level they are comparatively soft, consisting of a folii of a weathered argillaceous rock and siliceous hematite. The western of these ridges is capped by a ferruginous conglomerate, probably a portion of the Nullagine Series.

In the western side of this valley the rocks are soft highly calcareous schists covered by shallow travertine deposits and intersected by quartz reefs, but in the centre and eastern portion there is an intrusive mass of the older volcanic series consisting of dolerites, vesicular lavas, and amygdaloids often foliated but extremely hard.

Surrounding this entire tract is an extensive granitic area. As a rule these rocks at the surface are much weathered and soft, presenting a gneissic structure, but in places bold masses of a porphyritic character rise from the plain forming bold low ridges or peaks.

A series of pegmatite dykes offshoot from the main granite mass intersecting the range to the eastward and north of Mt. Kettle, traversing the schists in a north-easterly direction but terminating abruptly upon encountering the solid greenstones, at which point they form large massive bodies of irregular shapes; whilst in the greenstone area itself another series of similar dykes suddenly make their appearance, starting abruptly from the point of contact with the schists traversing the rocks in a northerly direction almost continuously for a distance of some three or four miles. These have apparently no connection with the series met with in the schists, although it is possible that they may be a continuation of the same displaced by faulting. The composition of these pegmatite dykes varies considerably from felspar to almost pure quartz, whilst offshoots from them are often composed almost entirely of mica.

In the greenstone area these dykes carry ores of tantalum in large bunches or splashes, the tantalite having apparently crystallised out subsequently to the felspar, since the former presents surfaces showing the casts of the laminae of the latter. This point is of particular interest owing to the fact that the lumps of tantalite derived from what is practically a quartz reef exhibit the same characteristics, therefore conclusively proving that the quartz is a secondary mineral replacing the felspar with which the ore in other portions of the dyke is solely associated.

It may be mentioned here that these dykes only contain ores of tantalum in appreciable quantities near the contact zone of the greenstones with the schists.

Upon the other side of the contact or in the schistose area these dykes do not contain tantalite, which mineral was supposed to be replaced by tin, since large and rich deposits of this mineral were discovered at the surface intimately associated with pegmatite fragments; the development of these bodies has, however, demonstrated the fact that although the stanniferous veins are not pegmatitic although often occupying the same fissure as they do or intersect them they are of entirely independent and more recent origin, whilst their course, although occasionally identical, is more irregular and has generally a tendency to depart from them below the surface, striking away to the northward with an underlay to the west. It would therefore appear that they are in reality a series of cross fissures which have been deflected from their true course upon encountering the pegmatite or quartz vein; at the same time it is an undoubted fact that this encounter of the two series of veins has had a considerable influence upon the deposition of cassiterite in the lodes, for so far it is only within some 30 or 40 feet of this intersection that the veins have proved to be of sufficient value to work, whilst the pegmatite veins themselves have to a small degree occasionally been enriched near the contact.

These tin-bearing veins, which consist of mica, quartz, tourmaline, and cassiterite, are small but often extremely rich in the last-named mineral, which may occur in masses up to 100lbs. in weight of great purity which need only breaking and hand-sorting before bagging.

*The Cassiterite Mine.*—This mine is situated upon the face of the range near the apex of the V-shaped valley, and upon the area held four tunnels or adit levels have been driven into the hill upon two of the quartz-pegmatite dykes. Of these, three have been driven upon the vein one below the other, thus forming a series of levels which test a considerable extent of the so-called lode both vertically and horizontally.

The uppermost of these has been driven completely through a spur of the range, whilst the other two have also been driven for a considerable distance and connected by winzes (see plan).

At one point of the outcrop at the top of the hill and following its outcrop down the face of the hill the rich tin-bearing vein was exposed and from it a small ravine called Ogilvie's Gully was enriched to such a considerable extent that a great many tons of tin ore were obtained by dry-blowing or hand-picking.

The rich vein of ore was at first supposed to form the footwall of the dyke, but upon development it was found only to follow the dyke for a short distance from the face of the hill; however, work was proceeded with and was rewarded farther on by another make of ore, which, however, was of much lower grade.

The vein was then followed and was found to branch off to the northward, it being small, varying from one to three feet in thickness, and was extremely rich in places. It was then stoped and the rich stone thus won beaten up, hand-picked, and then screened, the result, black tin, being bagged, whilst the valueless lode matter was tipped in one dump and the screenings containing fine tin into another.

In this manner the rich pipe of ore, which is 40ft. long at its greatest length, was worked out down to

\* See Bulletin No. 23, Mineral Resources of the Pilbara G.F., by A. Gibb Maitland, Government Geologist.

the water-level, whilst payable portions of the main dyke at the point of contact were also worked.

Upon the other or middle dyke another tunnel was also driven where the occurrence of the ore was found to be similar, and was worked in the same manner but not so extensively.

The lessees having in this manner obtained all the available ore without the aid of machinery sold the property to the present owners, who have erected a very complete tin-dressing plant upon the mine consisting of rock-breaker, Huntington mill, May jigs, and Wiffley tables driven by a powerful oil engine which also works a dynamo, the latter being connected by cable with a motor at the water shaft.

In January last this plant started to crush and dress, when it was found that the available water supply was insufficient to enable continuous crushing to be carried on, whilst after pumping for some time the supply so considerably diminished as to preclude the possibility of working more than about five shifts per week, but in spite of this fact the plant was of such a capacity that since its inception it has been able to handle all the ore dumps with the exception of some three or four weeks' supply, and since no development work has been carried on by the present owners the mill must necessarily come to a standstill for want of ore.

Although undoubtedly the present water supply is quite inadequate to the requirements of this large plant, even with the greatest of care, for a period of 8 hours per day, the question which naturally arises in one's mind is whether it is not a question of the plant being too large for the mine rather than the scarcity of water supply, for if this plant with its present limited supply can handle the ore accumulations of several years in about five months, cannot it continue to keep pace with the ore raised day by day from developments?

*Water Supply.*—The underground water supply in this elevated tract of country is necessarily limited, whilst owing to the character of its surface (as previously described), even given a considerable rainfall (which it has not), little would find its way down into the interstices of these solid rocks, whilst situated as it is at the head of the valley there is little catchment to drain.

The water-level, too, is considerably above the level of the surrounding plains, and since the foliation of the rocks follows the valley they admit of a free drainage northward.

The first well sunk was by the Government in the township near the contact of the massive greenstones with the schists, but the supply obtained was so limited that it was supplemented by a second well a few chains farther south in the same zone; thus between the two the requirements of the inhabitants were met. Later on, however, the company sank a well a little south of the last-mentioned but still in the same belt; failing to obtain sufficient water, a bore hole was put down in its bottom by the Government, by which means a fair supply was struck, but upon this being heavily drawn upon by the electric pump both Government wells were drained.

With a view to obtaining a further supply, the Government are now boring in the calcareous schists at a point about half a mile west upon the other side of the greenstone at a very likely looking spot, whilst another was selected farther to the northward. When first put down wells at these points will in all probability yield a comparatively good supply but will eventually re-

duce to something like 2,000 gallons per day, whilst the company state they require 10,000 gallons, which supply can only be obtained by sinking upon the granite area over the range to the southward, which will necessitate about  $1\frac{1}{4}$  miles of piping and power to raise water 350ft. in vertical height, whilst even upon this side of the range it is very doubtful whether this supply can be obtained from less than two wells although good sites have been selected.

*Conclusion.*—Since absolutely no development work upon this property demonstrates ore reserves it would, I consider, be premature upon the part of the Government to trouble about obtaining a larger water supply for this mine, since the existing supply is ample to treat all the ore that can be obtained whilst this development is taking place.

It would of course be premature to express a definite opinion with regard to the value of this property until further development has taken place, but all indications point to the existence of a small or series of small rich veins of very limited extent, which if carefully handled may pay handsomely in a small way, but there is nothing to encourage the idea that a mountain of tin exists, nor even a low-grade lode of great size.

(11.) *Preliminary Report upon the Mining Centres of the West Pilbara Goldfield.*

WHIM CREEK.—At this centre the Old Whim Well Copper Mine is still being actively worked; it is situated upon Loc. 71, a freehold property acquired about 20 years ago by a local syndicate who first worked this mine and later on formed it into a company. Up to the end of 1901 this company and syndicate had produced 9,097 tons of ore from this mine which averaged close on 17 per cent. Then for a period of five years the mine was closed down until it was taken over by the present company in 1907, who have since that date raised 3,638 tons of ore\* up to the end of 1908.

The lode as has been mentioned in previous reports lies upon the side of a hill, its dip corresponding with that of the slope, and in consequence it was only covered by rock at those points at which spurs strike off, and is exposed in the beds of each of the intervening valleys.

The outcrop of this lode can be traced upon the top of the Slate Hill ridge for a distance of three-quarters of a mile in a north-westerly direction from the cairn, whilst to the south-east of this point it is cut off by a quartzite bar along which lode-matter with patches of rich ore can be traced in a north-easterly direction for a distance of 60 chains.

The main section of this lode that has been worked is about 30 chains in length in which large but more or less lenticular masses of ore dip in a northerly or north-easterly direction which have been followed down on the face of the slope for a distance of 12 chains or to a point which allows of the delivery of the ore to the dressing plant which discharges into the trucks upon the tram line which connects with Balla.

Owing to the lenticular character of these ore bodies the original company came to the conclusion that all the ore of a sufficient value for shipment had been worked out. This, however, has proved not to be the case, since the present company by prospecting have discovered others of equal richness only a few feet above or below those previously worked. With the object of testing this lode at a

\* The percentage of the ore is not indicated in the official statistics. A. G. M.

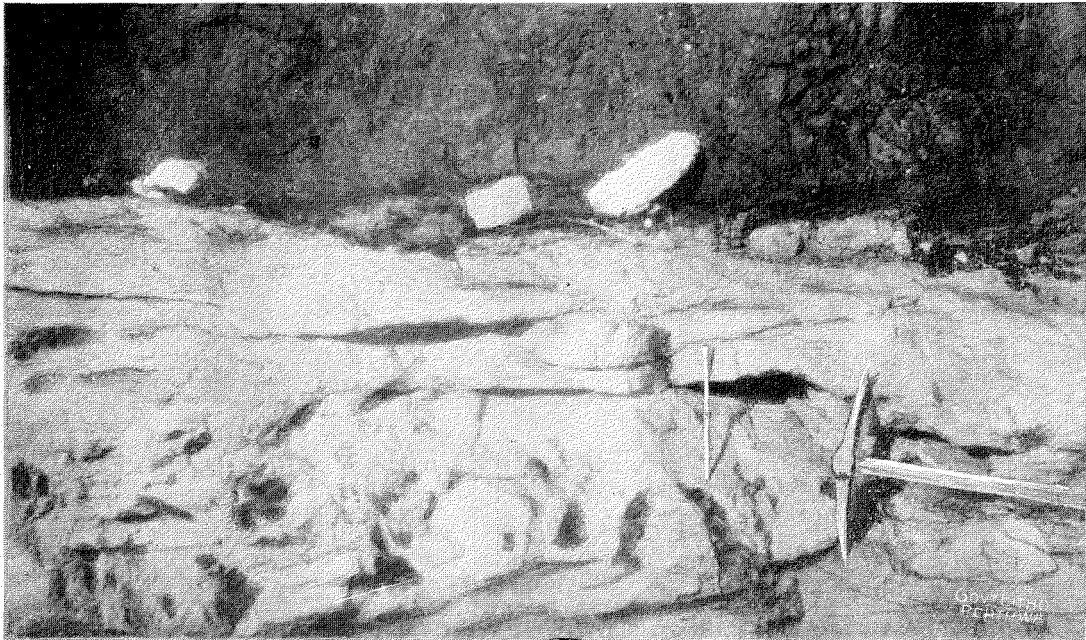


Photo., H. P. Woodward.

THE OCCURRENCE OF TANTALITE IN ALBITE, WODGINA, PILBARA G.F.

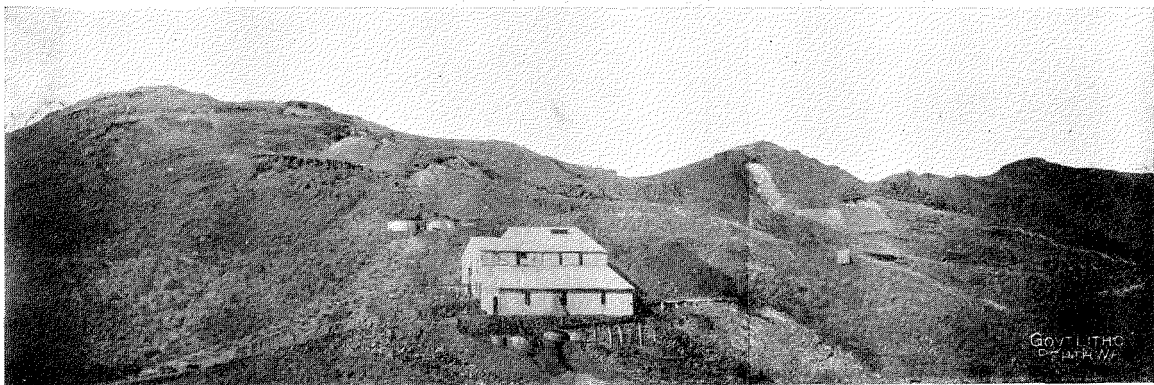


Photo., H. P. Woodward.

THE MT. CASSITERITE MINE, WODGINA, PILBARA G.F.

depth a vertical shaft was sunk some time ago on the flat at a distance of about 10 chains from the lowest workings; this cut a well-formed body of ore 6 feet in thickness and assaying 10 per cent. at the water level which is here about 80 feet in vertical depth. This lode was risen on in a northerly direction until connection was made with some prospecting work carried out by the original company which had proved unsatisfactory owing to the fact that the winze had followed a branch vein of little value.

For some reason further development from this shaft has been discontinued and the entire energy concentrated in scratching ore from the old upper workings upon the system which would be expected of a party of tributers who have no interest in the future of the mine.

Lately, however, a diamond drill has been purchased with the object of testing the lode at a depth and one bore already put down discloses that at the point where cut at a depth of some 270 feet the ore channel is about 50 feet in thickness, consisting of siliceified slate with small veins of marcasite and chalcopryite; it also discloses the fact that the formation has taken a steeper dip, for had the existing angle of dip been continuous it should have been cut at a depth of from 150 to 200 feet.

This bore hole is so far satisfactory since it not only proves the character of the lode in the sulphide zone but also sets at rest the question as to whether or no this lode will continue downwards.

Diamond drilling for lodes is at the best of times most unsatisfactory, and particularly when the ore occurs in this lenticular form, for even had a large body of rich ore been cut the extent of it would have been uncertain, whilst in this instance it is quite possible that such a body may have been missed by only a few feet.

By far the most satisfactory method of testing this lode would be by a drive at the water level from the 80-foot shaft which would have made available a 10 chain section of the lode lying between it and the existing workings which could have been worked by stopes and passes, and since it is all situated in the oxidised zone there is little reason to doubt but that as rich bunches of ore will be discovered in it as in the section already worked, added to which it could be more systematically worked and the ore more economically handled.

From this level also the ore body below the water level could be tested by winzes which would demonstrate its character in the sulphide zone and the direction of the shoots, thus enabling the management to select the most advantageous site for the permanent main shaft.

So far this lode has proved to be the largest and richest ore body as yet discovered in Western Australia in the oxidised zone, whilst to judge from its promising appearance at the water level there is every prospect of it proving to be a good lode in the sulphide zone.

The section to be worked between the water level and the existing workings will probably prove to contain ore in lenticular masses of high grade consisting largely of copper glance with some oxides and possibly metallic copper due to secondary enrichment, whilst below the water level, owing to the impervious character of the country it will in most probability pass almost directly into primary sul-

phides of considerably lower value which will require dressing but will be eventually useful if local smelting is undertaken.

The ore below the water level as proved by the bore will consist of a cupriferous zone of considerable thickness in which sulphides of copper and iron will occur in veins and bunches in a slate formation which has been hardened by the permeation of silicious solutions, but there will probably be but little quartz.

It will be noted from the above that the prospects before this mine are encouraging but still problematic until the development suggested has been carried out.

It is quite distressing to see such a fine ore body being worked in the present manner (which is the only possible manner in which it can be made to pay owing to the want of facilities), which consists of discarding all ore that will not assay 16 per cent.; this does not mean merely discarding some three tons of every four raised, but it represents about one-tenth of what could be raised if a 5 per cent. ore could be handled (which is considered a high grade in America). This, however, is impossible until smelting works are established either at Balla or preferably at the mine itself, for it would be more economical to haul the fuel with a return loading of matte or bar than to convey a bulk of low grade ore to the works, particularly as flux will not necessarily have to be conveyed from the coast. Another point also of importance is that with the inauguration of smelting works many other copper mines will be worked in this district, and since all of these lie inland the cartage from there will be shorter than to Balla.

In the vicinity of the Whim Creek there are several other small but promising lodes that have been partially developed, but now abandoned owing to the fact that only ores of a value between 20 and 30 per cent. will pay to work upon a small scale at the present market price of copper.

**MONS CUPRI.**—About four miles south in a direct line is situated this remarkable deposit, which consists of a large hill riddled with copper veins, two of the largest of which have, one upon the north and the other upon the south side, been considerably developed, and from these workings some 1,600 tons of 8 per cent. ore have been raised, a portion of which was treated on the spot in a small blast furnace.

The ore dumps and lodes have recently been tested by the Whim Well Company, who estimate them at something like 5 per cent., but of rather a siliceous character in the upper levels, but below the water level, in a winze, sulphide ore was cut that should smelt well after concentration.

If an ore of this grade could be smelted locally at a profit, there is a large quantity available upon this property, which can be easily won since a large section of the lode can be worked from the adits already driven.

**MALLINA.**—There are several abandoned gold mines here, upon two of which batteries were at one time worked, but there are no reliable records of the result of the early crushings. One of these lodes most recently worked contains a large quantity of antimony, dumps of which of high grade are still at grass, whilst some is stated to have been shipped.

**PEEWAH CREEK.**—There are some old antimony mines upon the Peewah Creek, about four miles south-

easterly of Mallina, around which a good deal of ore of good quality is still lying; they are said to have been abandoned on account of the low price of antimony and the low gold values contained.

EGINA.—This centre is deserted with the exception of about three dryblowers. It has been a purely alluvial field, and judging by the character of the country, I should conclude that the gold was derived from the disintegrating of the Nullagine beds which, at one time, overlaid it, since there are no indications of auriferous veins, the country being solid clay slates without quartz reefs.

There is an old copper mine about one mile to the westward of the well which has yielded some 500 tons—19½ per cent. ore. The lode can be traced for a considerable distance at the surface, and upon it a large amount of development work has been done, but the ore marketed has evidently been raised from a large opencut, about three chains in length, from which it must have been of high grade as spoil heaps are too small to indicate much dressing.

Some samples raised from one of the deep shafts indicate that the ore is passing into the sulphide zone, but no stoping appears to have been done at the lower levels.

There is a large heap of very good ore still left on the surface, from which a good number of tons of 20 per cent. ore could be picked since it consists largely of lumps of malachite, but cartage and other charges would be too great for even this to pay at the present price of copper.

HONGKONG AND ANNIE'S GAP.—There are several old abandoned gold mines at these centres, some of which have had batteries and other machinery upon them, but proved to be of insufficient size and value to pay companies; they would, however, probably pay a working party with their own small plant to work for a time.

PILBARA.—There are a few men working here, the largest number being upon stream tin, which occurs along the granite contact with the schists country upon the south edge of the belt, which runs easterly and westerly. The tin-bearing zone is followed by the auriferous, in which there are a number of large hungry-looking quartz reefs in which the gold occurs in very rich veins, dabs and splashes, the balance being absolutely barren, they have therefore absolutely failed so far as companies are concerned, although batteries have been erected upon two or three occasions.

Upon the north side of the gold belt there is a line of cupriferous country in which, at one or two points which have been opened, some nice ore is visible, but its distance from port precludes the possibility of its paying to work at present.

STATION PEAK.—Upon the mine here the tailings are being treated by cyanide, but no mining is being carried on.

The lode, which is a large one, has been worked from the surface by means of an adit to a level convenient for tramming to the battery, the stone proving to be of high value. A winze has been sunk upon it to water level from which a sample the owner, Mr. Bull, informs me, was taken that assayed 16 dwts., but contained a large quantity of pyrites.

CROYDON.—The mine here was flooded at the time of my visit, so only the surface could be examined upon which the outcrop can be traced for about 1½ miles as a ferruginous lode, pits here and there disclosing good carbonate of copper at a shallow depth.

The lode has been followed down in the mine to a depth of somewhere about 90 feet, where it contained so much blende that the company stopped work. Captain Piper then entered into an arrangement with them, and he is now working the rich secondary sulphides at the 60 feet level.

It is a pity that the work of sinking was discontinued, as it would probably have passed through the zinc which might possibly have only been a bunch.

The shoot now being worked is very rich, and it is extremely probable that others will be discovered along the lode when further prospecting has been carried on.

The ore at present is carted to Point Sampson by camel teams, a distance of about 60 miles, so that it requires to be of high standard.

SHERLOCK.—There is an old antimony mine upon the Croydon Road, crossing the lode in which outcrops for a distance of two or three chains along which a series of pits and trenches have been opened, from which some 10 tons or more of high-class ore have been raised, and bagged, but not carted.

TOWRANNA.—There are two old abandoned mines at this centre upon which, at one time, there were batteries; they did not, however, prove remunerative under company management, but might possibly by parties of working men, if the values continued down in the hard country.

WEERIANNA.—Upon this field, which is only about two miles from Roebourne, a line of small lenticular quartz bodies have been worked for a length of about 1½ miles in a north-easterly direction.

A short time ago a local company was formed, which with State aid erected a battery, but not making a success of things they surrendered the leases and plant to the Government. A party of working miners is now in treaty with the Minister regarding a lease of the mill; they propose to work one lease and to crush at a low rate for other working parties. They estimate that 10dwts. stone will pay them well. If this proves to be the case, this field should give employment to a fair number of men, it will also be an inducement to miners in other centres, such as Pilbara, Hong Kong, and Towranna, to work low-grade shows upon similar lines.

ROEBOURNE CENTRE.—These mines, which lie in the rough, hilly country immediately south of Weerianna, were all worked for copper, but are now abandoned; on the Lily Blanche there appears to be a good lode of yellow sulphide. From this about 1,000 tons of 17¾ per cent. ore have been shipped, and as the workings are of very limited extent this lode must be of considerable promise.

There are many other smaller but promising lodes which have been opened, but which did not pay to work under the existing conditions.

GLENROEBOURNE.—At this centre, which lies about 7 miles to the westward of Roebourne, are a number of copper lodes, which were originally worked over 30 years ago, since which time they have been abandoned and taken up again on three occasions. At the present time three properties are being worked, viz., the old Carlow Castle by Shaw and party, upon which some fine grade glance ore, carrying a fair quantity of gold, is being raised from the lode at the north-west corner of the lease, which is of a good size and very promising appearance. Whilst examining the other lodes upon this lease I discovered cobalt ore upon the dump of the old water shaft, also what

I take to be nickel and cobalt ore, samples of which have been assayed, with the following results:—

	Cobalt Ore, Smallpage. 4403	Cobalt Ore, Carlow Castle. 4404	Cobalt Ore, Carlow Castle. 4405
	%	%	%
Copper .. ..	12·80	4·24	4·00
Nickel .. ..	·13	·67	·45
Cobalt .. ..	1·63	1·00	1·87
Arsenic .. ..	·86	2·76	7·35

The Carlow Castle North is held by Smallpage and party, who are working the northern extension of the same lode as worked in the Carlow Castle. They have carried down an underlay shaft from 20 to 60 feet, from which they have raised and shipped some high class glance, carrying a considerable quantity of gold. The ore is of such high grade that this work has paid handsomely. In this lode there are also traces of cobalt ore, a sample of which has been forwarded for assay.

The old Glen Roebourne is now held as a six-acre lease, and a little ore raised from near the surface. This has the appearance of a fine lode from which, to judge by the extent of the workings, a very considerable quantity of ore must have been raised in the past.

There are numerous other lodes in this district that have been worked, but are now abandoned since it takes a very high-grade ore to pay when worked upon a small scale.

Upon the whole this belt and the Weerianna, which are only three miles apart, are extremely promising, and there is little doubt but that at some future time this will become an important copper-mining centre when smelting can be done on the spot.

THE NICOL CENTRE.—The reefs in this locality are the best defined in the district, being most regular in course for great distances, and they are contained between well-defined walls, having been worked from open-cuts to a depth of 20 to 30 feet, from which the stone has been mostly crushed. The Ninety-nine leases are now being worked, and the small three-head mill put in working order, with the object of testing the lode in bulk as development at a greater depth proceeds. Judging from general appearance this is a promising lode, but no examination could be made as the workings were full of water.

GENERAL.—Wherever the crystalline schists or slates outcrop in this district the country is of a highly metalliferous character, not strikingly auriferous, but more favourable for the baser metals associated with gold in the oxidised zone. Of these baser metals not only indications but actual discoveries prove it to be distinctly copper country in the highest degree, for not only are there large and rich lodes which pay to work under about the most unfavourable conditions in the world, but there are numerous others that cannot be worked at present, whilst extensive belts of slaty country are intersected by ferruginous outcrops of a distinctly cupriferous character, which may in the future prove to be copper lodes of greater value even than those now being profitably worked.

It is only necessary to refer to the report of the State Mining Engineer to see that it costs £10 per ton to realize upon ore from the Whim Well mine, which is worked upon a larger scale than the others, and is only 15 miles from a port, with which it is connected

by tramway, and, therefore, at the present market value of this metal it would be impossible to make even a 20 per cent. ore pay when worked upon a small scale without the gold contents are exceptionally high.

(12.) *Deep Boring for Minerals and other Deposits in the Roebourne and Onslow Districts.*

Prospecting for lodes by the means of a diamond drill has proved to be most unsatisfactory and unreliable, for the following reasons:—

(a.) Owing to the fact that payable ore deposits extend over such an infinitesimal portion of the total mineral-bearing area in any district, the chances are something like one million to one against a bore intersecting any value-carrying stone.

(b.) Since ore usually occurs in more or less lenticular concentrations the chances of cutting a valuable ore body, even when boring is conducted along a line of proved lode are so extremely remote that one would hesitate to recommend this method of prospecting without the work could be carried out in a thoroughly systematic manner by a series of bores at a cost of many thousands of pounds.

(c.) It may also be stated that the results obtained by boring for lodes may be most misleading: for instance, a small, rich vein or bunch may be cut and followed for several feet, which upon development may prove to have no size or extent.

(d.) It follows, therefore, that any attempt to thoroughly prospect the extensive mineral-bearing areas of the Roebourne and Onslow districts by means of deep boring would, unless unlimited means were available, be absolutely useless.

(e.) Water and horizontally-bedded deposits like coal may be prospected for by boring, since they both cover a considerable horizontal area, whilst the drill has also been successfully employed in mines in the place of cross-cutting to prove the existence of parallel ore bodies.

Being fairly thoroughly acquainted with the districts referred to, and knowing the extent covered by mineral deposits I cannot recommend this method of prospecting these districts since limited sums of money expended in this direction would, I consider, be absolutely wasted.

(13.) *The Country between Roebourne and Peak Hill.*

From Glen Roebourne I proceeded to the Upper Nicol, traversing a granite belt, upon the south-western side of which near the river schists again outcrop, and in these are some large quartz reefs upon which a considerable quantity of work was done some years ago. These reefs strike in an east and west direction, and are stated to have prospected well, but owing to the large volume of water encountered in sinking work was abandoned.

To the southward of this schistose belt a considerable area of granitic rocks is exposed, intersected by a large gabbro dyke, which often attains an elevation of 100 feet sheer up above the surrounding country. This dyke may be traced for a distance of some 20 miles running in a north-easterly direction.

To the northward of this dyke the bold cliff-like edge of the tableland may be observed in the distance, the rocks of which belong to the Nullagine Series, but differ from those previously examined farther to the eastward, in that the flaggy quartzites which overlie the volcanic rocks are much more largely developed.

Following down the course of the Maitland River to Karratha a belt of granite country is traversed, which



at the last-named place has been thrown up into a series of rough hills by the intrusion of a gabbro dyke, which strikes in a north-westerly direction. This dyke forms a bold hill ridge some eight miles in length, the core of which is gabbro, whilst flanking it upon either side are piled masses of granite, which have clearly been thrown up by it.

Westward of Karratha for a distance of 10 miles are extensive alluvial flats flanked to the southward in the distance by the Tableland (Nullagine) Series. Near Mt. Wilke, on the edge of the tableland, and between it and the telegraph line, is a belt of schistose country, which gives place to granite at the Eramurra Pool, and this belt is of a promising character for mineral deposits.

Between this point and the Fortescue River a low range is crossed, the rocks of which consist of ferruginous quartzites striking north and south, with a dip to the westward. Some samples of lignite, similar in character to those of Fly Brook and Depôt Hill, upon the Irwin River, were brought to me, said to have been discovered in this neighbourhood, but I was unable to visit the locality. The rocks are lithologically identical with the tableland section of the Nullagine Series, so largely developed along the upper course of the Fortescue River.

This series of rocks extends continuously in a southerly direction up the Fortescue River past Balmoral Station, as far as Munderoo Pool, at which point the volcanic series of vesicular lavas again make their appearance from beneath them.

From this point onwards in an easterly direction to Gregory's Gorge the volcanic series have been cut through by the river, which flows in a cañon-like channel, in the bed of which at one point an exposure of granitic rocks is visible underlying the eruptive series.

Upon emerging from the defile, which is about 100 miles in length, the river flows over a wide, rich alluvial flat, flanked upon the north by low, flat-topped hills of ferruginous quartzites and argillaceous flags and upon the south by the precipitous face of the Hamersley Range.

Near this point the fine springs, known as the Mill Stream, break out, the large flow of water being due to the rise of the impervious eruptive rocks, which prevent its further subterranean passage towards the coast.

Between the Mill Stream and Middle Creek Police Station extensive alluvial flats are crossed, but upon nearing the latter place broken, hilly country is entered, the rocks of which consist of flags and ferruginous quartzites. Mt. Billroth, near Tamberry Station, is a flat-topped hill, 1,371 feet above the sea level. On account, however, of the great elevation of the surrounding country it presents quite an insignificant appearance, as also does Mt. Florence, which attains nearly the same altitude.

From Mt. Florence to the Goodiarrie Hills the road crosses the alluvial plains of the Fortescue River, flanked to the northward by the low quartzite ridges, which form the dividing range between the watersheds of the streams which flow to the north coast and those which feed the Fortescue to the south.

The Goodiarrie Hills consist of rocks of ferruginous quartzites of the Nullagine Series, which at this point close in upon and cross the river, forming a bar above which the waters from the upper courses of the Fortescue are impounded in a large salt marsh some 50 miles in length and 12 miles in width. This salt marsh only overflows into the lower courses of

the river in very exceptional seasons, therefore this range of hills constitutes practically the head of the Lower Fortescue, the main tributaries of which take their rise in the Hamersley Range to the southward.

Upon the south side of this large salt marsh the Hamersley Ranges turn to the south-east in the direction of Ophthalmia Range, which latter is in reality the eastern extension of the former, and consists of the same series of rocks which have been classified by the Government Geologist as belonging to the Nullagine Series.

Roy Hill and Battle Hill are two isolated peaks of quartzose sandstone, which rise from the plain, whilst in this locality the granitic rocks are, apparently, not far below the surface, since the soil is composed of a red sand with a considerable quantity of mica.

From Roy Hill the Ethel Creek, which is the main branch of the Upper Fortescue, was followed in a south-westerly direction over an extensive plain to the base of the Ophthalmia Range, at which point volcanic rocks outcrop overlaid by ferruginous, flaggy quartzite, which constitute the main range and are similar lithologically to the upper section of the Nullagine Series.

About 12 miles from the range, in a south-westerly direction a belt of schistose country of a promising auriferous character is encountered; this belt has a north-easterly trend towards Coobina Soak, some 30 miles distant, at which point colours of gold are reported to have been discovered. This belt is intersected in places to the eastward of the route traversed by granitic intrusions, and it is in the vicinity of some of these that a good deal of prospecting has been done.

The dividing ridge between the watersheds of the Fortescue and Ashburton Rivers is a low cement (laterite) capped range of hills, whilst judging from the character of the surface and the quantity of strewn fragments of quartz and ironstone, the schists are not far beneath the surface.

Upon the south side of this ridge upon Goldfields Creek, one of the branches of the Ashburton, a considerable tract of kaolinised schists, containing large quantities of quartz, is exposed, which, at a point about eight miles north-east of Deadman's Hill, proved to be auriferous. A considerable extent of country here has been prospected, and a large amount of dry-blowing has been done, the gold being said to occur attached to quartz fragments (specimens), but there does not appear to be any record of the actual quantity won.

The character of the gold caused the prospectors to do a considerable amount of trenching over the worked-out patches, with the object of discovering the leaders from which it was shed, but so far success has not attended their efforts, and this field is now abandoned.

From this point south to within 20 miles of Peak Hill a belt of what would appear to be Lower Carboniferous rocks is crossed; these rocks consist of shales, sandstones, quartzites, and dolomitic limestones. They are nearly horizontally bedded and form flat-topped hills, which rise abruptly from the plains, and from the tops of which the same class of country stretches as far as can be seen with field glasses. To the eastward, however, I am informed upon good authority, the predominating rocks are sandstone.

Upon the south side of the Gascoyne River the crystalline schists again make their appearance; they mostly belong to the acidic group, in which the quartz veins are usually small, and occur in the form of a network through a kaolinised belt. These rocks may

possibly be altered sediments, but this question can only be determined by tracing them in a westerly direction down the river.

Upon the whole, the journey from Roebourne to Peak Hill disclosed little of value from a mining point of view, but at the same time added considerably to our knowledge of the geology of the State, since it formed an important link between the work carried on by the Government Geologist to the westward and that by Mr. Talbot, who accompanied the Canning Expedition; thus it enables us to delineate upon our maps those areas which in our opinion are likely to prove metalliferous, thus being the means of saving considerable time and money to prospectors. But although of a general negative character from a mining point of view it has revealed the fact that the auriferous belt worked at Bangemall and upon the Ashburton River extends in this direction, thus indicating the possibility that between the last-mentioned place and Goldfields Creek other rich patches may be discovered.

Between Peak Hill and Meekatharra, with the exception of a small patch of auriferous country at Abbots, the rocks where they outcrop appear to mostly belong to the granitic series, but since they are mostly covered by a layer of cement (laterite?) their true nature cannot be determined until a more detailed examination is possible.

From Peak Hill I travelled to Meekatharra and made a cursory geological examination of the district and the principal mine; from this I arrived at the conclusion that this centre was of very considerable promise and well deserved a detailed survey.

Owing to the fact that the surface of this belt of country is covered by cement (laterite?), and also to the decomposed nature of the rocks exposed in the shallow workings it was found impossible in so short a time as was then at my disposal to attempt an examination in anything like detail; this I should very much like to undertake at a future date.

(14). *Preliminary Report upon the Ore Bodies of Meekatharra.*

Meekatharra is situated upon the northern end of the Nannine auriferous belt, the intervening space between which two centres is becoming rapidly covered by scattered groups of leases.

The rocks of this belt consist for the most part of schistose greenstones much hydrated, intersected by dolerite, felspar, porphyry, and granitic dykes, and traversed parallel to the lines of banded ferruginous quartzites which evidently represent main lines of shearing, whilst upon the western side is a ridge of broken granitic hills.

The greater portion of this area is covered by cement (laterite ?) of variable thickness, the surface of which is often thickly strewn with quartz. Prospecting, therefore, consists in first testing these floaters (strewn quartz fragments) when, if they prove rich in gold, trenching or sinking for the reef is resorted to, but owing to the tough nature of the cement it is usually found to be more economical to sink shallow shafts and crosscut in the soft schists.

In this tract of country the banded quartz rocks are practically the only ones that outcrop, forming low stony ridges which run in a general north and south direction, and in consequence the careful mapping of these should be of considerable value in the elucidation of the faulting which has apparently

played an important part in dislocating the auriferous formations.

Until a detailed geological survey is made, however, it would be premature to draw conclusions as to the origin of these formations which differ considerably from any other of the auriferous deposits of the State, but it may be assumed with perfect safety that their origin is closely associated with the occurrence of the intrusive dykes, but whether the basic or acidic it is impossible to say, although evidence tends to point to the latter whilst the former are possibly the disturbing influence.

The gold occurs in what are generally known as lode formations but which in this instance would be more correctly described as stockworks since they consist (as far as worked) of belts of highly talcose and altered rocks intersected by numerous quartz veins of variable size, and it is these veins which carry the gold, the enclosing rock (formation) being absolutely barren although often pyritic.

The quartz may occur in the form of a perfect network of minute intersecting veins, in which case the whole mass of the formation is treated, or upon the other hand, as in the Fenian mine, these individual veins may be of sufficient size to be worked alone.

These formations are enclosed between well defined boundaries called walls, but which will prove in all probability when development has proceeded at a great depth to be only boundaries between the included matter (called formation) and the adjoining rock mass (called country).

These bodies have a more or less north and south trend with a dip to the eastward, whilst the so-called shoots pitch to the northward.

The general character of these formations points to the conclusion that they represent shatter rather than shear zones since, although the general trend of the quartz veins is north and south, they have the habit of darting across the body from wall to wall in an easterly and westerly direction upon those joint planes which dip north whilst the southerly inclined joints do not carry quartz but often veins of dolomite.

This erratic behaviour is very noticeable in the larger veins, which after crossing the ore channel abruptly gradually work back diagonally across the formation towards the other wall to be suddenly thrown back again, and so on time after time. The small veins behave in a similar manner to the larger but in them it is not so observable since the individual vein is not followed by the workings.

The occurrence of these areas of enrichment in a series of shoots, or more correctly speaking pitch zones, is in all probability brought about by a compressing force applied in the direction of the schistosity (north and south) such as would be caused by the intrusion of a mass of granite, whilst the meteoric waters find passage down these, the intervening belts being usually so impervious that the workings in one of these auriferous areas may be perfectly dry even though it is below another which is quite wet.

So far as can be gathered by a comparatively cursory examination, the primary force which is responsible for the shearing in the Marmont, Fenian, and Ingliston Consols is a large intrusive mass of felspar porphyry at the south-east end of the first-mentioned mine. This mass is an igneous acid intrusion, in part a felspar porphyry consisting prin-

cipally of albite and quartz, whilst the balance which covers the larger area is a soft kaolinized rock containing quartz and sericite, probably an hydrated form of the first-mentioned rock.

This latter class of rock appears to be fairly common upon this field, its occurrence being usually accepted as an indication of a barren zone although the adjoining country to the northwards may be rich.

There are also basic intrusions which consist of mica hornblende dolerite (diabase) that may possibly have influenced the enrichment of certain of the lodes, but this problem requires further investigation.

The depth to which these bodies in the main group will prove to be auriferous will depend upon that to which the shatter zones extend, since it is only in these that the concentration and deposition of gold have taken place. This, however, will probably be considerable since the lodes if anything show increased values and size in the lowest levels worked.

In the Ingliston Extended, which has no connection with the main groups before referred to, this zone of enrichment was of considerable thickness at the surface but gradually tapered downwards, then bifurcated, whilst below this point it rapidly decreased in size until both legs pinched out in the solid rock below.

In this mine a basic dyke was encountered upon the hanging wall side of the ore body; it is composed of a solid crystalline mica hornblende dolerite in the main mass, but adjoining the lode it has been considerably altered and sheared and loses all crystalline structure. Recently further developments were made in this mine by the discovery of an auriferous quartz reef lying to the north-westward of the main body; it had an underlay to the westward or in the opposite direction to that first worked and is apparently considerably dislocated, whilst at the northern end it runs into a kaolinized granite mass where it loses values.

It is not necessary to enter into a detailed description of the various mines in this preliminary synoptical report, but it may be mentioned that the Yaloginda lodes, so far as can be judged from the limited workings present very similar characters to those of Meekatharra.

(15.) *Supposed faulting in the Great Fingall Mine, Day Dawn.*

(With Plan and Section, Plates III. and IV.)

In response to instructions I visited Day Dawn on November 11th and devoted the following day to a re-examination of the lower levels of the Great Fingall Mine in the endeavour to ascertain if it were possible that the lode had been dislocated by faulting at its northern and southern ends.

The theory that this lode was cut off by a fault at its northern end is by no means new since as far back as 1902 Mr. Campbell, formerly of this Department, delineated it upon his plan of the Auriferous Reefs of Cue and Day Dawn, which accompanied Bulletin No. 7.

This fault theory probably originated in the fact that at the surface the main line of lode presents a massive outcrop having a general north-westerly course to a point at which the character of the schistose country rock changes into a massive greenstone.

An inspection of the plan referred to above reveals the fact that the reef terminates abruptly at a point near the north end of the workings, G.M.L. 2d, but that a large outcrop occurs a few chains to the eastward in G.M.L. 189d, which was supposed to be the faulted continuation of it. It will also be observed that another body following practically the same course of the main reef outcrops a few chains to the northward of the point at which it was lost.

A more recent and detailed examination\* of this district reveals the fact that no apparent dislocation has taken place at the surface but that at the point of contact between the chloritic schists and the massive greenstones the fissure has probably bifurcated, one branch of which first strikes in a north-easterly direction along the contact line for a distance of a few chains and then turns sharply in a northerly direction entering the massive greenstones. The other branch apparently follows the general direction of the main fissure but does not show at the surface for some few chains.

This bifurcation of the lode may be observed at its northern end in almost all the levels of the mine, but all attempts to trace the continuity of the fissure further in this direction has so far failed.

A considerable amount of prospecting with this object has been carried on at the No. 7 (524ft.) level which was driven upon the course of the lode into the solid greenstone country until another quartz body was cut that clearly proved to be the eastern branch described previously since this had been followed down in the Great Fingall North mine to a depth of 300 feet.

Two crosscuts also driven in a westerly direction from this level intersected another reef which is apparently the western branch seen at the surface.

Neither of these two quartz bodies carries any gold values nor have they any connection with the main reef, but it is quite clear that they represent the downward extension of the two branches which were previously described as outcropping at the surface.

A tracing of the outcrop when placed upon the top of the plan of this level practically coincides with the reefs cut in it, thus clearly proving that portions only of the two branches visible at the surface continue downwards, since at this depth the workings clearly disclose the fact that they have no connection by fissure with the main lode.

At a point about 150 feet to the northward of the bifurcation where the reef is ultimately lost a belt of highly fissile black schists is encountered, the cleavage planes in which strike in a north-easterly direction, or in other words at a considerable angle to the general direction of the lode channel, and this is supposed to be the fault plane.

Where penetrated in the No. 13 level this belt proves to consist of 37ft. of graphitic slate, 26ft. of chloritic schist or lode country, 47ft. graphitic schist, 11ft. country, 4ft. graphitic schist followed by massive greenstones (carbonated saussuritised dolerite); they therefore form the contact rocks between the chloritic schists in which the quartz reefs carry high values in gold and the massive greenstones in which the reefs so far have proved to carry it in patches only to a depth of about 100ft.

It is by no means easy to arrive at the origin of these graphitic rocks, but since this phenomenon is by no means uncommon at points where contact metamorphism has taken place (many instances of

\* Bulletin No. 29, Geology of Cue and Day Dawn.



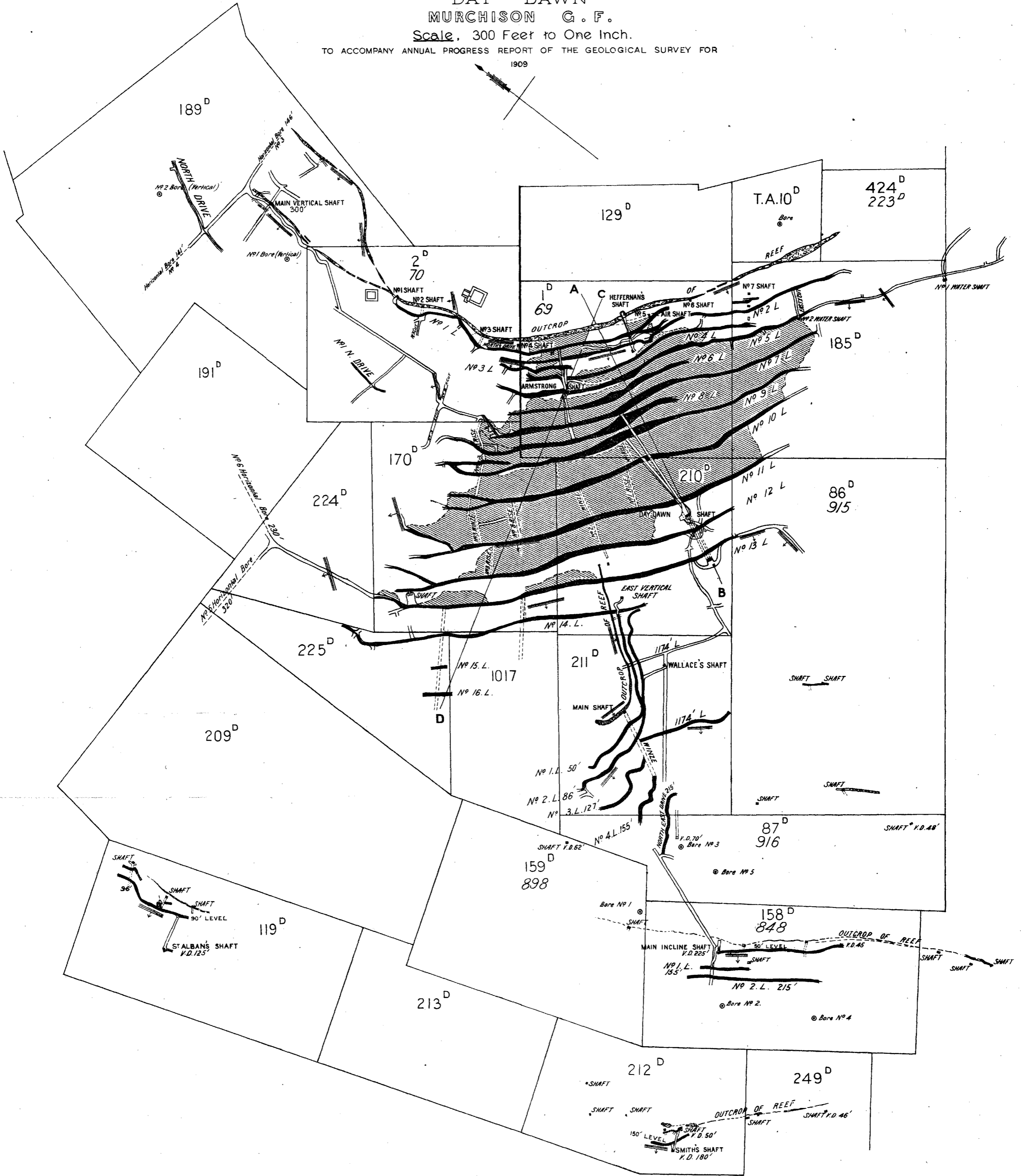
The Hon. H. GREGORY M.L.A.  
Minister for Mines.

# PLAN OF THE GREAT FINGALL CONSOLIDATED LTD GROUP.

DAY DAWN  
MURCHISON G. F.

Scale, 300 Feet to One Inch.

TO ACCOMPANY ANNUAL PROGRESS REPORT OF THE GEOLOGICAL SURVEY FOR  
1909



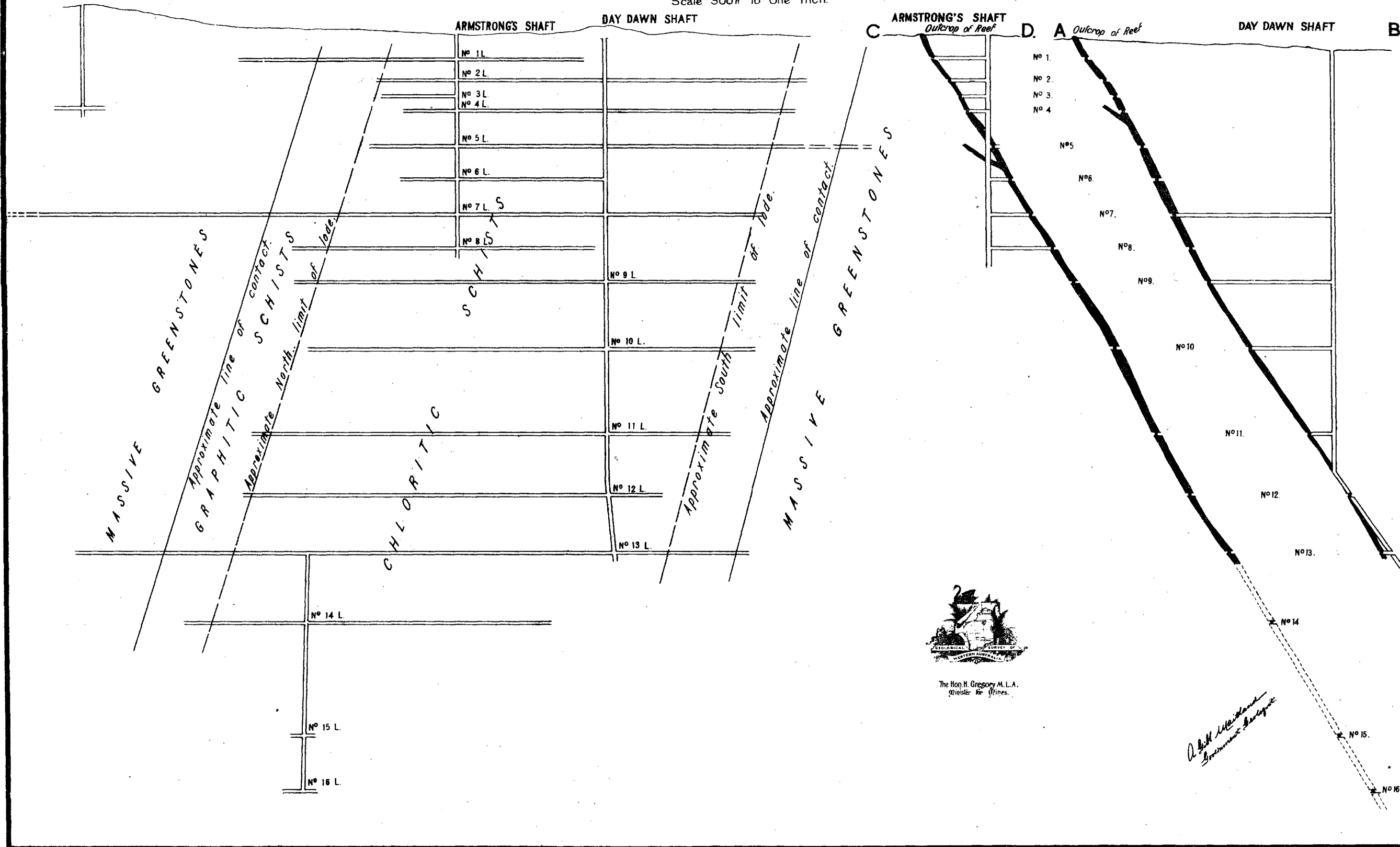
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*A. B. Kidson*  
Government Geologist

# SECTIONS OF THE GREAT FINGALL CONSOLIDATED LTD.

DAY DAWN MURCHISON G. F.

TO ACCOMPANY ANNUAL PROGRESS REPORT OF THE GEOLOGICAL SURVEY FOR 1909  
Scale 300ft to One Inch.



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

*Edith Murchison*  
Government Geologist

which occur at Kalgoorlie), it is not necessary to theorise upon this question particularly as they have apparently exercised no direct influence upon the enrichment or otherwise of the lode.

A reference to the geological map which accompanied my report upon this district published in 1907 as Bulletin No. 29, will demonstrate that the direction of the cleavage planes of these schists, which are north-easterly, follows that of the contact as mapped in at the surface, whilst those of chloritic schists which follow the north-westerly course of the lode lie at right angles to it. (See plan).

From the plan that accompanies this report it will also be noticed that at the southern end at the point where the lode is lost in both the Nos. 5 and 13 levels, massive greenstones are again encountered, the cleavage planes of which strike in a similar direction to the same rocks at the north end of the lode. Thus the entire length of the lode is contained in the chloritic schists, whilst the fissure, except at the surface, does not penetrate the massive rocks at either end in which the quartz bodies, although apparently following the same course, are not connected in any way and are barren.

After a careful study of this question I can see no evidence in support of the dislocation theory of the lode by faults at the ends, but I consider that very strong evidence exists which points to the conclusion that the Great Fingall lode itself occupies a faulted fissure plane which crosses the belt of chloritic schists from side to side terminating upon coming in contact with the massive greenstone belt at either. Whilst the shearing strains generated by the ascending or descending mass would be great enough to cause parallel schistosity in the rocks upon either side of the fault for a considerable distance.

Another point in favour of this fault fissure theory rests upon the fact that the West Fingall reef which overlies the lower workings of the Great Fingall follows the normal cleavage planes of the rocks or at right angles to the main lode (see plan).

The sedimentary origin or otherwise of these rocks has, to my mind, little value, for allowing that they were originally sediments they have since been melted and in consequence become igneous rocks quite as much as lavas poured out of volcanic craters. The great point of interest, however, appears to centre around the question of which class of rocks is likely to contain payable lodes at a depth, and this question seems pretty clearly answered in this district by not only experience gained in the Great Fingall Mine itself but in the other mines in the neighbourhood.

With regard to the continuity of values at a depth Mr. Hoover, who is an undoubted authority upon such matters, lays down as a general rule in his Principles of Mining that a lode maintaining its size and character to a depth equal to the length of its outcrop may be depended upon to extend for a further distance of half that length, but probably of diminished size; this would, under ordinary circumstances, give the Great Fingall a life to 1,800 feet; as, however, he further qualifies this rule in the case of fault planes, should my theory prove to be the correct one this reef may extend to a very considerable depth, whilst gold values, although recently found to steadily diminish level by level are so subjected to fluctuations that at any time it is quite possible a great improvement may be met with.

There is another point worthy of noting which is that the lode will probably carry values to such a

depth as the country rocks in its immediate vicinity are metasomatically altered.

With the object of arriving at some definite conclusion as to the origin of the above rocks, samples were submitted to Mr. E. S. Simpson, B.E., of this department, who made an exhaustive analysis, which is as follows:—

SiO <sub>2</sub>	..	..	62.62	F <sub>2</sub> O	..	..	2.62
TiO <sub>2</sub>	..	..	.16	F <sub>2</sub> O <sub>3</sub>	..	..	1.00
CO <sub>2</sub>	..	..	Nil	Al <sub>2</sub> O <sub>3</sub>	..	..	18.78
P <sub>2</sub> O <sub>5</sub>	..	..	.29	{ F ..	..	..	.57
H <sub>2</sub> O	..	..	2.07	{ S <sub>2</sub> ..	..	..	.65
K <sub>2</sub> O	..	..	3.30	{ C ..	..	..	1.60
Na <sub>2</sub> O	..	..	3.36	H <sub>2</sub> O	..	..	.13
CaO	..	..	.82				
Mg.O	..	..	3.09	Total	..	..	100.22
Mn.O	..	..	.16	Sp. Gr.	..	..	2.76

Whilst in his remarks upon it he says: "So far as the chemical composition goes, this rock may either be an altered carbonaceous shale or a much altered igneous rock to which hydro-carbons have penetrated."

A microscopic examination was also made by Mr. Glauert, also of this department, who says:—

"This is a very dense black rock showing a most distinct banded structure.

"The large amount of finely divided graphite greatly obscures the field, and renders the determination of the other minerals a matter of difficulty.

"Bands of pyrites can be seen even in the hand specimen running parallel to the foliation. The other minerals are quartz, zoisite and a little brown iron ore with a good deal of kaolinic matter.

"The rock is evidently a 'greenstone' altered by the shearing, etc., to which it has been subjected. There is no trace of any sedimentary structure."

Recently very considerable interest has been taken in the question of the origin of rocks belonging to the crystalline series, with the object of determining whether they are of altered sediments or of primary igneous origin.

In the Journal of Geology, Chicago University Press, August, 1909, under the title of "Chemical Composition as a Criterion in Identifying Metamorphosed Sediments," Mr. Edson S. Bastin of the U.S. Geological Survey propounded the following rules:—

That in altered sediments the percentage of Mg.O exceeds the Ca.O and the K<sub>2</sub>O the Na<sub>2</sub>O, whilst the Al<sub>2</sub>O<sub>3</sub> is in considerable excess over and above the | : | ratio necessary to satisfy the lime and alkalies.

Since all these conditions are fulfilled in the above analysis, it is highly probable that this rock is an altered sediment.

The general conclusions arrived at are:—

1. The Great Fingall reef has not been cut off or displaced at either end by faults.
2. Its entire length is contained in the chloritic schist belt which it crosses from side to side.
3. The reefs in this or similar belts of rocks will prove to be the only productive ones of this district.
4. The search for auriferous reefs in the hard crystalline greenstone belts is not likely to prove successful.
5. The Great Fingall reef being a cross fissure or fault may prove to be of very considerable downward extent.
6. Being a main fissure, although the values have gradually but persistently decreased downwards, there is every possibility of zones of increased enrichment being met with at any time.

7. And therefore it would be more advisable to expend all the available energy upon the downward development of this ore body in preference to seeking for supposed dislocated continuations of the reef in country which is not likely to contain auriferous veins.

CHAS. G. GIBSON, ASSISTANT GEOLOGIST.

(16.) *The Argol Syndicate's Property at York*  
(York Silver Mine.)

In accordance with instructions, I visited York and examined the Argol Syndicate's claim, and also the adjoining one worked by Mr. Carter; these being situated near the west corner of Loc. Y 6, about three and three-quarter miles north of York townsite.

A large serpentine dyke runs through the "Argol" property in a roughly east and west direction, and can be followed across country for some distance, such dykes being of fairly common occurrence throughout the Darling Range district. At the surface this dyke has weathered into the usual soft ferruginous "clay," but at a depth of 50 or 60 feet is fairly hard and unaltered, the change being a very gradual one. The enclosing country rock is a slightly schistose granite, this being the type rock of the district.

A small vertical shaft has been sunk to a depth of 50 to 60 feet on the dyke, but no further work has been done on it beyond a couple of small surface cuts. Three sets of samples were taken from here, and these gave an assay in the Departmental laboratory results as follows:—

No. 1.—	Gold, nil.	Silver, nil.	Copper, nil.
No. 2.—	do.	do.	do.
No. 4.—	do.	do.	do.

The samples showed no indications of the presence of any other commercial metals.

Sample No. 1 was from the weathered portion of the dyke, taken from a surface cut.

Sample No. 2 was a "grab" sample taken from the dump at the shaft.

Sample No. 4 was surface stone (altered serpentine):

On the adjoining claim some twenty chains to the south, worked by Mr. Carter, is a low ridge trending roughly east and west, and capped with a few feet of ironstone conglomerate. On the north side of this ridge, towards its eastern extremity, a tunnel has been driven in southerly under the ironstone for a distance of 150 feet; near its end this tunnel passes through a small decomposed serpentine (?) dyke striking roughly east and west and underlying slightly to the north. This dyke apparently forms the backbone of the ridge, and it is evidently to its decomposition that the ironstone owes its existence; some of this ironstone is of very fair quality, but it cannot be looked upon as of any great value.

The country on each side of the dyke is a slightly schistose granite, considerably kaolinised, and very soft where cut through in the tunnel. At the point where the tunnel passes through the dyke a vertical winze has been sunk, on the footwall side of the dyke, to a depth of about 60 feet; in the bottom of this winze the granite is becoming pretty hard.

A sample was taken across the dyke at the point where cut by the tunnel, and this gave on assay in the Department laboratory results as follows:—

No. 3.—	Gold, nil.	Silver, nil.	Copper, nil.
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There were no indications of the presence of any other commercial metals in the sample.

The work on this property appears to have been done under the belief that the ironstone capping of the ridge is the "cap" of a sulphide lode; such, however, is not the case, the ironstone mainly owing its existence to the weathering of the serpentine dyke and the subsequent concentration at the surface of the ferric oxide thus produced. Ironstone (laterite) cappings of this description are of common occurrence throughout the Darling Ranges, and are almost invariably found in association with basic (serpentine or diorite) dykes.

In view of what I saw on the spot, and of the results of the above assays there is, in my opinion, nothing to justify further work upon these properties, and I do not think that either of them is of any value from a mining point of view.

(17.) *The Kalgoorlie Goldfield.*

The full report on the Kalgoorlie Goldfield is in preparation and will be accompanied by a geological map. The report deals only with the general structural features of the field, the ore deposits being only touched on briefly; further work must yet be done on these and a full report on them published later.

The following is a short summary of the chief features as dealt with in the present report.

The original rocks of the field were of sedimentary origin, viz., shales, soft sandstones, conglomerates, etc., with possibly interbedded lava flows—laid down horizontally in probably pre-Cambrian time—on a gneissic or granite floor; these were subsequently by earth movement tilted into their present highly inclined positions, and later on were intruded by large masses of basic and ultra-basic igneous rocks (amphibolites), diabases (porphyrites, peridotites), these in turn being intruded by a small series of acidic rocks (quartz and felspar porphyries). Further, earth movement has then taken place causing considerable shearing and faulting of the rocks, the former resulting in the formation of the lines along which the auriferous lodes occur.

The rocks of the field have been grouped under the following nine heads:—

- (1.) The ancient sediments (shales, sandstones, grits, conglomerates, etc.).
- (2.) The calc schists (older greenstones).
- (3.) The fine-grained amphibolites (older greenstones).
- (4.) The quartz diabases (newer greenstones).
- (5.) The coarse-grained amphibolites (intrusive).
- (6.) The peridotites (intrusive?).
- (7.) The porphyrites (later intrusives).
- (8.) The quartz and felspar porphyries (later intrusives).
- (9.) The recent deposits (sand, loam, laterites, etc.).

The calc schists and the fine-grained amphibolites probably represent an older series of greenstones, possibly occurring originally as lava flows interbedded with the sedimentary series.

The coarse-grained amphibolites represent a somewhat later intrusion, or series of intrusions; they include both basic and acid types, some of the latter being very closely allied to the quartz-diabases, the whole series being probably originally derived from the same magma.

The quartz-diabases are by far the most important series of rocks on the field, as it is within them that all the more important ore bodies occur. Ore bodies, though, are also found in the calc schists and in cer-

tain of the coarse-grained amphibolites, but these cannot compare in importance with those in the diabases.

The peridotites possibly represent a later—or contemporaneous—intrusion of ultra-basic rocks: they are developed chiefly at the south end of the field, but even here are of comparatively limited area and of no great importance. At the north end of the field they are associated with certain of the ore deposits.

The porphyrites occupy a comparatively large area, and together with the closely related porphyries represent a later intrusion. They are of no economic importance and contain no auriferous deposits.

(18.) *Reported Tin Find near Coolgardie.*

In accordance with instructions I paid a short visit of inspection to the scene of the reported tin find near Coolgardie.

The find is situated some 12 or 13 miles south-west of Coolgardie, and claims have been pegged over two areas known respectively as Fraser's and Mercer's, the latter locality being about a mile and a half north of Fraser's, on which the original specimens were "specked."

The staple formation of the country is greenstone schist, having the general north-north-westerly strike, and this is intersected by a series of coarse-grained pegmatite dykes, the more general trend of which is roughly north and south and whose thickness is anything from a few inches up to a couple of chains.

A large one of these dykes outcrops on rising ground on Fraser's lease in a very much weathered form, and over the surface of it and on the slope of the hill down from it a small amount of tinstone (?) and tantalite has been picked up, the largest piece being stated not to exceed four ounces in weight.

On Mercer's ground a similar condition of affairs exists except that here there are several dykes, the main one of which is possibly a continuation of the one on Fraser's; here also a small amount of tinstone (?) and tantalite has been "specked," mostly in small pieces.

It has been stated that so far none of the ore has been found in the pegmatite, and I certainly in a somewhat brief examination could find none of it, although this is its natural source of origin.

No work of any description whatever has so far been done on any of the claims and no efforts made to trace a possible "run" of the ore into any of the gullies or flats; all the ore so far obtained has been "specked," and the amount so obtained has been variously estimated at from ten to twenty pounds in weight.

At the present time it is absolutely impossible to express a definite opinion as to the actual value of the find beyond saying that it is certainly worth further prospecting, and that the country, intersected as it is by pegmatite dykes similar to those prevailing on the North-West and other tinfields of Western Australia, is favourable to the occurrence of both tinstone and tantalite.

As to the necessary prospecting, this should be confined to the search for alluvial and for a possible "run" into the different gullies (on Mercer's) and on to the flats (at Fraser's), for, unless the existence of a considerable amount of alluvial, or detrital, ore can be proved, it is hardly likely that the lodes (the pegmatite dykes) will give any payable return for work done on them.

Five samples of ore have been handed to you by myself for determination and report by the Departmental Mineralogist. The greater portion of all these samples were "specked" on the ground by myself, the remainder having been similarly obtained by others in my company. The sample marked No. 5 was washed by myself from a sample of "dirt"—surface soil—on Mercer's lease.

Samples of detrital tin and tantalum ore, collected at Londonderry, were examined at the Survey Laboratory by Mr. Simpson, with the results given below:—

In all such material tin occurs in two forms, viz.:—

- (a) As free tin oxide (cassiterite), in which form it is marketable as a tin ore.
- (b) As combined tin oxide in the tantalum-bearing materials. In these it occurs as stannate of iron or manganese in quantities varying from less than one per cent. in normal tantalite and columbite up to eight per cent. in the stanniferous tantalite known as ixiolite. The latter mineral is known to occur in the Wodgina district.

The samples collected by Mr. Gibson from Londonderry consist mainly of normal columbite (niobate and tantalate of manganese) with ixiolite and a little normal tantalite. The tantalum minerals present exhibit a very wide range of specific gravity indicating a series of specimens ranging from nearly pure tantalate of manganese through all gradation of mixtures of tantalate and niobate to nearly pure niobate of manganese. In view of this fact efforts should be made to obtain a bulk sample (say ½ cwt.) of this ore to determine whether it would not be worth putting on the market as a tantalum or niobium ore, the value of which at present considerably exceeds that of tin ore.

In the following table the results for "tantalio oxide plus niobic oxide" were obtained by precipitation; those for tantalio oxide were deduced from the mean specific gravities:—

Assay Results.	3431. I.	3432. II.	3433. III.	3434. IV.
	% <i>Nil</i>	% <i>Nil</i>	% <i>Nil</i>	% <i>Nil</i>
Tin, free .. ..	2.79	0.40	4.06	1.82
Tin, combined .. ..	79.20	80.12	79.44	80.14
Tantalio oxide plus niobic oxide .. ..	47	47	49	32

3435, No. V. Concentrates from a dish of dirt. The total weight of these was 6.282 grammes (about one-fifth of an ounce), and their composition:—

	Grammes.
Cassiterite .. ..	.041
Tantalite and columbite .. ..	1.373
Ilmenite and garnet .. ..	1.472
Magnetite .. ..	.869
Quartz, etc., under 3.3 specific gravity	2.527
	-----
	6.282

In this sample of Mr. Gibson's there were only a few very small fragments of cassiterite. A sample forwarded to the Hon. the Minister by Mr. Frazer contained, however, a fragment of cassiterite about one inch in diameter.

It is worth noting that in 1902 I predicted the occurrence of tin in this locality, vide Bulletin VI., page 34.



H. W. B. TALBOT, Topographical Surveyor.

(19.) *Wiluna to Hall's Creek and Tanami.*

From the 1st of January until 1st August I was attached to the party under the command of Mr. Inspecting Surveyor Canning that is engaged sinking wells on the Wiluna-Kimberley stock route.

On August 1st I left the well-sinking party and proceeded to Hall's Creek, where I received telegraphic instructions to visit Tanami and endeavour to trace the extension of the mineral belt into W.A. I left Hall's Creek on August 13th and proceeded, via Sturt Station, to Tanami. From the latter place I travelled westerly to the border between South Australia and Western Australia, and thence northerly to the Gardiner Range. From the Gardiner Range I went west-north-westerly to Sturt Creek, which I crossed near the old Dennison Homestead. From this point I followed the track to Hall's Creek, which place was reached on September 13th.

From Hall's Creek I proceeded to Wyndham, arriving on October 11th. I left Wyndham by the s.s. "Koombana" on October 14 and arrived at Fremantle on October 25th.

On my return a preliminary report, dealing with the economic aspect of the country near the South Australian border in the vicinity of Tanami, was written, and for the completion of that work a commencement was made with the writing of a detailed report covering the whole of the country visited during my 14 months absence from Perth.

The following is a short description of the broader geological features of the country along the Stock Route:—

From Wiluna greenstone schists overlain in places by sandstones and quartzites extend to a point a few miles past No. 2 Well. Granite then makes its appearance and continues really as far as Lake Nabberu. Although there are belts of 10 miles in width in which no granite can be seen there is no doubt that it underlies the sandy plains and that the sand forming these is derived from the disintegration of the granite mass.

The Frere Range runs along the north band of Lake Nabberu and is formed of Devonian shales and sandstones resting unconformably upon a series of metamorphic slates. These slates extend northwards as far as the Carnarvon Range, under which they disappear. They extend north-westward beyond the limits of my travels, and along the stock route they may be seen at intervals as far as Pierre Spring, at which place they are seen dipping under Devonian conglomerates and sandstones identical with the beds of the Carnarvon Range. The slates are not seen again to the north, but a belt about 30 miles in width extends in an east-south-easterly direction beyond the furthest point reached by me, viz., the Lee Steere Range. These metamorphic rocks do not occupy the whole of the country, as in many places they are overlain by Devonian sandstones and in some localities areas of the slates are seen surrounded by sandy plains. Wherever these metamorphic rocks can be seen they are traversed by numerous lenticular quartz reefs, the strike of which invariably coincides with that of the enclosing slates. All the quartz seen by me was of the "buck" variety and appeared to be devoid of mineral of any kind. From what I saw of this belt of country I do not think that much hope can be held out that discoveries of any economic importance will be made within its boundaries.

From Pierre Spring to a little beyond Karara native well all the hills along the stock route, excepting some elevated diabase country around Weld Spring, consist of Devonian sandstones, grits, and conglomerates. Wherever the basal stratum of this series was seen it consisted of pebble conglomerate made up of fragments of the underlying slates and rounded quartz. At their southern boundary the Devonian rocks dip to the north at angles varying from 35 to 45 degrees, but as the beds are followed northwards the dip decreases rapidly, and in a range 13 miles north of Pierre Spring the dip is only 10 degrees. From this point northwards as far as the Devonian rocks extend the beds are tilted into a series of anticlinal and synclinal folds, and in the McKay Range near the northern extremity of this series there is a very extensive fold extending for the whole length of range and eastwards from it to beyond Karara. In this anticlinal the beds on the south side of the range have a dip of as much as 65 degrees. The axis of the folds runs in an easterly and westerly direction.

A few miles north-east of Karara there is a small belt of gneissic granite traversed by numerous quartz reefs and diabase dykes, the strike of which coincides with the foliation of the granitic rock, and this is in an easterly and westerly direction. This belt of gneissic granite is bounded on the north by a ridge of Devonian sandstone and conglomerate, which dips to the north at an angle of 55 degrees. No rocks are seen to the north of this point for about 12 miles, the intervening country being occupied by high sand ridges, when a strip of granite about two miles in width is crossed. This granite belt is seen at intervals in the hollows between the sand ridges for a distance of 25 miles westward from the stock route and it again makes its appearance further westward near the Rudall River.

From No. 26 Well north-eastward along the stock route to Sturt Creek and thence as far as Flora Valley, all the hills are formed of horizontally-bedded shales and sandstones probably of Carboniferous age. Excepting the south-west tablelands, which rise to a height of from 300 to 400 feet above the level of the surrounding country, none of the hills rise to any considerable altitude, and sand ridges occupy most of the country. Occasional patches of good grazing country occur along the Sturt to the site of the old Dennison Downs Homestead, but from there to Flora Valley the country along the Sturt consists of splendid downs covered with rich soil derived from the weathering of the Carboniferous shales which can be seen in places where small creeks have cut deep channels through the soil.

The Carboniferous rocks extend along the road to Tanami as far as the Gardiner Range, when Devonian sandstones again made their appearance. On the southern face of the Gardiner Range and in places on the eastern side these Devonian beds can be seen resting unconformably upon a series of highly inclined metamorphic rocks. The metamorphic rocks are traversed by numerous quartz reefs of a different type to those seen along the stock route, and I am of opinion that this belt of country is well worth prospecting. Samples of quartz were brought back for assay but none of these yielded any high returns, the gold contents ranging from nil to 3dwts. 6grs. per ton; but the fact that these samples yielded such poor returns must not be taken as a proof that payable reefs do not exist. Breaking off pieces of quartz with

a geological hammer is not prospecting, and in a country where the reefs are almost innumerable the chances are all against the finding of payable reefs, unless systematic prospecting is gone in for. These assays prove, however, that some of the reefs do carry gold.

Southward from the Gardiner Range auriferous belt most of the country is occupied by sand plain, but metamorphic rocks with quartz reefs occur on the tops of some of the rises, and in many places the presence of a large amount of detrital quartz and pieces

of the rock, similar to that associated with the quartz reefs south of the Gardiner Range, proves that the underlying rocks are at no great distance below the surface.

No country of economic importance was seen between the Gardiner Range and the Sturt along the route I followed on my return journey.

I have, etc.,

A. GIBB MAITLAND,  
GOVERNMENT GEOLOGIST.

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## DIVISION VI.

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### SCHOOL OF MINES OF WESTERN AUSTRALIA.

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#### DIRECTOR'S REPORT.

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##### *The Under Secretary for Mines.*

The School has continued to make good progress throughout the year, and arrangements have been completed for regular courses in new branches of class-work.

Mr. A. F. Heseltine was appointed Assistant in Chemistry at the beginning of 1909, and Mr. J. Murray, a thoroughly experienced mechanic, was placed in charge of the newly established classes in Fitting and Turning. All the classes have been working smoothly throughout the year, but it is unfortunate that Mr. H. W. Gartrell, M.A., B.Sc., who during the past two years has discharged the duties of Lecturer in Engineering with ability, has resigned his position to take up an appointment at the Adelaide University. Applications are now being called to fill the vacancy, and it is hoped that an appointment will be made at an early date in order that classwork may be recommenced at the beginning of the year without interruption to the students' courses.

During the First term there was a satisfactory increase in the number of individual students attending classes, but owing to the wood strike at the beginning of the Second term, the numbers showed a decrease for the remainder of the year. The total enrolments of classes, however, was greater than for the previous year, and indicates that more students are settling down to regular courses of instruction and are taking up groups of subjects with a definite object in view.

The Course for the Mining Surveyor's certificate drawn up in 1907 has been productive of good results, and several students who have entered upon the course have obtained engagements as Mining Surveyors or as combined Surveyors and Assayers to various companies. The Engineering lecture room erected during the year for the accommodation of the classes formed in connection with the newly established courses in Mechanical and Electrical Engineering has proved a great convenience, and will provide much needed room for expansion of the classwork of the School. The erection of this lecture hall has enabled the room which was originally designed for the purpose to be set aside as a common room for the exclusive use of those attending the School; and this, together with the Tennis Court, are greatly appreciated by the students. The Students' Association, as representative

of the main body of the students, now has a meeting place in which to organise the various clubs and gatherings which form a not unimportant part of the School life, and I have good reason to believe that the coming year will see the formation of a Science Society composed of the Senior students, and having for its object the writing and reading of papers on matters of interest connected with their studies.

The Engineering courses which have been drawn up will, it is hoped, enable students to meet the demand for men with a sound mechanical and electrical knowledge. In all processes there are mechanical difficulties to be surmounted, and in low-grade propositions, or where the metallurgical process has already been determined, mechanical skill and knowledge can make all the difference between profit and loss, but students must recognise that in order to obtain the full advantages from the lectures in Engineering they must possess a wide practical experience, together with sound theoretical knowledge, and must devote themselves conscientiously to the preliminary classes in the course.

The Fitting and Turning workshop, which can accommodate at one time only a limited number of students, has been fully taxed to meet the requirements of those seeking instruction. Three separate classes in Fitting and Turning have been in operation throughout the year, and no difficulty would have been experienced in making use of a larger workshop. There appears to be at the present time a need for the extension of the Fitting shop and the laying down of more machines, and in order that the students may derive the fullest advantage from the course of lectures in Engineering, a boiler and engine constructed with special fittings for the purpose of making working tests and measurements are necessary. The equipment possessed by the School, especially in Electrical Engineering, together with object lessons drawn from the plants of the Golden Mile, will enable students to obtain a good training in Engineering subjects, but extensions of the buildings and additional equipment, more particularly in Mechanical Engineering, would be very acceptable, and would greatly enhance the value of the course.

The Engine-driving and Practical Electricity classes continue to be well attended, and at the Government

examinations for Engine-drivers' certificates, conducted by the Chief Inspector of Machinery during 1908, School of Mines students succeeded in gaining one first-class certificate, two second-class certificates, and five third-class certificates, and these classes, which are well equipped with models and apparatus, afford excellent practical instruction in subjects of great importance to workers on the goldfields.

Throughout the year the class in Elementary Physics has been regularly attended by thirty scholars of the Kalgoorlie State School, and from those who have thus gained a knowledge of the rudiments of Science the School of Mines expects to draw a number of future students for the regular courses.

The average age of students attending classes is 23 years. The majority are engaged daily in employment in and about the mines, and are unable to devote their whole time to study. It has been found that a proportion of the new students wishing to take up courses of instruction at the School are insufficiently prepared in the foundation work of Mathematics, English, and Science of Secondary School standard to enable them to follow out the regular course of instruction to the best advantage. It is impossible for any student who lacks a knowledge of the groundwork of the School of Mines subjects to keep pace with those who possess such knowledge, and, in addition, their presence in the classes entails additional labour on the part of the Instructor. To meet the requirements of such students a scheme for preparatory instruction in Mathematics, Chemistry, Physics, Drawing, and Geology will be put into operation during 1910, and if necessary the class-work will be taken in the daytime as well as in the evening. The classes will be suitable for those who lack sufficient training in the groundwork of the School of Mines subjects, and will be especially useful for scholars who have left school recently and are able to devote their whole time to taking day courses of instruction at the School of Mines. Students who attend and pass all the classes in these preparatory subjects will find that when they take up the more advanced and regular classes of study of the School of Mines course they will be easily able to keep pace with the classwork and will make rapid progress in their studies.

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 1909 free assays and mineral determinations have been made for prospectors as follows:—

Assays for Gold and Silver .. .. .	594
Assays for Copper .. .. .	31
Assays for Tin, Lead, etc. .. .. .	6
Determination of Minerals, Rocks, etc. ..	50
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	681
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A large number were Departmental assays made for the Inspector of Mines, and there is urgent need for special power-driven appliances for crushing in order that the arduous work in connection with sampling may be minimised, and the assays made with the least possible delay.

All the assays and determinations, the total of which shows an increase of 185 over last year, have been made by responsible members of the Staff, who have spared no pains to ensure accuracy in the results. In addition, many other samples were received, but not being by the regulations entitled to free assay were handed over to private firms of assayers.

The Museum, which is kept open each afternoon, has been a source of interest and instruction to a fair number of visitors. Numerous donations of mineral samples, catalogues, and reports have been made to the School during the year, for which I duly record my thanks, and the School has been fortunate in securing valuable gifts of Prizes and Scholarships from those interested in the work of the Institution. The Editor of the *Australian Mining Standard* grants two prizes each year to the Senior scholars. The Chamber of Mines gives several Scholarships. The Mechanics' Institute grants free membership to three of our Senior students, and Messrs. Bewick, Moreing, & Company, through their General Manager, Mr. J. A. Agnew, grants the valuable concession of including the Western Australian School of Mines in the list of Institutions from which Senior scholars will be selected and provided with employment.

The ordinary scheme of Scholarships was suspended during 1909 and only a single Junior Scholarship, tenable at Kalgoorlie, was offered for competition at the November examinations.

Although it is understood that new Scholarships will be offered to replace existing ones as they terminate, the withholding of additional Scholarships has been a disappointment to students, who are anxious that ways and means will be found to carry out the original scheme in its entirety.

An increasing number of students now hold responsible positions, some of which have been secured as a direct result of the technical training received at the School, while it is safe to say that the positions formerly occupied by students have in many cases been improved and made more secure by the course of study here.

In the inauguration of new classwork and the introduction of new methods tending to improve the courses I have been ably assisted by the members of the Staff, to all of whom my thanks are due for their cordial co-operation in the proper conduct of the work 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 has been 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 classwork 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.

On several occasions throughout the year the classrooms of the School have been used for the conduct of examinations for Engine-drivers' certificates, Teachers' 'A' and "B" certificates, Pharmacy and Public Service examinations, and have proved very convenient.

I have, etc.,

F. B. ALLEN,

Director School of Mines.

Kalgoorlie, 12th January, 1910.

EXAMINERS.

The following Examiners conducted the Examinations in November, 1909:—

Subject.	Examiners.
Mathematics, Preparatory	F. B. Allen, M.A., B.Sc.
Mathematics I. ..	G. Tattersall, M.Sc. ; and J. Parr, B.Sc.
Mechanics, Theoretical	H. W. Gartrell, M.A., B.Sc. ; J. Parr, B.Sc.
Physics I. and II. ..	J. B. Allen, B.Sc., A.I.E.E. ; and D. McDougall, A.I.E.E.
Chemistry I., II., and III.	E. S. Simpson, B.E., F.C.S. ; and B. H. Moore, B.Sc., F.S.A.S.M.
Engineering Chemistry	B. H. Moore, B.Sc., F.S.A.S.M. ; and A. F. Heseltine, B.Sc., F.S.A.S.M.
Assaying I. and II. ..	B. H. Moore, B.Sc., F.S.A.S.M. ; and F. C. Stockwell, A.S.A.S.M.
Metallurgy I. and II.	B. H. Moore, B.Sc., F.S.A.S.M. ; and F. C. Stockwell, A.S.A.S.M.
Petrology .. ..	E. S. Simpson, B.E., F.C.S. ; and C. O. G. Larcombe, Assoc. S.T.C., F.G.S.
Mineralogy .. ..	E. S. Simpson, B.E., F.C.S. ; and C. O. G. Larcombe, Assoc. S.T.C., F.G.S.
Geology .. ..	F. C. Stockwell, A.S.A.S.M. ; and C. O. G. Larcombe, Assoc. S.T.C., F.G.S.
Mining Geology ..	C. O. G. Larcombe, Assoc. S.T.C., F.G.S.
Preparatory Mechanical Drawing	C. Bircher
Mechanical Drawing I. and II.	J. Parr, B.Sc. ; and H. W. Gartrell M.A., B.Sc.
Applied Mechanics } Prime Movers } Building Construction } Mechanical Engineering I. }	H. J. Clucas, B.C.E. ; and H. W. Gartrell, M.A., B.Sc.
Surveying I. and II. ..	P. G. D. Lavater, Inspecting Surveyor, Bewick, Moreing, & Co. ; and T. Butement, A.O.U.S.M.
Engine-driving I. and II.	C. J. Mathews, A.M.I.C.E. ; and C. Bircher
Practical Electricity I.	C. Bircher
Electrical Engineering I.	Curle Smith, M.I.E.E. ; C. Bircher
Fitting and Turning ..	C. Bircher ; and J. Murray

JUNIOR SCHOLARSHIP.

English .. ..	I. H. Boas, B.Sc.
Physiography .. ..	C. O. G. Larcombe, F.G.S.
Mathematics .. ..	F. B. Allen, M.A., B.Sc.

ATTENDANCES, 1909.

Class.	Total Enrolment.		
	1st Term.	2nd Term.	3rd Term.
Elementary Mathematics .. ..	7	4	6
Preparatory Mathematics .. ..	36	33	26
Mathematics I. .. ..	21	14	13
Theoretical Mechanics .. ..	5	7	4
Physics I. (Lectures) .. ..	13	11	11
Physics I. (Practice) .. ..	13	11	11
Physics II. (Lectures) .. ..	1	1	1
Physics II. (Practice) .. ..	1	1	1
Engineering Chemistry .. ..	11	7	7
Chemistry I. (Lectures) .. ..	29	26	23
Chemistry I. (Practice) .. ..	30	26	23
Chemistry II. (Lectures) .. ..	8	7	6
Chemistry II. (Practice) .. ..	8	6	5
Chemistry III. (Practice) .. ..	..	1	..
Chemistry III. (Lectures) .. ..	..	1	..
Assaying I. (Lectures) .. ..	9	9	6
Assaying I. (Practice) .. ..	8	9	6
Assaying II. (Lectures) .. ..	1	4	3
Metallurgy II. .. ..	2	2	2
Geology .. ..	7	7	7
Mineralogy .. ..	4	3	3
Petrology .. ..	4	3	3
Mining Geology .. ..	..	..	9
Surveying I. (Practice) .. ..	9	13	10
Surveying I. (Lectures) .. ..	10	13	10
Surveying II. (Practice) .. ..	3	7	6
Surveying II. (Lectures) .. ..	5	7	7
Elem. Mechanical Drawing .. ..	22	20	17
Mechanical Drawing I. .. ..	7	6	6
Mechanical Drawing II. .. ..	9	9	7
Mechanical Engineering .. ..	11	9	4
Engine-driving I. .. ..	13	12	11
Engine-driving II. .. ..	5	5	4
Practical Electricity .. ..	21	20	14
Electrical Engineering .. ..	10	7	6
Fitting and Turning .. ..	27	26	24
	370	347	302

1907.			1908.			1909.		
1st Term.	2nd Term.	3rd Term.	1st Term.	2nd Term.	3rd Term.	1st Term.	2nd Term.	3rd Term.
Total Enrolment.								
389	351	286	365	315	260	370	347	302
Average Attendance.								
320	306	268	300	275	250	340	325	290
Individual Students.								
166	157	141	184	171	154	182	150	138

EXAMINATION RESULTS, 1909.

The following Table shows the passes obtained by students of the Western Australian School of Mines,



Kalgoorlie, at the Annual Examinations held in November, 1909:—

Subject.	First Class.	Second Class.	Third Class.	Total.
Assaying I. . . . .	..	1	5	6
Chemistry I. . . . .	1	..	6	7
Chemistry II. . . . .	..	1	2	3
Geology . . . . .	..	1	3	4
Preparatory Mathematics . . . . .	4	3	2	9
Mathematics I. . . . .	..	..	5	5
Mechanical Drawing I. . . . .	..	3	2	5
Mechanical Drawing II. . . . .	..	5	1	6
Mineralogy . . . . .	..	1	1	2
Theoretical Mechanics . . . . .	..	..	2	2
Metallurgy II. . . . .	1	1	..	2
Physics I. . . . .	1	2	7	10
Physics II. . . . .	..	..	1	1
Petrology . . . . .	..	2	..	2
Surveying I. . . . .	1	..	1	2
Surveying II. . . . .	..	2	3	5
Practical Electricity . . . . .	1	1	4	6
Electrical Engineering I. . . . .	2	1	2	5
Engine-driving I. . . . .	2	4	2	8
Engine-driving II. . . . .	1	..	1	2
Engineering Chemistry . . . . .	..	2	2	4
Fitting and Turning I. . . . .	1	5	2	8
Mechanical Engineering I. . . . .	..	3	..	3
Elementary Mechanical Drawing . . . . .	3	5	..	8
Totals . . . . .	18	43	54	115

#### ENGINE-DRIVERS' CERTIFICATES.

The following students of the School of Mines passed the examinations held by the Chief Inspector of Machinery during 1909 for Engine-drivers' Certificates:—

Examination for First-Class Engine-driver's Certificate:—

H. Bosustow.

Examination for Second Class Engine-driver's Certificate:—

W. J. Collins.

N. Taylor.

Examination for Third Class Engine-driver's Certificate:—

A. Campbell.

F. Davey.

A. J. Bramley.

T. C. Halkyard.

A. S. Paul.

#### Entrance Examination.

At the Entrance Examination in Preparatory Mathematics, held on February 15th and 1th, 1909, the following candidate was credited with a pass:—

D. D. Griffiths.

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.

#### ASSAYERS' CERTIFICATES.

The following students of the W.A. School of Mines have gained certificates:—

R. Banks, Assayer's Certificate, November, 1908.

W. S. Bradley, Assayer's Certificate, November, 1909.

The following students of the Perth Technical School, which has been in existence for several years, and whose students are admitted to the W.A. 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.

R. W. Pike, Assayer's Certificate, November, 1908.

L. G. Klem, Assayer's Certificate, November, 1909.

R. R. Baxter, Assayer's Certificate, November, 1909.

M. F. G. Burrows, Assayer's Certificate, November, 1909.

G. S. Compton, Assayer's Certificate, November, 1909.

H. J. Cook, Assayer's Certificate, November, 1909.

#### DIPLOMAS.

The following students of the W.A. School of Mines have gained diplomas:—

S. J. Beech, Diploma in Metallurgy, November, 1906.

P. Adams, Diploma in Metallurgy, November, 1907.

H. Adams, Diploma in Metallurgy, November, 1908.

#### PRIZES.

The following students have gained prizes entitling them to one year's free tuition in the next grade of the respective subjects:—

Preparatory Mathematics—Griffiths, D.

Chemistry I.—Lang, J. H.

Metallurgy II.—Banks, R.

Elementary Mechanical Drawing—McMullen, F. D.

Surveying I.—Fry, A. T.

Physics I.—Lang, J. H.

Engine-driving I.—Halkyard, F. C.

Engine-driving II.—Collins, W. J.

Practical Electricity—Griffiths, D.

Fitting and Turning—Giles, E. V.

Electrical Engineering I.—Richardson, H. B.

The following awards of prizes offered by Critchley Parker, Esq., have been made on the results of the Annual Examinations:—

1909.

"Australian Mining Standard"—R. Banks.

"Australian Mining and Metallurgy"—W. S. Bradley.

The following students have been recommended for the prizes offered by the Mechanics' Institute:—

S. Wheeler. J. H. Lang. O. N. Pasker.

#### SCHOLARSHIP EXAMINATIONS, 1909.

##### JUNIOR SCHOLARSHIPS.

A. Getty.

E. Blanckensee.

G. Shaw.

W. L. Goode.

L. G. Allan.

J. C. I. Butement.

A. Getty gains a Junior Scholarship, tenable at Kalgoorlie.

##### CHAMBER OF MINES SCHOLARSHIP.

The following candidates have been recommended for Chamber of Mines Scholarships:—

Mechanical Engineering Scholarship, £20—D. D. Griffiths, Kanowna.

Metallurgy Scholarship, £15—S. D. Burgess, Kalgoorlie.

## DIVISION VII.

**ANNUAL REPORT OF THE CHIEF INSPECTOR OF MACHINERY AND CHAIRMAN OF BOARD  
OF EXAMINERS FOR ENGINE-DRIVERS FOR YEAR ENDED DECEMBER, 1909,  
WITH STATISTICS.**

*The Secretary for Mines, Mines Department, Perth.*

I have the honour to submit for the information of the Hon. the Minister for Mines, the following report on the operations of "The Inspection of Machinery Act, 1904," in the districts proclaimed thereunder, together with statistical tables for the year ended 31st December, 1909.

The duties carried out during the year are the same as dealt with in previous reports excepting that at the end of October, this Department ceased to act in an advisory capacity in connection with the machinery and working plant vested in the Fremantle Harbour Trust Commissioners, the latter having decided to transfer the work to the Public Works Department in order that the Engineering Workshops in Fremantle could be utilised in the matter of repairs and alterations.

## DIVISION I.—INSPECTION OF BOILERS.

*New Registrations.*—At the end of the year there were upon the registers 3,402 boilers as compared with 3,340 for 1908—an increase of 62 during the

year. Of the total registrations 1,288 were out of use on the 31st December, a slight decrease under the figures shown on the corresponding date last year. Small boilers replaced by larger and better types; temporary closing of works; introduction of electric, oil, and gas motors; and boilers undergoing overhaul and repair, mainly account for the "out of commission" section.

The types represented in the new registrations are: Loco. type (20), Vertical (20), Cornish (11), Water-tube (4), Return Multitubular—internally and underfired—(3), Lancashire (1), and Digesters (3).

*Boilers locally constructed.*—Twelve (12) only, or barely 20 per cent., of the new boilers were manufactured in the State. The smallness of this number is to be regretted in view of the fact that several engineering works are now fully equipped and capable of supplying local wants in this direction.

The following return shows the classification of boilers (exclusive of those permanently condemned) on the registers as fit for service at the end of the year:—

**RETURN No. I.—Return showing Classification of the various Boilers registered in each District on  
31st December, 1909.**

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.	Pilbara and West Pilbara	1909.	1908.
	Lancashire ... ..	22	6	...	44	5	14	11	5	19	...	126
Cornish ... ..	101	94	28	164	47	97	99	68	132	...	830	819
Semi-Cornish ... ..	30	4	3	6	2	5	...	3	26	...	79	79
Vertical, Stationary ... ..	350	66	16	85	35	74	72	50	81	...	829	810
Do. Portable ... ..	80	5	...	4	1	1	...	...	5	...	96	95
Do. Multi, Stationary ... ..	29	3	...	4	1	8	9	3	5	...	62	62
Do. Multi, Portable ... ..	15	...	...	...	...	...	3	...	...	...	18	18
Do. Patent Tubular ... ..	11	...	...	2	...	...	...	...	...	...	13	13
Loco. Type, Rectangular, Firebox, Stationary	62	9	2	23	11	8	15	9	18	...	157	156
Do. do. do. Portable	306	17	6	12	7	7	11	9	13	...	388	385
Do. Circular Firebox, Portable ...	104	1	...	3	...	1	...	...	...	...	109	100
Locomotive ... ..	61	9	...	9	4	...	5	5	4	...	97	90
Water Tube ... ..	82	15	2	96	...	3	22	9	1	...	230	226
Return Multitubular, underfired, Stationary	81	16	2	42	8	10	12	6	11	...	180	189
Do. do. do. Portable ...	5	5	...	3	...	...	...	...	3	...	16	16
Do. do. internally fired, Stationary	69	4	...	2	...	...	1	...	5	...	81	77
Do. do. do. Portable	1	...	...	...	...	3	...	...	...	...	4	4
Egg End and other types not elsewhere specified	17	7	1	6	1	...	2	1	1	24	60	60
Digesters ... ..	17	...	...	2	...	...	...	...	...	...	19	16
<b>Totals ... ..</b>	<b>1,443</b>	<b>261</b>	<b>60</b>	<b>507</b>	<b>122</b>	<b>231</b>	<b>262</b>	<b>168</b>	<b>324</b>	<b>24</b>	<b>3,402</b>	<b>3,340</b>

*Operations in the various Districts.*—Comparing Return No. II. with a similar return published in last year's Report, it is noted that there has been a decrease of 134 in the total number of thorough inspections made. Several causes have contributed to this result. In the North Coolgardie and Mount Margaret districts, inspection work was suspended for two months owing to illness of the District Inspector, whilst in the East Coolgardie, Coolgardie and Yilgarn, Dundas, North-East Coolgardie, and Broad Arrow Districts, owing to the illness and death of Inspector Latimer, work fell about three months into arrears. The Inspector for the Fremantle district was also obliged to take "sick leave," and was absent for 10 weeks. I have pointed out in previous reports, and now reiterate it, that until an adequate staff of Inspectors is provided it is impossible to keep work up to date, or to carry out the provisions of the Act in their entirety.

Of the 2,006 boilers inspected, 1,781 were granted certificates, 209 were in need of repair, whilst 16 were permanently condemned as not being fit for any useful pressure.

One hundred and fifty-two boilers were tested whilst under steam. The majority of these tests or "working inspections" are carried out without previous notice having been given to the owners or operators. They are considered highly important and arranged for the purpose of detecting possible tampering with safety valves, and consequent in-

crease over the pressure authorised. No breaches of any importance have been reported in this particular during the year.

It has been necessary on 25 occasions to issue certificates under Section 30 of the Act (quoted hereunder) for boilers located in outlying districts:—

"Inspection of boilers may be made at any time in the daytime at all reasonable hours, but an Inspector shall give the owner at least seven days' notice, in writing, of the date on which such inspection will be made.

If the Inspector does not attend on the date appointed, the inspection may be made by any competent person, together with a first-class certificated engine-driver; and the particulars recorded in a book to be kept for that purpose may be accepted by the Inspector in lieu of an inspection by himself, for any period not exceeding six months, and a certificate under section thirty-nine may be granted on payment of the prescribed fee."

This provision is a good one, and was designed to meet cases of emergency, and to prevent suspension of work and delays when an Inspector is unable to visit any given centre on account of being engaged elsewhere. Extreme care is of course exercised, and only boilers that are well attended to, and the condition of which is fairly well known, are certificated in this way.

Four hundred and forty-five repair notices were issued by Inspectors, the majority of which were for minor repairs only.

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.	1909.	1908.	
Total number of Boilers ... ..	1,443	261	60	507	81	41	231	262	168	324	3,402	3,340	
Inspections for the year:													
Thorough ... ..	831	131	31	331	35	18	121	159	120	97	1,854	1,988	
Working ... ..	71	1	...	1	...	...	17	41	17	4	152	181	
Boilers condemned:													
Temporarily ... ..	37	1	...	3	...	...	4	9	2	2	58	69	
Permanently ... ..	5	7	...	...	...	1	...	2	1	...	16	13	
Total Number of Notices issued for Repairs	222	15	3	58	5	5	38	64	18	17	445	566	
Total Number of Certificates issued	763	127	32	321	33	17	117	151	116	104	1,781	1,877	
Total amount of Fees ... ..	£ s. d. 1,412 17 7	£ s. d. 298 9 6	£ s. d. 73 5 0	£ s. d. 843 10 0	£ s. d. 90 5 0	£ s. d. 35 10 0	£ s. d. 252 2 0	£ s. d. 344 16 6	£ s. d. 197 7 6	£ s. d. 274 10 0	£ s. d. 3,822 13 1	£ s. d. 4,121 15 7	
Number of Inspectors ... ..	*4			2				1		1	8	8	

\* Three Inspectors during first five months of year.

NOTE.—This Return does not include work done under "The Navigation Act, 1904," or for Fremantle Harbour Trust Commissioners.

Fifty-eight boilers were temporarily thrown out or completion of repairs, as detailed in Return of commission and certificates for them refused No. III. pending the carrying out of important alterations

RETURN NO. III.  
Return of Boilers for which Certificates were refused pending Repairs.

No.	Type of Boiler.	Description of Repairs, etc.
5	Locomotive, Portable .. ..	All tubes to be drawn.
2	Do. .. ..	All tubes to be drawn, and lagging removed.
1	Do. .. ..	Bottom of barrel and firebox casing to be patched.
1	Do. .. ..	Mudwell to be removed; new rivets in smoke-box tube-plate and in bottom of barrel.
1	Do. .. ..	Defective portion of firebox back plate to be cut out and patched.
1	Locomotive .. ..	Defective plates in barrel to be renewed; new throat-plate and smoke-box, tube plate to be fitted.
2	Do. .. ..	Tubes to be drawn and lagging removed.
1	Do. .. ..	New smoke-box tube plate; new portion of throat plate; and sheathing plate in barrel to be fitted.
1	Do. .. ..	Bottom of barrel to be removed; crown and longitudinal stays to be fitted.
1	Do. .. ..	Copper tube-plate to be straightened, and new set of tubes fitted.
1	Do. .. ..	New fire-box tube-plate to be fitted; fire-box shell to be patched.
1	Do. .. ..	New barrel; copper tube-plate, and crown stays to be renewed.
2	Do. .. ..	New throat plate and new smoke-box tube plate to be fitted.
4	Cornish .. ..	Defective furnace and flue tube where bulged to be restored to true form, and seams riveted.
2	Do. .. ..	New flue-tube to be fitted.
2	Do. .. ..	Defective portion of furnace to be cut out and patched.
2	Do. .. ..	Defective portion of front end plate to be cut out and patched.
1	Do. .. ..	Front end plate, and first section of tube to be renewed.
1	Do. .. ..	Bottom of shell to be patched.
1	Lancashire .. ..	Flue tubes to be renewed.
1	Do. .. ..	Defective portion of shell around blow-off to be renewed.
1	Return Multitubular .. ..	All tubes to be drawn.
1	Do. .. ..	16 new tubes to be fitted.
2	Do. .. ..	Portion of bottom of shell to be cut out and patched.
1	Do. .. ..	Front end plate to be partially re-riveted, and mud-drum protected from furnace.
2	Vertical .. ..	Defective up-take to be renewed.
1	Do. .. ..	Part of shell at bottom to be cut away and renewed.
1	Do. .. ..	New fire-box to be fitted.
1	Locomotive, Stationary .. ..	Three new tubes to be fitted, and defective fire-box stays renewed.
1	Do. .. ..	Bottom of barrel to be renewed, and six new tubes fitted.
2	Do. .. ..	New crown stays, girders, and tubes to be fitted.
1	Do. .. ..	Four corners of fire-box casing to be patched.
2	Marine .. ..	Defective portions of combustion chamber to be cut out and patched.
1	Do. .. ..	Tube-plate to be patched, and new tubes fitted.
1	Do. .. ..	Bottom of shell to be cut out and renewed.
2	Do. .. ..	New set of tubes, and longitudinal stays to be fitted.
1	Water-tube .. ..	New plates to be fitted to lower half of steam drum.
1	Do. .. ..	New drum to be fitted.
1	Do. .. ..	Two water-tube nipples to be renewed.

*Boilers Temporarily and Permanently Condemned.*  
—There has been a decrease in the number of temporarily condemned boilers as compared with the figures for each of the other three preceding years, whilst a slight increase has taken place in regard to permanent condemnations. The proportions of condemnations to total inspections are: Temporary, 2.89 per cent.; and Permanent, .797 per cent., as compared with 3.18 per cent. and .599 per cent. respectively, for the year ended December 1908, as shown in Return No. IV. hereunder.

RETURN NO. IV.  
Return showing number of Temporarily and Permanently Condemned Boilers per 100 Inspections made since 1899.

Year.	Temporarily Condemned.	Permanently Condemned.
1899 .. ..	2.64 per cent.	1.42 per cent.
1900 .. ..	2.21 do.	.498 do.
1901 .. ..	4.35 do.	.511 do.
1902 .. ..	5.00 do.	.958 do.
1903 .. ..	2.43 do.	.697 do.
1904 .. ..	3.08 do.	.389 do.
1905 .. ..	2.84 do.	.388 do.
1906 .. ..	3.98 do.	.960 do.
1907 .. ..	4.36 do.	.802 do.
1908 .. ..	3.18 do.	.599 do.
1909 .. ..	2.89 do.	.797 do.

*Maintenance and Care of Boilers.*—All district Inspectors, with the exception of those operating in the Agricultural districts, report the maintenance of boilers and appurtenances to be generally good. Isolated cases of the neglect of safety valves have come under notice. Some owners appear to take it for granted that an Inspector has the exclusive right to examine or overhaul safety valves. One example of this erroneous impression was experienced recently with a Fremantle firm. A telephoned request was received at this office for the attendance of an Inspector to adjust “the Government Safety Valve,” as it was leaking. Upon advising the owner to obtain the services of a fitter and make the necessary adjustment, it was stated that two engineering firms had already been asked to attend to the valve, but both had absolutely refused on the grounds that the valve was a Government one, and could only be adjusted by the Government Inspector. Strictly speaking, this result is not altogether an objectionable one as it indicates a desirable change in views hitherto held. In the earlier stages of boiler inspection, the visits of an Inspector were not always welcomed. He was generally regarded as a spy who came to find fault to the prejudice of the boiler attendant, or other responsible person. Engineers and others now, however, treat an Inspector, who has been any length of time at the work, in a more friendly spirit, and as one who can give reliable

advice and practical hints about working or alterations based upon an experience of many hundreds of boilers of all types and sizes worked under various conditions.

*Explosions.*—I am pleased to report another clean sheet in the matter of explosions, which should be considered an extremely satisfactory result, seeing that for twelve years, during which 26,549 certificates have been issued, not a single boiler explosion has occurred.

*Mishaps, etc.*—Serious damage to a Cornish boiler through shortness of water was narrowly averted in Perth. The engine-driver reported to the manager that the boiler had lost two inches of water while he was away for a short while. The matter was looked into, and as no leaks could be found, it was concluded that the driver must have been mistaken. Next evening, however, whilst taking a last glance at the boiler before ceasing duty the driver noted that the water was not showing in the glass. He tested cocks and got nothing but steam. Fire was drawn, boiler cooled down, and a thorough examination made. It was discovered that the blow-off joint had been blown out. A wall had been built up in front of this joint and consequently the escape of water had not been detected. The fusible plug did not melt as the metal in it was of poor quality. Fortunately no damage was done, but had the defect not been noticed the whole furnace would probably have collapsed. Instructions were issued to owner to remove wall and rebuild it behind "blow-off" in the usual way.

In another instance it was noted during an ordinary inspection of a locomotive boiler, that the fire-box bore plain evidence of having been overheated. Tubes and crown stays had been leaking badly, and crown of firebox was bulged between crown stays. The engine-driver was positive that there had been no shortness of water whilst he was in charge, and advanced the opinion that the "cleaner" had started fire in the morning with an insufficient supply of water. The "cleaner" on the other hand was certain that he always had enough water before lighting up.

A locomotive owned by Messrs. Millar's Karri & Jarrah Co., Ltd., and used on their Karridale Timber

line left the rails and completely overturned down an embankment 20 feet deep. The engine and boiler were uninjured; two ladies, one child, the driver and fireman who were in the cab of engine also escaped injury in a miraculous way.

An unusual case of defective fittings was discovered during inspection of a vertical boiler on the German barque "Erling." When testing pressure gauge—a "Bourdon" type registering in atmospheres—it was found that although designed to register 200lbs. the pointer would not travel beyond 75lbs. Upon examination it was found that adjusting links—when at 75lbs.—were jammed against bracket on one side and a pin on the other. The lever safety valves on same boiler were also in very bad order. The levers were resting on bottom of lever guides, and although there was fully a quarter of an inch clearance between lever and spindle, it was impossible for valves to lift owing to spindle being corroded fast to casing and appeared to have been in such condition for a considerable period. The valve was with difficulty released with a hammer.

The remarkable corrosion in boilers on the Collie coalfield, referred to in my last annual report, appears to have been arrested in a very simple fashion. Before placing a comparatively new boiler in commission at the Collie Co-operative Collieries—one of the mines affected—the manager was advised to have all internal surfaces thoroughly painted with a cement wash, and to clean out and repaint at intervals not exceeding six weeks. The recommendation was acted upon, and has proved entirely satisfactory, as after a twelve months' run the plates and rivets show no signs of deterioration, and appear to be as good as when new.

In Return No. V. will be found particulars of registration, inspection, and classification of machinery inspected during the twelve months. The plants registered and under periodical inspection now number 2,728 as compared with 2,532 at the end of last year, an increase of 196.

The total inspections made also exceed those for 1908 by 176, the figures being 1,438 and 1,614, respectively.

## DIVISION II.—INSPECTION OF MACHINERY.

### RETURN No. V.

*Return showing classification of Machinery and operations during the year ending 31st December, 1909.*

	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.	
											1909.	1908.
Total number of registrations ... ..	1,352	155	34	424	24	11	127	194	129	278	2,728	2,532
Total number of inspections made ... ..	972	68	25	330	5	6	59	79	35	35	1,614	1,438
Certificates issued bearing fees ... ..	589	10	1	228	2	...	8	37	8	29	912	653
Certificates issued (steam) without fees ... ..	358	66	24	83	9	6	65	44	38	8	701	720
Repair notices issued ... ..	25	1	...	45	...	...	3	2	4	5	85	71
Electric Winding Engines ... ..	19	2	...	2	...	...	...	...	...	...	23	20
Electric Lighting and Power Plants ... ..	20	2	...	3	1	...	3	11	6	6	52	46
Electric Motors for all purposes ... ..	326	12	...	254	...	...	8	48	6	18	672	611
Lifts for passengers ... ..	34	...	...	...	...	...	...	...	...	...	34	33
Lifts for goods ... ..	62	...	...	10	...	...	...	...	...	...	72	71
Refrigerating Plants ... ..	16	...	...	5	...	...	1	2	1	3	28	23
Oil Engines ... ..	265	13	1	3	2	...	16	4	17	33	354	305
Horse-power of Oil Engines ... ..	1,877	84	1	48	49	...	153	35	80	225	2,504	2,321
Gas Engines ... ..	45	...	...	4	...	...	...	...	...	...	49	41
Horse-power of Gas Engines ... ..	379	...	...	113	...	...	...	...	...	...	492	312
Air Winches ... ..	...	4	...	17	1	...	...	...	...	2	24	20
Gas Producer Plants ... ..	2	1	...	3	1	...	...	4	2	3	16	8
Gas Producer Plants, Horse-power ... ..	135	54	...	105	51	...	...	160	220	160	885	358

NOTE.—This return does not include the work done under "The Navigation Act, 1904," or that specially arranged for with Fremantle Harbour Trust Commissioners.

*Dangerous Machinery.*—I have not had occasion during the year to enforce the provisions of the Act, or to complain of the want of supervision by occupiers and their managers. The majority of owners have readily complied with instructions issued to provide fencing and guarding of dangerous parts. Much time has been given by Inspectors to devising means and furnishing suggestions for the greater safety of those employed amongst machinery, but I am afraid that I cannot in every case record a reciprocation by the operators, some of whom appear to have a prejudice against any fixture calculated to interfere in the slightest degree with the manipulation of the machine operated. It is the old story of the belief of men accustomed to work in dangerous places, that they can rely absolutely upon their own cleverness to avoid accident at all times. A few cases have come under notice where after alteration and re-arrangement of plant, fencing and guards have not been replaced.

Each year it is found that more and better devices are being provided by makers of machinery for attachment to their goods before supplying to customers. The law, backed by public opinion, now requiring the safe-guarding of machinery, has evidently impressed manufacturers who desire to get their machinery in good order at the start and not wait to have it tinkered with later on, thus saving expense. There is probably nothing that could have such a marked effect and raise the degree of safety of machinery generally so much as a thorough, or all-round attempt by the makers of all classes of machinery to turn it out with all dangerous parts guarded in an efficient manner. The original cost is not considerable when compared with what it costs the purchaser to satisfactorily fence single machines. Then again, there are makers of machines who do not seem to have an intelligent idea of protecting dangerous portions, as the guards provided are so designed that there is danger of accident between the edge of the guard and the gearing, which could easily have been obviated at a trifling extra expense. I think it advisable to impress on owners the necessity of having a clause in their specifications for new machines, requiring all gearing, etc., fenced in conformity with "The Inspection of Machinery Act, 1904."

*Winding and Hoisting Engines.*—Owing to representations made from time to time regarding the condition and fitness for their functions of winding engines generally, on the East Coolgardie Goldfield, it was decided to make a special investigation.

Inspector McCulloch, who was selected for the task, commenced his labours in July, and I am furnishing an abridged report hereunder for general information:

In accordance with your instructions I proceeded to Kalgoorlie on 10th July, and now beg to submit my report as follows:—

In all I made a thorough examination and test of twenty-two winding engines, and also of one being built at Messrs. Silverthorne & Adair's to replace that in use at the Great Boulder Perseverance G.M. No. 6 shaft, and the results of my investigations are set forth in the accompanying Table.

As regards the testing of the brakes I was confronted with an initial difficulty as to what really constitutes an adequate brake. The Mines Regulation Act gives no assistance in this direction, and the determination as to the definition of the term "adequate brake" is apparently left entirely to the discretion of the Inspectors, a most undesirable state of affairs. The following is a copy of paragraph

(3), Clause (a), in Regulation 40 contained in subsection C, section 17, of the Mining Regulations of the Transvaal dealing with efficient brakes when raising and lowering persons:—

"Each winding drum unclutched from the engine can be maintained in a position of rest with no more slipping than one foot by means of its own brake or brakes (a) while bearing its maximum load when winding persons, and (b) when this load is increased to the extent of doubling the authorised load of the cage or skip. In estimating this authorised load one hundred and fifty pounds weight shall be allotted for each person."

My aim, however, was to institute a standard test by which the trial could be made without in any way causing stoppage or loss of time at the shaft, and without running the slightest risk of causing any damage to either cage, shaft, or engines. It is evident that if the drum be unclutched and the brake will not hold it, considerable damage might in some cases ensue, and I therefore came to the conclusion that if both brakes combined could exert a retarding effort equal to the average turning effort of the engine, the braking power could be considered sufficient for all ordinary purposes.

Now the maximum turning effort of a winding engine is exerted when both cranks are on the engine side of the crank circle, and each at an angle of 45deg. to the horizontal, and is in ratio 1.27 to 1 to the mean turning effort. This excess may be considered as approximately balancing the losses due to engine friction, and the difference between the co-efficients of friction of rest and at moderate velocities, and my method of testing the brakes has therefore been to balance the cages and ropes in the shaft, apply the brakes after setting the engine cranks as above described, and then turn on full steam with the reversing lever in either of the extreme positions. In a few cases, other and more severe tests were also made, but the above was the standard method adopted.

In addition to the steam winding engines mentioned in table, inspection was also made of the one being built at Messrs. Silverthorne & Adair's for the Perseverance G.M., and of the two electrical winders at the Associated G.M., and the New Reefer's G.M.

New certificates were issued by me in the following instances:—

Great Boulder Proprietary—Edward's shaft.  
Great Boulder Proprietary—Hamilton shaft.  
Electric winder at Associated G.M.  
South Kalgurli G.M.—Main shaft.  
South Kalgurli G.M.—Morty's shaft.  
Oroya Brownhill G.M.—North Block.  
Golden Horseshoe G.M.—Main shaft.  
Ironsides North G.M.  
Lake View G.M.—Main shaft.  
Great Boulder Main Reefs.

New certificates were unnecessary in the following instances:—

Great Boulder Proprietary—Main auxiliary.  
Electric winder at New Reefer G.M.  
as the current certificates do not expire until 1st March, 1910, and 1st June, 1910, respectively.

Notice was issued *re* the Associated Northern engine, requiring the Company to fit same with adequate brakes on or before 20th September, 1909. Notice was also issued *re* the Ironsides North engine, requesting the Company to renew brake blocks within one week from date as arranged with the engineer

—certificate issued but withheld until same complied with.

In the following instances no action has been taken, and same are reserved for your consideration:—

Name of Mine:	Shaft.	Date certificate expires.
Great Boulder Proprietary ..	Main .. ..	1-3-10
Hainault .. ..	Main .. ..	17-10-08
Associated .. ..	Judd's .. ..	18-10-08
Great Boulder Perseverance	No. 6 .. ..	15-3-09
Golden Link .. ..	Main .. ..	3-5-10
Kalgurli .. ..	Main .. ..	15-10-08
Golden Horseshoe .. ..	Main auxiliary	8-12-08
Golden Zone .. ..	Main .. ..	24-2-09
Oroya Brownhill .. ..	Waddington ..	29-8-08

Before proceeding further I append the results in detail of the braking tests made with the various engines:—

Great Boulder Proprietary Main Shaft	With ropes and cages balanced, brakes held against weight of ore and full steam for lowering. Would not quite hold against 1,900ft. of rope in addition.
Great Boulder Proprietary Main Auxiliary	Brakes held against either full steam or full unbalanced load. Would not quite hold against both together.
Great Boulder Proprietary, Edwards' Shaft	Brakes held against full steam and loaded skip at 1,400ft. with empty skip at 800ft., but would not quite hold against full steam and full unbalanced load of ore and rope at 2,230 ft. together.
Great Boulder Proprietary, Hamilton Shaft	Brakes held against full steam and unbalanced load of ore and rope at 1,900ft.
Hainault .. ..	Brakes held against full steam plus the weight of 350ft. of rope.
Associated, Judd's Shaft	Brakes held against full steam plus the weight of 1,100ft. of rope.
Associated Northern ..	Brakes would neither hold against full steam, nor in single gear with full load at 300ft. depth.
Kalgurli .. ..	No actual test made, as Management and Engineer admitted that brakes were quite inadequate to stand any such test.
Great Boulder Perseverance, No. 6 Shaft	Brakes held against full steam plus the weight of 800ft. of rope.
South Kalgurli, Main Shaft	Brakes held against full steam plus weight of ore, but not quite with 700ft. of rope added.
South Kalgurli, Morty's Shaft	One brake held against full steam.
Oroya Brownhill, North Block	Brakes held against full steam plus weight of ore. One brake only, would not quite do so.
Oroya Brownhill, Waddington Shaft	Brakes fully adequate, but cannot be properly operated by driver.
Golden Horseshoe, Main Shaft	Brakes held against full steam plus full weight of ore and rope.
Golden Horseshoe Auxiliary	Brakes would neither hold against full steam nor full unbalanced load.
Golden Zone .. ..	Brakes utterly inadequate.
Golden Link .. ..	Brakes would not hold engine under full steam even with one crank on dead centre, and the brake blocks do not fit the brake path.
Ironsides North ..	Brakes would just barely hold engine under full steam, but need adjustment.
Lake View Consols, Main Shaft	Brakes held against full steam plus weight of ore, and one brake alone will very nearly do so.
Great Boulder Main Reefs	Brakes will hold engine under full steam.

Coming now to the general discussion of the engines enumerated in paragraph above it will be seen that the brakes of the following engines were quite satisfactory, viz.: Great Boulder Proprietary (Main Shaft), Hainault, and Associated, and that the only questionable points in connection therewith are as to the method of applying the brakes, which in the first two is done by steam, and in the Associated engine by air and weight combined.

At the commencement I may say that I fully agree with the Inspector of Mines, that the method of applying the brakes by weights, with thoroughly efficient oil cataracts to prevent these coming on too suddenly in case of a failure of the steam supply, and of using steam or air only to take the brakes off, to be very much preferable to any other. The point where I do not quite agree with him is as to the powers under either Act enabling an Inspector to order the arrangement of these to be altered in such cases as the above, where the engines have been supplied by good makers and have, moreover, been working under the present conditions for years. Furthermore I cannot see why compressed air is not as good and reliable as steam for taking the brakes either off or on, as it should be the owner's and Inspector's duty in such a case to see that the air supply is not liable to any accidental interruption. Moreover while fully granting the force of objections to steam or air applied brakes in case of failure of the supply through the bursting of a pipe for instance, there are, as will be fully pointed out later on, other, and to my mind, far more important defects, which being questions of initial design are practically unalterable without possibly condemning the engine altogether. Where such is the case it is questionable how far the Acts are intended to apply. If an Inspector is to go fully into these questions, and not regard his duties as ending with seeing that the engine *as supplied and erected* is in fair and working order and properly fenced and guarded, it is evident that an enormous responsibility will be thereby cast upon his shoulders, which I question was ever intended in the existing legislation. If such responsibility is intended under the Acts the only proper course is to draw up a series of important amendments to the present Regulations, and appoint an engineer of high qualifications as Inspector of Machinery to the Goldfields purely and simply, making it obligatory also that all designs, specifications, etc., regarding new machinery or plant should be submitted to him before ordering or erecting.

The braking arrangements in the three engines mentioned are capable of alteration, though not to my mind in the most desirable manner, and at the cost moreover of considerable expense and inconvenience to the mines concerned. It is also evident that the effects of a heavily weighted brake coming on too suddenly might be almost as disastrous as the accident which it is designed to prevent, and the oil cataracts which alone would prevent such an occurrence, are, as is well known, difficult in many cases to keep in a state of thorough and reliable working order. The objection as to both brakes and reversing gears becoming inoperative owing to the bursting of one steam or air pipe, might be removed by supplying either one or the other by a separate pipe direct from the boilers or receiver, and this would be a far cheaper and simpler safeguard than altering the brake arrangements as suggested.



Having regard to the above I have refrained from making any positive recommendations as to these three engines, but certainly think that an amendment to the present Acts might be considered, if desirable, enacting that in all new engines erected, and where the brakes are not operated by hand or foot, the same should be applied by weights, and only taken off by steam or air.

As regards the engine at the Great Boulder Perseverance G.M. No. 6 shaft, an engine to replace this is now being built, or rather altered, at Messrs. Silverthorne & Adair's Works. The old engine has been overloaded, is running with fractured drums, repaired but strengthened only partially if at all, and will not reverse under steam. At the time the second drum fractured the engine was working from a depth of 1,300ft. with moreover 1,750ft. of rope coiled upon the drum, thereby greatly increasing the compressive strain upon the latter, which neglecting the relief in the lower coils due to the actual bending of the drum shell, is directly proportioned to the number of coils upon it. The engineer had already advised the manager that the engine should not be used below 1,100ft., but the last certificate issued, expiring 15th March, 1909, places no restrictions at all, except that men shall not be raised or lowered by the south drum. I am strongly of opinion, therefore, that a notice should be issued prohibiting hauling at any depth below 1,100ft. until the new engine is installed, also that men should not be raised or lowered by either drum.

As regards the inability of this engine to be reversed under steam, it is certain from measurements taken by me that the new engine to be installed will be similarly unreversible. This defect is shared in common with the engines tested at the Hainault, Associated Northern, Kalgurli, Oroya Brownhill Waddington Shaft, Golden Link, and Ironsides North engines, also a host of others on the Goldfields, and is to my mind a defect far transcending in importance that of the steam or air applied brakes already treated of. I do not attach so much importance to the impossibility of throwing full steam against the engine in cases of emergency while travelling at a high speed, for such a procedure might, in my opinion, cause an accident quite as bad as that which it attempted to avert. The real danger of this defect, which has already cost the lives of four men at the Edwards' shaft of the Great Boulder Proprietary G.M., is as follows. Supposing the driver to be lowering a heavy load by the brakes with the reversing lever set for hauling so that steam can, if required, be thrown against the engine, the drums of which in such a case are actually being revolved by the load. Then if from any cause the driver should take the trigger from the notch, or the same should in the case of defective notches be able to work out of itself, the action of the eccentric will, owing to the excessive friction of the slide valve on its seat, render it easier to raise the block in the link than to operate the valve, and the lever will consequently fly over like a shot out of a gun, giving full steam for lowering to an engine which is *already revolving at some speed* in the same direction. It is absolutely certain in such a case that before steam can be shut off, the engine again reversed, and the brakes put hard on, that the whole load, consisting possibly of men, will be precipitated to the bottom of the shaft.

This is not a "possible though improbable" occurrence such as that of a steam pipe bursting, but one which has already carried a heavy toll of human life, and the question is that if an Inspector of either Mines or Machinery is to be held responsible for the state of a winding engine, independently of its design and nature, what steps do the Government propose to put an end to such a state of affairs.

As regards the Golden Link engine, it is as already stated above, unreversible under full steam pressure. With slide valves of any size it is in many cases impossible to obtain the necessary leverage to enable such engines to be reversed under such conditions, for the minimum movement of the weight end of the lever system is that of the valve travel, and at any leverage much greater than 6 to 1 the movement of the driver's lever, therefore, becomes impossibly large. Even if a pull of 200 lbs. be exerted thereupon, which again is in itself a very excessive figure, this leverage would in many cases be insufficient. Moreover in this engine I found the brakes quite inadequate according to the test applied, and the brake blocks were furthermore not even approximately a fit when upon the brake path. With these properly bedded upon the path, it is certain that the brake would be more effective, and I would therefore recommend that such be ordered and another test made, before taking any further action. It is but fair to state that the steam pressure at the test carried out by me was 120 lbs., while at the previous test it was 80 lbs. only.

This engine has been recently installed to replace the electric winder complained of as being unreversible, and which is now thrown out. As regards the latter point, I think there is some misconception. No electrical winding engine is reversible in the sense that full current can be passed through the coils of the motor while the latter is revolving at a high speed in the opposite direction to that in which the current so passed would cause it to revolve, unless indeed the motor be of abnormal proportion in regard to its work and the main fuses be adjusted for a current far in excess of that which the motor can safely carry.

As regards this point, I venture to give the following extract from some previous remarks on this subject:—"It is of course possible to reverse the current in the motor while the latter is running, and in cases of great emergency, but manifestly this must be done with the greatest care, as otherwise the motor will be damaged or the fuses blown and the current cut off altogether. In this respect, therefore, the electric winder is inferior to the steam plant, although, as already pointed out, the capability of the latter of being reversed under full steam is also not of very great account under ordinary circumstances of emergency."

In the electric winding engine inspected at the Associated Gold Mine, the brakes are applied automatically as soon as the current is cut off, and the drums being of conical type the static moments during the trip remain fairly constant, and the engine is not subject to the negative moments occurring with cylindrical drum engines at considerable depths. As conical drums will moreover only permit of one layer of rope, and the engine is not designed for winding in single gear, it cannot be overloaded beyond the extent for which it was originally designed. The speed of winding used is not high, but the engineer informed me that the current could

not be thrown against the engine without fear of disastrous results.

The reason for inspecting the electric winder at the New Reefers Mine was that I was informed that this engine could be reversed at full speed. Upon inspection, however, I found that the maximum speed of winding was only 150ft. per minute, maximum depth 200ft. Full current can be thrown against this engine, while running, but the fuses are set for a current more than twice the maximum required at the motor, and the speed of winding is abnormally low as stated above, and this engine cannot be quoted, therefore, as having any great bearing upon the argument.

If, however, the term "non-reversible" was used as meaning that the *motor itself* was non-reversible, and that lowering had to be performed entirely by the brake, then I consider the objections amply justified.

*Re* the Kalgurli Main Shaft engine, the drums have been fractured, but have been so thoroughly repaired and strengthened that there is now no cause whatever for anxiety. The brakes are admittedly inadequate and the engine cannot be reversed under steam, but a new and thoroughly up-to-date engine is, I am informed by the manager, now actually under order, and will replace the present one as soon as possible. The present drivers thoroughly understand the engine and its limitations, and it would seem rather arbitrary to order new brakes to be fitted under these circumstances. I have accordingly made no recommendation.

*Re* the auxiliary engine at the Golden Horseshoe Mine, the engineer informs me that the matter of new steam brakes is already under consideration, and I think a notice should be sent to the management requiring same in reasonable time, say six months. New brakes, moreover, to be applied by weight and released only by steam.

The engine at the Golden Zone Mine is, I regret to say, a very bad example. It is a geared engine running at a very high piston speed—800ft. per minute as tested. The engine is fitted with plain iron band brakes, having no wood lining; the brakes are inadequate, it is loose on the foundations, the cylinders being fixed up with wooden wedges, has no depth indicator, and the drum and pinion shafts are supported in the centre by wooden blocks. I was informed that the foundation bolts which were built into the foundation have come loose and that the nuts cannot therefore be tightened up any more. It is difficult to say what precise action should be taken in this case, unless to prohibit men being raised or lowered by it altogether. An alternative would, however, be to order new brakes and a proper depth indicator (this should of course be done in any case) and to limit the speed of winding to a low figure when men are in the cage.

In the Oroya Brownhill engine at Waddington Shaft the brakes are worked by both foot levers and a wheel and screw attachment, but both are placed so as to be practically unworkable by the driver, who relies solely upon his disc brakes and reversing gear to control the engine. This state of affairs should certainly be altered. The engine is by an unknown maker, the name of the agents, F. A. Robinson & Co., London, 1899, alone appearing thereon, which fact probably accounts for its abominable design.

In conclusion, I can only add that it would appear advisable to adopt some standard method of testing the brakes, and to insist upon the keeping at each engine a proper record book wherein each

engine-driver would be required to note down any defects or requirements, etc., occurring during his shift, for the information of the engineer. This would also prove in addition an invaluable aid to Inspectors in their inspection of the engine, inasmuch as it would indicate the whereabouts of probable defects.

It will be noted that the term "inadequate brake" has occurred several times in the discussion of this matter. The determining of what constitutes an "adequate brake" was therefore the initial difficulty to be overcome. "The Inspection of Machinery Act, 1904," makes no mention of brakes, whereas the "Mines Regulation Act," in Section 32, subsection 18, enacts that Inspectors of Mines shall see that winding engines are fitted with "adequate brakes," but a definition of the term is not given. Official enquiries also failed to elicit any information on the point, the determination apparently being left entirely to the discretion of the Inspectors, which was most undesirable. It was therefore decided to institute a standard test, adopting as the basic principle "that if both brakes combined could exert a retarding effort equal to the average turning effort of the engine, the braking power could be considered sufficient for all ordinary purposes." The following general instructions were sent to each Inspector for their guidance when making inspections and tests, and results are satisfactory:—

"As the matter of winding engine brakes has called for considerable attention recently, please note that in future the following standard method of testing same is to be adopted, and particulars of test entered in the Machinery Register when issuing certificates:—

- (1.) As nearly as possible balance the weights of cages and ropes in the shaft.
- (2.) Set the engine with both cranks on the engine side of the crank circle and each at an angle of 45 degrees to the horizontal as nearly as possible.
- (3.) Put both brakes hard on.
- (4.) Apply full steam with the reversing lever set first in one and then the other of its extreme positions.
- (5.) In addition to testing brakes with cages balanced in shaft, it is also advisable that each drum be tested in single gear.

"The brakes should thus hold the engine under full steam, with no more slipping than one foot. If the engine fails to stand this test satisfactorily, issue necessary notice, in writing, for same to be altered accordingly."

In every instance where brakes were found to be inefficient or defective after being subjected to above test, alterations and adjustments have, as far as possible, been carried out.

### DIVISION III.—SURVEY OF HARBOUR AND RIVER VESSELS MACHINERY.

*Survey of Harbour and River Vessels' Machinery.*  
—At the end of the year 45 vessels carrying goods and passengers for reward were on the registers, of which 42 were duly surveyed and certificated. Return No. VI. furnishes particulars of machinery surveyed, also repairs and alterations which have been deemed necessary to maintain such machinery in an efficient state during at least the currency of certificate. Surveys were conducted at Fremantle, Bunbury, Albany, and Geraldton.

## 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 High Pressure Condensing Engine	Screw	Steam	15-2-09	
"Helena" ..	Compound Condensing Engine	Paddle	do.	29-4-09	
"Duchess" ..	Compound Surface Condensing Diagonal Engine	do.	do.	12-2-09	
"Torrens" ..	Compound Surface Condensing Engine	Screw	do.	24-11-09	
"Countess" ..	Compound Surface Condensing Diagonal Engine	Paddle	do.	22-2-09	
"Brownie" ..	Tandem Quadruple Condensing Engine	Screw	do.	11-2-09	
"Avon" ..	Double High Pressure Non-condensing Engine	do.	do.	12-1-09	
"Kentish Lass" ..	Double Cylinder Non-condensing Engine	Stern Wheel	do.	18-5-09	
"Eagle" ..	Compound Surface Condensing Engine	Screw	do.	30-9-09	
"Zephyr" ..	Two Triple Expansion Surface Condensing Engines	Twin Screw	do.	10-8-09	Leakages from seam caulked.
"Jessie" ..	High Pressure Non-condensing Engine	Screw	do.	5-8-09	New set of tubes to be fitted, and boiler tested by hydraulic pressure.
"Reliance" ..	Compound Surface Condensing Engine	do.	do.	16-3-09	
"Westralian" ..	Two Compound Surface Condensing Engines	Twin Screw	do.	10-9-09	
"Fremantle" ..	Triple Expansion Surface Condensing Engine	Screw	do.	12-7-09	
"Albatross" ..	Triple Expansion Surface Condensing Engine	do.	do.	10-6-09	
"Lady Forrest" ..	Compound Surface Condensing engine	do.	do.	28-9-09	
"Parmelia" ..	Triple Expansion Surface Condensing Engine	do.	do.	5-1-09	
"Koori" ..	Compound Surface Condensing Engine	do.	do.	17-7-09	
"Valkyrie" ..	Internal Combustion Engine	do.	Oil	11-3-09	
"Swan" ..	Do. . . . .	do.	do.	26-4-09	
"Ophir I." ..	Do. . . . .	do.	do.	11-3-09	
"Wilfred" ..	Do. . . . .	do.	do.	4-5-09	
"Ophir II." ..	Do. . . . .	do.	do.	11-3-09	
"Linnet" ..	Double Cylinder Internal Combustion	do.	do.	12-3-09	
"Eclipse" ..	Vertical Compound Surface Condensing	do.	do.	8-5-09	
"Fram" ..	Internal Combustion Engine	do.	do.	4-2-09	
"Mary" ..	Do. . . . .	do.	do.	25-1-09	
"Dorothy" ..	Do. . . . .	do.	do.	25-1-09	
"Perseverance" ..	Do. . . . .	do.	do.	28-1-09	
"May" ..	Do. . . . .	do.	do.	6-11-09	
"Eagle" ..	Do. . . . .	do.	do.	10-3-09	
"Brooke I." ..	Do. . . . .	do.	do.	9-3-09	
"Etta" ..	Do. . . . .	do.	do.	9-3-09	
"Benita" ..	Quadruple Expansion Condensing Engine	do.	Steam	9-2-09	
"Valdavia" ..	Double Cylinder Internal Combustion Engine	do.	Oil	11-3-09	
"Ophir III." ..	Internal Combustion Engine	do.	do.	11-3-09	
"Rocket" ..	Do. . . . .	do.	do.	15-2-09	
"Mayflower" ..	Double Cylinder Internal Combustion Engine	do.	do.	22-10-09	
"Peter Pan" ..	Internal Combustion Engine	do.	do.	16-12-09	
"Yorck" ..	Do. . . . .	do.	do.	16-12-09	
"Valthora" ..	Triple Cylinder Internal Combustion Engine	do.	do.	18-12-09	
"Valhalla" ..	Internal Combustion Engine	do.	do.	9-3-09	

## DIVISION IV.—ENGINEERING SURVEYS.

Engineering Surveys under "Navigation Act, 1904."—Engineering surveys under the "Navigation Act, 1904," have been conducted on similar lines to those obtaining during the last three years, i.e., an officer attached to this Department being responsible for inspecting lighthouses, survey of machinery, boilers, and steel and iron hulls of deep sea vessels. Declarations as to seaworthiness were furnished for

13 vessels to the Harbour and Light Department to which also fees amounting to £95 15s. were paid by ship owners, as against £90 10s. for the previous twelve months. The vessels surveyed and certificated being:—"Agnes," "Maitland," "Dunskey" (2), "Bruce," "Kepler," "Vigilant," "Herbert," "Una," "Venus," "Ferret," "Bruce," "Awhina," "Moonta."

Interim surveys of steamers undergoing overhaul or repair, and for which certificates were then current, were effected on the following vessels: "Hartbart" (under repair), "Petrel" (2) (under repair), "Penguin," "Rutherglen" (under repair), "Bucrania" (under repair), "Koombana" (after grounding), "Yanda" (under repair), "Zephyr," "Gorgon" (2), "Arrino," "Lameroo," "Westfield," "Thalia," "Australind" (under repair).

(The figure in parenthesis indicates number of surveys.)

#### DIVISION V.—EXAMINATION OF ENGINE-DRIVERS.

*Engine-drivers' Examinations.*—During the year four examinations for engine-drivers' certificates were held in Perth, two in each of the following centres:—Bunbury, Kalgoorlie, Malcolm, Cue; and one each at Norseman, Sandstone, Albany, Northam, and Ravensthorpe.

Forty-eight meetings of the Board of Examiners were held during the year, at which 252 applications for examination were dealt with, and the issue of the following certificates approved:—

#### RETURN No. VII.—Return showing Total Number of Certificates (all classes) Granted during 1909.

Class of Certificate.	Number granted.	
	1909.	1908.
First Class Competency (including Certificates issued under Regulation 9A)	37	34
Second Class Competency (including Certificates issued under Regulation 9A)	43	45
Third Class Competency	76	63
First Class Service	..	..
Second Class Service	..	1
Third Class Service	..	1
Locomotive and Traction Competency	17	16
Locomotive and Traction Service	..	1
Traction Competency	3	3
Traction Service	..	1
Marine Competency (including Certificates issued under Regulation 9A)	8	7
Interim	23	18
Copies	18	15
<b>Total</b>	<b>225</b>	<b>205</b>

*Inquiries, Prosecutions, etc.*—One inquiry only was conducted by the Board during the year, and that was in connection with a case of overwinding at the Boulder Deep Levels G.M. on the 9th February. The Board administered a caution to the driver concerned. It was found necessary to institute proceedings against a driver at the Westralia Colliery, Collie, under Section 65 of the Act, for being in charge of a steam engine and not being in possession of the requisite certificate. A conviction was obtained and fine and costs amounting to £2 1s. 3d. imposed.

#### DIVISION VI.—ACCIDENTS.

*Accidents.*—There has been an increase in the total number of accidents caused by machinery. That ever fruitful source of mishaps—belts, shafting, couplings, etc.—furnishing no less than 84 per cent. of the accidents recorded and inquired into. In fact, four of the five fatal accidents which I regret to have to place on record, were attributable to the same cause.

The first fatality occurred on the 24th May at the Burbanks Main Lode Mine, where the engine-driver was accidentally killed by being struck on the head with the starting lever of the air-compressor. The immediate cause of the accident was the omission by the driver to open the cock of the bye-pass of the air cylinder when barring the engine into a favourable position for starting. The result was that a certain amount of air compression took place—not sufficient to lift the retention valve of receiver which was carrying 75lbs. per square inch—and as soon as the lever was raised to engage for a second pinch a "kick-back" was received from the compression in the air cylinder. The engine is an 8-drill straight line "Ingersoll Sergeant" type, and was originally fitted with a second pawl for safety, but no bye-pass. This second

pawl was, according to the engineer, broken off some two or three years prior to the accident by the engine kicking back in a similar manner as when the accident occurred. To prevent a repetition of this a bye-pass was fitted from one end of the air cylinder to the other with an ordinary two-way cock fitted to same, and the engine-driver had instructions to open the bye-pass whenever they had occasion to lever the engine into starting position. The instruction in this instance was apparently neglected, with fatal results to the operator.

At the State battery, Menzies, a battery hand was killed by shafting that was dragged from its position by belting. The engine-driver desirous of stopping a portion of the machinery, removed the main belt and then speeded the engine up again. Whilst in the act of tying the belt back against the wall the end of a piece of hemp packing, was caught round the shaft and took the belt which was a 6in. by 6in. ply "Balata" with it. About 30 feet of the counter-shaft, which was amply supported on brackets, was pulled down on to the battery tables where the deceased was working.

A feeder employed on Huntington mills at the Hannans Consols G.M., Kalgoorlie, met his death in a belt race in which he was walking to his work, instead of using the way provided. It is presumed that his clothing was first caught by the belting, which hurled him against a pulley.

Carelessness on the part of the victim was responsible for a fatality at the Associated G.M., Boulder, on the 25th October. The workman in question was close by a pulley preparatory to putting a belt on, and had a piece of ¾in. pipe about 2ft. 6in. long in his hand. By some means the pipe came into contact with a pulley, and was driven into the unfortunate man's chest, killing him instantly.

The fifth fatal accident for the year occurred at the Lord Nolan Mine, Kalgoorlie, when a twelve-year old youth, who was taking lunch to his elder brother, was caught by winding rope. The machinery responsible for the occurrence is an ordinary Crab winch, fitted with fast and loose pulleys driven from cam shaft of battery and used for hauling from shaft. The belt is fitted with striking gear and can be held in whichever position required. It appears the boy had been in the habit of playing about the mine, and boylike took every opportunity of "driving" the engine when unobserved by those about the surface. The winch hauled about 20 skips a day, and the person in charge filled in his time with other surface work in the intervals. It was during one of these intervals that the boy, hearing the signal to haul up, presumably put the handle of the striker over and set the winch going. Had he remained at the handle he would have been unharmed, but he apparently attempted to guide the rope after setting it in motion, and got caught and wound on the winch barrel.

In not one of the above-mentioned cases could fault be found with the owners for not providing reasonable means of safety, neither was it found necessary to issue departmental instructions requiring alterations or additions.

*Non-fatal accidents.*—Inspectors' reports indicate that particular attention is given to the proper guarding and fencing of shafting, belts, etc. Notwithstanding this special care accidents in this direction are still too numerous and seem to suggest that carelessness on the part of the injured ones is mainly responsible. It may at once be granted that the fencing of certain machinery or parts thereof

may legitimately be considered as forming matter of opinion, but quite apart from the legal necessity incumbent upon him, no owner is justified in exposing his employees to danger from naked shafting, even for an hour after he first uses it, whereas the too common plan is for it to be left until the danger is pointed out by an inspector. It is of course impracticable to have all moving parts covered, and even the most efficient fencing and guarding are not designed to render impossible accidents that may occur when such dangerous material as loose strands of hair come in contact with moving parts. Many of the girls employed in the factories are arrayed in flimsy attire, including blouses with loose sleeves and trimmings, and the hair expanded loosely with strands escaping, either by accident or design, from their fastenings. Owners have been urged to insist upon the wearing of clothing more suitable for machinery work, and especially on the more effective confinement of the hair. Many of them have long since taken steps in this direction.

The usual list of slight scratches, bruises, and cuts, of which many occur, has been recorded. Although injury has been slight in nature, absence from duty has been necessitated in a number of cases, not infrequently from want of proper cleansing and dressing of wound at the time of the mishap.

Two accidents only have been reported as having been caused by circular saws, as against six last year, which must be considered satisfactory in view of the large number of workmen employed in connection with them.

With the exception of accidents classified under the heading "shafting, belting, couplings, etc.," ten only have been recorded as having been due to other causes.

#### RETURN NO. VIII.

Return showing Number of Accidents in each District during the Year ending 31st December, 1909.

Cause.	Districts.										Total all Districts.	
	South-Western.	Coolgardie and Yilgarn.	Dundas.	East Coolgardie.	North-East Coolgardie.	Broad Arrow.	North Coolgardie.	Mount Margaret.	East Murchison.	Murchison, Peak Hill, and Yalgoo.	1909.	1908.
Circular saws ...	1	...	...	1	...	...	...	...	...	...	2	6
Lathes, planing and shearing machines ...	...	...	...	3	...	...	...	...	...	1	4	2
Passenger lifts ...	1	...	...	...	...	...	...	...	...	...	1	2
Shafting, belting, couplings, pulley drums, and other mill gearing* ...	2	1 (1)	...	39 (3)	...	...	1 (1)	6	2	2	53	36
Moulding machines ...	...	...	...	...	...	...	...	...	...	...	...	1
Scalding ...	...	...	...	1	...	...	...	...	...	...	1	3
Hoists ...	...	...	...	2	...	...	...	...	...	...	2	1
Grinding and emery wheels ...	...	...	...	...	...	...	...	...	...	...	...	2
Totals ...	4	1 (1)	...	46 (3)	...	...	1 (1)	6	2	3	63 (5)	53 (6)

\*Excluding accidents covered by other headings.

Figures in parentheses denote number of fatal accidents.

In January of current year an employee at the Great Fingall Mine was killed through the bursting of an air receiver, which subsequent examination showed had wasted almost through, and which apparently had not been properly examined by the owners. Air receivers are not at present subject to the provisions of the Act, but I do not know of any reason why they should not be included and subjected to periodical inspections, and certificated for a period not exceeding two (2) years, according to condition, as the working conditions are undoubtedly severe owing to engine pulsations as each successive compression takes place. I am of opinion that inspec-

tions under "The Inspection of Machinery Act, 1904," should be made compulsory without delay.

#### DIVISION VII.—GENERAL.

*General—Inspectoral Staff.*—The vacancies referred to in my last report as having been created in April and November, 1908, respectively, were not filled until May, 1909, when Inspectors Churchill and Booth were appointed on probation for six months. The delay in filling these vacancies and the illness of Inspectors referred to earlier in this report, naturally imposed extra duty and longer hours on the remaining members of the staff, who have

worked loyally and well. A large amount of special work—not provided for in the Act—has been carried out on behalf of other Departments during the year, e.g., a comprehensive report on a proposed re-arrangement of the heating and cooking plant at the Perth Public Hospital was furnished at the request of the Board of Management concerned. This meant a great deal of work and time, as several tests had to be made with the then existing inadequate and badly arranged plant, owing to the entire absence of any reliable data. A similar report was required by the Public Works Department on the Fremantle Gaol cooking, laundry, and bath plants in the male and female quarters. In each case improvements were suggested which meant the saving of many pounds. In regard to the latter, specifications for the manufacture and erection of two large Lancashire boilers, including the brick chimney, and arrangement of many hundreds of feet of steam piping with all necessary expansion joints, steam traps, valves, etc., were prepared in this office, and the boilers are now being locally constructed under the supervision of this Department. This also took up a great deal of time to the detriment of specific work under the Act, as no special staff is provided for work of this nature. Advice has also been sought by the Lands Department in connection with land clearing at Denmark. Work of this description involves the application of a lot of time and careful attention, and means economy to the department for which it is performed, as otherwise outside expert advice would necessarily have to be obtained.

Owing to some dispute between the Contractors and Public Works Department, an independent report on the whole electrical and steam installations at the Claremont Hospital for Insane was called for. A number of important alterations and additions were recommended and adopted. Assistance was also rendered the Public Service Commissioner in the appointment of a Working Engineer for the same plant. Applications were invited and a selection made from eight candidates after a competitive examination.

*Revenue and Expenditure.*—The total amount received as inspection and examination fees during the year was £4,481 13s. 1d., showing a slight decrease when compared with the previous year's figures. Arrears in inspection work are chiefly responsible for the estimate of £4,500 not having been reached, but I confidently anticipate that next year's results will show a marked improvement.

*Correspondence.*—Inward correspondence totalling 7,723 was received and registered, and outward letters and telegrams amounted to 5,949.

*Mileage Travelled.*—To carry out inspections and other work dealt with in this report an approximate distance of 35,601 miles have been travelled by Inspectors, viz., 13,881 by road, 251 by steamer, and 21,469 by rail.

Before concluding this report, I desire to place on record my appreciation of the generous support and assistance which I have received from the staff, and to thank officers of other departments who have rendered assistance in connection with engineers' examinations held in the outlying centres.

C. J. MATHEWS,

Chief Inspector of Machinery and  
Chairman Board of Examiners.

19th May, 1910.

## DISTRICT INSPECTORS' REPORTS.

Inspector B. Pryn Jones, in charge of the East Coolgardie, Coolgardie and Yilgarn, Dundas, North-East Coolgardie, and Broad Arrow Districts, reports as follows:—

During the year the Department suffered a severe loss in the death of Inspector Latimer. He was widely respected as a conscientious and able officer, and his sad end, which many claim to have foreseen, is everywhere regretted. This district has difficulties peculiar to itself which his health was unable to resist. So strong was his zeal that he was practically forced to leave his post—but the relief came too late.

During his illness and until my arrival in August last, the work was carried on by Mr. Lee, but as it was impossible for one man to do all the work of this large district, the machinery work had to drift, and on commencing work there were over 360 groups due for inspection in and around Kalgoorlie.

The number was considerably reduced by the end of the year, and at time of writing there remain very few groups to do, many of which are small underground air winches. It might be explained that some of the groups had become dispersed and others are out of use, but most of the registered numbers which become available were given to new registrations. It frequently takes as long to discover that a group is out of use as to make an inspection, and much time is lost in this way.

Shortly after my arrival here, your circular laying down the standard test of winding engine brakes was received, and the work of recording particulars and making tests was proceeded with as quietly as possible. Typed forms were prepared, and over thirty winding engines have particulars recorded. Further than this, I have considered it wise to make notes of visits in each file, with remarks likely to assist in any future inspection. By the time all districts have been visited, I hope every winding engine will have its record.

Touching the correspondence regarding the severity of the standard test in those cases where power is greatly in excess of load, and your ruling that where abnormal conditions exist, an Inspector should make certain allowances, I would respectfully suggest that to meet such case, some other test should be laid down for the guidance of all Inspectors. I consider that our practice should be uniform, and I propose bringing up the question again shortly.

I notice by office records that a controversy has taken place on the subject of winding engine brakes. I respectfully contend that if it could be laid down precisely what a brake is required to do, it would be easy for an Inspector of Machinery to arrange a convenient test. What contingency is to be foreseen? If sudden want of motive power, such as the bursting of a steam pipe, then it should be sufficient to require the brake to safely hold or lower the loads from surface to bottom of shaft. Because the excess of ore load over a cage full of men is a fair margin of safety for latter, especially as a full load of men is almost invariably dealt with in double gear. If, on the other hand, the brake is required to withstand the simultaneous jamming of the throttle valve in full open position, and the reversing lever, then the single gear test with full load close

to bottom assisting steam (with cranks in favourable position) should be rigorously insisted on. Fracture of a steam pipe, although a remote contingency, has occurred twice in my experience. On one occasion the sudden collapse of the flue tube of Cornish boiler caused it to jump forward twelve inches, and so break main steam pipe. And a few years ago a copper expansion bend in a main steam line gave way without warning. But the number of recorded instances do not, I think, warrant the laying down of any hard and fast rules as to whether brakes should only be released, not applied by steam. At the same time, as there is no doubt as to which is the wiser practice, an Inspector should let it be clearly known which way his approval lies, although he cannot perhaps refuse a certificate on such a point.

Only two mines to my knowledge have steam applied brakes, and I have reason to believe both will be altered by the end of this year.

The steam brake, although efficacious, is not an ideal working implement. Cushioning cylinders and equilibrium gear are supposed to allow the pressure on brakes to be applied gradually, but after a little wear and tear the action is "fierce" or jerky. Nearly twenty years ago it was my lot to wag a steam reversing handle for large quadruple expansion engines, and I have still very clear recollections of its sweet action after overhaul, and very much the reverse after a period of inattention. Designers should, in my opinion, give their attention to devising a brake which will apply pressure gradually without perfect adjustment such as most of the present designs require. There is little reason why braking cannot be done almost entirely by hand or foot, power and steam only used to apply final pressure, and I know of some very efficient brakes which have no steam assistance.

Some new plant has been put in during the year. The Golden Horseshoe Coy. has Turbo-generators in full swing, and electric motors are dotted all over the plant. Two mines propose installing exhaust steam Turbine engines. The Kalgurli will soon have a large Fraser & Chalmers winding engine at work, and the Ivanhoe is getting ready for a new winder for the third compartment of the Patterson shaft. This will be a single drum, double brake engine with certain novel features.

The plant destroyed by fire at the Perseverance mine a few months ago has been sold to machinery dealers and is being rapidly removed to make room for two large "Walker" compressors and eight No. 8 Krupp Ball Mills. Timber has been ordered for rebuilding and men are busy on small gear such as conveyors, etc.

Suction gas plants are coming into vogue, and the erection of nine or ten plants has been started during the year. I hope by the end of this year to obtain some interesting data from local practice.

Boilers are well maintained wherever Scheme water is available, and even in the outside districts maintenance can be described as good. A great deal of this is, of course, due to regular inspection, and also to advice freely given when asked for, but boiler owners themselves seem to be taking more interest in the economy effected by good maintenance.

As I write word comes of an explosion of an air-receiver at Day Dawn, which I hope and expect will lead to the official inspection of them in future.

Some years ago, while watching the safety valve of an air-receiver while blowing-off, I was struck by the pulsation due to successive compressions in air-cylinders. The relief was in puffs and the gauge finger showed when steadied from violent oscillation a variation of 10lbs. per square inch every second or so. It appears to me that notwithstanding the fact that well designed receivers are cylindrical in body with semi-spherical ends, the working conditions are severe. Given, then, this movement (infinitesimal perhaps, but constant), the layer of water along the bottom and "sweating" on top, such conditions are good for rapid corrosion. I have often tried to get a look at a receiver, but failing, have informed the owners of my views on the subject. Explosions in pipes have taken place due to gas emanating from lubricating oil in air cylinders, but I only heard of one in this State.

*Accidents.*—Only three fatal accidents have occurred during the year. One, directly, by belt to a man who should not have been near it, another to a man who was about to put a belt on and was struck by an iron pipe with which he usually guided the belt on to the driving pulley, and the third to a boy who got entangled in the wire rope leading to a crab winch worked by fast and loose pulley from a battery cam shaft. In the last case the lad was a trespasser.

None of the three were due to insufficient guarding. Considering the amount of machinery working in this district I do not consider the record a bad one. As pointed out, in two cases the deceased should not have been near the machinery which caused the accident. In the third, the man went to perform an operation which he had done scores of times before and was picked up dead, so that no light could be thrown on the cause. There has been the usual number of bruised fingers and other accidents of a more serious nature, but no charge of neglect can be laid against the Department in any case. As a rule I find owners quite willing to erect safeguards when instructed to do so. Many of the large plants are a maze of moving belts, pulleys, shafting and elevators. Viewed from one side to-day, conditions seem safe—to-morrow, perhaps approached from another, there seems an element of danger to beltman and greaser. Every large plant should be visited many times a year, and the Inspector should get into conversation with the engine-drivers, beltmen, greasers, and other attendants to glean information for his guidance. Inspectors of Mines have always drawn my attention to any awkward or dangerous conditions which they see or hear about, and such information is always appreciated.

*Engine-drivers.*—The engine-drivers of Kalgoorlie are a fine body of men and are all properly certificated. The successful manipulation of a large winding engine dealing with two unevenly balanced loads varying momentarily, started and brought to rest every few minutes in response to signals, is about the severest test of a man's nerve and endurance that can be desired.

A few complaints have been received of the employment of uncertificated men in the outside districts, but no case has been serious enough for prosecution.

Three examinations have been supervised during the year—two in Kalgoorlie and one at Norseman. In the former town thirty candidates presented them-

selves on each occasion. As a body they appear keen and intelligent, and with such a schooling ground as the Golden Mile ought to become high-class men.

Inspector G. P. McCulloch, in charge of the North Coolgardie and Mount Margaret Districts, reports as follows:—

*Accidents.*—There have been eight (8) accidents during the year. One in the North Coolgardie, and seven in the Mt. Margaret districts. The former was the unfortunate case of F. Twyford, who was killed by the falling of a countershaft, and this case has been fully dealt with on the file appertaining thereto. Of the seven accidents in the Mt. Margaret district, five were of a trivial nature, and due to either carelessness or pure misadventure. The remaining two, although of a more serious nature, were also due to the same causes, and of a kind which could not be prevented by any care on the part of the inspectors.

The terrible carelessness displayed by employees working amongst machinery is a never-failing subject of remark. In many cases the fencing provided for by the Act becomes an actual danger in itself, owing to the persistence with which the oilers and cleaners crawl under or through it. It is also common to see men working about machinery with ragged or loose clothing flapping about them, and this cause alone has always carried a heavy toll of human life and limb.

*Mileage travelled.*—The mileage travelled during the 12 months was as follows:—

	Road.	Rail.	Total.
Mt. Margaret ..	1,769	1,591	3,360
North Coolgardie	1,037	1,310	2,347
	2,806	2,901	5,707

The total number of thorough inspections of boilers made being 280, the average mileage for inspection becomes: By road, 10; by rail 10 1/3rd. For the last four years the figures are:—

	Total by road.	Total by rail.	Total aggregate.
1906 ..	2,934 ..	2,437 ..	5,471
1907 ..	4,735 ..	2,454 ..	7,189
1908 ..	4,194 ..	4,327 ..	8,521
1909 ..	2,806 ..	2,901 ..	5,707

These figures form the best proof which I can adduce as to the fact that I have now succeeded in getting the work of these Districts back again into shape, and properly laid out so as to minimise the travelling and expense necessary to carry out the work. Were it not for this fact, indeed, it would have been impossible to have my work up to date as it is now, for there was (owing to my illness) no inspector at Malcolm at all during the months of April, May, and the greater part of June.

The condition and upkeep of the boilers and machinery in the districts show marked improvement. In many cases the installation of water-softening plants has been productive of greatly improved conditions, and has, besides preventing the rapid deterioration of the boilers, considerably lessened the expense of cleaning.

The question of Producer Gas plants for mining purposes is just now occupying considerable attention, but while these plants are eminently suitable under certain circumstances, and for some purposes, I strongly doubt their general applicability. One thing

is at least quite certain, that such plants will not stand the treatment to which many steam plants are subjected in their ordinary work, and that considerable care should be exercised by mine owners before discarding the old steam plants and launching into expenditure on innovations which may ultimately become subjects of regret.

On the other hand, were more skill and intelligence displayed in the installation of steam plants, these would seldom leave much to complain of. It is common to see, for instance, a mill engine which is capable of driving from 30 to 50 head, installed to drive 10 head only, the idea being that a fine reserve of power is obtained for very little if any greater first cost. This may be so, but it is also certain that such an engine will cost from £30 to £40 a month more in fuel than one of proper dimensions. In two cases where the writer has unofficially advised the addition of expansion valves to such engines, thus securing that practically all the work is taken out of the steam before discharging it into the atmosphere, and at a total cost of less than £100. The above saving has been amply secured by this one alteration alone. The use of suitable boilers, high pressure steam, atmospheric or other condensers, well lagged steam pipes, oil separators, water softeners, engines properly designed for the work to be done, and the taking of regular indicator diagrams, all contribute towards a saving almost incredible to those not well versed in the facts of such work, and which may make all the difference between a payable and a non-payable proposition. In this respect also, it is my opinion that where Government subsidies are granted, for the erection of mining plants and winding equipments, greater attention should be paid to the enforcing of the above conditions, if only for the better security of the mortgagees, and the plants, etc., approved by competent Departmental officers before erection.

Inspector W. Churchill, in charge of the Murchison and Yalgoo, Peak Hill, and East Murchison Districts, reports as follows:—

Since my appointment in May last, I have visited all the principal centres, and many of the outlying leases in my districts, but there are yet some few outlying mines such as at Yuin, Gullewa, Rothsay, New England, Youanme, which places I intend to visit in the course of the ensuing year.

Speaking generally, I should say that mining in the Murchison and East Murchison Districts shows a little increased activity so far as work is concerned, although the gold returns may not show any marked increase. A good deal of development work is being done, necessitating in some cases some slight additions to plants already here and in other cases removal of existing plant into new sites.

From the generally expressed opinion I should say that any future new plants will almost certainly be Suction Gas plants, in preference to steam, as the few plants already installed seem to be giving every satisfaction, and some amendments to the present Act might be necessary to deal with suction gas plants in a uniform manner as regards provision for stopping and starting instantly all machinery driven therefrom, as by means of fast and loose pulley or some approved form of friction clutch on engine shaft. Also a subject which will occupy attention soon, on small mines at least, is the matter of applying power from suction gas engine to winding plant, either by means of belt driving and friction gearing or electrically.



I have dealt shortly with each centre separately, as being the best means of showing the ground covered, information obtained, and work done since my appointment, and I find, like my predecessor, it is an utter impossibility for one Inspector to get through the amount of travelling, inspecting, and reporting in connection with such a large district, in anything like the regulation hours, and I think this should be taken into consideration when fixing the salary for an appointment of this class.

*Office Work.*—Clerical assistance has been the cause of some dissatisfaction and annoyance latterly, as the conditions under which I reported favourably of the new arrangement have not been fulfilled, and I found it necessary to complain of this office being neglected, but matters are now more satisfactory. I would only repeat here, that it is absolutely necessary for the efficient working of this branch that there be a clerk, whose primary duty is to attend to work of this office, and to be thoroughly in touch with the work always.

*Engine-drivers.*—I have not any cases of misbehaviour to report, and the general relations between owners and drivers seem to be very satisfactory in these districts. There have been four examinations held during the year, one at Sandstone, one at Lawlers, and two at Cue.

*Accidents.*—During the year a total of seven accidents was reported from both districts, four of which were classed as "serious" and three as "minor." In most cases the accidents appear to have been unavoidable except by the injured man himself.

*Prosecutions.*—I have not any prosecutions to report, although in some few instances proceedings have been threatened, which, however, had the desired effect.

*Boiler Feed.*—The matter of boiler feed water generally in these districts is one which could be improved greatly, much to the advantage of boilers and owners alike, by the expenditure of a little money in water treatment plant.

In conclusion, I wish to say that in taking over this district, I have made the inspection of boilers my first care, and may have somewhat overlooked the machinery; but hope to bring that part of my work up to date during the ensuing year, when I shall be more familiar with the various localities, mines, and the plants thereon.

Inspector H. L. Gill, of the South-Western District, reports as follows:—

The following is an analysis of work done by me in the South-Western District during the past year:—

Boiler certificates issued .. .. .	186
Machinery certificates issued .. .. .	77
Machinery other than steam certificates issued .. .. .	273
Schedule 4 .. .. .	15

During the year I registered 34 new groups of machinery, and have reason to think there are still a good many unregistered in the district.

*Accidents.*—During the year there have been three accidents due to machinery:—

- (a.) A man lost his thumb and two fingers by being caught by a circular saw.
- (b.) A boy lost a joint of his toe by climbing over an engine and getting it caught under the crank.
- (c.) A man got his arm broken by ignorantly interfering with self-acting grip gear of a lift.

In all three cases carelessness was the cause of the mishap. In cases (b.) and (c.) neither the boy nor the man had any business to place themselves where they were.

*Inspections.*—I am pleased to be able to report that though 84 inspections were behind-hand at the commencement of the year, by the end of the year all arrears were wiped off and the work brought up to date. Of course I refer to machinery, etc., inspections on Perth side, which fall to my lot.

*Lifts.*—There have been no lift accidents to passengers or lift attendants during the year (the one referred to above in (c.) was to the owner), and there is not much of any interest to report in connection with this subject. Generally the lifts about the town have worked well, and without giving more than the usual small electrical troubles, such as blowing out of fuses, brake adjustments, etc.

More attention has been paid to inspecting the cased-in worm gearing, thrust bearings, etc., as opportunity occurs to have these opened up.

In two cases the ball bearings in thrust bearings were found very bad, balls broken, and bearing and shafting cut.

In one case the keys in main winding drum worked loose, and keyways were much damaged. I ordered new keys. Those put in could hardly be dignified by the name of decent "wedges," and of course the trouble repeated itself in a few days. After this, I insisted on lift being stopped, drum and shaft being removed, and good well fitting keys being put in.

Several new ropes have been put in during the year. In two cases the renewal of ropes was necessitated by entirely unsuitable ropes being used.

One worm shaft was found much cut by a thrust-bearing washer. This matter was referred to in last year's report. After a recurrence of the trouble, and in view of the installation being too light throughout, and generally shoddy, the owners decided to replace the whole winding gear by a new one, which has worked without trouble ever since.

There has been a big falling off in the installation of new lifts this year—only one new registration having been effected.

In conclusion, I beg to report that the tendency to provide decent guards to machinery is increasing, and the public with whom I have come in contact appear to show a growing tendency to appreciate the efforts of this Department in trying to secure safe conditions both in boilers and machinery.

DIVISION VIII.

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**ANNUAL REPORT OF THE CHIEF INSPECTOR OF EXPLOSIVES, GOVERNMENT ANALYST, AND AGRICULTURAL CHEMIST, FOR YEAR 1909.**

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*The Secretary for Mines, Perth.*

Wellington Street, Perth,  
9th March, 1910.

Sir,

I have the honour to submit, for the information of the Hon. the Minister for Mines, my fourteenth Annual Report concerning the various classes of work coming within the scope of my duties.

If a report of this character is to be only a dry record of figures it can contain very little of general interest. Any departmental report, however, can only be of an interesting character in so far as the work of the department which it chronicles is of a progressive character. How far Government Departments should undertake research investigations is a matter of great difference of opinion. I have always held the view, however, that if technical Government departments are simply looked upon as intended only for the performance of routine work, the State itself will be the loser. If a tacit recognition is given to the view that a certain amount of research should be associated with the routine work, it will, I feel sure, be both of direct and indirect benefit (1) by providing solutions to problems of importance, and (2) by stimulating the professional zeal and enthusiasm of technical officers which cannot but react with good effect upon even the routine work.

I feel constrained to refer to this matter at some length because it is one of paramount importance when any consideration is given to the question of the ground which my work should cover, and that of equipment for my laboratory, both in the matter of staff and appliances; I consider it is an unprofitable year in which it is not possible to recall some attempt, however small it may have been, to open up new avenues of knowledge, and I feel constrained to draw attention to the opportunities which are allowed to slip by unnoticed.

During the year just closed there has been very little to record beyond the performance of merely routine duties.

The investigation in connection with the corrosion of the Goldfields Water Scheme mains was continued from time to time, and experiments were made to test the value of certain recommendations made by me. As the whole of this matter is still under departmental consideration it is not fitting for me to enter fully into the matter here.

Another subject which has been receiving attention is the question of the nature of fumes derived from explosives in our mines. This matter, which formed the subject of investigation by the Royal Commission on the Ventilation and Sanitation of Mines in 1904-5, has, during the last year or so, been further investigated by chemists in South Africa, and certain papers

published by Messrs. Cullen & Weiskopf have opened up very interesting questions of great importance to the health and safety of miners. Their investigations appeared to me to call for still further research on my part, and as a result of my representations to the Government, the Hon. the Minister for Mines has approved of my undertaking an extensive inquiry, and the co-operation of the Transvaal Government has been sought and obtained, so that by a simultaneous investigation in the two countries it is hoped that real progress may be made towards the betterment of the conditions under which men have to labour in our metalliferous mines. Preparations have been going on for some months, and at the time of writing this report the work of these investigations has just been commenced so far as Western Australia is concerned. It is anticipated that at least three months will be occupied in the actual experiments, full particulars of which will have to be delayed until my next Annual Report. The Government have provided a special sum of money to meet the special expenses necessary in connection with these inquiries.

Important as these investigations may appear, they are still only a small proportion of these which are called for in connection with other branches of my work. Amongst others that may be mentioned are the extremely important problems connected with the causes and control of soil fertility, the composition and improvement of water supplies, the investigation of native poison plants, and further inquiries into the question of potable spirits. The first three, although of paramount importance to this State, are at present in abeyance through lack of necessary staff and money, but as regards the last (investigation of spirits) a further step forward has been made during the year. The visit of the Chief Inspector of Liquors (Mr. Durham) to England afforded an opportunity of obtaining a large amount of first hand information and of obtaining representative samples of spirits which were not obtainable in Australia, and through Mr. Durham's efforts a large number of spirits were obtained and are now under special examination; as in the case of other work referred to the results are not yet in a form to allow of any generalisation to be drawn, but it is hoped, during the coming year, the investigation of these spirits will form the basis of a special report which will carry one step further the work which has been done in this State on this very important subject, and which has been instrumental in putting the inspection of liquors in Western Aus-

tralia probably in advance of that in any other part of the world. The Royal Commission on Whisky in England which recently completed its labours and presented its report was thought to have finally settled the questions submitted for its consideration, but I think that a critical examination will show that there is still much to be done, and since questions of this magnitude require to be considered from many points of view, it is hoped that even the work done in this State may help to provide knowledge which will contribute towards that which must inevitably come about—a more scientific and intelligent legislative control of the liquor traffic, of the same character as that universally demanded in the case of ordinary food-stuffs.

I think that the foregoing remarks, which may, by some, be considered out of place in an official departmental report, nevertheless need no apology in a State like this where, in the absence of any University establishment, and in view of the lack of private research of any kind, special duties are thrust upon Government departments, and I feel that it is necessary that the exceptional position existing here should be recognised.

#### IMPORTATION OF EXPLOSIVES.

The following tables give all the information, annually published, with regard to the Importation of Explosives into Western Australia:—

TABLE I.—*Importation for 1909.*

	Quantity.	Value.
	lbs.	£
Gelignite .. .. .	2,378,100	87,167
Dynamite .. .. .	7,500	307
Blasting Gelatine .. .. .	370,500	20,039
Gelatine Dynamite .. .. .	310,250	14,300
Detonators .. .. .	3,210,144 (number)	4,804
Fuse .. .. .	498,900 (coils)	10,920
Powder, Blasting .. .. .	242,217	6,163
Powder, Sporting .. .. .	575	65
Explosives, N.E.I. .. .. .	..	9,936
Fireworks .. .. .	..	385
		£154,086

TABLE II.—*Comparison of Importations for the last Five Years.*

Explosives, etc.	Year.				
	1905.	1906.	1907.	1908.	1909.
Nitro-Glycerine Compounds .. .. .	158,472	157,467	103,062	124,354	121,813
Blasting Powder .. .. .	5,026	2,317	5,403	2,896	6,163
Sporting Powder .. .. .	97	610	288	133	65
Fuse .. .. .	14,762	10,893	8,476	11,265	10,920
Fireworks .. .. .	..	586	362	312	385
Cartridges .. .. .	..	11,061	..	15,099	9,924
Detonators .. .. .	..	3,322	3,935	3,341	4,804
N.E.I. .. .. .	2,641	12,725	1,066	6	7
Caps .. .. .	..	272	..	20	5
	£180,998	£199,253	£122,592	£157,426	£154,086

TABLE III.—*Kinds and Quantities of principal Industrial Explosives Imported in 1908 and 1909.*

	1908.	1909.
	lbs.	lbs.
Gelignite .. .. .	3,261,928	2,378,100
Blasting Gelatine .. .. .	438,500	370,500
Gelatine Dynamite .. .. .	339,852	310,250
Dynamite .. .. .	12,000	7,500
Blasting Powder .. .. .	116,500	242,217
Sporting Powder .. .. .	1,150	575
	4,169,930	3,309,142

TABLE IV.—Comparison with other States.

Explosives, etc.	Western Australia.	N.S. Wales.	Queensland.	Victoria.	South Australia.	Tasmania.*	Proportion of total for Australia imported into West Australia.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	
Nitro-Glycerine Compounds .. .. .	3,066,350	1,325,145	1,531,280	1,753,140	554,400	434,400	
Blasting Powder .. .. .	242,217	1,851,900	709,100	234,000	123,250	44,875	
Sporting Powder.. .. .	575	26,140	3,750	83,000	9,150	2,150	
	3,309,142	3,203,185	2,244,130	2,070,140	686,800	481,425	27·58%
	£	£	£	£	£	£	
Fuse ■ .. .. .	10,920	..	10,397	2,256	2,532	..	
Detonators .. .. .	4,804	6,330	4,282	4,506	752	1,335	
Explosives, N.E.I. .. .. .	7	17,641	4,217	6,004	815	3,875	
	£15,731	£23,971	£18,896	£12,766	£4,099	£5,210	19·49%
Total value of Explosives enumerated above ..	£143,772	£86,609	£99,204	£96,835	£33,646	£28,567	29·42%

\* It is not clear from the Return whether the Victorian Importations include also those shown for Tasmania; this may probably be so, since the Tasmanian Importations are, I understand, tested in Victoria. This would modify the figures in the last column considerably.

It will be seen that a falling-off in the value of importations to the extent of £3,340 has taken place, although if quantities are considered there is a greater falling-off.

It is always difficult to obtain a constant relationship between quantities and values, as the latter are compiled from the invoices presented to the Customs, and it has been found in previous years that these are liable to large fluctuations which it is difficult to explain. A decrease in quantities of explosives means a considerable decrease in the amount of testing required by the shipments arriving in this State. The tests made, both on explosives imported and on those stored in various magazines throughout the country, are shown in the following table:—

Table V.—Tests made on Explosives.

	No. of Samples.
Monobel Powder .. .. .	5
Gelignite .. .. .	993
Fuse .. .. .	480
Gelatine Dynamite .. .. .	127
Blasting Gelatine .. .. .	151
Dynamite .. .. .	3
Miscellaneous .. .. .	243
Total .. .. .	2,002

These figures show a decrease of 810 samples over the tests for the previous year.

In connection with this part of my work a very interesting investigation has been carried out in conjunction with one of the leading manufacturing firms in England, the object being to determine the effect of differences in composition and climatic conditions on the stability of nitro-glycerine compounds. A very large number of tests were made on samples stored in magazines in the ordinary manner and on corresponding specimens kept in an incubator at a raised temperature and examined regularly for a period of twelve weeks. Although no conclusive results were arrived at, even if the results of such experiments are of a negative character, such inquiries cannot fail to be of some value in connection with the general study of the stability of explosive compounds.

In the course of testing the safety fuse imported, a considerable number of samples failed to comply

with the burning speed regulation now enforced in this State. All such consignments were withdrawn from the market by the merchants, and were mostly transferred to the Eastern States of the Commonwealth where no such speed regulation exists. There are abundant facts to show that this regulation has undoubtedly brought about on our mining fields a result which is very gratifying and which was the object of its introduction. The testimony of Mine Inspectors, the Mine Managers, and my own personal experience, go to show that the fuse now used on our fields possesses an accuracy and uniformity hitherto unapproached, and there can be no doubt that the perfect control of mine blasting which this renders possible has contributed materially both to the safety of our miners and to the efficiency of the work done by the explosives. Only those immediately acquainted with the details of mining pursuits can fully realise the great importance to be attached to the correct timing of fuse, and I am particularly pleased to be able to record the fact that some of those manufacturers who were at first inclined to resent the imposition of this regulation have been the most successful in producing for this market an accurate and uniform fuse in compliance with the requirements. The effect of safety fuse upon the fumes arising from blasting will be a special feature of the investigations which are now in hand, and a comparison will be made between safety fuse and electric firing. I have always been a strong advocate of the use of electricity in at least a certain portion of the blasting operations on our mines, and some recent experiments conducted at Kalgoorlie (not under the control of this department) give strong hopes that this method of firing will receive far more attention than it has in the past and that it will commend itself both from a commercial and hygienic point of view.

#### STORAGE.

There has been very little change in the explosives magazines during the period under review. There are at present 73 magazines on explosives reserves, one less than last year.

These include four Government buildings, the total capacity of all the magazines being 1,210½ tons.

Outside the reserves there are 39 magazines with a capacity of 33¼ tons, but detonator buildings are

licensed as adjuncts to main magazines and are not shown in the above figures. There are, however, fifty of these buildings with a capacity of some four million detonators. There has been considerable re-arrangement of buildings by transference from one site to another, as demanded by the fluctuations of mining activity in different districts.

There are at present, as during the preceding twelve months, 43 reserves with a total area of 3,195 acres. The question of the transfer of the Kalgoorlie Reserve is still in abeyance, this matter depending entirely upon the provision of funds for removal. As the new site selected will require to be connected with the railway system, and as the expense of removal is rather considerable, it is impossible at present to say when the desired change will be effected.

During the year considerable alterations were effected at the main Explosives depôt at Fremantle, which led to such a re-arrangement of the quarters and entrance gate as has enabled some economy to be effected, and by closing against all traffic the road leading through the Reserve to the Quarantine Station (an alteration which I have frequently urged) I have been able to dispense with the services of one watchman. At the same time this has added very materially to that isolation of the reserve and the buildings thereon, which is an indispensable condition for such an establishment.

During the year the magazine staff have had imposed upon them as an additional duty the clearance of extensive strips through the native scrub covering the reserve between the lines of magazines; the object of these strips being to provide fire-breaks in the case of an extensive outbreak of fire on the reserve or in the neighbourhood. The system of fire-breaks arranged has been completed, and it will be possible to keep them open with practically little labour. The entire removal of all scrub from the reserve would not only be a very costly matter but would give rise to difficulty by causing formation of sand drifts in the loose soil of which the reserve is composed, and very careful consideration of the whole matter has led me to the conclusion that the fire-breaks now cut will provide all necessary protection.

The magazines as constructed (with large protecting mounds surrounding each building) would, I think, be quite safe against any serious outbreak of fire on the reserve. The railway lines and other clearances connected with the work on the reserve would themselves afford a large degree of protection in the event of a fire arising in the enclosure; while the enclosing fence, surrounding roads, and clearances which have been made outside the boundaries of the reserve give reasonable grounds for believing that fire could not encroach from without. I think, therefore, that with the strips which have now been cleared, either any external or internal fire which may occur (though in itself only remotely possible) can be rapidly and completely controlled.

#### LICENSED PREMISES.

Under this head are included licenses for the sale of fireworks which are very largely in the hands of Chinese merchants. As the Act requires the supervision of this trade I endeavour to control it as far as possible with the means at my disposal; owing, however, to the fact that it only exists to any extent for a few weeks during the year, and on account of the frequent changes among the merchants who conduct the business, it is a trade which is very difficult

to control in a satisfactory manner, and if there are at that particular time of the year any more important demands on the time of the travelling inspector, this work must necessarily suffer.

The licenses issued and revoked for the storage and sale of explosives are shown in the following table:—

Applications received	..	..	55
Licenses issued	..	..	58
Licenses revoked	..	..	58
Licenses remaining in force	..	..	193

#### INSPECTION OF EXPLOSIVES.

The expansion of general work of the department has again somewhat interfered with the inspection work carried out by Mr. Kirton, the Assistant Inspector of Explosives, so that the inspections made during the year show a decrease on the previous twelve months; nevertheless, I have myself made supervisory visits, one to the Eastern Goldfields and one to Cue, and have by personal inquiry and inspection satisfied myself that the general condition of the magazines and stores throughout the country is satisfactory, and that the general safety of the public has been guarded by the inspections made. A number of minor details, such as improvement and repairs to magazines and smaller matters of administration which frequently arise, can only be attended to by more frequent personal inspection, and it is these which call for constant supervision by the inspector.

Though perhaps not important in themselves, these small matters if neglected lead to a general laxity and indifference which may extend to more important matters, and on this account are given greater attention than they may appear to warrant in themselves. I do not intend, therefore, to lose sight of the necessity of frequent visits being made to all centres where magazines are in existence, but when a staff have to perform so many varied duties as mine, it is necessary sometimes to temporarily transfer an officer from one class of work to another which may be of more immediate importance for the moment, and this has been the case with Mr. Kirton this year.

The following places, however, have been visited, in addition to inspections which have been made in the Metropolitan area:—Albany, Ravensthorpe, Hopetoun, Coolgardie, Kalgoorlie, Menzies, Kookynie, Malcolm, Leonora, Morgans, Laverton, Meekatharra, Nannine, Cue, Day Dawn, Magnet, Yalgoo, Geraldton, Bunbury, Busselton, Bridgetown, and Balingup.

A few prosecutions have been found necessary, as shown in the following table:—

Date.	Offence.	Penalty.
14-7-09	Overstocking on licensed premises	Fined 7s. and 23s. costs.
14-7-09	Storing explosives on unlicensed premises	Fined 7s. and 23s. costs.
26-6-09	Overstocking explosives in magazine at Hopetoun	Fined £10; Costs £3 5s. 2d.
17-9-09	Overstocking fireworks on licensed premises	Fined £5 and 12s. 6d. costs.
17-9-09	Overstocking fireworks on licensed premises	Fined £5 and costs, £1 2s. 6d.
27-10-09	Storing explosives on unlicensed premises	J.P. dismissed the case, both sides paying costs. The court was not satisfied that there was powder in kegs in the magazine.

As in previous years I give the following tables showing particulars of the general analytical work carried out in my laboratory:—

<i>General Classification of Analysis.</i>	
Explosives .. .. .	2,002
Spirits .. .. .	408
Waters (General) .. .. .	245
Soils .. .. .	90
Fertilisers .. .. .	228
Rocks and Deposits .. .. .	39
Essences .. .. .	18
Oils .. .. .	328
Foodstuffs and Miscellaneous .. .. .	119
Sewage .. .. .	315
Wheats and Flours .. .. .	62
Criminal Investigations .. .. .	63
Leads .. .. .	3
Lime .. .. .	18
Fabrics .. .. .	62
Vinegar .. .. .	11
Medicinal Compounds .. .. .	98
Milks .. .. .	9
Kerosene, Benzine, Turpentine, etc. .. .. .	196
Hydrometers .. .. .	55
Stomachs (13 human, 3 animal) .. .. .	16
Dairy Thermometers .. .. .	54
Corrosion Experiments .. .. .	13
Metals .. .. .	9
Matches .. .. .	40
Waters (Special) .. .. .	664
<b>Total .. .. .</b>	<b>5,165</b>

*Departments for which Work was performed.*

	No. of Samples.
Customs .. .. .	1,280
Agricultural Department .. .. .	376
Crown Law Department .. .. .	90
Inspection of Liquors .. .. .	107
Mines .. .. .	7
Works and Railways .. .. .	376
Engineer Goldfields Water Supply .. .. .	844
Public Health Department .. .. .	14
Private Analyses .. .. .	40
Miscellaneous .. .. .	29
Explosives .. .. .	2,002
<b>Total .. .. .</b>	<b>5,165</b>

As far as actual figures go these show a decrease on last year of 191 samples. A mere statement of figures, however, as regards chemical work can give very little idea of actual labour involved. A large number of analyses of apparently simple character in one year may, in the following year, be replaced by a similar number of much more complex samples involving far greater labour. As I have already stated in my opening remarks there has not been much work carried out except that of a routine character, but I should like, as in previous years, to specially refer to one or two items.

#### GOLDFIELDS WATER SCHEME.

The question of corrosion of the main conduit having been referred to a Board of Experts in England, requests were made by them from time to time for certain experiments and examinations to be made, and these were carried out for the Goldfields Water Supply Administration. In addition to these, by the erection of experimental plants, tests were made on the Kalgoorlie-Kanowna main of certain remedial measures, which I had suggested, and the working of these plants has been checked and controlled by a considerable number of analyses.

As the result of all these enquiries that have been made has not yet been made public I cannot refer to them in detail.

#### POTABLE SPIRITS.

The Chief Inspector of Liquors (Mr. Durham) during his visit to England arranged for a large number of special samples of spirits which have been duly received at my laboratory, the examination of which has been well advanced. These samples were selected with two objects in view. One class of samples was chosen as representative of certain brands sold under definite trade descriptions in this State and was selected to augment the data already collected locally with a view to the establishment of definite standards which would form the basis of prosecutions in cases of selling under false trade description.

The other class of samples was selected with a view to obtaining special data towards the establishment of a standard for "whisky." The methods of spirit analysis as adopted in this laboratory have been further elaborated and improved, and investigations of this character can now be carried out with great accuracy and expedition. The application of these methods to practical ends has been continued during the year with great success, and a large number of prosecutions have been successfully carried out by the Inspector of Liquors based almost entirely upon the analyses and reports issued from my laboratory. It is very gratifying to be able to state that the high degree of quality which it has been possible to bring about in the liquors sold in Western Australia has led to very extensive interested enquiries into our methods and procedure, both from England and the Eastern States, and this is a very striking example of practical developments arising out of chemical researches which at first may appear rather of an abstract and unpractical character.

#### AGRICULTURE.

In spite of the large field of investigation which naturally lies open before us in this sphere, very little has been done towards a satisfactory solution of the problems by which we are faced. The question of soil fertility, the improvement of soil products by a variety of methods of fertilisation, the suitability of special areas for special products, the question of nature and improvement of soil texture, bacterial agencies in the soil, and many other highly important lines of enquiry have all to be put aside for various reasons. Apart from the financial difficulty (with which of course I have nothing to do) there still remains, in spite of the progress which has been made in other countries, a large amount of prejudice in the minds of agriculturists that science is powerless to deal with the difficulties which they have to face, and there are many people who fail to recognise that when urging the superiority of "experience" they are only making an appeal to those facts upon which science so strenuously insists. Scientific and practical men alike only learn by the establishment of new facts how to proceed step by step, and in most countries it is coming to be more generally recognised that the scientifically trained man is more capable of sifting and correlating facts, and through his trained powers of observation should be more capable of arriving at generalisations which shall form the theories of future practical progress.

A striking instance of this has been afforded in recent years by Professor Biffen and his collaborators on the improvement in the quality of wheats. These workers have shown that by the application of Mendel's law they can produce valuable new types of wheat of an absolutely fixed character in three

generations, whereas under the older empirical methods, even with years of labour and selection, only unsatisfactory results were frequently obtained. On all hands there is evidence throughout the world of the earnest desire to build up what may be called a true science of agriculture, and since it is only by widespread observation of facts in many parts of the world that this end can be achieved, it seems apparent that in this State we could do much that would be of value not only to ourselves but to others. The work which was initiated a year or so ago on the matter of the wheats of this State is beginning to bear fruit. A considerable number of milling tests have been made and the influence of various reports which have been published is beginning to be felt among the farmers, while the bearing of this question on our export trade is beginning to be recognised. During the year I have had through my hands some very fine samples of hard "strong" wheats which go to show that this class can be grown to advantage in certain parts of this State. This field of enquiry is a very interesting one and I hope to pursue it further during the year.

A fair amount of work has been done in England on the question as to what constitutes "strength" of wheat. The samples of Canadian wheat referred to in my last annual report were planted during last season at Narrogin State Farm and have done better even than I had hoped. Enquiries into the quality of the grain produced are, however, necessary before any definite conclusions can be drawn.

#### POISON PLANTS.

The free distribution of antidote tablets for the treatment of poisoned stock has been abandoned by the Government, and the matter has been transferred by way of special agency to Messrs. Felton, Grimwade, & Bickford, by whom arrangements have been made to supply the applicants. The reports which are being received as to the efficiency of this treatment appear to be very satisfactory.

#### SUPERPHOSPHATE BAGS.

The method of treating superphosphate bags to preserve them against acid destruction has been the subject of a considerable amount of enquiry during the last year and letters seeking information on the subject have been received from all parts of the globe, including the Eastern States, Great Britain, America, Italy, and Shanghai. It is hoped that this treatment is going to be of some practical commercial value.

#### STAFF.

The staff now under my control consists of the following officers, viz.:-

Assistant Government Analyst ..	1
Assistant Inspector of Explosives	1
Analysts .. .. .	8
Clerks .. .. .	3
Magazine keepers .. .. .	2
Watchmen .. .. .	2
	—
	17
	—

Although there are two more analysts than last year it must not be forgotten in drawing comparisons as to the work carried out, that in the earlier part of the year the staff was still undermanned. It would appear as if the present staff (including those officers only temporarily employed) is sufficient for the requirements of routine work, but any advance into those fields of progressive enquiry to which I have referred in my opening remarks can only be undertaken if it is recognised that it will necessitate further highly qualified assistants.

I desire to express my deep appreciation of the work carried out by my staff, both professional and clerical, and of the loyalty and enthusiasm with which they have always readily responded to any special demands made upon them in times of emergency or stress of work. I also beg to acknowledge the ready assistance of the Commissioner of Police and his officers, and of the Inspectors of Mines, under the State Mining Engineer.

I have, etc.,

E. A. MANN,

Chief Inspector of Explosives, Government Analyst, and Agricultural Chemist.

#### APPENDIX I.

##### LIST OF EXPLOSIVES DESTROYED DURING 1909.

Date.	Locality.	Kind and Quantity.	Remarks.
26th June, 1909 ...	Fremantle ...	250 cases or 12,500lbs. Gelignite ...	Owing to chemical deterioration.
11th May, 1909 ...	Coolgardie ...	35lbs. Gelatine Dynamite ...	Owing to exudation.
13th August, 1909	Geraldton ...	5lbs. Dynamite ...	Owing to having got wet from rain.

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APPENDIX.

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DEPARTMENT OF MINES.

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MINING STATISTICS,

1909.

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## MINING STATISTICS TO 31st DECEMBER, 1909.

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## EXPLANATIONS OF SIGNS AND ABBREVIATIONS.

Gf. Goldfield.	M.R.C. Mineral Reward Claim.
Mf. Mineral field.	M.A. Machinery Area.
D. District.	Mach. L. Machinery Lease.
G.M.L. Gold Mining Lease.	P.A. Prospecting Area.
M.L. Mineral Lease.	T.A. Tailings Area.
Loc. Location.	T.L. Tailings Lease.
L.C. Lode Claim.	W.R. Water Right.
Q.C. Quartz Claim.	S.L. Special License.
R.C. Reward Claim.	V. Vacuum Filter Presses.

WESTERN AUSTRALIA.

SUMMARY OF MINERAL PRODUCTS.

GOLD AND OTHER MINERALS PRODUCED DURING 1909, AND THE ESTIMATED VALUE THEREOF, TOGETHER WITH A COMPARISON FOR PREVIOUS YEARS, AND THE TOTAL PRODUCTION TO DATE.

DESCRIPTION OF MINERAL.	1909.		1908.		1907.		1906.		PREVIOUS TO 1906.		TOTAL TO DATE.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
1. ANTIMONY ... (Exported) statute tons ...	...	£ ...	...	£ ...	25	£ 680	...	£ ...	22	£ 230	47	£ 860
2. ASBESTOS ... (Reported) do. ...	3	154	40	1,600	...	...	...	...	...	...	43	1,754
3. COAL ... (Reported) do. ...	214,302	90,965	175,248	75,694	142,373	55,158	149,755	57,998	834,814	428,910	1,515,992	708,725
4. COPPER { ORE ... (Exported) do. ...	6,959	59,541	2,503	29,272	3,727	61,493	336	6,162	17,933	304,601	31,458	461,069
{ INGOT & MATTE (Exported) do. ...	833	45,103	479	27,819	1,602	141,883	343	30,367	3,275	172,241	6,532	417,413
5. GOLD (Exported and Minted) fine ounces ...	1,595,269	6,776,274	1,647,911	6,999,882	1,697,554	7,210,749	1,794,547	7,622,749	14,871,687	63,170,911	21,606,968	91,780,565
6. IRONSTONE ... (Reported) statute tons ...	...	...	...	...	1,094	438	1,280	512	55,446	35,733	57,820	36,683
7. LEAD ORE ... (Exported) do. ...	...	...	...	...	...	...	...	...	33,644	364,756	33,644	364,756
8. LIMESTONE ... (Reported) do. ...	...	...	...	...	3,602	1,382	9,472	1,691	80,632	15,217	93,706	18,290
9. MICA ... (Exported) do. ...	...	...	†	10	...	...	...	...	†	294	...	304
10. PIG LEAD ... (Exported) do. ...	...	...	...	...	...	...	...	...	684	13,306	684	13,306
11. SCHEELITE ... (Exported) do. ...	...	...	...	...	4	140	...	...	...	...	4	140
12. SILVER ... (Exported) fine ounces ...	176,843	18,778	168,455	18,877	189,265	25,382	282,145	37,612	1,099,958	129,736	1,916,666	230,385
13. SILVER LEAD ORE ... (Exported) statute tons ...	211	1,199	518	5,006	211	1,866	...	...	...	...	940	8,071
14. TANTALITE ... (Exported) do. ...	...	...	†	400	...	...	...	...	18	79	18	6,129
15. TIN (ORE AND INGOT) (Exported) do. ...	698	65,959	1,093	83,595	1,502	166,13	1,442	147,380	5,778	420,125	10,513	883,198
16. WOLFRAM ... (Exported) do. ...	1	100	...	...	...	...	...	...	...	...	1	100
17. ZINC (SPELTER, ETC.)... (Exported) do. ...	19	244	11	98	73	3,390	...	...	...	...	103	3,732
UNENUMERATED ... (Exported) ...	...	735	...	2,750	...	817	...	1,035	...	344	...	5,681
TOTAL VALUES ...	...	£7,059,052	...	£7,245,003	...	£7,669,467	...	£7,905,506	...	£65,062,133	...	£94,941,161

† Weight not stated.

## AUSTRALASIAN MINERAL PRODUCTION.

COMPARATIVE TABLE SHOWING THE OUTPUT OF ALL MINERAL PRODUCTS FROM THE SEVERAL STATES OF AUSTRALIA AND THE DOMINION OF NEW ZEALAND DURING 1909.

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.
		£		£		£		£		£		£		£
Asbestos ... .. statute tons	3	154												
Gold ... .. fine ounces	1,595,269	6,776,274	204,709	869,546	455,577	1,935,168	654,222	2,778,956	44,777	190,201	7,111	30,206	472,464	2,006,900
Copper ... .. statute tons	833	45,103							8,638	586,419	5,697	334,584		
Copper Ore ... .. do	6,959	59,541	6,966	424,737	14,494	853,196	17	44	1,588	21,619	1,231	4,003	5	100
Lead (Pig, etc.) ... .. do			15,476	186,073	5,240	68,543					7	90		
Manganese ... .. do						2,124							6	79
Platinum ... .. fine ounces			440	1,720										
Silver ... .. do	176,843	18,778	1,718,005	168,974	1,001,383	99,093	21,655	2,310			1,660	167	1,813,830	180,872
Silver-Lead Ore ... .. statute tons	211	1,199	269,306	1,484,641					80,378	298,880	70	416		
Tin ... .. do														
Black Tin ... .. do	698	65,959	1,943	211,029	3,326	244,927	89	7,067	4,511	418,165				
Tin Ore ... .. do														
Scheelite ... .. do			193	14,618									58	4,263
Wolfram ... .. do	1	100	127	11,249	606	56,348	14	1,432	28	2,494				
Zinc Spelter ... .. do	19	244	373,906	1,041,230										
Antimony (Metal and Ore) ... .. do			95	711			1,750	5,000					2	60
Bismuth ... .. do			9	1,624		2,771			3	980				
Alunite ... .. do			3,500	8,791										
Coal ... .. do	214,302	90,965	7,019,879	2,618,596	756,577	270,726	126,334	75,802	66,162	56,237			201,685	183,961
Coke ... .. do			204,274	137,194										
Shale Oil ... .. do			48,718	23,617										
Iron ... .. do			29,762	106,357										
Iron Oxide ... .. do			4,900	4,948										
Ironstone ... .. do			4,339	3,471	48,636	48,221					16,120	8,296		
Lime ... .. do			25,849	24,283										
Limestone ... .. do			45,078	13,851	142,996	35,135					13,765	2,464		
Molybdenite ... .. do			28	3,249	93	9,272								
Phosphate Rock ... .. do											3,772	3,697		
Precious Stones ... .. carats				65,759		25,116								
Unenumerated ... ..		735		209,375		5,914		3,094				29,467		7,415
<b>Total Values ... ..</b>	... £	<b>7,059,052</b>	... £	<b>27,635,693</b>	... £	<b>3,656,554</b>	... £	<b>2,873,705</b>	... £	<b>1,574,995</b>	... £	<b>413,390</b>	... £	<b>2,383,650</b>

# PART I.—GOLD.

## TABLE I.

MONTHLY PRODUCTION OF GOLD, IN FINE OUNCES, SHOWING THE QUANTITY REPORTED TO THE MINES DEPARTMENT DURING 1909.

GOLDFIELD.	DISTRICT.	JANUARY.		FEBRUARY.		MARCH.		APRIL.		MAY.		JUNE.		JULY.	
		District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.
Kimberley ...	...	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.
Pilbara ...	Marble Bar ...	293·89	13·07	96·07	21·78	246·57	15·68	67·61	15·68	157·09	6·97	157·09	5·23	637·91	4·36
Do. ...	Nullagine ...	296·76	590·65	268·77	364·84	79·68	326·25	318·08	385·69	604·59	757·26	309·11	466·20	358·90	996·81
West Pilbara ...	...	...	19·35	...	27·19	...	257·68	...	160·68	...	70·75	...	168·24	...	122·19
Ashburton ...	...	...	20·80	...	24·00	...	23·20	...	18·83	...	145·60	...	50·70	...	27·00
Gascoyne ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Peak Hill ...	...	...	674·20	...	648·84	...	615·93	...	817·22	...	823·29	...	708·78	...	685·47
East Murchison ...	Lawlers ...	6,432·90	11,239·77	5,695·58	12,646·07	6,312·55	12,369·28	6,228·14	12,553·31	10,033·78	16,021·78	6,769·89	13,867·64	7,075·09	12,970·42
Do. ...	Black Range	4,806·87	6,950·49	6,950·49	6,056·73	6,056·73	6,325·17	6,325·17	5,988·00	5,988·00	7,097·75	7,097·75	5,835·33	5,835·33	5,835·33
Murchison ...	Cue ...	1,158·74	2,148·80	2,148·80	1,590·35	1,590·35	2,451·36	2,451·36	1,542·48	1,542·48	1,494·90	1,494·90	1,071·22	1,071·22	1,071·22
Do. ...	Nannine	3,506·62	2,964·46	2,964·46	4,920·42	4,920·42	3,546·16	3,546·16	3,615·22	3,615·22	5,177·61	5,177·61	4,069·20	4,069·20	4,069·20
Do. ...	Day Dawn	3,605·34	3,451·68	3,451·68	3,467·70	3,467·70	3,642·12	3,642·12	3,506·45	3,506·45	3,640·64	3,640·64	3,686·09	3,686·09	3,686·09
Do. ...	Mt. Magnet	908·10	1,166·44	1,166·44	1,457·65	1,457·65	1,265·21	1,265·21	1,147·19	1,147·19	1,479·91	1,479·91	1,606·56	1,606·56	1,606·56
Yalgoo ...	...	...	75·68	...	75·68	...	221·13	...	19·26	...	163·52	...	204·06	...	198·45
Mt. Margaret ...	Mt. Morgans	1,816·70	1,666·85	1,666·85	2,399·96	2,399·96	2,027·28	2,027·28	2,249·62	2,249·62	2,483·02	2,483·02	1,661·41	1,661·41	1,661·41
Do. ...	Mt. Malcolm	6,366·52	7,867·29	7,867·29	7,485·75	7,485·75	6,783·00	6,783·00	6,677·27	6,677·27	7,463·12	7,463·12	7,753·20	7,753·20	7,753·20
Do. ...	Mt. Margaret	968·47	1,732·28	1,732·28	2,183·60	2,183·60	2,202·62	2,202·62	3,320·81	3,320·81	4,317·11	4,317·11	4,075·84	4,075·84	4,075·84
North Coolgardie	Menzies	2,232·99	2,367·29	2,367·29	3,076·23	3,076·23	2,780·11	2,780·11	3,400·09	3,400·09	2,658·93	2,658·93	2,430·71	2,430·71	2,430·71
Do. ...	Ularring	1,222·39	950·18	950·18	1,162·42	1,162·42	1,477·01	1,477·01	1,603·88	1,603·88	1,556·91	1,556·91	1,341·99	1,341·99	1,341·99
Do. ...	Niagara	1,670·54	1,198·47	1,198·47	1,752·35	1,752·35	1,177·70	1,177·70	1,590·57	1,590·57	1,145·95	1,145·95	1,612·56	1,612·56	1,612·56
Do. ...	Yerilla	1,043·40	831·60	831·60	604·22	604·22	242·13	242·13	868·86	868·86	1,572·23	1,572·23	1,213·83	1,213·83	1,213·83
Broad Arrow	...	...	597·44	...	852·99	852·99	1,503·25	1,503·25	1,218·76	1,218·76	1,647·83	1,647·83	698·96	698·96	698·96
N.E. Coolgardie	Kanowna	1,664·82	1,472·23	1,472·23	2,185·16	2,185·16	1,754·22	1,754·22	1,691·35	1,691·35	2,057·88	2,057·88	1,821·28	1,821·28	1,821·28
Do. ...	Kurnalpi	401·60	7·18	7·18	54·15	54·15	27·86	27·86	39·19	39·19	10·37	10·37	18·47	18·47	18·47
East Coolgardie	East Coolgardie	75,741·94	72,144·56	72,144·56	77,687·10	77,687·10	76,160·66	76,160·66	75,752·31	75,752·31	74,441·82	74,441·82	75,422·29	75,422·29	75,422·29
Do. ...	Bulong	145·22	157·43	157·43	106·65	106·65	339·93	339·93	185·89	185·89	332·70	332·70	300·24	300·24	300·24
Coolgardie	Coolgardie	2,068·00	2,076·38	2,076·38	2,401·64	2,401·64	2,675·02	2,675·02	1,876·56	1,876·56	1,883·43	1,883·43	2,778·88	2,778·88	2,778·88
Do. ...	Kunanalling	93·06	607·38	607·38	429·24	429·24	515·14	515·14	496·63	496·63	595·25	595·25	237·43	237·43	237·43
*Yilgarn ...	...	...	1,213·48	...	1,238·95	1,238·95	1,881·39	1,881·39	1,773·44	1,773·44	1,366·62	1,366·62	1,469·49	1,469·49	1,469·49
Dundas	...	...	1,738·13	...	1,833·61	1,833·61	2,334·75	2,334·75	1,666·18	1,666·18	3,073·99	3,073·99	2,523·96	2,523·96	2,523·96
Phillips River	...	...	469·87	...	1,347·81	1,347·81	309·66	309·66	305·50	305·50	140·33	140·33	296·97	296·97	296·97
State generally	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
<b>TOTAL</b>	Fine ounces ...	...	121,186·21	...	121,892·26	...	132,822·79	...	128,002·08	...	133,782·31	...	133,107·90	...	134,937·69
	Sterling value	£514,766	£517,766	£564,195	£543,718	£568,271	£565,407	£573,179							

TABLE I.—Monthly Production of Gold, in Fine Ounces—continued.

GOLDFIELD.	DISTRICT.	AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL FOR 1909.	
		District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.
Kimberley ...	...	...	5·23	...	10·45	...	13·07	...	10·00	...	13·00	...	134·52
Pilbara ...	Marble Bar ...	95·70	602·37	77·16	422·37	210·89	554·67	246·61	557·15	240·99	740·23	2,523·16	6,764·49
Do. ...	Nullagine ...	506·67		345·21		343·78		310·54		499·24		4,241·33	
West Pilbara ...	...	...	96·44	...	133·51	...	93·87	...	309·18	...	80·54	...	1,539·62
Ashburton ...	...	...	31·20	...	19·59	...	19·59	...	29·81	...	26·00	...	436·32
Gascoyne ...	...	...	...	...	...	...	...	...	...	...	...	...	...
Peak Hill ...	...	...	718·95	...	593·65	...	615·17	...	538·77	...	478·52	...	7,918·79
East Murchison ...	Lawlers ...	5,808·70	11,738·64	6,749·99	14,112·99	5,689·64	13,146·98	5,102·73	11,769·10	5,643·24	13,472·62	77,542·23	155,908·60
Do. ...	Black Range ...	5,929·94		7,363·00		7,457·34		6,666·37		7,829·38		78,366·37	
Murchison ...	Cue ...	1,538·39	11,388·99	1,489·39	10,583·22	3,356·60	14,570·64	1,450·68	11,462·50	1,978·22	11,816·89	21,271·13	133,105·86
Do. ...	Nannine ...	4,405·85		3,665·95		5,603·10		5,049·34		4,468·28		50,992·21	
Do. ...	Day Dawn ...	3,902·72	1,389·84	4,038·04	1,694·36	3,916·58	1,148·64	3,813·84	1,593·70	3,776·69	1,593·70	44,447·89	16,394·63
Do. ...	Mt. Magnet ...	1,542·03		1,389·84		1,694·36		1,148·64		1,593·70		16,394·63	
Yalgoo ...	...	...	234·85	...	114·61	...	114·39	...	155·17	...	304·19	...	1,805·31
Mt. Margaret ...	Mt. Morgans ...	1,449·65	13,530·47	3,115·66	15,412·46	2,142·14	14,659·89	2,512·89	14,653·45	2,197·58	14,107·00	25,722·76	155,864·99
Do. ...	Mt. Malcolm ...	8,274·38		7,550·25		8,519·29		8,413·27		7,282·99		90,436·33	
Do. ...	Mt. Margaret ...	3,806·44	5,565·32	4,746·55	7,815·96	3,998·46	6,155·44	3,727·29	5,813·59	4,626·43	9,263·14	39,705·90	79,398·99
North Coolgardie ...	Menzies ...	3,048·52		3,516·37		2,872·06		2,818·13		4,649·95		35,851·38	
Do. ...	Ularring ...	820·90	1,846·89	1,516·36	1,398·98	902·09	1,007·44	976·79	1,448·94	1,755·74	1,408·51	15,286·66	17,061·87
Do. ...	Niagara ...	1,207·69		1,846·89		1,398·98		1,011·23		1,448·94		17,061·87	
Do. ...	Yerilla ...	483·21	2,961·47	936·34	1,420·92	982·31	766·99	1,007·44	1,818·20	1,408·51	1,818·20	11,199·08	17,121·70
Broad Arrow ...	...	...		1,883·16		2,961·47		1,420·92		766·99		11,199·08	
N.E. Coolgardie ...	Kanowna ...	2,079·42	2,138·21	2,392·93	2,841·31	1,990·68	2,019·19	2,203·96	2,737·13	2,471·70	2,520·78	23,785·63	25,462·38
Do. ...	Kurnalpi ...	58·79		2,138·21		448·38		2,841·31		28·51		2,019·19	
East Coolgardie ...	East Coolgardie ...	77,304·05	77,504·50	76,221·48	76,367·43	74,123·74	74,204·78	74,029·50	74,211·70	67,870·70	68,082·12	896,900·15	899,289·27
Do. ...	Bulong ...	200·45		77,504·50		145·95		76,367·43		81·04		74,204·78	
Coolgardie ...	Coolgardie ...	2,265·09	2,989·40	2,124·75	2,355·83	2,371·42	3,093·91	2,197·68	2,486·76	3,663·77	4,474·96	28,382·62	34,134·90
Do. ...	Kunanalling ...	724·31		2,989·40		231·08		2,355·83		722·49		3,093·91	
Yilgarn ...	...	...	1,362·61	...	2,526·24	...	1,961·58	...	1,974·28	...	1,698·02	...	20,909·12
Dundas ...	...	...	2,410·73	...	2,955·76	...	2,215·99	...	2,630·58	...	2,359·73	...	29,549·27
Phillips River ...	...	...	383·36	...	462·94	...	486·62	...	685·14	...	989·14	...	6,713·52
State generally ...	...	...	17·20	...	...	...	...	...	...	...	...	...	348·09
TOTAL	Fine ounces ...	...	132,601·63	...	139,689·79	...	135,346·70	...	130,791·30	...	132,245·08	...	1,576,405·74
	Sterling value	£563,256		£593,365		£574,916		£555,566		£561,741		£6,696,146	

TABLE II.

TOTAL YEARLY PRODUCTION OF GOLD, IN FINE OUNCES, AS REPORTED TO THE MINES DEPARTMENT, TO 31ST DECEMBER, 1909.

GOLDFIELD.	DISTRICT.	1909.		1908.		1907.		1906.		1905.		1904.	
		District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.
		ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.
Kimberley ...	...	...	134.52	...	150.16	...	336.57	...	165.72	...	496.14	...	205.84
Pilbara ...	Marble Bar ...	2,523.16	6,764.49	3,179.76	6,965.61	5,856.44	10,042.96	2,256.97	5,711.90	4,534.25	11,473.83	3,129.37	8,029.65
Do. ...	Nullagine ...	4,241.33	...	3,785.85	...	4,186.52	...	3,454.93	...	6,939.58	...	4,900.28	...
West Pilbara ...	...	...	1,539.62	...	1,005.60	...	464.08	...	749.16	...	801.14	...	3,427.71
Ashburton ...	...	...	436.32	...	161.71	...	143.01	...	278.24	...	207.53	...	509.96
Gascoyne ...	...	...	...	...	...	...	...	...	...	...	...	...	...
Peak Hill ...	...	...	7,918.79	...	7,980.10	...	8,111.14	...	2,008.20	...	13,586.87	...	14,113.57
East Murchison ...	Lawlers ...	77,542.23	155,908.60	72,109.75	144,792.31	61,259.79	119,207.31	60,351.20	95,771.49	68,232.52	84,926.28	78,543.91	89,730.30
Do. ...	Black Range ...	78,366.37	...	72,682.56	...	57,947.52	...	35,420.29	...	16,693.76	...	11,186.39	...
Murchison ...	Cue ...	21,271.13	...	24,702.50	...	25,878.80	...	18,337.11	...	15,125.05	...	15,286.71	...
Do. ...	Nannine ...	50,992.21	133,105.86	38,820.52	157,848.40	31,792.41	169,397.46	26,572.08	182,395.82	18,549.17	206,734.88	18,668.31	214,403.13
Do. ...	Day Dawn ...	44,447.89	...	84,422.44	...	101,591.06	...	124,047.58	...	161,507.28	...	161,163.51	...
Do. ...	Mt. Magnet ...	16,394.63	...	9,902.94	...	10,135.19	...	13,439.05	...	11,553.38	...	19,284.60	...
Yalgoo ...	...	...	1,805.31	...	551.03	...	4,371.38	...	4,450.19	...	4,742.77	...	2,353.41
Mt. Margaret ...	Mt. Morgans ...	25,722.76	...	28,912.13	...	28,755.18	...	30,206.54	...	35,130.45	...	55,463.96	...
Do. ...	Mt. Malcolm ...	90,436.33	155,864.99	86,018.61	153,597.15	81,709.00	169,466.07	94,095.06	166,258.94	96,644.33	188,712.21	87,927.26	187,383.87
Do. ...	Mt. Margaret ...	39,705.90	...	38,666.41	...	59,001.89	...	41,957.34	...	56,937.43	...	43,992.65	...
North Coolgardie ...	Menzies ...	35,851.38	...	37,023.37	...	37,053.24	...	33,237.86	...	41,895.33	...	37,100.73	...
Do. ...	Ularring ...	15,286.66	79,398.99	21,598.97	91,251.59	19,072.73	86,790.67	25,210.13	110,957.04	43,387.07	148,771.00	21,769.41	145,064.61
Do. ...	Niagara ...	17,061.87	...	21,477.90	...	18,881.94	...	37,418.89	...	45,520.17	...	67,230.33	...
Do. ...	Yerilla ...	11,199.08	...	11,151.35	...	11,782.76	...	15,090.16	...	17,968.43	...	18,964.14	...
Broad Arrow ...	...	...	17,121.70	...	18,429.97	...	21,907.18	...	21,510.61	...	18,583.66	...	22,180.19
N.E. Coolgardie ...	Kanowna ...	23,785.63	...	26,355.22	...	29,244.99	...	37,267.87	...	42,341.66	...	38,648.56	...
Do. ...	Kurnalpi ...	1,676.75	25,462.38	717.50	27,072.72	1,952.97	31,197.96	830.87	38,098.74	832.72	43,174.38	1,151.07	39,799.63
East Coolgardie ...	East Coolgardie ...	896,900.15	899,289.27	888,415.37	890,772.70	937,238.61	941,170.94	989,357.24	995,831.87	997,193.02	1,006,965.90	1,050,922.89	1,062,078.27
Do. ...	Bulong ...	2,389.12	...	2,357.33	...	3,932.33	...	6,474.63	...	9,772.88	...	11,155.38	...
Coolgardie ...	Coolgardie ...	28,382.62	34,134.90	32,820.61	40,029.39	53,029.44	60,810.37	55,771.11	64,030.18	54,499.04	63,664.27	53,505.01	63,199.76
Do. ...	Kunanalling ...	5,752.28	...	7,208.78	...	7,780.93	...	8,259.07	...	9,165.23	...	9,694.75	...
Yilgarn ...	...	...	20,909.12	...	22,162.87	...	19,291.98	...	23,546.75	...	19,291.42	...	25,508.64
Dundas ...	...	...	29,549.27	...	28,643.63	...	23,602.23	...	20,434.84	...	25,960.95	...	31,830.27
Phillips Kiver ...	...	...	6,713.52	...	4,404.69	...	4,313.87	...	2,779.89	...	2,563.26	...	4,016.63
Donnybrook ...	...	...	...	...	...	...	...	...	...	...	...	...	...
State generally ...	...	...	348.09	...	271.13	...	1,367.70	...	1,315.71	...	...	...	...
TOTAL	Fine Ounces ...	...	1,576,405.74	...	1,596,090.76	...	1,671,992.88	...	1,736,295.29	...	1,840,656.49	...	1,913,835.44
	Sterling Value	£6,696,146	£6,779,763	£7,102,174	£7,375,314	£7,818,612	£8,129,456						

TABLE II.—Total Yearly Production of Gold, in Fine Ounces, etc.—continued.

GOLDFIELD.	DISTRICT.	1903.		1902.		1901.		1900.		PREVIOUS TO 1900.		TOTAL TO 31 DECEMBER, 1909.	
		District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.	District.	Goldfield.
		ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.
Kimberley	...	...	644.54	...	301.71	...	262.25	...	504.21	...	13,102.48	...	16,304.14
Pilbara	Marble Bar	4,787.33	9,570.04	4,501.02	10,602.12	3,636.77	9,072.45	10,168.33	14,507.02	47,208.53	58,197.01	91,781.93	150,937.08
Do.	Nullagine	4,782.71	...	6,101.10	...	5,435.68	...	4,338.69	...	10,988.48	...	59,155.15	...
West Pilbara	...	...	5,100.48	...	1,910.42	...	198.73	...	779.48	...	3,040.57	...	19,016.99
Ashburton	...	...	903.94	...	926.66	...	938.04	...	1,493.56	...	2,323.38	...	8,322.35
Gascoyne	...	...	...	...	...	...	85.10	...	64.86	...	355.31	...	505.27
Peak Hill	...	...	31,750.17	...	35,297.81	...	18,607.23	...	25,175.67	...	65,828.32	...	230,377.87
East Murchison	Lawlers	84,738.16	85,451.08	75,687.91	75,880.05	65,342.19	65,356.03	56,340.31	56,431.96	91,868.41	91,944.20	792,016.38	1,065,399.61
Do.	Black Range	712.92	...	192.14	...	13.84	...	91.65	...	75.79	...	273,383.23	...
Murchison	Cue	20,688.78	...	21,016.82	...	18,755.54	...	18,383.98	...	85,261.30	...	284,707.72	...
Do.	Nannine	19,947.48	204,181.85	19,329.49	172,914.32	17,690.99	123,865.85	25,913.18	98,833.87	62,728.43	322,395.32	331,004.27	1,981,076.76
Do.	Day Dawn	136,768.68	...	102,030.80	...	57,867.95	...	12,413.87	...	91,893.29	...	1,078,154.35	...
Do.	Mt. Magnet	26,776.91	...	30,537.21	...	29,551.37	...	37,122.84	...	82,512.30	...	287,210.42	...
Yalgoo	...	...	3,138.35	...	5,198.89	...	8,351.30	...	8,794.00	...	22,933.20	...	66,689.83
Mt. Margaret	Mt. Morgans	64,817.55	...	54,019.40	...	44,290.60	...	38,781.48	...	44,968.72	...	451,068.77	...
Do.	Mt. Malcolm	80,055.86	184,590.89	75,691.81	187,265.81	81,786.28	165,434.40	70,373.52	126,955.40	77,949.77	136,925.33	922,687.83	1,822,455.06
Do.	Mt. Margaret	39,717.48	...	57,554.60	...	39,357.52	...	17,800.40	...	14,006.84	...	448,698.46	...
North Coolgardie	Menzies	52,870.58	...	50,168.26	...	51,568.02	...	47,103.26	...	172,232.60	...	596,104.63	...
Do.	Ularring	19,142.55	162,139.18	25,766.96	154,238.37	17,821.18	121,974.00	11,641.47	91,388.29	14,573.70	237,879.61	235,270.83	1,429,853.35
Do.	Niagara	77,013.02	...	69,877.50	...	42,146.08	...	25,013.63	...	31,508.79	...	453,150.12	...
Do.	Yerilla	13,113.03	...	8,425.65	...	10,438.72	...	7,629.93	...	19,564.52	...	145,327.77	...
Broad Arrow	...	...	26,021.17	...	17,092.95	...	29,885.18	...	43,438.91	...	86,497.63	...	322,669.15
N.E. Coolgardie	Kanowna	40,554.02	41,279.02	39,497.86	40,777.95	35,318.30	38,138.17	38,127.32	41,355.01	235,574.49	241,274.70	586,715.93	607,630.66
Do.	Kurnalpi	724.99	...	1,280.09	...	2,819.87	...	3,227.69	...	5,700.21	...	20,914.73	...
East Coolgardie	East Coolgardie	1,062,898.06	1,076,078.12	941,436.40	958,285.90	856,748.86	874,193.90	657,863.87	674,992.98	1,622,195.49	1,672,956.68	10,901,169.96	11,052,616.53
Do.	Bulong	13,180.06	...	16,849.50	...	17,445.04	...	17,129.11	...	50,761.19	...	151,446.57	...
Coolgardie	Coolgardie	58,692.50	71,285.59	65,002.37	74,502.96	59,973.11	73,083.48	70,702.09	90,009.59	259,007.17	324,308.30	791,385.07	959,058.79
Do.	Kunanalling	12,593.09	...	9,500.59	...	13,110.37	...	19,307.50	...	65,301.13	...	167,673.72	...
Yilgarn	...	...	19,276.71	...	20,066.81	...	21,925.95	...	24,353.94	...	114,091.57	...	330,425.76
Dundas	...	...	33,845.76	...	28,579.34	...	29,843.03	...	34,036.83	...	91,087.76	...	377,413.91
Phillips River	...	...	7,050.73	...	7,441.30	...	665.83	...	36.72	...	...	...	39,986.44
Donnybrook	...	...	53.21	...	61.36	...	3.54	...	339.95	...	383.70	...	841.76
State generally	...	...	...	...	...	...	108.93	...	128.46	...	1,151.91	...	4,691.93
<b>TOTAL</b>	Fine Ounces	...	<b>1,962,360.83</b>	...	<b>1,791,344.73</b>	...	<b>1,581,993.39</b>	...	<b>1,328,620.71</b>	...	<b>3,486,676.98</b>	...	<b>20,486,273.24</b>
	Sterling Value	<b>£8,335,579</b>		<b>£7,609,149</b>		<b>£6,719,881</b>		<b>£5,643,622</b>		<b>£14,810,462</b>		<b>£87,020,158</b>	



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 1909.

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.		
			Proclama- tion gazetted.	To take effect from	Latest Amendment of Boundaries gazetted.	To take effect from	Goldfield.	District.	No.	Area in Acres.	Milling.		Cyaniding.			Men employed.		Diggers
											Stamps.	Other Mills.	Leach- ing and Agitat- ing Vats.	Agi- tating Vats.	Filter and Va- cuum Presses	Above Ground.	Under Ground.	
Kimberley .. ..	.. ..	Hall's Creek ..	20-5-86	20-5-86	31-10-02	1-11-02	33,833	..	..	45	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	35 22	426 252	65 40	.. ..	21 8	4 2	.. ..	38 45	41 34	89 17
West Pilbara .. ..	.. ..	Roebourne ..	20-9-95	1-11-95	1-3-07	1-3-07	10,843	..	10	128	30	1	5	..	..	10	2	41
Ashburton .. ..	.. ..	Onslow ..	11-12-90	11-12-90	18-10-01	14-10-01	14,230	..	3	48	..	..	..	..	..	..	..	10
Gascoyne .. ..	.. ..	Carnarvon ..	25-6-97	15-4-97	18-10-01	14-10-01	5,313	..	..	..	..	..	..	..	..	..	..	..
Peak Hill .. ..	.. ..	Cue .. ..	19-3-97	1-4-97	18-10-01	14-10-01	24,732	..	46	402	50	5	15	3	9	66	34	10
East Murchison .. ..	{ Lawlers Black Range Cue ..	Lawlers .. ..	28-6-95	28-6-95	7-8-08	1-3-08	28,369	{ 19,875 8,494	183 157	2,756 2,397	228 115	9 ..	92 55	17 4	7 1	501 342	499 559	28 67
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	99 177 58	1,089 2,288 541	128 189 60	.. .. ..	57 88 37	2 4 10	2 2	138 256 226	208 455 198	14 179 21
Yalgoo .. ..	.. ..	Cue .. ..	8-2-95	23-1-95	..	..	18,833	..	44	494	105	6	22	..	..	30	28	2
Mt. Margaret .. ..	{ Mt. Morgans Mt. Malcolm Mt. Margaret }	Menzies .. ..	12-3-97	1-4-97	1-3-07	1-3-07	44,860	{ 1,637 3,330 39,893	35 113 75	593 2,030 1,307	122 225 173	3 10 6	81 122 60	2 25 14	3 6 6	172 375 292	189 569 324	34 17 34
North Coolgardie .. ..	{ Menzies Ularring Niagara Yerilla }	Menzies .. ..	28-6-95	28-6-95	7-8-08	1-9-08	29,936	{ 6,805 6,913 688	78 65 70	1,115 815 960	151 85 112	.. .. 1	104 90 42	9 5 4	4 2 3	239 138 131	353 184 193	10 32 24
Broad Arrow .. ..	.. ..	Coolgardie ..	17-11-96	20-11-96	8-6-06	1-7-06	1,038	..	71	939	123	3	55	..	..	104	175	66
North-East Coolgardie .. ..	{ Kanowna Kurnalpi East Coolgardie }	Coolgardie ..	20-3-96	15-4-96	27-3-08	1-4-08	20,604	{ 1,094 19,510	74 5	908 48	158 5	3 2	67 ..	3 ..	2	159 10	267 15	67 17
East Coolgardie .. ..	{ East Coolgardie Bulong Coolgardie Kunanalling }	Coolgardie ..	21-9-94	1-10-94	27-3-08	1-4-08	1,800	{ 810 990	209 19	2,948 245	727 30	101 ..	460 4	173 ..	132 ..	2,600 33	3,351 55	50 25
Coolgardie .. ..	.. ..	Coolgardie ..	6-4-94	6-4-94	1-3-07	1-3-07	11,702	{ 9,384 2,318	115 35	1,525 436	284 60	2 2	127 44	6 ..	2	273 93	353 107	63 55
Yilgarn .. ..	.. ..	Coolgardie ..	1-10-88	1-10-88	1-3-07	1-3-07	13,685	..	101	1,562	140	..	98	..	1	224	236	1
Dundas .. ..	.. ..	Norseman ..	31-8-93	31-8-93	1-3-07	1-3-07	11,430	..	74	997	120	2	58	7	3	152	223	9
Phillips River .. ..	.. ..	Ravensthorpe..	21-9-00	14-9-00	1-3-07	1-3-07	5,572	..	17	240	30	2	15	..	..	43	52	..
State generally .. ..	.. ..	Perth .. ..	..	..	..	..	..	..	1	24	..	2	..	..	..	..	..	..
<b>Total .. ..</b>			..	..	..	..	<b>330,126</b>	..	<b>2,105</b>	<b>28,919</b>	<b>3,752</b>	<b>170</b>	<b>1,918</b>	<b>301</b>	<b>186</b>	<b>6,973</b>	<b>9,034</b>	<b>1,020</b>

TABLE III.—Return showing, for the respective Goldfields and Districts, etc.—continued.

GOLDFIELD.	DISTRICT.	1909 GOLD PRODUCTION—DISTRICTS.						1909 GOLD PRODUCTION—GOLDFIELDS.									
		Alluvial.	Dolled and Specimens.	Ore treated.	Gold therefrom.	Total Gold.	Silver.	Alluvial.	Dolled and Specimens.	Ore treated.	Gold therefrom.	Total Gold.	Silver.				
		Fine ozs.	Fine ozs.	tons (2,240 lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	tons (2,240 lbs.)	Fine ozs.	Fine ozs.	Fine ozs.				
Kimberley .. ..																	
Pilbara .. ..	Marble Bar	1,064·71	252·13	777·20	1,206·32	2,523·16	..	134·52	..	..	134·52	..	..	..	..	..	
	Nullagine .. ..	325·59	3·77	2,459·50	3,911·97	4,241·33	..	1,390·30	255·90	3,236·70	5,118·29	8,764·49	..	..	..	..	
West Pilbara .. ..								530·78	..	256·60	1,008·84	1,539·62	168·51	..	..	..	
Ashburton .. ..								436·32	..	..	436·32	162·02	..	..	..	..	
Gascoyne .. ..								..	..	..	..	..	..	..	..	..	
Peak Hill .. ..								59·48	452·45	68,058·00	7,406·86	7,918·79	309·48	..	..	..	
East Murchison .. ..	Lawlers .. ..	310·18	153·57	224,889·75	77,078·48	77,542·23	3,453·11	388·62	1,644·11	332,619·00	153,375·87	155,908·60	3,609·26	..	..	..	
	Black Range	78·44	1,490·54	107,729·25	76,797·39	78,366·37	156·15	..	..	..	..	..	..	..	..	..	
	Cue .. ..	121·32	1,226·80	24,469·50	19,923·01	21,271·13	56·68	..	..	..	..	..	..	..	..	..	
Murchison .. ..	Nannine .. ..	586·24	453·23	67,279·96	49,952·74	50,992·21	70·22	893·96	2,300·56	263,991·21	129,911·34	133,105·86	8,176·56	..	..	..	
	Day Dawn .. ..	158·67	23·67	130,607·33	44,265·55	44,447·89	8,049·66	..	..	..	..	..	..	..	..	..	
	Mt. Magnet .. ..	27·73	596·86	41,634·42	15,770·04	16,394·63	..	..	..	..	..	..	..	..	..	..	
Yalgoo .. ..								1·60	139·05	3,193·05	1,664·66	1,805·31	..	..	..	..	
Mt. Margaret .. ..	Mt. Morgans .. ..	310·14	103·92	77,097·05	25,308·70	25,722·76	..	953·90	1,230·86	340,744·72	153,630·23	155,864·99	8,749·73	..	..	..	
	Mt. Malcolm .. ..	68·18	991·37	181,682·17	89,376·78	90,436·33	4,778·03	..	..	..	..	..	..	..	..	..	
	Mt. Margaret .. ..	575·58	185·57	81,965·50	38,944·75	39,705·90	3,971·70	..	..	..	..	..	..	..	..	..	
	Menzies .. ..	..	275·78	53,580·21	35,575·60	35,851·38	234·61	..	..	..	..	..	..	..	..	..	
North Coolgardie .. ..	Ularring .. ..	13·95	108·98	15,955·50	15,163·73	15,286·66	..	188·20	533·93	107,821·91	73,626·86	79,398·99	255·58	..	..	..	
	Niagara .. ..	88·04	17·20	26,009·70	16,956·63	17,061·87	15·15	..	..	..	..	..	..	..	..	..	
	Yerilla .. ..	86·21	181·97	12,276·50	10,930·90	11,199·08	5·82	..	..	..	..	..	..	..	..	..	
Broad Arrow .. ..								983·07	628·40	32,298·24	15,510·23	17,121·70	..	..	..	..	
North-East Coolgardie .. ..	Kanowna .. ..	177·29	754·35	52,709·50	22,353·99	23,785·63	.. 32	369·75	908·05	52,726·50	24,184·58	25,462·38	5·27	..	..	..	
	Kurnalpi .. ..	192·46	153·70	17·00	1,330·59	1,676·75	4·95	..	..	..	..	..	..	..	..	..	
East Coolgardie .. ..	East Coolgardie .. ..	1,359·01	916·81	1,735,450·12	894,624·33	896,900·15	97,450·47	1,391·23	1,202·81	1,740,778·96	896,695·23	899,289·27	97,450·47	..	..	..	
	Bulong .. ..	32·22	286·00	5,323·84	2,070·90	2,389·12	..	..	..	..	..	..	..	..	..	..	
Coolgardie .. ..	Coolgardie .. ..	363·95	156·62	53,455·50	27,862·05	28,382·62	12·92	363·95	169·66	60,893·00	33,601·29	34,134·90	12·92	..	..	..	
	Kunanalling .. ..	..	13·04	7,344·50	5,739·24	5,752·28	..	..	..	..	..	..	..	..	..	..	
Yilgarn .. ..								..	29·49	44,337·00	20,879·63	20,909·12	288·08	..	..	..	
Dundas .. ..								32·34	1,581·86	47,717·75	27,935·07	29,549·27	11,338·76	..	..	..	
Phillips River .. ..								2·78	33·75	6,421·38	6,676·99	6,713·52	1,676·88	..	..	..	
† Donnybrook .. ..								..	..	..	..	..	..	..	..	..	
State generally .. ..								..	..	..	348·09	348·09	..	..	..	..	
		Total for 1909 ..						8,120·80	11,210·88	3,105,004·02	1,557,074·06	1,576,405·74	132,203·52	..	..	..	..

† Abolished, 4th March, 1908.

TABLE III.—Return showing, for the respective Goldfields and Districts, etc.—continued.

GOLDFIELD.	DISTRICT.	TOTAL GOLD PRODUCTION—DISTRICTS.						TOTAL GOLD PRODUCTION—GOLDFIELDS.									
		Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Total Gold.	Silver.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Total Gold.	Silver.				
		Fine ozs.	Fine ozs.	tons (2,240 lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	tons (2,240 lbs.)	Fine ozs.	Fine ozs.	Fine ozs.				
Kimberley																	
Pilbara	Marble Bar	9,128·20	2,582·89	49,654·58	80,071·34	91,781·93	574·01	14,062·01	2,922·36	79,575·82	133,952·71	150,937·08	574·01				
	Nullagine	4,933·81	339·97	29,921·24	53,881·37	59,155·15											
West Pilbara								4,511·10	220·73	14,188·85	14,285·16	19,016·99	168·51				
Ashburton								8,006·71	315·64			8,322·35	162·02				
Gascoyne								268·27	18·51	236·70	218·49	505·27					
Peak Hill								511·26	2,421·99	457,659·85	227,444·62	230,377·87	2,193·07				
East Murchison	Lawlers	4,984·14	5,900·82	1,708,458·89	781,131·42	792,016·38	20,525·22	6,308·61	9,291·15	2,004,465·56	1,049,799·85	1,065,399·61	20,748·14				
	Black Range	1,324·47	3,390·33	296,006·67	268,668·43	273,383·23	222·92										
	Cue	931·94	3,273·31	315,618·87	280,502·47	284,707·72	355·79										
Murchison	Nannine	8,288·81	5,530·15	381,356·14	317,185·31	331,004·27	1,174·98	12,422·81	17,918·06	2,524,219·45	1,950,735·89	1,981,076·76	122,366·93				
	Day Dawn	1,910·22	3,149·97	1,459,913·48	1,073,094·16	1,078,154·35	119,703·73										
	Mt. Magnet	1,291·84	5,964·63	367,330·96	279,953·95	287,210·42	1,132·43										
Yalgoo								521·49	743·63	95,857·23	65,424·71	66,689·83	3·30				
Mt. Margaret	Mt. Morgans	1,027·41	3,144·50	757,194·96	446,896·86	451,068·77	5,682·67	4,409·30	9,701·78	3,080,632·64	1,808,343·98	1,822,455·06	45,981·65				
	Mt. Malcolm	1,572·71	4,652·02	1,561,663·32	916,463·10	922,687·83	26,316·73										
	Mt. Margaret	1,809·18	1,905·26	761,774·36	444,984·02	448,698·46	13,982·25										
	Menzies	962·58	2,206·27	595,802·53	592,935·78	596,104·63	8,878·83										
North Coolgardie	Ularring	18·57	916·29	230,226·01	234,335·97	235,270·83	5,432·74	3,130·73	11,769·74	1,788,849·04	1,414,952·88	1,429,853·35	19,764·47				
	Niagara	1,043·44	1,269·99	808,028·22	450,836·69	453,150·12	5,394·43										
	Yerilla	1,106·14	7,377·19	154,792·23	136,844·44	145,327·77	58·47										
Broad Arrow								18,040·18	2,510·97	462,776·34	302,118·00	322,669·15	517·26				
North-East Coolgardie	Kanowna	104,048·41	8,154·84	710,360·52	474,512·68	586,715·93	2,494·54	115,220·35	10,461·68	715,136·22	481,948·63	607,630·66	2,505·76				
	Kurnalpi	11,171·94	2,306·84	4,775·70	7,435·95	20,914·73	11·22										
East Coolgardie	East Coolgardie	24,341·56	19,582·17	12,799,151·85	10,857,246·23	10,901,169·96	701,557·39	50,816·49	33,616·53	12,916,465·27	10,968,183·51	11,052,616·53	701,557·39				
	Bulong	26,474·93	14,034·36	117,313·42	110,937·28	151,446·57											
Coolgardie	Coolgardie	5,861·59	6,915·85	1,179,647·44	778,607·63	791,385·07	607·55	6,192·70	11,764·50	1,393,635·12	941,101·59	959,058·79	627·77				
	Kunanalling	331·11	4,848·65	213,987·68	162,493·96	167,673·72	20·22										
Yilgarn								70·57	934·62	772,895·93	329,420·57	330,425·76	3,762·15				
Dundas								1,909·64	6,205·39	460,142·78	369,298·88	377,413·91	26,352·47				
Phillips River								411·43	665·95	45,634·19	38,909·06	39,986·44	3,857·07				
† Donnybrook								23·24		1,653·30	818·52	841·70					
State generally								124·89	155·90	27·00	4,411·14	4,691·93	481·77				
		Total to 31-12-1909						249,138·87	121,639·13	26,331,648·79	20,115,495·44	20,436,273·24	951,623·74				

† Abolished, 4th March, 1908.

TABLE IV.

PRODUCTION OF GOLD AND SILVER FROM ALL SOURCES, SHOWING IN FINE OUNCES THE OUTPUT AS REPORTED TO THE MINES DEPARTMENT DURING 1909, AND THE TOTAL PRODUCTION TO DATE.

Kimberley Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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. Dockerell	..	Voided leases .. ..	..	..	..	..	..	..	..	..	44.00	435.93	..
Ruby Creek	(61) .. ..	Ruby Queen .. ..	..	..	..	..	..	..	..	..	9,678.00	6,216.22	..
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 Pantou	..	Voided leases .. ..	..	..	..	..	..	..	..	..	34.70	138.70	..
Do.	..	Sundry claims .. ..	..	..	..	..	..	..	..	..	3.00	15.01	..
		<i>From Goldfield generally :—</i>											
		Reported by Banks and Gold Dealers .. ..	134.52	..	..	..	..	..	..	..	2,176.89	..	..
		<b>Total</b> .. ..	<b>134.52</b>	..	..	..	..	..	..	..	<b>2,176.89</b>	..	<b>14,127.25</b>

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Pilbara Goldfield.  
MARBLE BAR DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.	693 .. ..	Bobby Burns .. ..	..	..	1.50	23.67	..	..	..	..	1.50	23.67	..
Do.	(161) .. ..	(Bulletin) .. ..	..	..	..	..	..	..	..	..	1,965.00	3,427.92	..
Do.	(161) .. ..	Bulletin .. ..	..	..	82.00	279.47	..	..	..	..	82.00	279.47	..
Do.	695 .. ..	Bulletin .. ..	..	..	14.00	141.04	..	..	..	..	14.00	141.04	..
Do.	(161, 653) ..	(Bulletin leases) .. ..	..	..	..	..	..	..	..	..	440.00	1,104.97	..

Do.		Voided leases								7,202.75	10,818.50	
Do.		Sundry claims		57.44	4.75	63.96			215.98	148.75	518.36	
Boodalyerrie..	701	Boodalyerrie East		125.39					125.39			
Do.		Voided leases							148.85	120.25	587.86	
Do.		Sundry claims		7.16					7.16			
Breen's Find..		Voided leases								14.00	66.82	
Elsie ..		Voided leases								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 ..	687	Devon			5.51	16.84				5.51	16.84	
Do.	673	Enterprise								41.16	23.97	
Do.	(641)	Franklin							69.06	403.84	430.10	
Do.	(661)	Franklin North Extended								13.25	3.93	
Do.	672	New Chum Railway								45.22	26.39	
Do.	(658)	Railway Signal								30.36	29.27	
Do.	615	Robert's Group: British Exploration of Australasia, Ltd.			10.69	21.14				281.40	441.82	
Do.	(674)	Thistle								6.26	3.58	
Do.		Voided leases							71.26	12,213.15	17,292.55	
Do.		Sundry claims	10.50	23.55	70.00	181.37		38.68	59.12	1,330.89	1,953.87	
North Pole ..		Voided leases								416.00	277.02	
North Shaw ..		Voided leases						7.53		351.45	674.72	
Do.		Sundry claims							567.06			
Sharks ..		Sundry claims						145.08	19.37	6.00	33.00	
Shaw River ..		Voided leases								101.00	49.63	
Talga Talga ..		Voided leases							83.83	574.50	975.98	
Do.		Sundry claims						50.26	68.99	204.65	520.25	
Tambourah ..		Voided leases								1,438.50	1,739.44	
Do.		Sundry claims							64.65	639.25	797.44	
Warrawoona..	505	(Bowbells : British Exploration of Australasia, Ltd.)								483.70	753.59	
Do.	483, 505	British Exploration of Australasia, Ltd.			10.25	21.54				1,423.25	1,134.39	
Do.	675	Britannia								11.50	17.81	
Do.	483	(Gauntlet)								1,128.30	3,124.40	
Do.	483	(Gauntlet: British Exploration of Australasia, Ltd.)								161.00	207.86	
Do.	604	Klondyke Boulder			189.00	106.42				1,039.69	1,873.68	
Do.	627	Klondyke Queen		3.80	308.50	242.50			3.80	384.25	427.70	
Do.	690	Warrawoona Queen			17.00	20.22				17.00	20.22	
Do.		Voided leases								13.19	3,008.11	8,356.91
Do.		Sundry claims		25.06	54.00	57.61		44.30	358.35	1,123.04	2,157.33	
Western Shaw		Voided leases								1,221.00	930.73	
Do.		Sundry claims	12.52	7.63					12.52	63.55		

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Pilbara Goldfield—continued.

MARBLE BAR DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.	
Man's Well	..	Voided leases .. ..	..	..	..	..	..	..	33.55	89.04	439.20	..	
Do.	..	Sundry claims .. ..	..	..	10.00	19.61	..	..	16.72	220.86	464.22	..	
Yandicoogina	..	Voided leases .. ..	..	..	..	..	..	..	140.76	2,664.50	5,597.99	..	
Do.	..	Sundry claims .. ..	..	2.10	..	..	..	..	234.70	103.75	120.34	..	
		<i>From District generally:—</i>											
		Sundry parcels treated at:											
		Osborne Cyanide Works .. ..	..	..	..	6.83	..	..	..	..	6.83	..	
		Stray Shot Battery .. ..	..	..	..	4.10	..	..	..	..	9.75	..	
		Various Works .. ..	..	..	..	..	..	..	..	237.95	1,140.31	..	
		Reported by Banks and Gold Dealers .. ..	1,041.69	..	..	..	..	..	8,829.83	217.05	..	..	
		<b>Total .. ..</b>	<b>1,064.71</b>	<b>252.13</b>	<b>777.20</b>	<b>1,206.32</b>	<b>..</b>	<b>..</b>	<b>9,123.20</b>	<b>2,582.39</b>	<b>49,654.58</b>	<b>80,071.34</b>	<b>574.01</b>

NULLAGINE DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.
Eastern Creek	180L	Crescent .. ..	..	..	393.00	502.85	..	..	..	475.75	858.34	..
Do.	176L	Doherty Reward .. ..	..	..	129.25	112.04	..	..	..	142.25	171.43	..
Do.	177L	Harp .. ..	..	..	62.00	79.22	..	..	..	62.00	79.22	..
Do.	182L	Morning Star .. ..	..	..	130.00	183.94	..	..	..	155.00	297.64	..
Do.	(187L)	Mt. Olive .. ..	..	..	20.00	18.76	..	..	..	20.00	18.76	..
Do.	179L	Rose .. ..	..	..	152.00	83.00	..	..	..	152.00	83.00	..
Do.	178L	Shamrock .. ..	..	..	104.00	123.58	..	..	..	118.25	195.13	..
Do.	184L	Thistle .. ..	..	..	33.50	33.02	..	..	..	33.50	33.02	..
Do.	..	Sundry claims .. ..	..	3.77	10.00	16.31	..	..	3.77	10.00	16.31	..
Elsie	..	Voided leases .. ..	..	..	..	..	..	..	..	408.25	1,323.85	..
Do.	..	Sundry claims .. ..	..	..	..	..	..	..	..	20.00	16.85	..
Middle Creek	106L	Barton .. ..	..	..	251.00	530.23	..	..	..	4,781.65	5,925.64	..
Do.	136L	Little Wonder .. ..	..	..	91.00	91.14	..	..	..	842.00	3,306.72	..
Do.	(138L)	Little Wonder West .. ..	..	..	..	..	..	..	..	195.50	471.36	..

Do.	168L	Yes-No	69-25	97-74	191-25	257-99				
Do.		Voided leases			102-00	91-51				
Do.		Sundry claims	42-50	35-10	68-00	88-93				
Mosquito Creek	143L	Ard Patrick	210-25	485-63	768-75	2,414-49				
Do.	186L	Belle Vue	6-00	13-13	6-00	13-13				
Do.	79L	(Galtee More)			586-00	1,648-33				
Do.	79L, 145L	Galtee More leases	217-00	313-77	1,207-00	2,273-75				
Do.	(159L)	Land's End		3-91	96-70	331-62				
Do.	171L	Latest Surprise	101-50	98-81	21-42	209-50				
Do.		Voided leases			3,506-85	4,112-73				
Do.		Sundry claims	79-00	141-12	166-47	1,939-44				
Nullagine	119L, 120L, 121L, 122L	British Exploration of Australasia, Ltd.	10-00	56-36	787-00	145-29				
Do.	122L	(Grant's Hill)			1,658-00	701-61				
Do.		Voided leases			13-96	4,991-75				
Do.		Sundry claims	46-25	77-77	104-70	97-49				
20-Mile Sandy	173L	Federation	51-00	98-81	95-25	253-51				
Do.	167L	Mountain Maid	65-00	265-72	172-00	534-42				
Do.		Voided leases			375-95	480-77				
Do.		Sundry claims	186-00	148-05	14-36	1,857-90				
<i>From District generally :—</i>										
Sundry parcels treated at :										
Doherty's Works				48-86		48-86				
Enterprise Works				26-30		226-29				
Royer's Public Crushing Works						7-53				
State Battery—20-Mile Sandy				226-80		379-26				
Various Works					50-50	2,407-85				
Reported by Banks and Gold Dealers			325-59		4,828-04	22-50				
<b>Total</b>			<b>325-59</b>	<b>3-77</b>	<b>2,459-50</b>	<b>3,911-97</b>	<b>4,933-81</b>	<b>339-97</b>	<b>29,921-24</b>	<b>53,881-37</b>

### West Pilbara Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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	02	9-00	3-15		
Lower Nicol	(143)	Early Morn							11-00	3-87		
Do.	106, 109	Ninety-nine leases			42-10	22-04		1-10	582-35	337-19		
Do.	(142)	Peep of Day							13-00	3-71		
Do.		Voided leases							40-85	50-86		
Do.		Sundry claims					10-44	2-71	10-00	11-51		
Mallina		Voided leases							103-60	102-83		

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

West Pilbara Goldfield—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.	
Pilbara ..	146 .. ..	Pilbara Broken Hill .. ..	..	..	..	..	..	..	48·12	..	..	..	
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	148·00	..	293·42	..	
Do. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	1·11	86·24	..	..	..	
Roebourne ..	150 .. ..	Q.E. .. ..	..	..	25·50	{ 43·55 } { *45·26 } { 9·68 } { *39·22 }	101·40	..	..	25·50	88·81	101·40	
Do. ..	.. ..	Sundry claims .. ..	..	..	4·00	..	67·11	..	..	4·00	48·90	67·11	
Station Peak	149 .. ..	Prince Regent .. ..	177·74	..	..	741·04	..	..	..	..	741·04	..	
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	9,993·00	9,382·00	..	
Do. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	..	..	37·50	48·19	..	
Towranna ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	1,934·80	2,088·26	..	
Weerianna ..	151, 152, (153) ..	Hillside leases .. ..	..	..	185·00	79·20	..	..	..	185·00	79·20	..	
Do. ..	(135, 136, 137, 138)	Roebourne Copper and Gold Mines, W.A., N.L.	..	..	..	*28·85	..	..	..	723·00	302·35	..	
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	25·25	220·30	..	
Do. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	..	..	4·00	25·30	..	
		<i>From Goldfield generally:—</i> Reported by Banks and Gold Dealers .. ..	353·04	..	..	..	..	..	4,300·41	82·54	..	6·38	..
		<b>Total .. ..</b>	<b>530·78</b>	..	<b>256·60</b>	<b>1,008·84</b>	<b>168·51</b>	<b>4,511·10</b>	<b>220·73</b>	<b>14,188·85</b>	<b>14,285·16</b>	<b>168·51</b>	

\* From Copper Ore.

Ashburton Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.	Fin ozs.	
Mt. Mortimer	.. ..	Sundry claims .. ..	..	..	..	..	..	..	354·37	315·64	..	..	..
Uaroo ..	M.L. 81 .. ..	Walgo .. ..	..	..	..	..	..	162·02	..	..	..	162·02	..
		<i>From Goldfield generally:—</i> Reported by Banks and Gold Dealers .. ..	436·32	..	..	..	..	..	7,652·34	..	..	..	..
		<b>Total .. ..</b>	<b>436·32</b>	..	..	..	..	<b>162·02</b>	<b>8,006·71</b>	<b>315·64</b>	..	..	<b>162·02</b>



## Gascoyne Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.	TOTAL FOR 1909.					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 ..	327P .. ..	Brilliant .. .. .	..	292·11	..	..	..	354·16	·04	53·63	..	..
Do. ..	330P .. ..	Groper .. .. .	..	47·88	..	..	..	47·88	..	..	..	..
Do. ..	.. .. .	Voided leases .. .. .	..	..	..	..	..	751·44	712·34	1,884·02	2·00	..
Do. ..	.. .. .	Sundry claims .. .. .	..	4·31	..	..	..	397·32	16·05	45·14	..	..
Mt. Fraser ..	(317P) .. ..	Mt. Fraser .. .. .	..	..	..	..	..	..	142·50	148·69	..	..
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.	..	..	95·00	38·39	..	..	..	450·51	493·52	..
Do. ..	1P .. .. .	(North Star) .. .. .	..	..	..	..	..	162·32	..	..	..	..
Do. ..	310P .. .. .	Oversight .. .. .	..	38·13	..	..	..	41·24	851·11	440·08	..	..
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.	..	..	67,491·00	7,097·70	309·48	..	191·46	447,127·35	217,962·37	2,191·07

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Peak Hill Goldfield—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.
Peak Hill ..	(319P) .. ..	Undersight .. ..	..	..	..	..	..	..	116·08	126·50	100·25	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	65·33	2,227·00	2,082·24	..	..
Do. ..	.. ..	Sundry claims .. ..	..	2·86	98·00	38·66	..	102·97	741·00	169·22	..	..
Ravelstone ..	336P .. ..	Anglo-Saxon .. ..	..	2·00	..	..	..	2·00	..	..	..	..
Do. ..	(325P) .. ..	Gadget .. ..	..	6·08	..	..	..	6·08	..	37·00	11·46	..
Do. ..	323P .. ..	Old Irish .. ..	..	..	224·00	160·20	..	..	..	299·50	188·48	..
Do. ..	328P .. ..	Redemption .. ..	..	..	112·00	63·12	..	..	..	224·00	116·28	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	3,618·85	2,745·87	..
Do. ..	.. ..	Sundry claims .. ..	..	..	38·00	8·79	..	..	..	553·60	283·17	..
Wilgeena ..	.. ..	Voided leases .. ..	..	..	..	..	..	23·54	128·50	146·79	..	..
Wilthorpe ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	47·00	20·93	..	..
<i>From Goldfield generally :—</i>												
Sundry parcels treated at:												
State Battery—Ravelstone .. ..			..	3·05	..	..	..	3·05	..	..	4·83	..
Various Works .. ..			..	..	..	..	..	..	30·00	319·97	..	..
Reported by Banks and Gold Dealers .. ..			59·48	56·03	..	..	..	511·26	157·12	..	..	..
<b>Total .. ..</b>			<b>59·48</b>	<b>452·45</b>	<b>68,058·00</b>	<b>7,406·86</b>	<b>309·48</b>	<b>511·26</b>	<b>2,421·99</b>	<b>457,659·85</b>	<b>227,444·62</b>	<b>2,193·07</b>

East Murchison Goldfield.

LAWLERS DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.
Bronzewing ..	1017 .. ..	Bronzewing .. ..	..	..	80·50	47·25	..	..	..	80·50	47·25	..
Do ..	1057 .. ..	Hawk .. ..	..	..	10·00	20·62	..	..	..	10·00	20·62	..
Do ..	1020 .. ..	Malbie .. ..	..	..	11·50	22·90	1·94	..	..	11·50	22·90	1·94
Cork Tree ..	.. ..	Voided leases .. ..	..	..	..	..	..	29·90	3,767·00	3,292·87	..	..
Do ..	.. ..	Sundry claims .. ..	..	25·50	..	..	..	25·50	13·00	9·32	..	..

Kathleen Valley	113	..	..	(Nil Desperandum)	..	..	..	..	..	17,960-00	7,618-73	..
Do	113	..	..	Nil Desperandum	..	..	160-00	83-02	..	1,234-00	720-92	..
Do	113, (635)	..	..	(Nil Desperandum leases)	..	..	..	..	..	2,722-50	1,625-77	..
Do	382	..	..	(Yellow Aster)	..	..	..	..	..	37,605-00	27,051-42	..
Do	382	..	..	Yellow Aster: Yellow Aster G.M. Co., N.L.	..	..	2,226-00	1,184-89	..	6,647-75	2,903-50	..
Do	..	..	..	Voided leases	..	..	..	..	..	141-57	1,288-50	1,292-34
Do	..	..	..	Sundry claims	..	..	..	..	..	478-40	1,122-25	679-06
Lake Darlot	182	..	..	Amazon	..	..	72-00	64-20	..	7-92	3,438-00	5,823-37
Do	93	..	..	Ballangarry	..	..	843-00	291-36	..	..	5,572-60	2,695-64
Do	626	..	..	Filbandint	..	..	..	..	..	..	999-00	918-19
Do	375	..	..	King of the Hills	..	..	523-00	219-42	..	101-48	1,271-00	1,474-90
Do	648, 654, 852	..	..	Monte Cristo leases	..	..	755-00	273-91	..	..	6,592-60	3,244-92
Do	273	..	..	St. George	..	..	23-50	20-01	..	2,927-22	732-00	7,869-38
Do	(363)	..	..	Waikato	..	..	..	..	..	9-24	4,370-00	5,241-49
Do	633	..	..	(Zangbar)	..	..	..	..	..	..	997-00	505-75
Do	633, 823	..	..	Zangbar leases	..	..	45-00	63-32	..	..	18,788-00	7,060-83
Do	..	..	..	Voided leases	..	..	..	..	..	818-41	15,889-20	10,369-06
Do	..	..	..	Sundry claims	..	..	344-00	334-08	..	1-16	232-96	1,598-71
Lawlers	19, 414	..	..	Bounty leases	..	..	..	..	..	..	1,630-35	1,788-67
Do	532	..	..	(Brilliant)	..	..	..	..	..	..	3,648-00	2,600-94
Do	532	..	..	Brilliant	..	..	55-00	133-34	..	..	55-00	445-44
Do	532, (533)	..	..	(Brilliant leases)	..	..	..	..	..	..	8,741-00	5,704-36
Do	1069	..	..	Dalmatia	..	..	44-00	65-59	..	..	44-00	65-59
Do	900	..	..	Dobra Scrica	..	..	143-00	97-87	..	..	1,076-00	1,000-52
Do	376	..	..	(Donegal: London and Western Australian Exploration Co., Ltd.)	..	..	..	..	..	..	38-00	69-73
Do	377	..	..	(Eastern United Extended)	..	..	..	..	..	..	106-00	69-72
Do	37, 58, 62, 70, 155, 156, 157, 158, 376, 377, (381), 385, (399, 426, 427), 459, (470, 500), 508, 509, (510, 511, 512, 552), 562, 563, (573), 811, 840, T.L. 8	..	..	(East Murchison United, Ltd.)	..	..	..	..	..	..	291,797-00	155,594-26
Do	(999)	..	..	Hidden Secret	..	..	43-01	..	..	43-01	82-00	79-83
Do	1080	..	..	Lillian Lass	..	..	72-00	13-20	..	..	72-00	13-20
Do	58	..	..	(London and Western Australian Exploration Co., Ltd.)	..	..	..	..	..	..	2,438-50	2,755-45
Do	37, 58, 62, 70, 155, 156, 157, 158, 376, 377, (381), 385, (399, 426, 427), 459, (470, 500), 508, 509, (510, 511, 512, 552), 562, 563, (573), 811, 840	..	..	(London and Western Australian Exploration Co., Ltd.)	..	..	..	..	..	..	179,563-00	40,438-14
Do	1038	..	..	Moa	..	..	124-00	139-35	..	..	161-00	203-74
Do	1030	..	..	Never Can Tell	..	..	..	..	..	..	71-00	20-14
Do	373	..	..	New Holland	..	..	289-00	43-53	..	..	4,774-25	2,353-86

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

East Murchison Goldfield—continued.

LAWLERS DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.
Lawlers ..	37, 58, 62, 70, 155, 156, 157, 158, 376, 377, 385, 459, 508, 509, 562, 563, 811, 840, 918, (929), 1053	Northern Mines, Ltd. .. ..	..	..	84,043·00	21,600·98	1,978·92	..	..	241,562·00	52,704·96	4,574·83
Do. ..	459 .. ..	(Quartzite King) .. ..	..	..	..	..	..	..	119·50	92·47	..	
Do. ..	385 .. ..	(Queen) .. ..	..	..	..	..	..	..	1,252·00	623·25	..	
Do. ..	889 .. ..	(Rajah) .. ..	..	..	..	..	..	..	867·00	229·59	..	
Do. ..	889, 895 .. ..	Rajah leases .. ..	..	..	240·00	24·32	..	..	1,628·00	724·26	..	
Do. ..	(1021) .. ..	Sunbeam .. ..	..	..	26·00	16·10	..	..	69·50	41·46	..	
Do. ..	910 .. ..	Sunrise .. ..	..	..	1,084·00	769·47	..	..	3,575·00	2,564·07	..	
Do. ..	521 .. ..	(Vivien) .. ..	..	..	..	..	..	..	45·50	21·75	..	
Do. ..	908 .. ..	Vivien Gem .. ..	..	63·38	848·75	997·28	..	..	2,335·25	2,381·57	..	
Do. ..	408, 521, 574, 624, 625, 719	Vivien G.M. Co., Ltd. .. ..	..	..	41,146·00	10,602·10	230·00	..	168,564·18	64,519·50	1,377·06	
Do. ..	62, 562, 563 ..	(Waronga South leases) .. ..	..	..	..	..	..	..	42,150·00	14,329·48	..	
Do. ..	988 .. ..	Wild Cat .. ..	..	..	806·50	550·25	..	..	3,793·50	2,824·65	..	
Do. ..	1010 .. ..	Yongala .. ..	..	..	183·50	8·59	..	..	266·50	40·13	..	
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	289·43	35,899·45	45,259·77	89·33
Do. ..	.. ..	Sundry claims .. ..	..	19·94	182·50	79·24	..	14·81	63·27	5,074·35	3,089·64	..
New England	.. ..	Voided leases .. ..	..	..	..	..	..	..	57·54	899·00	720·25	..
Do. ..	.. ..	Sundry claims .. ..	..	1·74	..	..	..	..	4·32	554·50	465·23	..
Sir Samuel ..	21, 24, 35, 38, 308, 310, 368, 439, 582, 584, 585, 615, (890)	Bellevue, Ltd. .. ..	..	..	22,628·00	11,835·78	1,230·65	..	..	33,115·00	18,550·91	1,968·91
Do. ..	21, 24, 35, 38, 308, 310, 368, (369), 439, 582, (583), 584, 585, (586), 615, 890, 891	(Bellevue Proprietary, Ltd.) .. ..	..	..	..	..	..	..	..	211,751·00	108,107·88	8,088·00
Do. ..	(339) .. ..	Vanguard .. ..	..	..	..	..	..	..	..	9,941·00	3,967·24	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	3,488·00	2,419·01	..
Do. ..	.. ..	Sundry claims .. ..	..	..	74·00	48·09	..	..	15·81	1,244·50	1,130·94	..

Wiluna	983	Adelaide Junction							66-00	23-48		
Do.	940, 973, 974	Adelaide leases		512-00	121-68				616-00	148-53		
Do.	(143)	Brothers		149-00	41-59				3,242-00	2,798-90		
Do.	1108	Brothers		41-00	10-71				41-00	10-71		
Do.	946	Bulletin		3,270-00	1,348-73				5,605-00	2,144-82		
Do.	959	Bulletin North							391-00	91-44		
Do.	1039	Caledonia		78-00	138-38				78-00	138-38		
Do.	149	(Derwent)							164-30	350-97		
Do.	149	Derwent		49-00	17-88				49-00	17-88		
Do.	140	Golden Age		208-00	541-16				752-00	870-93		
Do.	1068	Golden Age South		183-00	100-17				183-00	100-17		
Do.	140, 162, 163	(Golden Age Consolidated, Ltd.)							42,521-00	19,750-45		
Do.	140	(Golden Age Lake Way, Ltd.)							12,899-00	7,468-69		
Do.	1016	Golden Bracelet							126-00	612-53		
Do.	542, 548, 550, 906, 930, 931, 932, 937, 938, 943, 944, 952	Gwalia Consolidated, Ltd.		61,084-00	21,994-46				201,461-32	71,883-42	69-03	
Do.	1066, 1067	Happy Jack No. 1 leases		96-00	85-06				96-00	85-06		
Do.	1033	Hill Rise		57-00	3-42				57-00	3-42		
Do.	954	Indicator							767-00	143-44		
Do.	933	Lady of the Lake		165-00	95-61				322-00	228-68		
Do.	149	(Lake Way Goldfield 1899, Ltd.)							8,243-00	7,960-40		
Do.	162, 163	Lake Way leases							630-00	369-60		
Do.	956	Lone Hand		81-00	5-15				332-50	44-21		
Do.	137	Monarch of the East		281-00	176-70				503-00	308-41		
Do.	137	(Monarch of the East G.M. Co., N.L.)							12,251-00	8,888-27		
Do.	870	Moonlight							1,856-00	787-66		
Do.	967	Red Page							457-00	434-50		
Do.	917	Squib		58-00	19-51				276-50	67-00		
Do.	677	(Try Again)		14-00	10-46				1,185-00	1,143-02		
Do.	942	(Try Again Extended)		43-00	6-27				306-00	363-87		
Do.	677, 942	Try Again leases		200-00	114-65				200-00	114-65		
Do.	162	(West Australian Goldfields, Ltd.)							2,786-00	1,238-44		
Do.	(980)	White Swan		49-00	22-49				249-50	84-86		
Do.	1046	Woodcutter		110-00	60-17				110-00	60-17		
Do.		Voided leases							8,850-45	6,765-76	124-00	
Do.		Sundry claims	5-30	483-50	285-09		5-30	537-27	2,837-15	1,506-26		
<i>From District generally :-</i>												
Sundry parcels treated at :												
		Black Swan Cyanide Works			115-69	11-60				115-69	11-60	
		Cinderella Works		472-50	229-71				938-50	1,204-39	26-00	
		Cork Tree Cyanide Works			48-87					57-39		
		Lawlers Public Battery			44-12				214-00	1,335-84		
		State Battery—Lake Darlot			213-41				315-00	1,056-93		
		State Battery—Wiluna		123-00	1,267-24				123-00	1,476-26		
		Urquhart's Cyanide Works			293-89					4,276-70	200-00	
		Wilks Bros. Cyanide Works			16-15					48-48		
		Various Works							384-50	4,452-22	526-73	
		Reported by Banks and Gold Dealers	304-88				4,962-87	54-19				
		<b>Total</b>	<b>310-18</b>	<b>153-57</b>	<b>224,889-75</b>	<b>77,078-48</b>	<b>3,453-11</b>	<b>4,984-14</b>	<b>5,900-82</b>	<b>1,708,458-89</b>	<b>781,131-42</b>	<b>20,525-22</b>

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

East Murchison Goldfield—continued.

BLACK RANGE DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.		
Birrigrin	(163B)	Belfast	..	..	..	..	..	..	..	..	..	..	..	..
Do.	109B, 130B	(Birrigrin G.Ms., Ltd.)	..	..	147·00	38·84	..	..	4·86	176·50	280·95	..	..	..
Do.	109B	(Hawthorne)	..	..	..	..	..	..	..	799·50	546·09	..	..	..
Do.	109B, 130B	Hawthorne leases	..	..	..	..	..	..	..	1,555·00	2,013·25	..	..	..
Do.	130B	(Ione)	..	..	1,903·00	1,916·25	..	..	..	1,903·00	1,916·25	..	..	..
Do.	128B	(Pelerin)	..	..	..	..	..	..	..	24·00	20·83	..	..	..
Do.	128B, (336B), 356B, (487B)	Pelerin leases	..	..	440·00	611·88	..	..	..	1,765·46	3,621·53	..	..	..
Do.	(429B)	Possible	..	..	..	..	..	..	..	712·00	1,137·51	..	..	..
Do.	584B	Possible	..	1·19	..	..	..	..	..	272·75	265·92	..	..	..
Do.	159B	Red Castle	..	..	86·00	64·40	..	..	1·19	340·50	441·79	..	..	..
Do.	113B	Stranger	..	..	192·00	269·74	..	..	..	611·50	803·63	..	..	..
Do.	(168B)	(Wheel Ellen)	..	..	..	..	..	..	787·03	201·00	1,423·81	..	..	..
Do.	572B	Wheel Ellen	..	21·89	25·00	27·26	..	..	21·89	25·00	27·26	..	..	..
Do.	(279B)	Woodleys	..	..	84·50	29·78	..	..	..	333·70	204·44	..	..	..
Do.	..	Voided leases	..	..	..	..	..	..	5·71	849·00	482·69	..	..	..
Do.	..	Sundry claims	..	..	103·75	60·40	..	..	..	298·50	157·60	..	..	..
Maninga Marley	(341B)	Agnes	..	..	..	..	..	..	..	151·00	66·77	..	..	..
Do.	203B	(Havilah)	..	..	..	..	..	..	..	1,507·50	2,315·74	..	..	..
Do.	203B, 243B, 249B, 254B, 287B, 288B, 289B, 305B, 350B, 504B	Havilah G.M. Co., N.L.	..	..	10,259·00	4,965·23	..	..	..	25,693·00	14,411·06	..	..	..
Do.	203B, 243B, 249B, 254B, 287B, 288B, 289B, 305B	(Havilah leases)	..	..	..	..	..	..	..	2,240·00	2,432·48	..	..	..
Do.	513B	Kurrajong	..	..	30·00	13·51	..	..	..	47·00	31·30	..	..	..
Do.	53B	(Maninga Marley)	..	..	..	..	..	..	..	222·75	274·92	..	..	..
Do.	53B, 77B, 100B	Maninga Marley leases	..	..	185·00	338·68	..	..	..	5,785·33	6,441·83	..	..	..
Do.	67B	Maninga Marley North	..	..	683·00	995·16	..	..	..	2,649·50	3,639·89	..	..	..
Do.	(475B)	May King	..	..	71·00	28·65	..	..	..	159·00	100·11	..	..	..
Do.	..	Voided leases	..	..	..	..	..	..	3·99	206·75	162·38	..	..	..
Do.	..	Sundry claims	..	..	118·00	131·95	..	..	..	310·50	294·87	..	..	..
Montagu	185B	(Caledonian)	..	..	..	..	..	..	..	346·90	785·20	..	..	..
Do.	185B, 351B	Caledonian leases	..	..	150·00	85·41	..	..	..	310·00	343·41	..	..	..
Do.	135B	Montagu Boulder	..	..	910·00	574·05	..	..	..	1,150·00	695·97	..	..	..
Do.	175B	Montagu Monarch	..	..	191·00	139·31	..	..	..	462·50	677·05	..	..	..

Do.	624E	Prince Foote	18-00	67-46	18-00	67-46
Do.	578B	Sefton	179-00	100-27	179-00	100-27
Do.		Voided leases			21-31	304-75
Do.		Sundry claims	181-25	147-36		250-50
Nunngarra	(49B)	Abundance	31-69		31-69	421-75
Do.	(450B)	Albion	9-50	11-30	39-95	15-00
Do.	22B, 233B, 290B, 300B, 309B, 314B, 315B, 321B, 322B, (323B)	Black Range Kohinoor G.M. Co., N.L.	1,750-00	1,078-73		4,823-00
Do.	478B	Breakway	128-80	298-50	128-80	357-00
Do.	382B	(Bull Oak)				725-00
Do.	369B, 379B, 382B, 383B	Comrades leases	1,316-00	766-21		3,870-50
Do.	616B	Dead Beat		10-00		10-00
Do.	211B	Eclipse		172-50		493-75
Do.	389B	(Faugh-a-ballagh)				139-00
Do.	389B, 495B	Faugh-a-ballagh leases		224-00		224-00
Do.	(19B, 49B)	(Fingall and Abundance leases)				40-75
Do.	(337B)	Freedom		30-00		570-00
Do.	621B	Freedom		11-50		11-50
Do.	607B	Glanmire		21-00		21-00
Do.	457B	Indomitable		30-00		98-00
Do.	22B	(Kohinoor)				331-25
Do.	330B	Kohinoor North	15-25	655-00	381-51	989-00
Do.	139B	(Lady Ellen)				219-75
Do.	139B	Lady Ellen		19-00		19-00
Do.	139B, (234B)	(Lady Ellen leases)		33-00		259-50
Do.	286B	Late Seddon		186-00		445-50
Do.	568B	Mac's Addition		65-00		65-00
Do.	383B	(Maid Marion)				373-00
Do.	285B	Missing Link				284-50
Do.	(365B)	(New Sensation)				163-00
Do.	(365B, 366B)	New Sensation leases		129-00		410-50
Do.	205B	Nunngarra		177-50		300-50
Do.	619B	Nunngarra Junction		22-50		22-50
Do.	(329B)	Royal Flush				207-50
Do.	300B	(Sceptic)				3-75
Do.	(121B)	Squib				413-75
Do.	(499B)	Venture				42-50
Do.	378B	Worker		180-00		758-50
Do.		Voided leases				40-52
Do.		Sundry claims	613-09	380-00	277-81	54-65
Sandstone	4B	(Adelaide)				7-21
Do.	4B, 5B, 11B, 17B, 26B, 70B, 140B, 150B	(Adelaide leases)				21,010-00
Do.	5B	(Black Range)				152-68
Do.	4B, 5B, 9B, 11B, 17B, 26B, 70B, 140B, 150B, 256B	Black Range Mining Co., N.L.	26,882-00	22,054-45		51,229-00
Do.	623B	Black Range South Extended	10-59			10-59
Do.	800B	Blackstone	9-88			9-88
Do.	(500B)	Eileen		37-00		37-00

09

11-00

1-22

2-33

5-60

225

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

East Murchison Goldfield—continued.

BLACK RANGE DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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	233B	(Floater)	..	..	..	..	..	..	..	51.25	36.14	..
Do.	149B	(Golden Gate)	..	..	..	..	..	..	..	113.75	62.98	..
Do.	151B	(Golden Key)	..	..	..	..	..	..	..	883.00	1,412.75	..
Do.	(473B)	Horseshoe	..	..	..	..	..	..	..	31.50	16.35	..
Do.	196B	Juno: Sandstone Development G.M. Co., N.L.	..	..	7,620.00	4,232.12	70.00	..	..	9,684.00	7,061.94	87.00
Do.	16B	(Kingoonya)	..	..	..	..	..	..	..	1,406.00	1,850.40	..
Do.	(493B)	Leap Year	..	..	17.50	6.08	..	..	..	50.00	24.64	..
Do.	509B	Mary S.	..	..	57.00	75.69	..	..	275.60	70.00	84.09	..
Do.	604B	Orion	..	..	186.57	..	..	..	186.57	..	..	..
Do.	6B, 10B, 16B, 74B, 81B, 114B, 149B, 151B, 189B, 193B, 206B, 216B, 238B, 463B, 477B, 498B	Oroya Black Range, Ltd.	..	..	48,176.00	31,982.37	56.15	..	..	115,263.00	77,419.58	56.15
Do.	573B	Oroya Extended	..	..	135.50	125.88	..	..	..	135.50	125.88	..
Do.	187B	Sandridge: Sandstone Development G.M. Co., N.L.	..	..	..	..	..	..	..	263.00	102.22	..
Do.	6B	(Sand Stone)	..	..	..	..	..	..	..	1,439.50	1,938.54	..
Do.	510B	Storekeeper	..	..	9.36	..	..	..	9.36	..	..	..
Do.	559B	Surprise North	..	..	6.64	..	..	..	6.64	..	..	..
Do.	10B	(Undaunted)	..	..	..	..	..	..	..	80.00	46.04	..
Do.	74B	(Undaunted East)	..	..	..	..	..	..	..	648.25	619.82	..
Do.	114B	(Undaunted East Extended)	..	..	..	..	..	..	..	276.00	181.34	..
Do.	8B	Wanderie	..	..	67.00	15.49	..	..	..	2,417.50	2,401.44	..
Do.	23B	Wanderie No. 1 West	..	..	557.50	153.59	..	..	..	2,589.00	1,334.07	..
Do.	589B	Wanderie North Extended	..	..	22.07	..	..	..	22.07	..	..	..
Do.	174B	(Wonoka)	..	..	..	..	..	..	..	68.50	36.35	..
Do.	174B	Wonoka: Sandstone Development G.M. Co., Ltd.	..	..	..	..	..	..	..	235.50	186.93	..
Do.	..	Voided leases	..	..	..	..	..	..	43.82	2,073.88	2,198.98	..
Do.	..	Sundry claims	..	..	48.38	322.00	208.35	..	49.84	560.50	349.23	..
Youanme	543B	Battler's Relief	..	..	16.00	32.35	..	..	..	16.00	32.35	..
Do.	538B	Commonwealth	..	..	128.25	92.22	..	..	..	128.25	92.22	..
Do.	523B	Continental	..	..	100.50	68.87	..	..	..	100.50	68.87	..
Do.	517B	Golden Crown	..	..	68.00	59.73	..	..	..	68.00	59.73	..
Do.	526B	Great Western	..	..	9.71	553.75	417.43	..	9.71	553.75	417.43	..
Do.	519B	Hill End	..	..	..	135.75	103.03	..	..	135.75	103.03	..



Do.	564B	Junction	28-00	21-27			28-00	21-27				
Do.	544B	Lady Agnes	16-00	6-22			28-00	12-88				
Do.	582B	Marloo	10-00	6-13			10-00	6-13				
Do.	554B	Oaks	37-44			36	39-28					
Do.	521B	Peru	85-00	107-92			85-00	107-92				
Do.	(569B)	Prospector	14-00	3-18			14-00	3-18				
Do.	535B	Retreat	57-00	17-90			57-00	17-90				
Do.	550B	Sunny Morn	76-74	9-50			96-62	9-50				
Do.	530B	Thompson's Luck	15-50	3-01			6-18	15-50	3-01			
Do.	534B	Two Boys	38-50	11-30			38-50	11-30				
Do.	514B	United	527-00	508-95			527-00	508-95				
Do.	563B	Wairarapa	26-50	6-97			26-50	6-97				
Do.	545B	White Boulder	58-00	7-12			58-00	7-12				
Do.		Voided leases					3-97					
Do.		Sundry claims	89-00	33-40			89-00	33-40				
<i>From District generally:—</i>												
Sundry parcels treated at:												
		Reply Works	37-00	850-25			37-00	850-25				
		State Battery—Nunngarra	168-00	761-94	30-00		202-00	5,774-67	59-53			
		State Battery—Youanme		384-00				384-00				
		Various Works						4,313-27				
		Reported by Banks and Gold Dealers	78-44	11-43			1,251-50	11-43				
		<b>Total</b>	<b>78-44</b>	<b>1,490-54</b>	<b>107,729-25</b>	<b>76,797-39</b>	<b>156-15</b>	<b>1,324-47</b>	<b>3,390-33</b>	<b>296,006-67</b>	<b>268,668-43</b>	<b>222-92</b>

## Murchison Goldfield.

### CUE DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.	..	..	3,533-00	3,256-08	38-08	..	..	13,007-33	11,824-83	81-28
Do.	1467, 1488	Barrambie South G.M. Co., N.L.	..	..	70-00	31-38	..	..	190-00	63-86	..	
Do.	1467	(Dawn of Hope)	..	..	..	..	..	9-99	5-09	29-70	..	..
Do.	1458	(Golden Treasure)	..	..	..	..	..	6-54	..	..	..	..
Do.	1709	Ironclad	..	..	22-00	10-11	..	..	22-00	10-11	..	..
Do.	1712	Mystery	..	..	224-00	324-53	..	..	239-00	385-44	..	..
Do.	1708	Sugarstone	..	..	847-00	551-30	..	..	847-00	551-30	..	..
Do.		Voided leases	..	..	..	..	..	5-96	83-50	64-07	..	..
Do.		Sundry claims	..	..	9-50	4-41	..	..	9-50	4-41	..	..
Cuddingwarra	(1510)	Emily	..	..	..	..	..	..	339-50	511-04	..	..
Do.	(1662)	Gold King: Victory United G.M. Co., N.L.	..	..	..	..	..	..	55-00	14-08	..	..

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Murchison Goldfield—continued.

CUE DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.
Cuddingwarra	1643 .. ..	Rhinegold .. ..	..	..	221·00	61·37	..	..	..	444·00	141·22	..
Do.	595, 1122, (1685)	Victory United G.M. Co., N.L.	..	..	330·00	187·83	..	..	..	21,270·00	31,530·56	15·42
Do.	.. ..	Voided leases .. ..	..	..	..	..	..	..	36·52	12,091·75	10,544·28	..
Do.	.. ..	Sundry claims .. ..	..	6·71	49·50	37·76	..	..	6·71	338·00	283·52	..
Cue	1047 .. ..	(Agamemnon) .. ..	..	..	..	..	..	..	..	2,276·33	1,564·83	..
Do.	1047, 1310	Agamemnon leases .. ..	..	..	82·00	69·30	..	..	..	4,792·00	2,708·09	..
Do.	1047 .. ..	Agamemnon: Agamemnon, Ltd.	..	..	..	..	..	..	..	7,053·50	4,649·42	..
Do.	1750 .. ..	Belgravia .. ..	..	..	70·50	26·87	..	..	..	70·50	26·87	..
Do.	(1713) .. ..	Bonnie Dundee .. ..	..	..	85·50	24·94	..	..	..	133·50	49·37	..
Do.	(1687) .. ..	Columbia .. ..	..	..	..	..	..	..	..	30·00	30·84	..
Do.	1703 .. ..	Countess .. ..	..	..	1,185·50	188·59	..	..	..	1,230·50	214·54	..
Do.	203, 1148	(Cue Consolidated G.Ms., Ltd.)	..	..	..	..	..	..	..	23,427·50	18,382·10	..
Do.	203 .. ..	Cue No. 1 .. ..	..	..	..	..	..	..	..	7,640·50	12,579·87	..
Do.	1446 .. ..	(Cue Town No. 3) .. ..	..	..	..	..	..	..	..	639·00	287·68	..
Do.	1446, 1447	Cue Town No. 3 leases .. ..	..	..	..	..	..	..	..	226·50	112·58	..
Do.	1714 .. ..	Dew Drop .. ..	..	..	111·00	105·47	..	..	..	111·00	105·47	..
Do.	1751 .. ..	Dreadnought .. ..	..	..	81·50	45·78	..	..	..	81·50	45·78	..
Do.	1684 .. ..	Duke of York .. ..	..	..	643·50	313·57	..	..	..	1,266·50	616·01	..
Do.	1637 .. ..	(Gem of Cue) .. ..	..	..	..	..	..	..	..	214·50	233·79	..
Do.	(1719) .. ..	Gem of Cue East .. ..	..	..	269·50	192·91	..	..	..	269·50	192·91	..
Do.	1722 .. ..	Gem of Cue East .. ..	..	..	150·00	82·23	..	..	..	150·00	82·23	..
Do.	1020 .. ..	Gem of Cue Extended .. ..	..	..	..	436·76	..	..	..	20·00	3,573·07	..
Do.	1637, 1663	Gem of Cue leases .. ..	..	..	1,583·50	833·31	..	..	..	2,906·00	1,702·72	..
Do.	1020, 1044	(Gem of Cue, Ltd.) .. ..	..	..	..	..	..	..	..	11,724·00	6,746·05	..
Do.	1509 .. ..	Happy Jack .. ..	..	..	..	..	..	..	..	896·00	656·45	..
Do.	1681 .. ..	Hidden Treasure .. ..	..	..	171·00	158·94	..	..	..	385·50	387·89	..
Do.	1148 .. ..	(Light of Asia) .. ..	..	..	..	..	..	..	..	10,175·00	7,302·20	..
Do.	1148, 1299, 1300, 1634, 1666, 1667	Light of Asia leases .. ..	..	..	5,127·00	3,343·38	..	..	..	12,464·00	8,316·75	..
Do.	1674 .. ..	Lily .. ..	..	..	201·00	335·37	..	..	..	574·50	715·73	..
Do.	1718 .. ..	Lord Nolan .. ..	..	..	84·00	92·95	..	..	..	84·00	92·95	..
Do.	1691 .. ..	Lucky Hit .. ..	..	..	64·00	55·15	..	..	..	110·50	86·60	..
Do.	(1694) .. ..	New Golden Stream .. ..	..	..	103·00	47·08	..	..	..	241·00	176·62	..
Do.	1732 .. ..	Normanby .. ..	..	..	158·50	93·63	..	..	..	158·50	93·63	..
Do.	(1705) .. ..	Old Caledonia .. ..	..	..	15·00	1·60	..	..	..	166·50	27·11	..
Do.	(1481) .. ..	Old Princess Ada .. ..	..	..	..	..	..	..	..	1,661·00	633·69	..
Do.	1433 .. ..	Princess Ada .. ..	..	..	20·00	23·44	..	..	..	4,159·50	1,462·72	..
Do.	222, 653, 1016, 1048, 1114	(Princess (Murchison) Consolidated, Ltd.)	..	..	..	..	..	..	..	6,806·50	6,044·31	..
Do.	222, 653, 1016, 1048, 1114	Princess Royal leases .. ..	..	..	2,949·00	3,078·04	..	..	..	4,969·00	4,767·66	..

Do.	1151, 1252, 1362, 1391, 1498, 1689	Queen of the May leases		29-00	11-39			6,926-00	6,974-06	
Do.	1248	Rising Sun		39-00	23-08			1,279-00	879-49	
Do.	(1755)	Roosevelt		6-00	11-13			6-00	11-13	
Do.	1576	Rose		151-50	26-04			481-50	301-62	
Do.	1374	Salisbury						2,239-00	955-94	
Do.	1374	(Salisbury)						579-00	324-64	
Do.	1374, (1407, 1408, 1413)	(Salisbury leases)						4,279-00	3,081-67	43-35
Do.	1044	South Volunteer		218-00	59-18			6,395-00	3,223-97	
Do.	1325	(Starlight)						1,506-50	1,473-40	
Do.	1325, 1539	Starlight leases		238-50	142-04			630-00	864-91	
Do.	(1672)	Star of Hope					132-91			
Do.	1706	St. Catherine's Bank		37-50	29-20			37-50	29-20	
Do.	(1655)	Struggle		707-00	151-20			1,062-50	297-03	
Do.	(1692)	Volunteer South Extended		46-00	18-59			159-50	115-63	
Do.	1739	Volunteer South Extended		135-00	100-73			135-00	100-73	
Do.		Voided leases					34-72	222-37	80,847-80	55,107-80
Do.		Sundry claims	32	1,021-50	510-46		45	263-16	7,825-85	5,577-51
Eelya	(1687)	Columbia		25-00	19-63			25-00	19-63	
Do.	(1648)	Eelya North		71-50	124-37			193-00	576-16	
Do.	(1496)	Eelya Reward						82-50	48-96	
Do.	1696	Jasper Queen		123-00	338-03			174-00	475-83	
Do.		Sundry claims		21-00	48-99			47-25	146-80	197-76
Erroll's	1743	Great Saddle		1,080-00	255-76			1,080-00	255-76	
Do.	(1531)	(Legacy)						4,847-00	2,920-85	
Do.	(1490)	Three Star	3-62					51-00	151-52	
Do.	(1531, 1572, 1588, 1671, 1680)	(Wha G.Ms., Ltd.)		320-00	99-24			2,564-00	1,582-73	
Do.		Voided leases						103-00	106-95	
Do.		Sundry claims		83-00	64-08			153-00	82-20	
Mindoolah	(1603)	Boggy Day		98-00	15-73			400-50	513-59	
Do.	1707	Double Barrell		12-50	9-93			12-50	9-93	
Do.	(1623)	Excelsior						492-50	297-55	
Do.	1735	Excelsior		15-00	9-62			15-00	9-62	
Do.	(1624)	Le Soleil						297-00	300-24	
Do.	(1603)	Mindoolah Main Reef						337-00	123-57	
Do.	(1651)	Mindoolah Queen						232-00	63-94	42-97
Do.	(1652)	Pride of Mindoolah						326-50	194-82	
Do.	(1682)	Wondery						15-50	10-13	
Do.		Voided leases					3-07	5,636-00	3,211-82	
Do.		Sundry claims		243-50	218-97			9-81	889-50	1,067-36
Reedy's Find	1720	Balaclava		7-00	12-42			7-00	12-42	
Do.	1675	New Year's Gift	1-71					29-66	41-00	23-55
Do.	1727	Rosandora	39-51	2-00	50-05			39-51	2-00	50-05
Do.	(1678)	Pinnacles						31-99	13-50	7-76
Do.	1737	Rejected		16-00	4-80			16-00	4-80	
Do.		Voided leases						109-49	390-50	530-75
Do.		Sundry claims					136-94	17-76	195-05	116-52
Tukanarra	(1697)	Big Lode North						5-00	4-56	
Do.	1665	Boyd's Extended		2-00	3-20			55-00	141-03	
Do.	1583	Cable		405-00	211-47			953-00	643-05	
Do.	1725	Douglas Boulder	26-97	83-50	174-58			83-50	174-58	
Do.	(1736)	Douglas Pup		9-00	31-65			9-00	31-65	

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Murchison Goldfield—continued.

CUE DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.	
Tukanarra ..	1752 .. ..	El Dorado .. ..	..	..	46·00	20·06	..	..	..	46·00	20·06	..	
Do. ..	1527 .. ..	Ensign .. ..	..	272·12	198·00	385·61	18·60	..	478·86	305·00	664·67	48·48	
Do. ..	1688 .. ..	Judy's Gift .. ..	..	..	..	..	..	..	..	15·00	2·07	..	
Do. ..	1337 .. ..	Nemesis .. ..	..	608·78	201·00	1,009·36	..	..	608·78	1,767·00	5,118·72	..	
Do. ..	1756 .. ..	Orient .. ..	..	..	10·00	2·97	..	..	..	10·00	2·97	..	
Do. ..	1729 .. ..	Prince Albert .. ..	..	267·38	7·00	35·47	..	..	267·38	7·00	35·47	..	
Do. ..	1717 .. ..	Try Again .. ..	..	..	50·00	24·68	..	..	..	50·00	24·68	..	
Do. ..	1432 .. ..	Union Jack .. ..	..	..	..	..	..	..	..	858·00	2,932·05	124·29	
Do. ..	..	Voided leases .. ..	..	..	..	..	..	14·65	878·91	12,483·60	9,513·20	..	
Do. ..	..	Sundry claims .. ..	..	..	183·50	113·58	..	3·76	31·62	2,344·25	5,149·95	..	
<i>From District generally:—</i>													
Sundry parcels treated at:													
		Cue No. 1 Works .. ..	..	..	67·00	997·42	..	..	..	67·00	2,323·42	..	
		Gem of Cue Extended Works .. ..	..	..	..	84·06	..	..	..	..	84·06	..	
		Great Saddle Works .. ..	..	..	..	68·56	..	..	..	..	68·56	..	
		Mindoolah Main Reef Works .. ..	..	..	..	188·22	..	..	..	..	505·07	..	
		State Battery—Tukanarra .. ..	..	..	..	203·38	..	..	..	518·50	2,527·04	..	
		Various Works .. ..	..	..	..	..	..	..	..	6,858·52	17,623·16	..	
		Reported by Banks and Gold Dealers .. ..	121·00	..	..	..	..	738·35	7·54	..	..	..	
		<b>Total .. ..</b>	<b>121·32</b>	<b>1,226·80</b>	<b>24,469·50</b>	<b>19,923·01</b>	<b>56·68</b>	<b>931·94</b>	<b>3,273·31</b>	<b>315,618·87</b>	<b>280,502·47</b>	<b>355·79</b>	

NANNINE DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.
Abbotts ..	807N .. ..	Crescent .. ..	..	..	105·10	120·46	..	..	..	105·10	120·46	..
Do. ..	827N .. ..	Just-in-Time .. ..	..	..	..	..	..	..	..	8·50	4·40	..
Do. ..	(171N) .. ..	Mt. Vranizan .. ..	..	..	..	..	..	..	..	13,416·00	12,205·69	..
Do. ..	172N, 247N, 248N	New Murchison King G.Ms. .. ..	..	..	..	..	..	..	..	21,356·00	24,463·53	..

Do.	..	..	Voided leases ..	..	..	..	..	..	..	..	187.00	227.91	..
Do.	..	..	Sundry claims ..	..	..	3.00	7.42	..	..	..	16.00	38.41	..
Burnakura	238N	..	Alliance ..	..	..	269.00	83.36	..	..	..	4,008.00	3,461.61	5.87
Do.	509N, 527N	..	Federal City leases	..	..	2,368.00	1,157.12	..	..	..	13,457.00	6,893.97	..
Do.	408N, (451N), 517N	..	New Alliance leases	..	..	1,168.00	295.08	..	..	..	12,475.00	15,414.98	13.12
Do.	693N	..	Perseverance	..	..	190.00	183.19	..	..	206.11	286.00	335.30	..
Do.	..	..	Voided leases ..	..	..	..	..	..	..	3,000.54	635.50	1,290.86	7.91
Do.	..	..	Sundry claims ..	..	..	..	..	..	11.35	22.93	25.00	18.90	..
Chesterfield	806N	..	Big Ben ..	..	29.06	131.00	207.59	..	..	29.06	256.00	437.48	..
Do.	(634N)	..	Dorothy ..	..	..	12.00	4.17	..	29.02	21.00	243.00	189.45	..
Do.	943N	..	Gift ..	..	..	2.00	24.64	..	..	..	2.00	24.64	..
Do.	361N	..	Margueritta	..	1.33	445.01	254.08	..	..	106.92	3,810.51	3,837.47	80
Do.	753N	..	Margueritta North	..	..	14.00	5.65	..	..	..	14.00	5.65	..
Do.	(858N)	..	Margueritta North Extended	..	..	51.00	158.63	..	..	..	51.00	158.63	..
Do.	..	..	Voided leases ..	..	..	..	..	..	..	18.57	2,219.75	2,532.32	..
Do.	..	..	Sundry claims ..	..	..	106.00	71.46	..	..	..	221.50	185.23	..
Gabanintha	787N, 788N	..	Golden Hope leases	..	..	304.00	145.39	..	..	..	304.00	145.39	..
Do.	379N	..	(Mountain View)	..	..	..	..	..	..	..	2,626.50	2,141.93	73.17
Do.	577N	..	Mountain View East	..	..	..	..	..	..	..	60.00	15.12	..
Do.	379N, 504N, 505N	..	Mountain View leases	..	..	335.00	345.90	..	..	..	1,391.00	805.56	..
Do.	874N	..	Mountain View South	..	..	30.00	8.02	..	..	..	30.00	8.02	..
Do.	32N, 46N, (460N)	..	Nannine Goldfields, Ltd.	..	..	..	20.00	45.00	..	..	8,620.00	3,705.34	451.49
Do.	32N	..	(Tumbulgum)	..	..	..	..	..	..	..	670.50	255.47	..
Do.	46N	..	(Tumbulgum Extended)	..	..	..	..	..	..	..	63.00	83.02	..
Do.	..	..	Voided leases ..	..	..	..	..	..	..	..	4,284.50	3,884.21	..
Do.	..	..	Sundry claims ..	..	1.33	10.00	17.17	..	1.33	..	230.00	216.86	..
Garden Gully	798N	..	Jasper Star ..	..	22.00	15	24.59	..	26.36	27.88	15	24.59	..
Do.	928N	..	Kyarra ..	..	..	21.00	54.74	..	..	..	21.00	54.74	..
Do.	797N	..	Sabbath ..	..	..	139.00	166.30	..	..	..	139.00	166.30	..
Do.	..	..	Voided leases ..	..	..	..	..	..	..	..	260.00	525.11	..
Do.	..	..	Sundry claims ..	..	..	54.50	63.16	..	..	..	160.50	195.36	..
Gum Creek	672N	..	Hilda No. 1 ..	..	..	44.00	48.58	..	..	..	118.25	127.68	..
Do.	895N	..	Jupiter ..	..	..	100.00	154.55	..	..	..	100.00	154.55	..
Do.	..	..	Voided leases ..	..	..	..	..	..	25.27	88.12	1,211.33	1,299.79	..
Do.	..	..	Sundry claims ..	..	..	15.50	17.98	..	..	..	163.50	102.30	..
Jillawarra	(758N)	..	Bubinue ..	..	..	..	..	..	..	..	52.50	82.51	..
Do.	(455N)	..	Jillawarra	..	..	..	..	..	..	..	868.00	965.85	..
Do.	904N	..	Midge ..	..	117.55	18.35	386.83	..	..	117.55	18.35	386.83	..
Do.	..	..	Voided leases ..	..	..	..	..	..	..	252.47	459.50	546.09	..
Do.	..	..	Sundry claims ..	..	56.39	12.00	25.25	..	169.02	58.08	12.00	25.25	..
Meekatharra	578N	..	Batavia ..	..	..	..	..	..	..	..	136.00	155.22	..
Do.	597N	..	Commodore	..	..	54.00	141.73	..	..	..	498.00	1,268.71	..
Do.	555N	..	Commodore Block	..	..	..	..	..	..	..	279.00	1,022.82	..
Do.	477N	..	Fenian ..	..	..	2,038.00	2,159.76	..	..	..	8,831.75	18,289.22	..
Do.	477N, 814N	..	Fenian leases	..	..	9,401.00	12,350.29	..	..	..	9,401.00	12,350.29	..
Do.	313N	..	Halcyon ..	..	..	55.00	17.03	..	..	2.11	2,881.75	1,306.15	..
Do.	635N	..	Halcyon Extended	..	..	203.50	116.10	..	..	..	516.50	665.41	..
Do.	236N	..	Haveluck	..	..	32.00	48.62	..	..	..	2,806.25	1,942.13	..
Do.	475N	..	(Ingliston Consols Extended)	..	..	..	..	..	..	..	1,536.25	4,248.25	30
Do.	475N, 515N, 729N, 822N	..	Ingliston Consols Extended leases	..	..	4,608.00	4,833.46	..	..	..	6,255.50	8,631.48	..
Do.	544N	..	Ingliston Consols South	..	..	..	..	..	..	..	20.50	24.49	..
Do.	398N	..	(Ingliston Extended)	..	..	..	..	..	..	..	1,320.25	1,106.46	..

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Murchison Goldfield—continued.

NANNINE DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.
Meekatharra..	398N, 437N, 462N	Ingliston Extended G.Ms., Ltd	..	..	9,021-00	4,025-94	..	..	..	48,560-00	21,192-38	..
Do.	(514N)	Ingliston No. 2	..	..	..	..	..	..	..	61-50	54-05	..
Do.	637N	Ingliston South Extended	..	..	..	..	..	..	..	10-00	10-60	..
Do.	507N	Ingliston United	..	..	..	..	..	..	..	293-25	147-95	..
Do.	852N	Lone Hand	..	..	53-10	46-96	..	..	..	53-10	46-96	..
Do.	(728N)	Macquarrie	..	..	991-50	172-79	..	..	..	4,051-50	780-63	..
Do.	915N	Macquarrie	..	..	591-00	100-70	..	..	..	591-00	100-70	..
Do.	734N	Macquarie North	..	..	..	..	..	..	7-63	59-00	10-48	..
Do.	533N	Marmont	..	..	9,840-00	7,015-98	..	..	..	23,112-00	19,650-17	..
Do.	580N	Marmont Extended	..	..	..	..	..	..	..	43-00	38-03	..
Do.	855N	Mount Ralph	2-00	..	..	..	..	..	2-00	..	..	..
Do.	610N	Multum in Parvo	..	..	18-00	171-53	..	..	..	59-13	2,166-33	..
Do.	(774N)	Nil Desperandum	..	..	..	..	..	..	..	10-00	3-22	..
Do.	93N	N. 93	..	..	1,071-00	478-53	..	..	36-47	5,494-50	2,556-72	..
Do.	832N	Occidental	..	..	300-00	60-89	..	..	..	319-50	73-12	..
Do.	372N	Pioneer	..	..	1,007-00	1,061-52	..	..	..	4,533-25	4,834-40	..
Do.	890N	Pioneer Continuation	..	..	35-00	17-40	..	..	..	35-00	17-40	..
Do.	866N	Pioneer South	..	..	27-00	7-16	..	..	..	27-00	7-16	..
Do.	931N	Queen of the Hill	..	..	130-00	34-69	..	..	..	130-00	34-69	..
Do.	803N	Recovery	..	..	30-00	3-27	..	..	..	244-00	51-93	..
Do.	531N	Revenue	..	..	..	..	..	..	..	15-25	4,689-98	..
Do.	773N	St. Francis	..	..	246-00	25-64	..	..	..	458-00	69-54	..
Do.	(789N)	Sweetheart	..	..	..	..	..	..	78-52	..	..	3-00
Do.	..	Voided leases	..	..	..	..	..	..	61-70	10,722-98	7,676-84	..
Do.	..	Sundry claims	..	..	133-00	72-34	..	177-68	..	1,308-35	900-99	..
Munara Gully	..	Voided leases	..	..	..	..	..	..	..	13,167-75	6,489-65	..
Do.	..	Sundry claims	..	..	..	..	..	..	..	63-00	21-75	..
Nannine	840N	Annie and Margaret	..	1-40	179-00	108-77	..	..	1-40	179-00	108-77	..
Do.	(756N)	Black Pidgeon	..	..	..	..	..	..	..	12-50	6-86	..
Do.	791N	Black Snake	..	..	440-50	151-57	..	..	..	537-50	201-80	..
Do.	273N	(Caledonian)	..	..	..	..	..	..	..	887-00	1,225-50	..
Do.	8N	Caledonian Extended	..	..	151-00	61-67	..	..	..	1,691-50	2,561-48	..
Do.	273N, 543N	Caledonian leases	..	..	305-00	46-64	..	..	..	2,793-50	1,119-64	..
Do.	754N	Champion	..	2-15	574-00	182-42	..	..	2-15	1,256-50	508-97	..
Do.	817N	Champion South	..	12-64	284-50	135-41	..	..	12-64	284-50	135-41	..
Do.	(830N)	Dark Horse	..	..	34-00	14-65	..	..	..	70-00	32-32	..
Do.	(792N)	Easter Gift	..	..	..	..	..	..	..	9-00	14-36	..
Do.	(946N)	Keep it Dark	..	135-21	22-50	29-04	..	..	135-21	22-50	29-04	..
Do.	617N	Lady Mary line of reef	..	..	27-00	5-39	..	..	..	478-00	157-41	..
Do.	16N, 25N, 166N	Mt. Hall, Royalist Consolidated, and Nannine leases	..	..	1,885-00	1,912-85	..	..	..	15,488-60	18,422-08	127-60
Do.	(765N)	Oozulimbird	..	..	53-50	24-91	..	..	..	240-00	185-81	..
Do.	(752N)	Queen of the Lake	..	..	..	..	..	..	..	163-00	54-26	..

Do.	785N	Queenslander							54.00	70.47					
Do.	25N	(Royal Consolidated)						19.18	762.53	3,500.70					
Do.	(813N)	Waikari							90.50	96.29					
Do.		Voided leases						34.02	53,602.90	31,337.32	39.85				
Do.		Sundry claims				416.50	169.17	7.63	1,806.50	1,479.94					
Quinn's	835N	Commonwealth				73.00	69.36		73.00	69.36					
Do.	905N	Millionaire			1.50				1.50						
Do.	622N	Phoenix				100.00	44.08		2,590.00	1,431.41	90.70				
Do.	776N	Phoenix Extended				404.00	177.38		415.11	197.96					
Do.	843N	Princess Dagmar				578.00	302.94		578.00	302.94					
Do.		Voided leases						7.30	2,260.75	1,265.59					
Do.		Sundry claims			2.25	58.86	159.00	2.25	198.90	122.85					
Stake Well	(781N)	Dyed Garments				33.00	7.17		175.00	56.68					
Do.	(599N)	Gladstone							203.00	83.86					
Do.	566N	Kohinoor				287.50	88.23		1,701.50	670.60					
Do.	593N	(Koh-i-Noor South)							2,714.50	991.63					
Do.	593N, 604N	Kohinoor South G.M. Co., Ltd.				5,100.00	2,357.60		5,100.00	2,357.60					
Do.		Voided leases							187.73	1,125.50					
Do.		Sundry claims							6.70	57.00					
Star of the East	(174N)	Star of the East, Ltd.							27,019.00	20,122.53					
Do.		Voided leases							225.00	182.87					
Yaloginda	834N	Black Jack				10.00	17.59		332.86	19.00	1,112.80				
Do.	833N	Black Jack South				.10	73.81		.10	73.81					
Do.	760N	Criterion				312.50	224.59		385.00	268.30					
Do.	708N	Gibraltar				106.00	18.60		206.00	38.38					
Do.	(759N)	Golden Calf							25.00	13.02					
Do.	666N	Karangahaki				8,771.00	3,963.87		11,330.50	5,734.27					
Do.	897N	Lady Mary				34.00	20.02		34.00	20.02					
Do.	833N	Lewes Castle				11.00	3.29		11.00	3.29					
Do.	899N	Maranui				52.00	108.29		52.00	108.29					
Do.	923N	New Chum				8.00	51.15		8.00	51.15					
Do.	(841N)	Red Jack				2.00	4.85		2.00	4.85					
Do.	541N	Revenue North				184.00	66.24		519.50	223.34					
Do.	(770N)	Revenue Proprietary							10.50	8.99					
Do.	709N	(Rocklee)				232.00	186.57		336.00	273.30					
Do.	709N, 857N	Rocklee leases			.44	68.00	56.81		68.00	56.81					
Do.	857N	(Rock Lee South)				41.00	34.85		41.00	34.85					
Do.	891N	Romsey				166.00	100.85		166.00	100.85					
Do.	845N	Saracen				60.00	9.93		60.00	9.93					
Do.	675N	Two Bells				49.00	65.86		154.50	200.70					
Do.	810N	Two Bells North				20.00	40.86		20.00	40.86					
Do.		Sundry claims				14.70	212.65		20.70	328.15					
<i>From District generally:—</i>															
Sundry parcels treated at:															
		Champion Cyanide Works					137.04			626.98	1.04				
		Champion Extended Cyanide Works					100.71	6.22		149.71	6.22				
		Margueritta Cyanide Works					21.08			21.08					
		State Battery—Meekatharra					1,307.64	19.00		3,630.60	19.00				
		State Battery—Nannine					47.02			319.11					
		Various Works							153.75	3,348.15	334.91				
		Reported by Banks and Gold Dealers				580.66		7,795.58							
		<b>Total</b>				<b>586.24</b>	<b>453.23</b>	<b>67,279.96</b>	<b>49,952.74</b>	<b>70.22</b>	<b>8,288.81</b>	<b>5,530.15</b>	<b>381,356.14</b>	<b>317,185.31</b>	<b>1,174.98</b>

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Murchison Goldfield—continued.

DAY DAWN DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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) .. ..	..	..	..	..	..	..	..	..	..	..	..	..	
Do. ..	389D, 421D, 422D	Creme D'Or leases .. ..	..	..	450·00	364·58	..	..	..	..	150·00	175·18	..	..	
Do. ..	14D .. ..	(Cresus) .. ..	..	..	..	..	..	..	..	..	948·00	816·83	..	..	
Do. ..	26D, 264D, 265D, 319D, 323D, 344D, 352D, 411D	East Fingall G.Ms., Ltd. .. ..	..	..	..	..	..	..	..	..	1,138·00	1,640·41	..	..	
Do. ..	26D .. ..	(Eureka No. 5) .. ..	..	..	..	..	..	..	..	..	1,208·00	773·29	..	..	
Do. ..	26D .. ..	(Eureka No. 5) .. ..	..	..	..	..	..	..	..	..	..	1,280·25	1,292·49	..	
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, 435D, 436D, 437D, 449D), 453D, 455D	Great Fingall Consolidated, Ltd. .. ..	..	..	127,285·00	41,269·16	8,049·66	..	..	..	..	1,378,675·00	971,553·13	119,703·49	..
Do. ..	464D .. ..	Lone Hand .. ..	..	..	20·00	75·72	..	..	..	..	..	20·00	75·72	..	
Do. ..	14D, 138D, 166D, 167D, 180D, 254D, 255D, 256D, 260D, 337D, (338D, 339D, 340D, 341D)	Murchison Associated G.Ms., Ltd. .. ..	..	..	626·00	217·64	..	..	..	..	..	4,711·50	2,499·61	..	
Do. ..	(456D) .. ..	New Ballarat .. ..	..	..	8·00	15·07	..	..	..	..	..	8·00	15·07	..	
Do. ..	462D .. ..	Nil Desperandum .. ..	..	..	43·50	84·69	..	..	..	..	..	43·50	84·69	..	
Do. ..	321D .. ..	Richmond .. ..	..	..	..	..	..	..	..	..	..	4·12	..	..	
Do. ..	119D .. ..	(West Fingall No. 6) .. ..	..	..	..	..	..	..	..	..	..	43·00	15·32	..	
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	123·81	310·08	28,824·95	19,164·68	..	24	
Do. ..	.. ..	Sundry claims .. ..	..	..	134·50	96·08	..	..	..	125·32	827·75	823·87	..	..	
Island ..	446D .. ..	Central .. ..	5·81	..	..	..	..	..	5·81	..	..	..	..	..	
Do. ..	443D .. ..	Eureka .. ..	5·77	1·65	12·50	24·19	..	..	51·08	24·05	20·50	646·13	..	..	
Do. ..	407D .. ..	First Chip .. ..	..	22·02	53·33	627·42	..	..	..	267·37	71·38	745·36	..	..	
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	..	288·30	28,803·00	43,370·60	..	
Do. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	..	17·74	130·01	8·50	42·02	..	..	



Mainland	450D	Austin Hill	73.50	101.07	..	..	..	95.50	144.52	..	
Do.	(355D, 356D, 361D)	(Mainland Consols leases)	..	..	..	..	124.86	13.50	811.42	..	
Do.	..	Voided leases	..	..	..	..	1,696.60	7,012.90	22,076.82	..	
Do.	..	Sundry claims	2.42	..	..	..	3.24	7.64	22.00	59.35	
Webb's Patch	370D	(Hill End)	..	..	..	..	..	..	36.00	110.12	
Do.	370D, 391D	(Hill End leases)	4.90	1,232.00	1,059.64	..	4.90	..	4,103.00	3,575.61	
Do.	370D, 391D	Hill End Murchison G.M. Co., N.L.	..	660.00	324.02	..	..	..	660.00	324.02	
Do.	..	Voided leases	..	..	..	..	..	83.07	214.50	424.22	
Do.	..	Sundry claims	..	9.00	6.27	..	..	67.77	34.00	295.61	
<i>From District generally :-</i>											
Sundry parcels treated at:											
Various Works			..	..	..	..	..	16.61	940.75	1,537.30	
Reported by Banks and Gold Dealers			139.77	..	..	..	1,246.80	3.48	..	..	
<b>Total</b>			<b>158.67</b>	<b>23.67</b>	<b>130,607.33</b>	<b>44,265.55</b>	<b>8,049.66</b>	<b>1,910.22</b>	<b>3,149.97</b>	<b>1,459,913.48</b>	<b>1,073,094.16</b>
										<b>119,703.73</b>	

MOUNT MAGNET DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.
Lennonville	573M, (591M, 610M)	Brooklyn leases	..	..	..	..	..	..	334.25	426.72	..	
Do.	(894M)	Canterbury Cake	..	7.06	50.65	18.17	..	7.06	98.65	43.17	..	
Do.	984M	City View	..	129.82	..	..	..	129.82	..	..	..	
Do.	965M	Dunboyne	..	..	110.00	10.23	..	..	110.00	10.23	..	
Do.	767M	(Galtee Moore)	..	..	..	..	..	6.80	3,025.00	1,180.85	..	
Do.	767M	Galtee Moore	..	..	655.00	226.87	..	..	666.00	241.47	..	
Do.	963M	Galtee Moore Extended	..	..	100.00	17.48	..	..	100.00	17.48	..	
Do.	767M, (807M)	(Galtee Moore leases)	..	..	..	..	..	..	578.00	171.97	..	
Do.	(874M)	Gambier Extended	..	..	..	..	..	..	21.00	11.36	..	
Do.	932M	Good Hope	..	..	414.00	214.17	..	..	448.00	219.31	..	
Do.	(895M)	Rangitira	..	..	..	..	..	..	11.00	1.51	..	
Do.	966M	Splendour	..	..	7.00	22.50	..	..	7.00	22.50	..	
Do.	968M	St. Michael	..	..	343.00	28.28	..	..	343.00	28.28	..	
Do.	876M	Turn of the Tide	..	..	27.45	16.43	..	..	98.95	107.88	..	
Do.	877M	Victoria	..	80	42.40	30.88	..	..	158.90	156.64	..	
Do.	970M	Welcome Stranger	..	..	113.10	64.05	..	..	113.10	64.05	..	
Do.	974M	Wheel North No. 1	..	..	35.25	7.36	..	..	35.25	7.36	..	
Do.	(934M)	Wheel of Fortune	..	..	35.00	34.94	..	..	35.00	34.94	..	
Do.	962M	Wheel of Fortune Central	..	..	12.40	2.11	..	..	12.40	2.11	..	
Do.	(103M)	Wheel of Fortune North	..	..	49.50	11.80	..	..	347.50	216.10	..	
Do.	(103M, 373M, 574M, 730M)	(Wheel of Fortune North leases)	..	..	..	..	..	..	25,475.00	30,129.11	458.82	
Do.	(151M)	(Wheel of Fortune South Block)	..	..	..	..	..	..	2,586.15	6,691.90	..	

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

**Murchison Goldfield—continued.**  
**MOUNT MAGNET DISTRICT—continued.**

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.	
Lennonville ..	(151M) .. ..	Wheel of Fortune South Block ..	..	..	33·50	20·22	..	..	..	66·50	37·10	..	
Do. . . . .	(151M, 452M) ..	(Wheel of Fortune South Block leases)	..	..	..	..	..	..	..	47	191·00	149·08	..
Do. . . . .	992M .. ..	Yule Tide .. ..	..	336·15	..	..	..	..	..	336·15	..	..	..
Do. . . . .	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	2,691·55	90,771·47	68,319·65	..
Do. . . . .	.. ..	Sundry claims .. ..	..	..	36·15	30·46	..	..	..	13·36	1,325·40	695·28	..
Mt. Magnet ..	317M .. ..	(Birthday) .. ..	..	..	..	..	..	..	..	..	184·50	29·11	..
Do. . . . .	314M, 317M, 320M	Black Hill Development Co., Ltd. ..	..	..	2,074·00	1,303·38	..	..	..	..	2,074·00	1,303·38	..
Do. . . . .	953M .. ..	Britannia .. ..	..	..	90·00	21·70	..	..	..	..	90·00	21·70	..
Do. . . . .	(943M) .. ..	Boomer .. ..	..	..	28·00	6·26	..	..	..	..	28·00	6·26	..
Do. . . . .	507M .. ..	(Bronzewing) .. ..	..	..	..	..	..	..	..	..	43·48	..	..
Do. . . . .	853M .. ..	(Brown Hill North) .. ..	..	..	..	..	..	..	..	..	771·02	417·40	..
Do. . . . .	853M, 882M ..	Brown Hill North leases .. ..	..	..	476·50	128·34	..	..	..	..	724·00	218·07	..
Do. . . . .	979M .. ..	Carbine .. ..	..	..	167·50	137·29	..	..	..	..	167·50	137·29	..
Do. . . . .	942M .. ..	Coronet .. ..	..	..	462·00	147·29	..	..	..	..	616·00	186·72	..
Do. . . . .	490M .. ..	(Cushie Doo) .. ..	..	..	..	..	..	..	..	..	76·71	263·35	..
Do. . . . .	905M .. ..	Cushie Doo East .. ..	..	..	..	..	..	..	..	..	30·00	5·41	..
Do. . . . .	(941M) .. ..	Cushie Doo Extended .. ..	..	..	69·40	34·98	..	..	..	..	94·40	58·27	..
Do. . . . .	490M, 507M ..	Cushie Doo leases .. ..	..	..	74·52	27·92	..	..	..	73·65	1,564·02	628·82	3·05
Do. . . . .	(846M) .. ..	Cushie Doo South .. ..	..	..	100·00	16·01	..	..	..	..	211·50	45·29	..
Do. . . . .	960M .. ..	Daisy .. ..	..	..	49·00	11·20	..	..	..	..	49·00	11·20	..
Do. . . . .	(803M) .. ..	Digger's Dab .. ..	..	..	..	..	..	..	..	..	56·87	339·60	..
Do. . . . .	(885M) .. ..	El Dorado .. ..	..	..	..	..	..	..	..	..	151·00	15·23	..
Do. . . . .	752M, 826M, 833M	Great Boulder No. 1, Ltd. .. ..	..	..	25,289·00	6,123·80	..	..	..	..	38,458·50	10,325·26	..
Do. . . . .	761M .. ..	Havelock .. ..	..	25·00	138·00	79·52	..	..	..	25·00	697·30	521·93	..
Do. . . . .	463M .. ..	Hesperus Dawn .. ..	..	..	..	..	..	..	..	..	2,895·60	4,728·46	..
Do. . . . .	872M .. ..	Invercauld .. ..	..	..	514·00	82·43	..	..	..	..	1,379·00	185·37	..
Do. . . . .	771M .. ..	Jupiter .. ..	..	..	320·50	195·72	..	..	..	..	1,114·08	838·93	..
Do. . . . .	959M .. ..	Lady Mollie .. ..	..	34·18	71·00	68·80	..	..	..	34·18	71·00	68·80	..
Do. . . . .	(954M) .. ..	Lady Muriel .. ..	..	..	..	..	..	..	..	..	43·00	7·53	..
Do. . . . .	(811M) .. ..	Last Call .. ..	..	..	..	..	..	..	..	..	94·50	9·64	..
Do. . . . .	(945M) .. ..	Lydeard St. Lawrence .. ..	..	..	..	..	..	..	..	..	59·00	24·53	..
Do. . . . .	314M, 317M, 320M	(Morning Star leases) .. ..	..	..	..	..	..	..	..	..	63,938·00	35,059·35	..
Do. . . . .	972M .. ..	Morning Star North .. ..	..	..	13·50	37·10	..	..	..	..	13·50	37·10	..
Do. . . . .	314M, 317M, 320M	(Morning Star Quartz Co., N.L.) ..	..	..	6,090·09	3,887·24	..	..	..	..	50,750·59	28,994·38	655·73
Do. . . . .	956M .. ..	Mollie's Luck .. ..	..	..	76·50	31·26	..	..	..	..	76·50	31·26	..
Do. . . . .	(949M) .. ..	Murray .. ..	..	3·01	..	..	..	..	..	3·01	..	..	..
Do. . . . .	445M .. ..	Neptune .. ..	..	50·51	194·75	64·14	..	..	..	847·65	1,684·91	2,346·26	..

Do.	(878M)	Poseidon									31.00	8.52	
Do.	892M	Revenue			78.50	483.52					141.00	710.23	
Do.	(955M)	Santa Claus			17.00	11.16					17.00	11.16	
Do.	911M	Saturn			305.00	78.29					305.00	78.29	
Do.	696M	Sirdar			2,214.50	559.83					8,118.00	2,560.12	
Do.	752M	(St. George)									3,335.00	1,439.07	
Do.	(958M)	Taunton			28.35	18.97					28.35	18.97	
Do.	(931M)	Try Again			40.00	5.13					40.00	5.13	
Do.	(806M)	Tucker Bag			11.00	6.35				2.21	194.50	178.34	
Do.		Voided leases							27.83	537.43	43,214.29	50,458.55	13.83
Do.		Sundry claims		10.33	519.30	272.28				201.05	9,074.71	5,490.59	
Mt. Magnet East		Voided leases							63.29	753.94	5,506.25	2,798.49	
Do.		Sundry claims			5.00	3.85				37.22	214.50	144.10	
Moyagee	940M	Break of Day			3.60	3.81					3.60	3.81	
Do.		Voided leases									1,510.00	973.62	
Do.		Sundry claims			49.50	112.70				84.93	182.75	300.11	
Youanme		Sundry claims									33.00	44.58	
<i>From District generally:—</i>													
Sundry parcels treated at:													
		State Battery—Boogardie				784.06					45.01	5,651.19	
		State Battery—Lennonville				154.97					18.06	6,083.59	
		State Battery—Mount Magnet				114.79						114.79	
		Various Works									25.00	7,028.75	1.00
		Reported by Banks and Gold Dealers		27.73					1,200.72	.35			
		<b>Total</b>		<b>27.73</b>	<b>596.86</b>	<b>41,634.42</b>	<b>15,770.04</b>		<b>1,291.84</b>	<b>5,964.63</b>	<b>367,330.96</b>	<b>279,953.95</b>	<b>1,132.43</b>

### Yalgoo Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.	
Adavale		Sundry claims									10.00	12.56	
Bilberatha		Voided leases									554.00	200.07	
Carlaminda		Voided leases									947.32	524.72	3.30
Do.		Sundry claims									114.00	71.96	
Field's Find	414, 441, 442, 443	(Field's Find G.Ms., Ltd.)									30,579.00	20,437.49	
Do.	414, 441, 442, 443	(Field's Reward G.Ms., Ltd.)									138.00	266.95	

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Yalgoo Goldfield—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.
Field's Find ..	575 .. ..	Killarney .. ..	..	..	20·00	6·41	..	..	..	20·00	6·41	..
Do. ..	414, 441, 442, 443	Reward G.Ms., Ltd. ..	..	60·78	669·00	598·72	..	..	60·78	1,650·00	1,637·92	..
Do. ..	..	Voided leases ..	..	..	..	..	..	..	..	11·50	5·23	..
Do. ..	..	Sundry claims ..	..	..	28·00	42·78	..	..	42·13	161·75	148·72	..
Gullewa ..	170, 171, 174 ..	(Monarch G.M. Syndicate) ..	..	..	..	..	..	..	..	12·00	9·04	..
Do. ..	170, 171, 174 ..	Monarch leases ..	..	..	..	..	..	..	..	5,571·00	1,640·88	..
Do. ..	(34, 53, 54, 445)	(Phoenix G.Ms., Ltd.) ..	..	..	..	..	..	..	..	11,633·50	10,613·00	..
Do. ..	586 .. ..	Shannadoah ..	..	..	213·00	224·79	..	..	..	213·00	224·79	..
Do. ..	..	Voided leases ..	..	..	..	..	..	..	..	923·00	546·26	..
Do. ..	..	Sundry claims ..	..	..	108·00	106·28	..	..	..	169·50	127·99	..
Kirkaluca ..	..	Sundry claims ..	..	..	..	..	..	..	..	8·80	4·01	..
Melville ..	..	Voided leases ..	..	..	..	..	..	..	14·37	2,716·50	1,420·76	..
Do. ..	..	Sundry claims ..	..	..	..	..	..	11·55	..	238·00	158·11	..
Messenger's Patch ..	546 .. ..	Caledonian .. ..	..	..	68·50	18·70	..	..	..	78·50	23·78	..
Do. ..	581 .. ..	Crescent .. ..	..	..	72·00	22·12	..	..	..	72·00	22·12	..
Do. ..	(559) .. ..	Iron Duke .. ..	..	..	..	..	..	..	..	20·00	17·05	..
Do. ..	548 .. ..	Marloo .. ..	..	60·07	23·95	50·42	..	..	227·88	28·95	62·71	..
Do. ..	570 .. ..	McDonald and Hampton Lease Syndicate ..	..	..	14·00	2·52	..	..	..	14·00	2·52	..
Do. ..	541 .. ..	Mug's Blow .. ..	..	18·20	30·00	50·75	..	..	47·30	30·00	50·75	..
Do. ..	584 .. ..	Vatican .. ..	..	..	40·50	13·92	..	..	..	40·50	13·92	..
Do. ..	..	Voided leases ..	..	..	..	..	..	..	..	53·00	24·85	..
Do. ..	..	Sundry claims ..	..	..	221·30	110·56	..	463·12	..	283·30	173·24	..
Nyounda ..	..	Voided leases ..	..	..	..	..	..	..	217·63	416·00	183·91	..
Do. ..	..	Sundry claims ..	..	..	..	..	..	..	..	18·00	21·67	..
Pinyalling ..	501, 537 .. ..	Baron Rothschild G.Ms., Ltd. ..	..	..	..	..	..	..	..	216·00	40·60	..
Do. ..	501 .. ..	(Beryl) .. ..	..	..	..	..	..	..	..	432·00	249·01	..
Do. ..	..	Voided leases ..	..	..	..	..	..	..	1·36	1,543·50	577·47	..
Do. ..	..	Sundry claims ..	..	..	..	..	..	..	..	42·50	22·14	..
Rothesay ..	..	Voided leases ..	..	..	..	..	..	..	..	8,971·00	3,300·07	..
Wadgingarra ..	561 .. ..	Mt. Kersey .. ..	..	..	19·00	3·11	..	..	..	19·00	3·11	..
Do. ..	515 .. ..	Wadgingarra Main Reef ..	..	..	..	..	..	..	..	37·50	20·86	..



TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Mount Margaret Goldfield—continued.

MOUNT MORGANS DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.	
Mt. Margaret	266F .. ..	Excelsior .. ..	..	..	490.00	255.62	..	..	..	490.00	255.62	..	
Do. ..	(174F) .. ..	Mt. Margaret Lake View .. ..	..	..	..	..	..	..	..	36.00	8.19	..	
Do. ..	66F .. ..	Mt. Morven .. ..	..	..	450.00	138.36	..	..	..	1,330.00	923.14	12.55	
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	1,504.00	961.11	..	
Do. ..	.. ..	Sundry claims .. ..	..	..	199.50	155.25	..	..	..	311.00	222.82	..	
Mt. Morgans..	(251F) .. ..	Huon Belle .. ..	..	..	..	..	..	..	..	80.00	341.82	..	
Do. ..	6F .. ..	Lily of the Valley South: Westralia Mt. Morgans G.Ms. Co., Ltd.	..	..	908.00	463.20	..	..	..	1,230.50	624.33	..	
Do. ..	8F .. ..	Millionaire: Millionaire, Ltd. ..	..	..	115.00	121.28	..	..	..	12,277.00	6,360.82	..	
Do. ..	29F, 30F .. ..	Mt. Morgans Transvaal G.Ms., Ltd. ..	..	..	..	33.58	..	..	..	3,276.00	1,133.47	..	
Do. ..	(97F) .. ..	(Ramornie) .. ..	..	..	..	..	..	..	..	334.00	327.78	..	
Do. ..	(97F, 121F) .. ..	Ramornie leases .. ..	..	..	..	..	..	..	..	2,675.00	1,872.29	..	
Do. ..	29F, 30F .. ..	(Transvaal leases) .. ..	..	..	..	..	..	..	..	2,309.00	3,605.48	..	
Do. ..	29F, 30F .. ..	Transvaal leases .. ..	..	..	5,434.00	1,471.32	..	..	..	5,434.00	1,471.32	..	
Do. ..	100F .. ..	(Turn of the Tide) .. ..	..	..	..	..	..	..	..	214.00	84.52	..	
Do. ..	5F, 10F, 19F, 22F, 32F, 73F .. ..	Westralia Mt. Morgans G.Ms. Co., Ltd.	..	..	57,017.00	14,993.18	..	..	..	570,619.00	290,370.52	5,552.63	
Do. ..	7F, 20F, 21F .. ..	Westralia Mt. Morgans G.Ms. Co., Ltd.	..	..	..	..	..	..	..	18,261.00	8,033.52	..	
Do. ..	6F .. ..	(Westralia Mt. Morgans Syndicate, Ltd.)	..	..	..	..	..	..	..	3,002.00	1,022.90	..	
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	2,683.00	2,546.18	2.10	
Do. ..	.. ..	Sundry claims .. ..	..	..	140.00	103.29	..	..	..	998.25	874.46	..	
Murrin Murrin	208F .. ..	(Alex Junior) .. ..	..	..	..	..	..	..	..	2,182.25	2,791.98	..	
Do. ..	208F, 250F .. ..	Alex Junior leases .. ..	..	..	1,667.00	1,120.07	..	..	..	4,831.00	3,442.99	..	
Do. ..	(207F) .. ..	Bound to Win .. ..	..	..	..	..	..	..	..	742.30	529.83	..	
Do. ..	195F .. ..	(Elbe) .. ..	..	..	..	..	..	..	..	60.00	116.41	..	
Do. ..	195F .. ..	Elbe .. ..	..	..	12.00	59.17	..	..	..	12.00	59.17	..	
Do. ..	195F, (197F) .. ..	(Elbe leases) .. ..	..	..	28.75	46.70	..	..	..	2,731.75	2,891.06	3.60	
Do. ..	(255F, 256F) .. ..	Malcolm Mines, Ltd. .. ..	..	..	17.30	81.26	..	..	..	56.30	390.45	..	
Do. ..	194F .. ..	(Murrin Murrin Proprietary) .. ..	..	..	..	..	..	..	..	3,767.00	4,461.70	..	
Do. ..	196F .. ..	(Perseverance) .. ..	..	..	..	..	..	..	..	6,074.50	6,198.52	..	
Do. ..	200F .. ..	(Princess Alix) .. ..	..	..	..	..	..	..	..	4,893.00	8,839.80	20.00	
Do. ..	200F .. ..	Princess Alix .. ..	..	..	12.00	85.35	..	..	..	12.00	85.35	..	
Do. ..	200F, (213F) .. ..	(Princess Alix G.M. Co., Ltd.)	..	..	..	..	..	..	..	1,090.00	890.65	..	
Do. ..	200F, (213F) .. ..	(Princess Alix leases) .. ..	..	..	18.00	115.82	..	..	..	929.25	1,873.51	..	
Do. ..	(203F) .. ..	Princess Alix South .. ..	..	..	..	..	..	..	..	1,138.00	1,712.44	..	
Do. ..	193F .. ..	(Proprietary Extended) .. ..	..	..	..	..	..	..	..	44.33	929.25	..	
										3.49	1,138.00	1,712.44	..
										1,454.50	1,172.33	..	

Do.	193F, 194F, 196F, 198F, 199F, 201F, 202F	Proprietary Extended leases	..	..	10,197-00	5,402-49	..	..	..	26,699-00	14,538-91	6-00	
Do.	..	Voided leases	..	..	..	..	..	10-43	175-11	48,655-47	39,273-03	..	
Do.	..	Sundry claims	..	..	36-10	110-00	99-60	..	154-48	786-75	756-17	..	
Redcastle	..	Voided leases	..	..	..	..	..	4-49	436-54	2,509-95	2,169-63	..	
Do.	..	Sundry claims	..	..	..	9-00	10-81	..	103-58	116-00	155-56	..	
<i>From District generally :-</i>													
Sundry parcels treated at:													
		Various Works	..	..	..	..	..	..	..	788-50	2,995-91	84-03	
		Reported by Banks and Gold Dealers	..	..	310-14	32-47	..	..	987-56	32-47	..	..	
		<b>Total</b>	..	..	<b>310-14</b>	<b>103-92</b>	<b>77,097-05</b>	<b>25,308-70</b>	<b>1,027-41</b>	<b>3,144-50</b>	<b>757,194-96</b>	<b>446,896-86</b>	<b>5,682-67</b>

MOUNT MALCOLM DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.
Cardinia	..	Voided leases	..	..	..	..	..	..	1,568-29	1,355-24	3,279-88	..
Diorite King	1293c	Diorite Queen	..	..	144-05	46-37	..	..	..	144-05	46-37	..
Do.	(1247c)	Full Moon	..	..	65-00	57-60	..	..	..	279-00	221-82	..
Do.	1172c	(Homeward Bound)	..	..	..	..	..	..	..	1,127-00	625-59	..
Do.	1179c	King of the Hills	..	..	210-00	230-37	..	..	..	1,170-00	1,073-52	..
Do.	1172c, 1205c	Leeta G.M. Co., Ltd.	..	..	2,093-00	879-93	..	..	..	2,383-00	997-60	..
Do.	1220c	Mount Stirling	..	..	65-75	265-02	..	..	..	239-25	502-84	..
Do.	1256c	New Chum	..	..	105-00	159-18	..	..	..	184-00	248-95	..
Do.	(1260c)	New Queen	..	..	44-50	24-05	..	..	..	78-50	106-43	..
Do.	(1246c)	Rose of Diorite	..	..	..	..	..	..	..	186-00	113-56	..
Do.	..	Voided leases	..	..	..	..	..	..	774-66	23,522-48	22,637-52	..
Do.	..	Sundry claims	..	..	98-80	61-72	..	..	59-84	2,111-05	2,609-87	..
Dodger's Well	1317c	Ivy	..	..	37-50	23-60	..	..	..	37-50	23-60	..
Do.	1270c	Myrtle	..	..	86-25	286-84	..	..	..	151-75	553-96	..
Do.	..	Voided leases	..	..	..	..	..	..	54-97	537-80	970-87	..
Do.	..	Sundry claims	..	..	3-37	111-50	65-08	..	3-37	581-25	356-04	..
Leonora	1314c	Auckland	..	..	65-60	45-85	..	..	..	65-60	45-85	..
Do.	1288c	Casino	..	..	127-45	524-15	..	..	133-18	127-45	524-15	..
Do.	1212c	Dawn of Hope	..	..	40-00	48-92	..	..	..	154-00	299-55	..
Do.	198c	(Eastern)	..	..	..	..	..	..	..	302-00	321-72	..
Do.	210c, 253c	(Forest leases)	..	..	..	..	..	..	60-69	843-00	1,109-34	..

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

**Mount Margaret Goldfield—continued.**  
**MOUNT MALCOLM DISTRICT—continued.**

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.
Leonora	218c, 219c, 776c, 902c, 903c, 904c, (1106c, 1109c, 1110c, 1111c, 1142c, 1157c), 1167c	(Grea Tower Hill G.Ms., Ltd.)	..	..	..	..	..	..	62,255·00	20,034·56	10·71	
Do.	1056c	(Harbour Lights)	..	..	..	..	..	6,989·25	1,665·07	..		
Do.	1056c, 1214c	Harbour Lights leases	..	..	1,291·00	205·46	..	5,753·00	1,124·46	..		
Do.	195c, 196c	Leonora Gold Blocks leases	..	..	457·00	273·56	..	11,608·00	11,520·43	..		
Do.	210c, 253c, (1268c)	Leonora Main Reefs, Ltd.	..	..	320·00	166·75	..	14,586·00	5,692·10	..		
Do.	(1282c)	Mascotte	..	157·87	9·05	33·39	..	157·87	18·05	117·89		
Do.	218c, 219c	(Octagon Explorers, Ltd.)	..	..	..	..	..	5,000·00	1,569·68	..		
Do.	1217c	Ping Pong	..	..	204·00	524·09	..	632·00	1,429·31	..		
Do.	1216c	Rajah	..	..	60·00	50·05	..	224·00	477·53	..		
Do.	190c, 207c, 352c, 353c, 380c, 446c, 447c, 450c, 476c, 489c, 490c, 504c, 523c, 741c, 742c, 811c, 812c, 813c, 814c, 980c, 981c, 1225c, 1226c, 1227c, 1228c, 1229c, 1230c, 1231c, 1232c, 1291c, 1292c	Sons of Gwalia, Ltd.	..	..	142,454·00	61,266·25	4,727·97	..	1,138,279·50	620,066·80	24,616·79	
Do.	198c, 1082c	(Sons of Gwalia South G.M. Co., N.L.)	..	..	..	..	..	631·00	903·61	..		
Do.	198c, 1082c, 1257c, 1258c, 1259c	Sons of Gwalia South G.Ms., Ltd.	..	..	18,322·00	11,534·51	..	46,081·00	31,231·52	8·66		
Do.	263c, 774c, 793c	Trump leases	..	..	28·25	154·86	..	21,794·45	16,002·07	..		
Do.	..	Voided leases	..	..	..	..	..	374·22	8,225·60	5,478·21		
Do.	..	Sundry claims	..	8·24	475·05	400·91	..	8·81	4,601·55	4,272·13		
Malcolm	1058c	Alice	..	..	95·00	53·02	..	679·50	545·16	..		
Do.	1313c	Barrington	..	..	8·27	6·67	..	8·27	6·67	..		
Do.	1294c	Great Northern	..	..	76·00	40·15	..	76·00	40·15	..		
Do.	1175c	Malcolm Prospecting Co., N.L.	..	..	5,965·00	3,186·15	..	9,810·50	5,803·09	..		
Do.	1308c	Midas	..	..	166·00	111·09	..	166·00	111·09	..		
Do.	(1183c)	(Nine of Hearts)	..	..	..	..	..	196·00	32·96	..		



Do.	(1183c)	(Nine of Hearts)							248-00	90-16	
Do.	(1183c)	(Queen Margaret G.M. Co., Ltd.)							67-00	38-03	
Do.	991c	Richmond Gem			205-00	96-30			6,810-00	6,104-96	
Do.	(1133c)	Sunday			126-00	59-98		32-82	1,670-50	1,058-31	
Do.	1306c	Sunday			36-00	60-19			36-00	60-19	
Do.		Voided leases						8-89	22,857-51	22,139-32	
Do.		Sundry claims			368-50	197-40		6-64	2,604-10	1,816-19	
Mertondale	648c	(Merton's Boulder, Ltd.)							160-00	117-64	
Do.	645c	(Merton's Consols)							23-00	68-27	
Do.	638c, 644c, 645c, 648c, 653c, 1146c, 1178c	Merton's Reward G.M. Co., Ltd.			2,767-00	2,452-13	4-70		71,555-00	34,589-40	1,497-58
Do.	638c	(Merton's Reward North)							11,396-50	20,033-09	
Do.	648c	(Merton's Reward No. 1 North)							122-00	89-97	
Do.	1289c	Sinn Fein			170-00	118-08			170-00	118-08	
Do.	1311c	Toss-up			49-00	25-86			49-00	25-86	
Do.		Voided leases							524-00	427-81	
Do.		Sundry claims	30-86		96-75	64-28		30-86	881-00	595-88	
Mt. Clifford	1261c	(Bannockburn)			44-00	17-15		9-98	93-00	53-02	
Do.	1261c	Bannockburn: Bannockburn G.M. Co., Ltd.			130-00	25-22			130-00	25-22	
Do.	(1244c)	Blue Spec			20-00	12-15		40-41	45-00	52-07	
Do.	(1125c)	Emancipator							548-50	792-01	
Do.	1303c	Emancipator	44-87					44-87			
Do.	(1118c)	Victory No. 1							1,055-50	3,589-27	
Do.	1305c	Yes-No	451-45		21-00	312-29		451-45	21-00	312-29	
Do.		Voided leases							25-95	1,829-13	
Do.		Sundry claims	32-03		13-00	223-03		9-75	208-44	698-76	
Pig Well	1271c	Ada Crossley							168-00	15-47	
Do.	1272c	Ada Crossley North			42-00	10-96			42-00	10-96	
Do.	(1250c)	Ada H.							228-00	104-78	
Do.	1089c	(Gambier Lass)							4,320-50	4,485-26	26-40
Do.	1089c, 1210c	Gambier Lass leases			1,652-00	1,841-62			2,212-00	2,324-74	
Do.	1203c	Gambier Lass North			50-00	6-87			104-00	19-35	
Do.	1295c	Starlight			94-00	346-27			94-00	346-27	
Do.		Voided leases							3,683-07	5,308-85	37-28
Do.		Sundry claims	34-06		436-65	112-83		34-06	2,090-40	848-60	
Randwick	(1195c)	Black Chief			30-00	29-13			237-00	261-51	
Do.	(1251c)	English and Scottish							36-00	9-03	
Do.	(1266c)	Golden Splash			57-00	19-48			57-00	19-48	
Do.	987c	Randwick			380-00	111-49		234-23	3,974-75	2,223-35	
Do.	1325c	Triangle			7-50	30-51			7-50	30-51	
Do.		Voided leases							3,586-50	4,636-55	
Do.		Sundry claims	13-79	45-41	285-00	201-08		66-57	962-75	680-20	
Webster's Find	(1262c)	Carnegies			181-50	38-48			269-00	53-96	
Do.	1254c	Handsworth			11-25	9-14			35-25	32-30	
Do.	(1273c)	Mt. Blow Hard							9-00	6-74	
Do.	(1224c)	Webster's			187-00	214-26			267-00	279-97	
Do.		Voided leases						25-00	21,179-75	13,597-20	
Do.		Sundry claims			95-00	35-73		15-73	1,283-30	821-25	
Wilson's Creek		Voided leases							333-50	168-27	
Do.		Sundry claims						4-24	5-00	19-04	

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Mount Margaret Goldfield—continued.

MOUNT MALCOLM DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.		
Wilson's Patch	1120c .. ..	(Great Western) .. ..	..	..	..	..	..	..	..	..	..	..	..	..
Do. ..	1120c, 1130c ..	Great Western leases .. ..	..	..	803.00	276.70	..	..	..	4,770.00	3,206.85	..	..	..
Do. ..	..	Voided leases .. ..	..	..	..	..	..	..	99.38	12,612.50	5,546.81	..	..	..
Do. ..	..	Sundry claims .. ..	..	..	90.00	60.39	..	..	1.50	2,206.10	1,187.85	..	..	1.05
		<i>From District generally:—</i>												
		Sundry parcels treated at:												
		Drew and Mason's Cyanide Works .. ..	..	..	..	..	..	..	..	..	..	93.97	..	..
		Lang's Cyanide Works .. ..	..	..	..	..	..	..	..	..	..	751.23	..	..
		Mt. Clifford Battery .. ..	..	..	..	..	..	..	..	..	..	506.57	..	..
		Mulcahy's Cyanide Works .. ..	..	..	..	..	68.10	..	..	..	..	68.10	..	..
		Orotava Works, Kalgoorlie .. ..	..	..	..	..	..	..	..	..	..	15.90	..	..
		State Battery—Leonora .. ..	..	..	..	..	1,084.60	25.24	..	..	45.50	5,594.57	98.14	..
		State Battery—Pig Well .. ..	..	..	9.00	489.49	..	20.12	..	..	22.00	1,983.99	20.12	..
		Various Works .. ..	..	..	..	..	..	..	..	..	349.50	1,456.13	..	..
		Reported by Banks and Gold Dealers .. ..	54.39	50.00	..	..	..	..	1,471.39	131.00	..	..	..	..
		<b>Total .. ..</b>	<b>68.18</b>	<b>991.37</b>	<b>181,682.17</b>	<b>89,376.78</b>	<b>4,778.03</b>	<b>1,572.71</b>	<b>4,652.02</b>	<b>1,561,663.32</b>	<b>916,463.10</b>	<b>26,316.73</b>		

MOUNT MARGARET DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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 .. ..	..	..	82.50	64.73	..	..	2.34	1,432.00	2,572.28	..	..	..
Do. ..	1832T .. ..	Boomerang .. ..	..	..	116.00	125.05	..	..	..	116.00	125.05	..	..	..
Do. ..	1770T .. ..	(Dog Star) .. ..	..	..	..	..	..	..	..	10.00	2.21	..	..	..
Do. ..	1770T, 1778T ..	Dog Star leases .. ..	..	..	326.00	201.71	..	..	..	394.00	239.95	..	..	..
Do. ..	1553T .. ..	Golden Bell .. ..	..	..	154.00	293.75	..	..	..	2,391.00	6,751.28	..	..	..

Do.	1806r	Golden Bell North	608.00	943.96	608.00	943.96		
Do.	(1754r)	Great Westralia	26.50	29.74	286.50	246.68		
Do.	(1802r)	Hiram Nelson	12.00	3.40	12.00	3.40		
Do.	1010r	(Karridale)	239.00	383.44	3,727.08	11,278.43	200.00	
Do.	1010r, 1655r	Karridale leases	49.00	79.23	49.00	79.23		
Do.	1655r	(Karridale South)			17.00	17.20		
Do.	1782r	Maori King	24.00	19.37	75.00	132.28		
Do.	1815r	Maori King North	32.00	32.60	32.00	32.60		
Do.	943r	(Mikado)			342.00	206.14		
Do.	943r, 1124r	Mikado G.M. Co., Ltd.			11,003.10	8,921.76	8.30	
Do.	1750r	Mikado North	16.00	11.24	23.00	30.65		
Do.	(1805r)	Mountain King	24.00	23.41	56.00	94.73		
Do.	1044r	Nil Desperandum	295.00	436.11	2,954.00	5,754.69		
Do.	1841r	Redeemed	50.00	26.13	50.00	26.13		
Do.	1695r	Rock of Ages	280.50	222.02	689.00	891.98		
Do.	781r	(Sailor Prince)			4,771.00	4,725.83	16.00	
Do.	1089r	Savage Captain	51.50	82.27	1,707.20	5,088.70		
Do.	1644r	Specimen Hill	640.00	350.07	2,608.00	1,388.05		
Do.	(1787r)	Sudden Jerk			10.50	12.96		
Do.	1726r	Sunrise	208.00	210.48	311.00	356.75		
Do.	1716r	Surprise	274.00	332.37	379.00	1,431.32		
Do.	(1766r)	Swan			150.00	207.65		
Do.	(1813r)	Tempus			11.00	14.44		
Do.	1836r	Tempus	8.00	3.62	8.00	3.62		
Do.	(1817r)	Waterloo			17.00	6.16		
Do.		Voided leases			1.02	50.35	18,317.30	32,746.86
Do.		Sundry claims	383.00	346.26	54.75	2,004.65	1,971.25	
Duketon	(1517r)	(Mulga Queen)				2,910.00	2,560.48	
Do.	(1517r)	Mulga Queen				4,328.00	3,228.75	
Do.	(1517r, 1550r, 1573r, 1589r)	(Mulga Queen leases)				2,987.00	2,611.94	
Do.		Voided leases			110.53	19,277.00	11,899.37	
Eagle's Nest		Voided leases			145.34	331.00	1,215.78	
Do.		Sundry claims				55.00	42.21	
Erlistoun	(1809r)	Annie	18.00	51.96		56.00	91.13	
Do.	(1808r)	Baneygo North	49.00	40.38		74.00	105.63	
Do.	(1812r)	Bungarra				6.50*	16.38	
Do.	(1731r)	Erlistoun Queen No. 3	18.50	44.96		18.50	44.96	
Do.	(1794r)	Great Derwent				16.00	23.58	
Do.	1679r	Hootanui	68.00	112.34		435.00	1,988.57	
Do.	1382r	King of Creation	30.00	4.64		679.00	242.02	
Do.	1801r	Riccaboni	380.00	242.11		380.00	242.11	
Do.	(1712r)	Rutherglen				.10	109.90	
Do.	(1800r)	Sweet Nell	34.00	27.19		34.00	27.19	
Do.	(1760r)	Tokai				.05	25.53	
Do.	1665r	Westralia Tasmania	3,160.00	670.35		4,204.00	914.56	
Do.		Voided leases				11,149.25	12,614.01	
Do.		Sundry claims	249.00	286.34	1,175.43	1,052.90	940.47	
Euro	1546r	(Euro)				352.00	289.24	
Do.	1546r, 1625r	Euro leases	1,048.00	217.34		16,461.00	6,495.19	
Do.		Voided leases				66,795.25	28,730.27	
Do.		Sundry claims	60.00	6.71		209.00	87.27	

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.	TOTAL FOR 1909.					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.
Laverton ..	371T .. ..	(Augusta) .. ..	..	..	477·00	252·91	..	..	..	11,216·00	11,670·72	..
Do. ..	371T .. ..	Augusta G.M. Co., N.L. .. ..	..	..	1,753·00	1,018·85	..	..	..	1,753·00	1,018·85	..
Do. ..	1767T .. ..	British Flag .. ..	..	..	50·00	66·86	..	..	..	226·00	264·87	..
Do. ..	1822T .. ..	Brothers United .. ..	..	8·93	49·00	210·28	..	..	8·93	49·00	210·28	..
Do. ..	(1788T) .. ..	Comet .. ..	..	5·52	8·50	3·88	..	..	5·52	104·00	140·66	..
Do. ..	1779T .. ..	Constance .. ..	..	..	18·00	17·21	..	..	..	26·50	44·99	..
Do. ..	1797T, 1798T .. ..	Craiggimore leases .. ..	..	..	8,324·00	1,794·92	..	..	..	10,757·00	2,414·68	..
Do. ..	838T .. ..	(General Wabash) .. ..	..	..	..	..	..	..	..	100·00	288·72	..
Do. ..	371T .. ..	(Golden Rhine G.Ms. (W.A.), Ltd.) .. ..	..	..	..	..	..	..	..	15,497·50	11,031·75	..
Do. ..	829T .. ..	(Ida H.) .. ..	..	..	..	..	..	..	..	111·00	285·13	..
Do. ..	829T, 838T, 846T, 1219T, 1310T, 1671T .. ..	Ida H. G.M. Co., Ltd. .. ..	..	..	14,180·00	8,447·25	712·83	..	..	115,497·00	87,159·29	4,674·69
Do. ..	1783T .. ..	Just in Time .. ..	..	..	234·00	59·78	..	..	..	406·00	148·67	..
Do. ..	1783T, (1784T) .. ..	(Just in Time G.M. Co., N.L.) .. ..	..	..	..	..	..	..	..	469·00	180·50	..
Do. ..	(1777T) .. ..	Kiora .. ..	..	..	15·00	3·53	..	..	..	29·00	13·98	..
Do. ..	715T, 806T, 1206T, 1207T, 1483T, 1523T, 1524T, 1525T, 1542T, 1544T, 1548T .. ..	(Lancefield G.M. Co., Ltd.) .. ..	..	..	..	..	..	..	..	153,829·00	58,842·47	5,824·39
Do. ..	715T, 806T, 1206T, 1207T, 1483T, 1523T, 1524T, 1525T, 1542T, 1544T, 1548T .. ..	(Lancefield G.M. Co., Ltd.) .. ..	..	..	..	..	..	..	..	102,179·78	39,402·81	..
Do. ..	715T, 806T, 1206T, 1207T, 1483T, 1523T, 1524T, 1525T, 1542T, 1544T, 1548T .. ..	Lancefield G.M. Co., Ltd. .. ..	..	..	46,961·00	19,458·08	3,258·87	..	..	46,961·00	19,458·08	3,258·87
Do. ..	1840T .. ..	Mary Mac .. ..	..	..	350·00	272·78	..	..	..	350·00	272·78	..
Do. ..	(1803T) .. ..	Mount St. John .. ..	..	..	168·00	23·13	..	..	..	210·00	33·75	..
Do. ..	1828T .. ..	Normanton .. ..	..	..	79·00	131·81	..	..	..	79·00	131·81	..
Do. ..	1795T .. ..	Wanda .. ..	..	..	..	..	..	..	..	6·00	3·95	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	1,102·46	111,918·00	40,714·76	..
Do. ..	.. ..	Sundry claims .. ..	..	171·12	278·50	367·75	..	43·56	345·12	2,172·70	1,739·60	..

Mt. Barnicoat	..	Voided leases ..	..	..	..	..	..	..	..	652·00	359·12	..			
Do.	..	Sundry claims	..	..	..	..	..	..	..	23·00	23·37	..			
Quartz Hill	..	Voided leases ..	..	..	..	..	..	..	..	10·00	3·86	..			
<i>From District generally :—</i>															
Sundry parcels treated at:															
Caledonia Works	..	..	..	..	..	7·00	53·58	..	..	7·00	53·58	..			
Craiggiemore Works	..	..	..	..	..	..	..	..	..	..	110·28	..			
Mulga Queen Battery	..	..	..	..	..	..	101·46	..	..	..	101·46	..			
Orotava Works, Kalgoorlie	..	..	..	..	..	..	19·54	..	..	..	19·54	..			
Prosser's Cyanide Works	..	..	..	..	..	..	31·28	..	..	..	31·28	..			
State Battery—Burtville	..	..	..	..	..	..	570·34	..	..	62·00	2,823·11	..			
State Battery—Laverton	..	..	..	..	..	..	114·25	..	..	11·50	196·89	..			
Various Works	..	..	..	..	..	..	..	..	..	120·00	3,107·95	..			
Reported by Banks and Gold Dealers	..	..	..	..	..	564·28	..	..	587·90	..	..	..			
<b>Total</b>			..	..	..	<b>575·58</b>	<b>185·57</b>	<b>81,965·50</b>	<b>38,944·75</b>	<b>3,971·70</b>	<b>1,809·18</b>	<b>1,905·26</b>	<b>761,774·36</b>	<b>444,934·02</b>	<b>13,982·25</b>

### North Coolgardie Goldfield. MENZIES DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.
Comet Vale	5208z	(Comet Tunnel)	..	..	..	..	..	..	..	749·50	417·12	..
Do.	(5148z)	Coonega G.M. Co., Ltd.	..	..	..	20·71	..	54·32	607·50	796·21	..	
Do.	5217z	(Gladstone)	..	..	1,740·00	1,906·29	26·18	..	10,879·50	8,678·16	95·29	
Do.	5217z, 5333z	Gladstone leases	..	..	2,454·00	2,007·80	..	..	2,454·00	2,007·80	..	
Do.	5300z	(Happy Jack)	..	..	875·50	464·27	..	..	1,363·50	776·10	..	
Do.	5300z, 5325z	Happy Jack leases	..	..	151·00	91·56	..	..	1,511·00	91·56	..	
Do.	5325z	(Iron King)	..	..	41·50	20·62	..	..	41·50	20·62	..	
Do.	(5148z)	(Milparinka)	..	..	..	..	..	..	545·00	73·22	..	
Do.	(5326z)	Post Town	..	..	32·00	36·02	..	..	42·00	52·90	..	
Do.	5211z	(Sand Queen)	..	..	..	..	..	..	3,436·75	3,639·12	2·00	
Do.	5208z, 5211z	Sand Queen G.Ms., Ltd.	..	..	5,292·00	2,403·93	..	..	5,361·50	2,445·34	..	
Do.	..	Voided leases	..	..	..	..	..	355·38	7,995·60	4,169·28	2·00	
Do.	..	Sundry claims	..	..	9·00	10·63	..	23·00	293·25	283·10	..	
Geongarrie	5346z	Great Luck	..	..	31·00	32·35	..	..	31·00	32·35	..	
Do.	..	Voided leases	..	..	..	..	..	·94	14,666·14	9,290·87	..	
Do.	..	Sundry claims	..	1·08	80·50	118·90	..	27·93	23·11	454·25	418·66	..
Menzies	5253z	(Africander)	..	..	..	..	..	..	236·50	557·54	..	
Do.	5253z, 5267z	Africander leases	..	..	215·00	76·99	4·13	..	761·00	646·99	4·13	
Do.	3011z	Alpha	..	..	203·50	109·71	..	..	307·50	275·56	..	
Do.	5319z	Black Jack	..	..	100·50	475·50	..	..	230·50	688·91	..	
Do.	5338z	Black Jack North	..	..	58·50	11·15	..	..	58·50	11·15	..	

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

North Coolgardie Goldfield—continued.

MENZIES DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.
Menzies	2823z	(Crusoe Gold Claims, Ltd.)	..	..	291·00	172·63	..	..	..	33,135·00	32,978·74	1,038·47
Do.	5294z	(Dreadnought)	..	..	..	..	..	..	..	465·00	408·35	..
Do.	5294z	Dreadnought G.M. Co., N.L.	..	..	1,022·00	365·95	..	..	..	1,354·00	567·68	..
Do.	(5215z)	Dublin Castle	..	..	68·00	32·73	..	..	..	69·16	566·00	..
Do.	(5323z)	Eaglehawk	..	67	..	..	..	..	..	67	171·00	92·91
Do.	(4965z), 4966z	(Etrenna and Aurelia)	..	..	..	..	..	..	..	..	655·25	371·14
Do.	2821z	(Florence)	..	..	..	..	..	..	..	..	3,225·00	3,306·86
Do.	2821z, 2829z	Florence G.Ms., Ltd.	..	..	1,264·00	945·47	..	..	..	..	6,381·00	5,069·29
Do.	5089z	Flying Fish	..	..	118·50	120·37	..	..	..	..	1,129·50	1,723·31
Do.	4855z	(Goodenough)	..	..	..	..	..	..	..	..	3,430·95	5,177·86
Do.	4855z, 4901z, (4977z)	(Goodenough leases)	..	..	..	..	..	..	..	..	1,017·00	1,042·80
Do.	4855z, 4901z, (4977z)	(Goodenough leases : Westralian Machinery Corporation, Ltd.)	..	..	..	..	..	..	..	..	169·00	219·03
Do.	5257z	Hill's View	..	..	20·00	12·31	..	..	..	2·37	87·50	93·80
Do.	5337z	Ishtar	..	..	23·00	12·94	..	..	..	..	23·00	12·94
Do.	5302z	Lady Harriet	..	..	330·00	587·45	..	..	..	..	4·74	1,648·00
Do.	2820z, 3006z	(Lady Shenton G.M., Ltd.)	..	..	..	..	..	..	..	..	96,611·00	132,656·24
Do.	2835z	Lady Sherry	..	..	715·96	163·15	..	..	..	..	4·74	1,417·96
Do.	2835z, (3914z)	(Lady Sherry leases)	..	..	..	..	..	..	..	..	60·77	904·25
Do.	(5181z)	(Lincoln)	..	..	..	..	..	..	..	..	9·72	116·00
Do.	(5181z, 5256z)	Lincoln leases	..	..	45·50	34·55	..	..	..	..	2·78	414·50
Do.	5244z	Lion	..	17·95	68·00	79·47	..	..	..	..	30·27	270·50
Do.	5339z	Little Wonder	..	..	240·50	186·82	..	90·64	..	..	240·50	186·82
Do.	5230z	Lone Hand	..	..	74·00	68·27	..	..	..	..	448·50	340·20
Do.	4855z, 4901z, (4977z)	Lusitania leases	..	..	148·50	140·48	..	..	..	..	302·00	290·83
Do.	4987z	Maori Chief	..	..	99·50	72·25	..	..	..	5·44	951·75	791·30
Do.	4895z, 4944z, 5251z, 5252z	Maranora leases	..	..	220·00	347·99	..	..	..	..	3,680·30	4,226·69
Do.	3011z, 3031z	(Menzies Alpha leases, Ltd.)	..	..	..	..	..	..	..	..	11,807·50	16,330·18
Do.	4931z, 4934z, 4935z, 4936z, 5074z, 5075z, 5260z, 5261z, 5315z	Menzies Consolidated G.Ms., Ltd.	..	..	21,218·00	10,875·70	..	..	..	..	177,349·00	106,874·41
Do.	2820z, 3006z	Menzies Gold Mine leases	..	..	4,188·00	2,325·91	113·66	..	..	..	26,851·25	13,677·53
Do.	2835z	(Menzies Lady Sherry G.M. Co., N.L.)	..	..	..	..	..	..	10·88	..	2,208·00	2,330·60
Do.	2829z	(Menzies, Ltd.)	..	..	..	..	..	..	..	..	308·00	457·23
Do.	2832z, 2844z, 3100z, 3138z, 4966z	Menzies Mining and Exploration Corporation, Ltd.	..	..	2,283·00	1,384·54	..	..	..	..	21,930·95	27,653·94
Do.	(5236z)	Menzies Proprietary	..	..	93·50	34·35	..	..	..	118·44	471·00	669·69

Do.	5258z, 5298z	Menzies Prospecting and Development Co., N.L.							62.00	31.38		
Do.	(4960z)	Meriyulah						9.08	499.00	424.48	40	
Do.	5266z	Olive Branch		55.00	18.92				251.00	124.08		
Do.	(5273z)	Queen's Birthday		10.00	8.17				68.00	178.95		
Do.	2836z, 4855z, 4901z, (4977z)	(Queensland Menzies G.M. Co., N.L.)							50,321.50	76,928.28	6,486.90	
Do.	2823z	Robinson Crusoe	13.24	1,033.50	521.99			13.24	1,033.50	521.99		
Do.	(5232z)	Secret		76.00	13.89			8.03	648.50	515.45		
Do.	(5081z)	St. Albans						8.71	322.50	395.18		
Do.	3031z	Stirling		395.00	97.51				764.00	236.59		
Do.	(5289z)	Sun							46.00	67.75		
Do.	5318z	Surprise	242.84					337.15	76.00	260.53		
Do.	(5316z)	Two Dicks							782.00	720.36		
Do.	(5066z)	Victory		57.50	98.96				462.60	991.30		
Do.	3048z	Warrior		1,205.00	430.56				4,679.00	2,759.32	5.00	
Do.	3048z	(Warrior: Menzies G.M. Co., N.L.)							1,165.00	731.48		
Do.	2836z	Wedderburn		252.75	142.26				272.75	186.96		
Do.	2836z	(Wedderburn: Queensland Menzies G.M. Co., N.L.)							104.50	123.92		
Do.	2836z	(Wedderburn: Westralian Machinery Corporation, Ltd.)							122.00	171.93		
Do.	5299z	White Rock		41.00	111.03				165.00	603.98		
Do.		Voided leases					34.54	198.62	30,254.40	37,711.3	33.98	
Do.		Sundry claims		2,003.00	1,013.21		6.69	255.02	8,421.25	5,075.27		
Mt. Ida	5307z	(Copperfield)							120.00	24.89		
Do.	5307z	Copperfield		137.00	145.71				486.00	613.82		
Do.	(5306z), 5307z	(Copperfield leases)							158.00	89.34		
Do.	5035z	Federation		46.00	172.81				1,703.00	4,463.75		
Do.	5250z	Forest Belle		279.00	263.33				1,345.00	993.59		
Do.	5243z	Mt. Ida Meteor		1,857.00	669.14				6,572.00	4,988.32	39.00	
Do.	(5313z)	Pactolus							102.00	46.15		
Do.	5344z	Sandstone		21.00	27.19				21.00	27.19		
Do.	5349z	South Timoni		63.00	96.98				63.00	96.98		
Do.	5321z	Timoni		20.00	36.62				20.00	36.62		
Do.	5177z	Unexpected		764.00	1,234.56				2,431.00	5,931.97		
Do.	5290z	Unexpected South		615.00	961.24				1,846.00	4,217.61	35.64	
Do.	5292z	Wild Rose		190.00	164.56				331.00	237.29		
Do.		Voided leases						77.07	22,422.58	27,461.90	23.74	
Do.		Sundry claims		394.00	249.90			9.57	3,069.50	1,975.84		
<i>From District generally:—</i>												
Sundry parcels treated at:												
		Allsop and Howell's Works, Kalgoorlie			3.00					3.00		
		Lady Harriet Battery		33.50	15.50				33.50	15.50		
		Goongarrie Cyanide Works			245.02					288.51		
		Menzies Milling Co., Ltd. Works			192.92					192.92		
		Menzies Mining and Exploration Corporation, Ltd., Works		150.00	132.99				150.00	132.99		
		Mt. Ida Cyanide Works			520.81					2,788.71		
		Orotava Works, Kalgoorlie			9.04					82.42		
		State Battery—Menzies		€7.00	2,228.02					859.00		
		State Battery—Mt. Ida							1,690.25	1,567.52		
		Various Works							1,253.05	2,970.69	122.93	
		Reported by Banks and Gold Dealers					881.60	195.48				
		<b>Total</b>		<b>275.78</b>	<b>53,580.21</b>	<b>35,575.60</b>	<b>234.61</b>	<b>962.58</b>	<b>2,206.27</b>	<b>595,802.53</b>	<b>592,935.78</b>	<b>8,878.83</b>

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

North Coolgardie Goldfield—continued.

ULARRING DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.
Davyhurst	854U	Callion G.M. Co., W.A., N.L.	..	..	400·00	84·14	..	..	400·00	84·14	..	
Do.	860U	Callion G.M. Syndicate, N.L.	..	..	..	..	..	307·00	109·01	..		
Do.	883U	Eileen	..	..	27·50	5·91	..	114·00	602·06	..		
Do.	925U	Golden Lode	..	..	453·00	90·15	..	453·00	90·15	..		
Do.	459U	(Golden Pole)	..	..	..	..	..	34·00	47·51	..		
Do.	459U, 461U, 468U, 484U, 786U, 873U	Golden Pole G.Ms., Ltd.	..	..	5,858·00	5,914·41	..	70,909·00	70,101·08	..		
Do.	459U, 461U, 468U, 484U	(Golden Pole G.Ms., N.L.)	..	..	..	..	..	970·00	2,321·69	..		
Do.	613U	(Great Ophir)	..	..	..	..	..	161·00	96·79	..		
Do.	613U	(Great Ophir G.Ms., Ltd.)	..	..	..	..	3·34	559·10	311·83	..		
Do.	613U, 834U, 857U, 864U, 878U, (879U), 907U	Great Ophir Gold Corporation, Ltd.	..	..	..	..	..	3,000·00	408·43	..		
Do.	440U	(Homeward)	..	..	..	..	..	418·50	681·40	..		
Do.	(814U)	(Homeward Bound)	..	..	..	..	..	52·00	20·35	..		
Do.	440U, 496U, (767U, 814U)	Homeward G.M. Co., Ltd.	..	..	84·00	77·91	..	1,017·25	765·67	118·60		
Do.	440U, 496U	(Homeward leases)	..	..	..	..	..	139·00	146·37	..		
Do.	897U	Iron Cross	..	..	240·00	37·68	..	264·50	45·62	..		
Do.	(902U)	Jack of Hearts	..	..	33·00	13·57	..	91·00	37·98	..		
Do.	915U	King Edward	..	..	156·00	44·92	..	156·00	44·92	..		
Do.	908U	Lady Alice	..	..	31·00	7·19	..	31·00	7·19	..		
Do.	882U	Lady Ellen	..	5·78	133·00	135·95	..	5·78	310·50	354·61		
Do.	(893U)	Lady Mary	..	..	195·00	45·06	..	195·00	45·06	..		
Do.	898U	Light of Israel	..	..	22·50	12·46	..	22·50	12·46	..		
Do.	877U	(Melrose)	..	..	..	..	..	29·00	11·27	..		
Do.	896U	North Callion	..	..	31·00	8·11	..	31·00	8·11	..		
Do.	901U	Old Judge	..	..	45·00	10·45	..	45·00	10·45	..		
Do.	874U	(Resurgam)	..	..	..	..	..	415·00	769·72	..		
Do.	874U, 877U	Resurgam leases	..	..	314·00	643·79	..	314·00	643·79	..		
Do.	920U	Trier	..	..	1·50	6·07	..	1·50	6·07	..		
Do.	438U	(Waihi)	..	..	..	..	..	4·51	243·50	851·09		
Do.	496U	(Waihi Consols)	..	..	..	..	..	95·00	153·55	..		
Do.	438U	Waihi: Westralia Waihi G.Ms., N.L.	..	..	487·00	384·70	..	487·00	384·70	..		
Do.	(880U)	Wendouree	..	..	..	..	..	39·00	15·16	..		
Do.	438U	(Westralia Waihi G.Ms., N.L.)	..	..	..	..	..	1,437·00	1,526·94	58·90		



Do.	438v, (792v)	(Westralia Waihi [G.Ms., N.L.]	..	..	40-25	..	..	..	26,192-00	15,004-51	5,225-54		
Do.	903v	Wheel of Fortune	..	..	101-00	140-15	..	..	101-00	140-15	..		
Do.	..	Voided leases	..	..	..	..	..	2-93	103-82	18,217-90	13,561-99		
Do.	..	Sundry claims	..	25-12	499-50	302-44	..	..	26-42	3,903-60	1,919-18		
Mulline	(179v)	Bella Maie	..	..	41-50	25-61	..	..	18-00	3,457-00	3,623-67		
Do.	916v	Bella Maie	..	..	113-00	50-88	..	..	..	113-00	50-88		
Do.	918v	Claymore	..	..	8-50	15-38	..	..	..	8-50	15-38		
Do.	917v	Clingstone	..	..	30-00	71-39	..	..	..	30-00	71-39		
Do.	871v	Golden Horn	..	..	100-50	108-20	..	..	..	283-00	511-02		
Do.	894v	Great Leviathan	..	..	94-50	218-43	..	..	27-53	137-50	279-08		
Do.	921v	Jack	..	..	13-50	5-57	..	..	..	13-50	5-57		
Do.	139v, 235v, 555v, 670v, 671v, 679v, 732v, 862v	Lady Gladys G.M. Co., N.L.	..	..	2,239-50	2,438-47	..	..	..	14,761-50	15,744-43		
Do.	670v	(Lady Gladys Junction)	..	..	..	..	..	..	..	..	52-78		
Do.	139v, 235v, 555v	(Lady Gladys leases)	..	..	..	..	..	..	170-89	7,741-00	15,025-05		
Do.	892v	Mount Woolhouse	..	..	72-00	93-99	..	..	..	133-50	159-77		
Do.	(895v)	Mulline Gift	..	..	..	..	..	..	..	60-00	153-53		
Do.	872v	Peachtree	..	..	37-00	45-44	..	..	..	145-50	188-45		
Do.	324v, 600v, 730v	Riverina South leases	..	..	1,607-00	966-69	..	..	43-87	11,557-50	8,550-37		
Do.	123v	Riverina	..	..	856-00	447-76	..	..	..	2,424-00	1,977-95		
Do.	123v, (773v)	(Riverina G.M. Co., N.L.)	..	..	..	..	..	..	..	11,254-00	7,096-21		
Do.	763v	Young Australian	..	..	..	..	..	..	..	588-50	1,220-20		
Do.	910v	Young Australian North	..	..	14-50	7-11	..	..	..	14-50	7-11		
Do.	..	Voided leases	..	..	..	..	..	..	13-80	16,021-97	16,293-54		
Do.	..	Sundry claims	..	..	332-50	191-90	..	..	18-01	2,756-50	2,250-69		
Mulwarrie	912v	Golden Agate	..	..	10-00	27-62	..	..	..	10-00	27-62		
Do.	909v	Kjillaloe	..	..	118-00	182-15	..	..	..	118-00	182-15		
Do.	(886v)	Mulwarrie	..	..	9-00	10-80	..	..	1-13	277-50	79-82		
Do.	494v	Mulwarrie Main Reef	..	..	..	..	..	..	..	1,772-00	2,884-90		
Do.	855v	Ularring Westralia	..	..	146-00	66-86	..	..	3-06	1,043-00	495-19		
Do.	..	Voided leases	..	..	..	..	..	..	35-03	13,573-39	20,493-47		
Do.	..	Sundry claims	..	..	59-50	100-44	..	..	5-36	826-75	566-05		
Ularring	900v	Cardinal	..	78-08	524-50	849-47	..	..	411-28	702-50	1,200-84		
Do.	911v	Clinker	..	..	42-50	33-41	..	..	..	42-50	33-41		
Do.	(904v)	Lady Lillian	..	..	38-00	22-30	..	..	..	38-00	22-30		
Do.	(766v)	Off Chance	..	..	..	..	..	..	..	889-50	1,147-27		
Do.	888v	Shamrock	..	..	319-00	283-49	..	..	6-01	647-50	532-46		
Do.	..	Voided leases	..	..	..	..	..	..	1-86	6,386-35	9,685-33		
Do.	..	Sundry claims	..	..	17-00	9-46	..	..	..	143-00	113-15		
<i>From District generally :-</i>													
Sundry parcels treated at:													
	Orotava Works, Kalgoorlie	..	..	..	..	20-18	..	..	..	..	54-39		
	State Battery—Mulline	..	..	..	..	623-72	..	..	..	442-50	9,701-67		
	State Battery—Mulwarrie	..	..	..	..	241-70	..	..	..	579-45	2,453-13		
	Various Works	..	..	..	..	..	..	..	15-82	77-25	44-75		
	Reported by Banks and Gold Dealers	..	..	13-95	..	..	..	15-64	..	..	..		
<b>Total</b>			..	13-95	108-98	15,955-50	15,163-73	..	18-57	916-29	230,226-01	234,335-97	5,432-74

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

North Coolgardie Goldfield—continued.

NIAGARA DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.
Desdemona ..	707g .. ..	Apollo .. .. .	..	..	36·00	5·71	..	..	..	36·00	5·71	..
Do. ..	673g .. ..	(Desdemona) .. ..	..	..	400·00	657·18	..	..	..	4,289·00	4,894·18	12·04
Do. ..	673g, 664g, 715g	Desdemona leases .. ..	..	..	889·00	515·12	..	..	..	889·00	515·12	..
Do. ..	695g .. ..	Harriet .. .. .	..	..	251·00	110·92	..	..	..	251·00	110·92	..
Do. ..	685g .. ..	Othello .. .. .	..	..	1,177·00	415·12	..	..	5·73	1,442·00	497·99	..
Do. ..	664g .. ..	(Rising Sun) .. ..	..	..	..	..	..	..	..	246·50	143·81	..
Do. ..	.. .. .	Sundry claims .. ..	..	..	705·20	350·27	..	..	8·99	1,033·20	518·83	..
Kookynie ..	27g .. .. .	Altona: Cosmopolitan Proprietary, Ltd.	..	..	..	..	..	..	..	4,396·00	4,102·63	..
Do. ..	27g, 28g ..	(Altona leases: Cosmopolitan Proprietary, Ltd.)	..	..	..	..	..	..	..	538·00	423·30	..
Do. ..	31g .. .. .	Altona No. 1 North: Cosmopolitan Proprietary, Ltd.	..	..	10·00	6·31	..	..	..	575·50	415·76	..
Do. ..	28g .. .. .	Altona No. 1 South: Cosmopolitan Proprietary, Ltd.	..	..	..	..	..	..	..	4,651·00	4,440·26	..
Do. ..	717g .. ..	Batavia .. .. .	..	..	92·00	64·14	..	..	..	92·00	64·14	..
Do. ..	265g, 269g ..	Battery leases: Cosmopolitan Proprietary, Ltd.	..	..	..	..	..	..	..	..	47·50	..
Do. ..	316g .. ..	Canadian: Cosmopolitan Proprietary, Ltd.	..	..	..	..	..	..	..	41·20	62·63	..
Do. ..	320g .. .. .	Champion .. .. .	..	..	3,108·50	1,795·41	..	..	..	6,202·50	3,699·53	..
Do. ..	320g, (335g, 347g)	(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. ..	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. ..	26g .. .. .	Englishman: Cosmopolitan Proprietary, Ltd.	..	..	6,092·00	5,592·54	15·15	..	..	540,874·62	262,096·89	4,915·90
Do. ..	194g .. ..	(Diamantina) .. ..	..	..	..	..	..	..	..	117·05	118·02	..
Do. ..	194g .. ..	Diamantina: Cosmopolitan Proprietary, Ltd.	..	..	..	..	..	..	..	83·50	84·65	..
Do. ..	(704g) .. ..	Excelsior .. .. .	..	..	50·00	59·56	..	..	..	50·00	59·56	..
Do. ..	647g .. ..	(Happy-go-Lucky) .. ..	..	..	..	..	..	..	..	106·50	57·78	..
Do. ..	647g .. ..	Happy-go-Lucky: Mulwarrie Exploration Co., Ltd.	..	..	523·50	191·25	..	..	..	2,153·50	995·00	..
Do. ..	24g .. .. .	Irishman: Cosmopolitan Proprietary, Ltd.	..	..	..	..	..	..	..	44·50	44·14	..

Do.	(669g)	..	..	Lubra .. .. .	..	..	..	..	..	..	1,253.50	468.86	..	
Do.	25g	..	..	Scotchman : Cosmopolitan Proprietary, Ltd.	..	..	..	..	..	..	508.00	241.62	..	
Do.	696g	..	..	Two D's .. .. .	..	..	140.00	104.61	..	..	140.00	104.61	..	
Do.	720g	..	..	Victoria .. .. .	..	..	129.50	100.79	..	..	129.50	100.79	..	
Do.	23g	..	..	Welshman No. 1: Cosmopolitan Proprietary, Ltd.	..	..	..	..	..	..	50.50	78.12	..	
Do.	22g	..	..	Welshman : Cosmopolitan Proprietary, Ltd.	..	..	..	..	..	..	202.50	179.54	..	
Do.	..	..	..	Voided leases .. .. .	..	..	..	..	..	256.48	41,485.10	39,821.92	..	
Do.	..	..	..	Sundry claims .. .. .	..	..	442.00	190.67	..	30.59	74.79	3,025.75	1,913.09	..
Niagara	(586g)	..	..	Challenge .. .. .	..	..	..	..	..	..	969.50	812.70	..	
Do.	714g	..	..	Challenge .. .. .	..	..	60.50	35.82	..	..	60.50	35.82	..	
Do.	518g, 529g, 577g	..	..	(Eagle Hawk Heather Co., N.L.)	..	..	..	..	..	..	6,650.00	2,423.32	..	
Do.	718g	..	..	Ettocsam .. .. .	..	..	203.50	90.48	..	..	203.50	90.48	..	
Do.	419g, 461g	..	..	(Hannans Main Reef G.M. Co., Ltd.)	..	..	..	..	..	..	11,119.00	5,910.89	..	
Do.	661g	..	..	Justice .. .. .	..	..	144.50	219.44	..	..	492.50	478.61	..	
Do.	314g	..	..	Lily .. .. .	..	..	52.50	87.48	..	..	632.50	1,311.70	..	
Do.	694g	..	..	Mara Mines, Ltd.	..	..	109.00	115.44	..	..	109.00	115.44	..	
Do.	(571g)	..	..	May .. .. .	..	..	108.00	84.46	..	..	1,670.00	1,499.96	..	
Do.	721g	..	..	May .. .. .	..	..	187.50	123.23	..	..	187.50	123.23	..	
Do.	(442g)	..	..	Mikado .. .. .	..	..	28.00	15.25	..	..	229.00	282.82	..	
Do.	518g	..	..	(Missing Link) .. .. .	..	..	..	..	..	..	431.00	563.27	..	
Do.	518g, 529g, 577g	..	..	Missing Link leases .. .. .	..	..	96.00	39.06	..	..	96.00	39.06	..	
Do.	419g	..	..	(Opal) .. .. .	..	..	..	..	..	..	552.50	490.53	..	
Do.	419g	..	..	(Opal : Hannans Main Reef G.M. Co., Ltd.)	..	..	..	..	..	..	119.00	70.99	..	
Do.	419g, 461g, 679g, 688g, 689g	..	..	Orion Mines, Ltd.	..	..	8,074.50	3,859.96	..	..	11,447.50	6,395.57	..	
Do.	461g	..	..	(Pearl : Hannans Main Reef G.M. Co., Ltd.)	..	..	..	..	..	..	398.00	224.38	..	
Do.	(693g)	..	..	Perseverance .. .. .	..	..	24.00	12.66	..	..	93.00	74.11	..	
Do.	674g	..	..	Pine Lodge .. .. .	..	..	86.00	63.22	..	..	377.00	333.17	..	
Do.	611g	..	..	(W. E. G. Extended) .. .. .	..	..	..	..	..	..	85.00	51.32	..	
Do.	505g, 611g	..	..	W. E. G. leases .. .. .	..	..	1,029.00	306.36	..	..	6,962.00	5,153.81	..	
Do.	(613g)	..	..	White Cross .. .. .	..	..	50.00	20.81	..	..	876.50	496.54	..	
Do.	..	..	..	Voided leases .. .. .	..	..	..	..	..	..	50.43	16,963.50	12,864.68	..
Do.	..	..	..	Sundry claims .. .. .	9.74	17.20	624.00	356.51	..	9.74	42.50	5,769.75	3,537.01	..
Tampa	278g	..	..	(Fortuna) .. .. .	..	..	..	..	..	..	109.00	187.42	..	
Do.	278g, 349g	..	..	Fortuna leases .. .. .	..	..	292.00	374.89	..	..	1,520.50	2,036.18	..	
Do.	349g	..	..	(Grafter) .. .. .	..	..	..	..	..	..	1,751.00	2,487.00	..	
Do.	722g	..	..	Gregory .. .. .	..	..	165.00	47.05	..	..	165.00	47.05	..	
Do.	692g	..	..	Sunbeam .. .. .	..	..	133.00	118.78	..	..	209.00	247.01	..	
Do.	..	..	..	Voided leases .. .. .	..	..	..	..	..	..	14.86	13,612.05	8,872.49	..
Do.	..	..	..	Sundry claims .. .. .	..	..	485.00	81.39	..	5.07	..	2,121.50	1,177.94	..
<i>From District generally :—</i>														
Sundry parcels treated at:														
Cumberland Cyanide Works .. .. .														
Eagle Hawk Heather Works .. .. .														
Grafter—Battery .. .. .														
State Battery—Niagara .. .. .														
Various Works .. .. .														
Reported by Banks and Gold Dealers .. .. .														
					78.30	..	..	..	..	998.04	775.74	..	41.17	..
<b>Total</b>					<b>88.04</b>	<b>17.20</b>	<b>26,009.70</b>	<b>16,956.63</b>	<b>15.15</b>	<b>1,043.44</b>	<b>1,269.99</b>	<b>808,028.22</b>	<b>450,836.69</b>	<b>5,394.43</b>

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

North Coolgardie Goldfield—continued.

YERILLA DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.	418R, 497R	Gawler G.M. Co., Ltd.	..	..	86.00	228.94	..	..	..	86.00	228.94	..
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)	..	..	..	..	..	..	..	5,217.00	9,968.12	34.58
Do.	401R, 500R	Neta leases	..	..	347.50	411.58	..	..	..	347.50	411.58	..
Do.	934R	Old Edjudina	..	..	22.50	49.66	..	..	..	22.50	49.66	..
Do.	539R, 537R	Senate leases	..	..	469.00	1,165.59	..	..	..	4,141.00	8,041.52	..
Do.	944R	Three Crosses	..	..	89.00	172.97	..	..	..	89.00	172.97	..
Do.	..	Voided leases	..	..	..	..	..	..	3.65	8,061.75	6,918.03	3.21
Do.	..	Sundry claims	..	..	104.00	109.58	..	..	..	1,286.00	1,119.67	..
Eucalyptus	..	Voided leases	..	..	..	..	..	..	2,864.77	1,351.35	3,020.68	..
Do.	..	Sundry claims	..	..	..	..	..	..	367.50	170.50	194.49	..
Linden	(864R)	Bell	..	..	..	..	..	..	..	108.50	39.45	..
Do.	(901R)	Carmen	..	..	..	..	..	..	..	126.00	39.27	..
Do.	871R	Democrat	..	9.01	195.50	748.10	..	..	9.01	288.00	1,346.27	..
Do.	915R	Devon Deep Levels	..	..	..	..	..	..	..	62.50	35.75	..
Do.	898R	Dreadnought	..	..	16.50	20.90	..	..	..	93.50	106.23	..
Do.	(888R)	Golden Ridge	..	..	..	..	..	..	..	29.00	11.20	..
Do.	923R	Great Carbine	..	7.53	304.00	147.47	..	7.53	..	304.00	147.47	..
Do.	942R	Great Junction	..	..	142.00	49.24	..	..	..	142.00	49.24	..
Do.	(914R)	Green Hills	..	..	14.50	12.29	..	..	..	110.00	114.75	..
Do.	(897R)	Hoffnung	..	..	38.00	50.22	..	..	..	38.00	50.22	..
Do.	(921R)	Jack and Doris	..	..	..	..	..	..	..	28.00	66.65	..
Do.	(911R)	Kangaroo	..	..	..	..	..	..	..	42.00	15.89	..
Do.	(917R)	Keystone	..	..	17.50	7.12	..	..	..	69.50	30.46	..
Do.	(861R)	Lady Ethel	..	..	127.00	55.44	..	..	8.12	247.00	174.17	..
Do.	937R	Linden Star	..	..	22.00	126.92	..	..	..	22.00	126.92	..
Do.	939R	Maudsley	..	..	116.00	117.78	..	..	..	116.00	117.78	..
Do.	940R	Oakover	..	..	39.00	18.54	..	..	..	39.00	18.54	..
Do.	(881R)	Oldfield Proprietary	..	..	11.50	34.27	..	..	..	44.50	163.49	..
Do.	869R	Rock	..	46.94	..	..	..	..	..	52.57	5.00	..
Do.	862R	Wimmera	..	..	90.50	39.47	..	..	..	137.50	75.66	..
Do.	..	Voided leases	..	..	..	..	..	..	453.65	6,224.40	10,101.53	..
Do.	..	Sundry claims	..	..	77.81	7.32	886.50	703.20	..	25.30	1,689.00	..



TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

North Coolgardie Goldfield—continued.

YERILLA DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.
undamindera	466R .. ..	(Queen of the May) .. ..	..	..	..	..	..	..	..	1,810.60	1,719.92	..
Do. ..	466R .. ..	Queen of the May .. ..	..	..	..	..	..	..	..	202.00	143.86	..
Do. ..	(889R) .. ..	Success .. ..	..	..	..	..	..	..	..	28.00	28.78	..
Do. ..	493R, 541R ..	(Treasure East leases) ..	..	..	347.00	253.85	..	..	..	450.00	313.70	..
Do. ..	493R, 541R, 916R	Treasure East leases ..	..	..	349.00	237.89	5.82	..	..	349.00	237.89	5.82
Do. ..	..	Voided leases .. ..	..	..	..	..	..	..	71.37	5,458.65	7,647.59	..
Do. ..	..	Sundry claims .. ..	..	11.64	237.00	181.57	..	..	13.01	1,882.00	1,522.18	..
<i>From District generally :—</i>												
Sundry parcels treated at :												
		State Battery—Linden .. ..	..	..	..	738.98	..	..	..	72.00	894.61	..
		State Battery—Pinjin .. ..	..	..	..	132.20	..	..	..	109.00	838.83	..
		State Battery—Yarri .. ..	..	..	..	120.48	..	..	..	218.00	1,716.15	3.50
		State Battery—Yerilla .. ..	..	..	..	87.59	..	..	..	..	87.59	..
		Various Works .. ..	..	..	..	..	..	..	2.17	732.85	3,300.52	..
		Reported by Banks and Gold Dealers ..	..	..	..	..	..	..	871.36	154.74	..	..
		<b>Total .. ..</b>	<b>86.21</b>	<b>181.97</b>	<b>12,276.50</b>	<b>10,930.90</b>	<b>5.82</b>	<b>1,106.14</b>	<b>7,377.19</b>	<b>154,792.28</b>	<b>136,844.44</b>	<b>58.47</b>

Broad Arrow Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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 ..	1365w .. ..	Argyle .. ..	..	..	209.00	137.01	..	..	..	282.50	199.00	..
Do. ..	(1278w) .. ..	Baden Powell .. ..	..	..	69.00	32.68	..	..	..	520.50	611.02	..
Do. ..	(1369w) .. ..	Eureka .. ..	..	..	..	..	..	..	..	117.00	22.85	..
Do. ..	1392w .. ..	Excelsior .. ..	..	..	70.00	10.17	..	..	..	70.00	10.17	..
Do. ..	1404w .. ..	Golden Eagle .. ..	..	..	19.50	42.61	..	..	..	19.50	42.61	..
Do. ..	1272w .. ..	Mt. Pleasant .. ..	..	..	..	..	..	..	..	..	1.40	..

Do.	1272w	(Mt. Pleasant: Zoroastrian, Ltd.)							246.00	417.85	
Do.	1377w	Vettors			237.75	164.31			237.75	164.31	
Do.		Voided leases						256.68	68,932.16	48,209.33	203.60
Do.		Sundry claims			224.00	182.27			1,879.58	1,276.27	
Black Flag	1398w	Crown			194.00	50.79			194.00	50.79	
Do.	(1333w)	First Chance							56.00	18.64	
Do.	1177w	(King Edward)							172.00	429.74	
Do.	1177w	King Edward			59.00	52.48		1.96	545.70	408.31	
Do.	1177w, (1182w, 1208w)	(King Edward leases)							370.86	1,293.21	
Do.	1378w	King Edward North			39.00	38.14			39.00	38.14	
Do.	1384w	Lady Bountiful			73.50	44.59			73.50	44.59	
Do.	(1281w)	Last Chance			46.00	29.26			477.00	373.78	
Do.	1383w	Westella			13.00	4.45			13.00	4.45	
Do.		Voided leases						27.81	340.64	37,405.31	20,898.35
Do.		Sundry claims	92.84	40.05	107.00	109.04		682.45	154.78	1,824.95	1,723.28
Broad Arrow	(56w, 75w, 11259w)	Broad Arrow Consols G.M. Co., N.L. (Claremont)							10,220.50	5,469.84	
Do.	1334w								118.00	33.50	
Do.	3w, 138w, 139w, 173w, 1334w	Claremont G.Ms., Ltd.			1,690.00	1,057.04			5,411.00	3,658.56	
Do.	1209w	Dixie			59.00	100.09			60.72	468.35	511.04
Do.	3w, 138w, 139w, 173w	(Golden Arrow Mine, Ltd.)							35,878.75	20,187.46	15.85
Do.	(1342w)	Golden Buckle North							145.50	57.92	
Do.	56w, 75w	(Liberty leases)							298.90	375.35	
Do.	(1353w)	New Devon						91.93	10.00	14.88	
Do.	1256w	Talbot		8.38	115.00	212.65		8.38	915.00	1,105.98	
Do.	1357w	Tara			170.00	326.61			194.00	367.81	
Do.	643w	Victory		188.19	33.00	95.36			262.90	1,310.00	1,583.02
Do.		Voided leases						54.85	377.03	56,102.16	59,729.19
Do.		Sundry claims	350.85	102.47	313.54	210.66		947.30	315.58	5,533.54	3,081.02
Paddington	(1355w)	Golden Block			70.00	18.80			356.00	114.93	
Do.	53w, 57w, 60w, 61w, 123w, 1050w	Gwalia Proprietary, Ltd.			1,206.00	168.11			1,206.00	168.11	
Do.	1262w	Kalgurli G.M. Syndicate, Ltd.							645.00	374.73	
Do.	45w	Mount Corlic		212.91	1,346.00	420.42		229.91	4.37	9,576.75	4,131.97
Do.	1374w	New Mona			3,409.00	302.79			3,409.00	302.79	
Do.	53w, 57w, 60w, 61w, 128w, 1050w	(New Standard Exploration Co., Ltd.)			4,867.00	1,127.01		5,240.81	133,036.00	60,672.23	18.96
Do.	1351w	Pakeha							226.00	28.09	
Do.	1356w	Recovery			254.00	673.02			403.00	741.24	
Do.	1047w	Star of W.A.		58.98	597.00	447.33			253.38	10,524.00	8,753.63
Do.	1352w	Unexpected			1,668.00	116.49				3,553.00	479.17
Do.		Voided leases								6,344.90	3,110.43
Do.		Sundry claims	68.26		124.80	34.10		1,639.14		8,531.59	5,181.92
Siberia	1368w	Anticipation			237.50	140.62				237.50	140.62
Do.	1316w	Band of Hope		27.51					27.51	45.00	18.07
Do.	1345w	Cave Hill			51.00	126.67				261.00	1,653.74
Do.	1372w	Denver City		8.94					8.94		
Do.	1347w	Expectation								74.00	85.95
Do.	1382w	Federal			56.00	50.02				56.00	50.02

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Broad Arrow Goldfield—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.		
Siberia	1400w	Gimblet Extended	..	..	34.00	48.16	..	..	..	34.00	48.16	..		
Do.	1371w	Gimblet South	..	..	1,624.00	610.98	..	..	..	1,624.00	610.98	..		
Do.	1399w	Gimblet South Extended	..	..	45.00	20.08	..	..	..	45.00	20.08	..		
Do.	1338w	Gimblet West	..	..	252.50	188.23	..	..	..	680.50	482.83	..		
Do.	1286w	Golden	..	143.40	7.65	126.51	..	..	179.11	97.41	331.08	..		
Do.	1390w	Golden Gimblet	..	1.23	153.00	117.23	..	..	1.23	153.00	117.23	..		
Do.	1358w	Golden Mount	..	..	495.00	260.07	..	..	4.26	624.00	337.69	..		
Do.	1292w	Invincible	..	..	113.00	8.40	..	..	..	1,084.00	290.94	..		
Do.	1289w, 1308w	Lady Evelyn leases	..	6.90	339.00	959.57	..	..	6.90	2,037.25	2,335.20	..		
Do.	1367w	Lochiel	..	7.96	..	..	..	..	16.51	..	..	..		
Do.	1293w	Mexico	..	..	65.00	186.68	..	..	..	301.00	694.34	..		
Do.	1291w	Missouri	..	..	172.00	65.59	..	..	8.64	784.50	274.06	..		
Do.	1348w	Old Identities	..	..	44.00	37.94	..	..	..	138.00	117.63	..		
Do.	(1288w, 1303w)	(Orabanda leases)	..	..	..	..	..	..	..	8,201.00	1,771.77	..		
Do.	(1294w)	Palmerston	..	..	150.00	24.05	..	..	24.20	150.00	24.05	..		
Do.	1299w	Palmerston North	..	..	157.00	31.27	..	..	..	662.00	92.45	..		
Do.	1300w	Pole	..	..	68.00	64.91	..	..	..	170.00	704.12	..		
Do.	1375w	Siberia Consols	..	..	65.00	1,134.59	..	..	..	65.00	1,134.59	..		
Do.	1336w	Slippery Gimblet	..	..	10,687.00	2,675.40	..	..	..	14,253.50	3,841.64	..		
Do.	1283w	Waverley	..	..	24.00	15.60	..	..	..	875.00	280.17	..		
Do.	..	Voided leases	..	..	..	..	..	..	52.89	1,379.00	422.16	..		
Do.	..	Sundry claims	..	48.86	34.30	175.50	222.08	..	84.34	52.43	2,338.25	2,941.70	..	
Smithfield	..	Voided leases	..	..	..	..	..	..	..	1,027.00	200.90	..		
Do.	..	Sundry claims	..	..	..	..	..	..	..	20.00	9.54	..		
<i>From Goldfield generally :—</i>														
Sundry parcels treated at:														
		Allsop and Howell's Works, Kalgoorlie	..	..	..	..	..	..	..	..	6.70	271.76	..	
		Braybrook's Cyanide Works	..	..	..	..	..	..	..	..	427.54	..	..	
		Broad Arrow Consols Works	..	..	..	40.41	..	..	..	..	118.29	..	..	
		Carter's Venture Works	..	..	..	92.43	..	..	..	..	81.50	1,465.25	..	
		New Arrow Proprietary Works	..	..	..	131.83	..	..	299.35	..	5,229.08	4,666.06	..	
		Ora Banda Works	..	..	..	613.65	..	..	..	..	77.00	1,176.31	..	
		Orotava Works, Kalgoorlie	..	..	..	2.54	..	..	..	..	2.54	..	..	
		Paddington Consols Works	..	..	..	700.36	..	..	..	..	9.75	6,567.25	..	
		Regan's Works	..	..	..	..	..	..	..	..	27.00	58.75	..	
		Vettersburg Cyanide Works	..	..	..	78.94	..	..	..	..	..	98.34	..	
		Zoroastrian Works	..	..	..	527.14	..	..	..	..	53.00	985.03	..	
		Various Works	..	..	..	..	..	..	..	1,970.91	11,288.85	11,041.33	7.09	
		Reported by Banks and Gold Dealers	..	209.35	..	..	..	..	..	6,862.40	..	..	..	
		<b>Total</b>	..	..	..	..	..	..	..	18,040.18	2,510.97	462,776.34	302,118.00	517.26



# North-East Coolgardie Goldfield.

## KANOWNA DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.
Black Swan ..	..	Voided leases .. ..	..	..	..	..	..	..	..	160.00	141.76	..
Gambier ..	434x, 878x ..	(Atlas G.Ms., Ltd.) .. ..	..	..	..	..	..	..	..	8,007.00	3,378.99	..
Do. ..	434x .. ..	(Camelia) .. ..	..	..	..	..	..	..	..	242.50	325.82	..
Do. ..	434x .. ..	Camelia .. ..	..	..	..	..	..	3.53	..	2,415.00	1,103.70	..
Do. ..	878x .. ..	Camellia Extended .. ..	..	..	176.00	131.14	..	..	..	698.00	696.44	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	35.20	1,226.50	971.93	..07
Do. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	24.70	245.94	858.75	662.21	..
Gindalbie ..	1176x .. ..	Carrington .. ..	..	..	19.00	7.02	..	..	..	19.00	7.02	..
Do. ..	1047x .. ..	Eclipse .. ..	..	..	275.00	141.82	..	..	..	798.00	681.17	..
Do. ..	1123x .. ..	Gindalbie .. ..	..	..	..	..	..	..	..	101.00	36.97	..
Do. ..	1258x .. ..	Jack's Dream .. ..	..	..	23.00	13.59	..	..	..	23.00	13.59	..
Do. ..	(1191x) .. ..	Jubilee .. ..	..	..	..	..	..	..	..	141.00	45.26	..
Do. ..	392x, 394x, 396x, 1048x, 1207x	Melton G.M. Co., N.L. .. ..	..	..	654.00	485.80	..	..	..	654.00	485.80	..
Do. ..	(1192x) .. ..	Occidental .. ..	..	..	9.00	17.34	..	..	..	114.50	299.96	..
Do. ..	392x, 394x, 396x, 1048x, 1207x	(Queen Margaret G.M. Co., Ltd.) .. ..	..	..	740.00	394.65	..	..	..	25,540.03	24,642.71	38.31
Do. ..	392x, 394x, 396x	(South Gippsland leases)	..	..	..	..	..	..	..	3,697.00	3,805.05	..
Do. ..	1174x .. ..	United .. ..	..	..	947.00	460.27	..	..	..	1,710.50	1,875.27	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	19.94	2,907.55	2,792.92	..
Do. ..	.. ..	Sundry claims .. ..	..	..	162.00	163.56	..	..	674.82	889.75	981.84	..
Gordon ..	1233x .. ..	(Mt. Eba) .. ..	..	..	34.00	36.14	..	..	..	34.00	36.14	..
Do. ..	1233x .. ..	Mt. Eba G.Ms., Ltd. .. ..	..	..	279.00	80.66	..	..	..	279.00	80.66	..
Do. ..	891x .. ..	(Sirdar) .. ..	..	..	..	..	..	..	32.60	168.50	1,319.35	..
Do. ..	891x .. ..	Sirdar G.M. Co., Ltd. .. ..	..	..	7,539.00	1,176.40	..	..	..	7,573.00	1,220.23	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	205.17	1,145.80	932.67	..
Do. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	..	54.65	586.50	525.61	..
Kanowna ..	35x, 64x .. ..	Ballarat and Prince Oscar Co., Ltd. .. ..	..	59.79	326.50	327.14	..32	3.59	102.16	6,102.50	2,509.72	205.1
Do. ..	35x, 64x, (345x)	(Ballarat and Prince Oscar Syndicate, Ltd.) .. ..	..	..	..	..	..	..	47.79	5,497.00	2,926.09	..
Do. ..	1160x .. ..	Bulong United .. ..	..	96.37	24.00	27.36	..	..	136.88	228.00	240.67	..
Do. ..	367x .. ..	(Commonwealth G.Ms., Ltd.) .. ..	..	..	..	..	..	..	..	4,266.00	1,685.13	..
Do. ..	1151x .. ..	Evelyn Amalgamated .. ..	..	2.63	247.00	90.15	..	..	20.85	2,352.50	449.76	..
Do. ..	1246x .. ..	Fitzroy .. ..	..	..	30.00	5.49	..	..	..	30.00	5.49	..
Do. ..	1062x .. ..	Gentle Polly .. ..	..	..	1,264.50	1,606.83	..	..	23.82	5,195.25	11,604.96	359.00
Do. ..	83x, (180x, 200x), 201x	(Golden Cement claims) .. ..	..	..	..	..	..	..	..	5,848.00	2,570.51	..

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

North-East Coolgardie Goldfield—continued.

KANOWNA DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.
Kanowna	55x	(Golden Crown)	..	..	114.00	56.84	..	..	290.71	2,070.75	1,534.42	..
Do.	1224x	(Golden Crown Extended)	..	..	16.00	46.33	..	..	..	16.00	46.33	..
Do.	55x, 1224x	Golden Crown leases	..	7.19	211.00	130.86	..	..	7.19	211.00	130.86	..
Do.	1257x	Golden Dump	..	..	349.00	40.93	..	..	..	349.00	40.93	..
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.	1260x	Goodenough	..	..	48.00	8.89	..	..	..	48.00	8.89	..
Do.	1256x	Havilah	..	..	140.00	156.78	..	..	..	140.00	156.78	..
Do.	1019x	Kanowna	..	126.17	564.00	466.50	..	..	688.08	4,511.00	7,555.56	..
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	..	..	..	..	..	..	..	5,341.00	263.36	..
Do.	1055x	Kintore	..	..	312.00	336.76	..	..	..	1,479.75	2,238.51	..
Do.	(1217x)	Lady Syble	..	..	..	..	..	..	..	104.00	25.51	..
Do.	52x	(Lake View South G.M. (W.A.), Ltd.)	..	..	249.50	119.95	..	..	..	23,579.65	10,136.28	24.33
Do.	52x	Lake View South, Ltd.	..	..	157.50	116.76	..	..	..	157.50	116.76	..
Do.	18x, 19x	(Lily Australis G.Ms., Ltd.)	..	..	..	..	..	..	..	197.00	119.18	..
Do.	1231x	Lydon's Dream	..	..	14.00	6.85	..	..	..	28.50	13.85	..
Do.	1076x	Madame Melba	..	..	145.00	112.27	..	..	35.87	1,755.50	2,726.77	18.00
Do.	(1154x)	Minerva	..	..	37.00	10.78	..	..	26.01	1,266.00	352.56	..
Do.	(1202x)	Monte Christo	..	..	73.00	41.74	..	..	5.56	443.50	311.77	..
Do.	1254x	My Daisy	..	..	30.00	18.65	..	..	..	30.00	18.65	..
Do.	55x	(New Standard Exploration Co., Ltd.)	..	..	..	..	..	..	11.49	2,128.50	2,740.13	..
Do.	1196x	North Lead Lode	..	19.09	182.00	35.48	..	..	19.09	426.00	88.01	..
Do.	1152x	North Lead Lode Consols	..	4.19	738.00	143.45	..	..	9.83	2,507.50	477.98	..
Do.	3x, 18x, 19x, (46x), 60x, 81x, 938x, 974x, 1035x, (1132x, 1135x)	North White Feather G.Ms., Ltd.	..	..	25,781.00	9,874.68	..	..	..	141,568.75	72,119.50	159.19
Do.	1261x	Prince Foote	..	..	49.00	33.21	..	..	..	49.00	33.21	..
Do.	(153x)	Q.E.D.	..	..	52.00	31.94	..	..	12.21	1,934.00	817.75	..
Do.	(1209x)	Red Streak	..	..	36.00	9.13	..	..	83.90	794.00	246.35	..
Do.	(1220x)	Red, White, and Blue	..	..	73.00	20.56	..	..	88.98	269.00	69.87	..
Do.	52x	(Robinson G.Ms., Ltd.)	..	..	..	..	..	..	..	16,478.75	16,213.33	..
Do.	(1214x)	Rollo's Reward	..	..	..	..	..	..	..	2.00	.44	..
Do.	(1242x)	Scotia	..	..	43.00	6.50	..	..	..	65.00	16.57	..

Do.	1121x	..	..	Sunbeam	..	..	..	..	..	..	1,914.50	1,449.94	..		
Do.	1232x	..	..	Try Again	..	..	..	..	..	..	860.00	278.71	..		
Do.	(153x)	..	..	(Waldon's Find G.M., Ltd.)	..	..	..	..	..	..	1,076.05	904.43	..		
Do.	12x, 13x, 14x, 15x, 855x, 1001x, 1012x, 1103x, (1107x), 1108x, (1109x)	..	..	(White Feather Main Reefs, Ltd.)	..	..	..	..	..	..	123,327.56	82,334.52	1,675.68		
Do.	9x, 10x, 12x, 13x, 14x, 15x, 72x, 83x, 201x, 855x, 1001x, 1012x, 1103x, 1108x, 1249x	..	..	White Feather Main Reefs (1906), Ltd.	..	8.36	4,743.00	2,136.39	..	..	20.45	18,440.50	6,259.15	..	
Do.	9x, 10x, 72x, 83x, (180x, 200x), 201x, (431x)	..	..	(White Feather Reward, Ltd.)	..	..	..	..	..	..	42,767.75	22,255.23	14.80		
Do.	367x	..	..	Wood's Find	..	..	654.00	281.41	..	..	..	2,601.50	1,244.82	..	
Do.	..	..	..	Voided leases	..	..	..	..	..	750.11	54,368.26	28,445.58	..		
Do.	..	..	..	Sundry claims	..	355.27	765.00	379.15	..	88.57	851.87	9,704.86	4,991.66	..	
Mulgarrie	1251x	..	..	Lady Clara	..	..	82.50	70.59	..	..	82.50	70.59	..		
Do.	1228x	..	..	Lady Pratt	..	70.03	50.00	12.46	..	148.46	60.00	38.70	..		
Do.	1213x	..	..	Mount Jewell	..	..	24.00	5.50	..	15.74	33.00	15.60	..		
Do.	..	..	..	Voided leases	..	..	..	..	..	977.20	3,002.50	1,661.43	..		
Do.	..	..	..	Sundry claims	..	..	..	..	..	13.29	106.00	160.20	..		
Six Mile	1238x	..	..	Signal Success	..	5.26	..	..	..	5.26	..	..	..		
Do.	..	..	..	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:															
	Last Chance Cyanide Works	..	..	..	..	..	..	411.03	..	..	..	1,198.37	..		
	Middleton's Cyanide Works	..	..	..	..	..	..	..	..	..	..	1,765.01	..		
	Morrison's Cyanide Works	..	..	..	..	..	..	13.40	..	..	..	377.07	..		
	North White Feather Filter Press Works	..	..	..	..	..	..	..	..	..	..	797.46	..		
	Old Cement Works	..	..	..	..	..	..	1,369.45	..	..	52.00	3,399.56	..		
	Riedel and Norton's Works	..	..	..	..	..	627.00	235.59	..	..	642.00	282.30	..		
	Robinson's Cyanide Works	..	..	..	..	..	..	141.27	..	..	..	5,657.98	..		
	Various Works	..	..	..	..	..	..	..	..	25.01	903.10	8,244.57	..		
	<b>Total for Leases and Quartz Claims</b>	..	..	..	..	754.35	50,360.50	22,534.98	..	..	141.87	7,286.46	570,371.86	367,382.68	2,494.54
<i>Cement from Alluvial Claims :-</i>															
	Reported by Owners	..	..	..	..	..	457.00	64.64	..	305.41	867.52	25,545.40	12,591.94	..	
	Treated locally (not reported by owners) at:	..	..	..	..	..	..	..	..	..	..	5,965.50	2,368.32	..	
	Old Cement Works	..	..	..	..	..	445.00	55.63	..	..	..	3,323.00	455.37	..	
	Riedel and Norton's Works	..	..	..	..	..	1,447.00	198.74	..	..	..	260.00	22.69	..	
	State Battery—Kalpini	..	..	..	..	..	..	..	..	..	..	77,090.21	54,895.82	..	
	Various Works	..	..	..	..	..	..	..	..	..	..	27,804.55	36,711.17	..	
	Treated outside District (not reported by owners)	..	..	..	..	..	..	..	..	..	..	..	84.69	..	
	Reported by Banks and Gold Dealers	..	..	..	..	177.29	..	..	..	103,601.13	..	..	..	..	
	<b>Total</b>	..	..	..	..	177.29	754.35	52,709.50	22,853.99	..	..	8,154.84	710,360.52	474,512.68	2,494.54

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

North-East Coolgardie Goldfield—continued.

KURNALPI DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Do.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Kurnalpi	316κ	..	Spion Kop	..	..	..	79·42	..	..	..	210·70	..	..	16·71	
Do.	(322κ)	..	Queen May	..	..	..	17·95	..	..	..	17·95	..	..	..	
Do.	(319κ)	..	Welshman's	..	..	..	..	2·00	..	..	..	2·00	..	34·34	
Do.	..	..	Voided leases	..	..	..	..	..	..	371·18	8·66	2,675·05	1,626·76	6·27	
Do.	..	..	Sundry claims	..	..	..	..	..	..	217·92	33·81	68·50	64·85	..	
Mulgabbie	263κ	..	Cables	..	..	..	..	1·00	..	..	309·79	2·50	337·93	..	
Do.	303κ	..	Hope	..	..	..	36·18	8·00	..	..	147·70	15·00	1,508·49	..	
Do.	312κ	..	Mulgabbie Perseverance	..	..	..	..	6·00	..	..	..	11·90	987·98	4·95	
Do.	..	..	Voided leases	..	..	..	..	..	..	..	50·67	7·00	629·67	..	
Do.	..	..	Sundry claims	..	..	..	..	53	..	..	6·50	1,362·81	80·75	612·38	
<i>From District generally:—</i>															
Sundry parcels treated at:															
Various Works			..	..	..	..	..	..	..	..	..	56·50	187·39	..	
Reported by Banks and Gold Dealers			..	..	..	..	..	..	..	..	10,557·47	19·62	..	..	
<b>Total</b>			..	..	..	..	..	..	..	..	192·46	153·70	17·00	1,330·59	4·95
			..	..	..	..	..	..	..	..	11,171·94	2,306·84	4,775·70	7,435·95	11·22

East Coolgardie Goldfield.

EAST COOLGARDIE DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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	..	..	..	..	..	..	..	..	..	..	..	120·00	76·93	..
Do.	..	..	..	..	..	..	..	..	..	..	..	25·00	24·60	..
Boorara	4297E	..	(Golden Ridge)	..	..	..	..	..	..	..	132·74	128·00	166·96	..
Do.	3908E, 3910E, 3912E, 4033E, 4045E, 4327E	..	Golden Ridge G.M. Co., Ltd.	..	..	..	..	24,133·75	..	..	..	64,953·75	41,833·66	..

Do.	4297E, 4298E	Golden Ridge Reclaimed G.M. Co., N.L.			880.00	303.46			880.00	303.46	
Do.	4314E	Pearl			37.50	11.31			82.50	20.43	
Do.	4298E	(Reclaimed)						74.61			
Do.	3908E, 3910E	(Waterfall leases)							2,849.00	2,389.48	
	3912E, 4033E										
Do.		Voided leases						60.93	55,461.78	30,663.89	
Do.		Sundry claims	49	2.30	35.00	17.46		2.30	35.00	17.46	
Boulder	392E	(Acrobat : Paringa Consolidated Mines, Ltd.)							10.25	37.15	
Do.	38E, (52E, 53E), 71E, 72E, 101E	Associated G.Ms. of W.A., Ltd.		8.24	122,478.00	58,967.87	1,170.13		8.49	900,618.70	697,713.96
Do.	49E, (263E), 4211E	Associated Northern Blocks (W.A.), Ltd.			39,467.50	17,185.65	732.00		524.18	252,032.62	351,205.44
Do.	(4308E)	Boko		1.96	58.00	11.97			1.96	273.00	73.65
Do.	890E	Boomerang			560.75	105.11				727.75	134.08
Do.	(682E), 902E, 923E, 986E, (1064E), 1124E, 1196E, 4075E	Boulder Deep Levels, Ltd.)								3,043.00	1,778.10
Do.	902E, 923E, 986E, 1124E, 1196E, 4075E	Boulder Deep Levels (1907), Ltd.			763.00	194.65				787.50	210.30
Do.	281E	(Brookman Bros : Boulder G.M. Co., Ltd.)								8,655.00	8,417.00
Do.	989E	(Brown Hill Central G.Ms., Ltd.)								2,957.50	2,071.92
Do.	558E, 1175E, 3961E	Brown Hill Extended, Ltd.			2,197.25	798.92				26,830.00	41,433.48
Do.	(4310E)	Captain Wallace								7,000.00	770.96
Do.	1163E	Cassidy's North			67.00	7.95				67.00	7.95
Do.	24E, 888E, 949E, (1168E)	Central and West Boulder G.Ms., Ltd.			686.73	274.37				30,308.43	18,417.54
Do.	352E	(Chaffer's G.M. Co., Ltd.)								4,256.00	1,299.03
Do.	352E, 4434E	Chaffer's G.M. Co., Ltd.			28,232.00	12,390.71				39,974.50	17,326.30
Do.	4307E	Confidence							8.20	70.00	78.82
Do.	238E	Croesus North No. 1, Ltd.			81.00	9.64				10,576.25	4,006.88
Do.	1621E	(Croesus Proprietary G.M. Co.)								79.00	45.87
Do.	13E, 90E, 302E, 989E	Croesus South G.Ms., Ltd.			3,213.50	1,542.87				49,332.00	20,682.45
Do.	351E, 1001E, 1002E, 1085E, 1113E, 1219E, 1326E, 1397E	Golden Horseshoe Estates Co., Ltd.			263,361.00	142,872.93	34,508.83			1,904,590.00	1,715,985.49
Do.	750E	(Golden Link Consolidated G.Ms., Ltd.)								10,729.00	6,096.80
Do.	2325E, 2326E	(Golden Link Consolidated G.Ms., Ltd.)								1,525.00	733.48
Do.	750E, 1621E	Golden Links, Ltd.			13,537.02	6,264.31				87,115.02	43,504.60
Do.	(947E), 1294E, (3469E)	Golden Pike and Lake View East Mines, Ltd.								490.50	131.44
Do.	(4290E, 4316E)	Great Boulder Consols leases								25.00	3.12
Do.	873E	Great Boulder Main Reef, Ltd.			270.50	41.52				143,292.39	119,541.14
Do.	50E	Great Boulder No. 1, Ltd.			1,906.24	1,106.34				11,232.74	9,995.98
Do.	66E	Great Boulder Perseverance G.M. Co., Ltd.			171,588.00	70,680.87	5,535.34			1,442,579.23	1,133,016.22
Do.	16E, 51E, 61E, 102E, 280E, 1109E	Great Boulder Proprietary G.Ms., Ltd.			187,755.00	140,828.78	16,057.80			1,402,064.00	1,598,097.53
Do.	902E, 1124E	(Great Boulder South G.M. Co., Ltd.)								437.00	122.11
Do.	3643E	Hainault G.Ms., Ltd.			59,817.00	20,206.90				333,997.70	125,924.02
Do.	6E	(Hannan's Block 45, Ltd.)								2,343.55	3,226.69

Do.	4037E, 4054E	4039E	(North End Mines, Ltd.)	..	..	..	..	..	..	..	5,876-00	2,425-03	4-00
Do.	4037E, 4054E	4039E	(North End Mines, Ltd.)	..	..	..	..	..	..	..	1,812-00	883-27	..
Do.	(4282E)	..	Northern Promise	..	..	5-00	2-93	..	..	..	87-00	31-71	..
Do.	535E	..	(Octagon Explorers, Ltd.)	..	..	..	..	..	..	..	3,180-00	1,069-29	..
Do.	4277E	..	Off Chance	..	17-57	379-00	31-56	..	..	98-80	717-00	188-14	..
Do.	4E, 392E	..	Paringa Mines, Ltd.	..	..	15,019-50	2,859-16	..	..	..	33,358-48	16,101-68	..
Do.	4329E	..	Patience	..	..	20-00	2-78	..	..	..	32-00	4-32	..
Do.	4309E	..	Poseidon	..	..	31-00	130-10	..	..	63-66	75-00	293-80	..
Do.	(4348E)	..	Pride of the Hills	..	..	24-00	54	..	..	..	24-00	54	..
Do.	(4391E)	..	Pride of the Hills	..	..	39-00	8-27	..	..	..	39-00	8-27	..
Do.	1228E	..	Red, White, and Blue	..	..	130-00	25-56	..	..	..	130-00	25-56	..
Do.	4039E	..	(Rising Sun)	..	..	..	..	..	..	..	170-00	28-50	..
Do.	4039E	..	(Rising Sun)	..	..	..	..	..	..	..	16-00	1-88	..
Do.	4037E, 4054E, 4231E	4039E	Rising Sun leases	..	..	294-00	98-78	..	..	..	294-00	98-78	..
Do.	4121E	..	Royal	..	..	..	..	..	..	..	10-00	2-80	..
Do.	(4303E)	..	Sir John Forrest	..	..	..	..	..	..	35-14	132-50	69-28	..
Do.	3771E	..	Sons of Gwalia, Kalgoorlie	..	..	185-00	119-19	..	..	..	1,388-00	820-07	..
Do.	4402E	..	Territoria	..	..	132-50	59-23	..	..	..	132-50	59-23	..
Do.	4289E	..	(Union Club)	..	..	..	..	..	..	..	700-00	257-45	..
Do.	4289E, 4320E	..	Union Club leases	..	19-24	440-00	78-40	..	..	19-24	800-00	185-66	..
Do.	4383E	..	Wandin	..	..	20-00	5-86	..	..	..	20-00	5-86	..
Do.	3880E, 4146E	..	Westralian Machinery Corporation, Ltd.	..	..	1,418-00	386-05	..	..	..	2,114-00	691-74	..
Do.	..	..	Voided leases	..	..	..	..	..	4-21	435-01	54,272-54	41,651-53	370-07
Do.	..	..	Sundry claims	181-85	35-75	1,703-50	354-91	..	181-85	35-75	1,703-50	354-91	..
Wombola	(4254E)	..	Black Oak: Kalgoorlie and Boulder Firewood Co., Ltd.	..	..	166-00	102-48	..	..	..	1,126-20	546-48	..
Do.	(4342E, 4344E)	4343E	Cutter's Luck leases	..	..	20-00	28-42	..	..	..	72-00	96-72	..
Do.	(4294E)	..	Knight St. George	..	..	..	..	..	..	..	62-00	17-66	..
Do.	(4336E)	..	Lady Agnes	..	..	733-00	215-81	..	..	..	1,397-50	402-26	..
Do.	4349E	..	Sudden Jerk	..	163-54	..	..	..	..	163-54	..	..	..
Do.	..	..	Voided leases	..	..	..	..	..	..	312-37	2,051-08	819-43	..
Do.	..	..	Sundry claims	..	..	321-50	82-51	..	..	..	321-50	82-51	..
<i>From District generally:—</i>				..	..	..	..	..	..	..	..	..	..
Sundry claims				51-21	..	96-00	18-70	..	10,907-93	431-95	5,208-00	1,560-12	..
Sundry parcels treated at:				..	..	..	..	..	..	..	..	..	..
Allsop and Howell's Works				..	..	..	89-63	231-72	..	..	..	89-63	231-72
Barnes' Works				..	..	..	489-77	..	..	..	..	1,414-39	..
Bonnie Lass Works				..	..	..	239-42	..	..	..	55-00	1,291-49	..
Brown Hill Consols Works				..	..	35	4,717-17	..	..	..	673-35	22,221-18	..
Cresus South Works				..	..	..	1,779-49	..	..	..	9,230-35	12,714-75	..
Fremantle Smelter, Ltd.				..	..	..	150-01	..	..	..	..	150-01	..
Fremantle Trading Company, Ltd.				..	..	..	71-57	328-55	..	..	..	71-57	328-55
Glenartney Works				..	..	..	126-11	..	..	..	..	830-97	..
Golden Zone Works				..	..	..	76-94	..	..	..	..	340-97	..
Hannan's Central Works				..	..	..	6,349-25	..	..	..	100-00	16,404-77	..
Hannan's Proprietary Works				..	..	..	2,672-89	..	..	..	..	5,129-85	..
Ironsides North Works				..	..	..	1,653-24	..	..	..	23-00	5,977-82	..
Orotava Works				..	..	..	61-73	..	..	..	..	1,381-87	..
Various Works				..	..	..	..	..	384-36	15-15	29,477-55	43,367-35	403-37
Reported by Banks and Gold Dealers				1,059-66	..	..	..	..	8,077-49	9,013-32	..	4-57	..
<b>Total</b>				<b>1,359-01</b>	<b>916-81</b>	<b>1,735,450-12</b>	<b>894,624-33</b>	<b>97,450-47</b>	<b>24,341-56</b>	<b>19,582-17</b>	<b>12,799,151-85</b>	<b>10,857,246-23</b>	<b>701,557-39</b>

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

East Coolgardie Goldfield—continued.

BULONG DISTRICT

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.
Balagundi	106 Y	Balagundi Consolidated	..	..	432·00	116·72	..	..	..	432·00	116·72	..
Do.	1055Y	Lady Molly	..	22·56	..	..	..	..	70·91	19·00	136·73	..
Do.	1070Y	May Queen	..	..	42·00	32·27	..	..	..	42·00	32·27	..
Do.	(1064Y)	Sunday Gif	..	..	22·00	4·93	..	..	..	22·00	4·93	..
Do.	..	Voided leases	..	..	..	..	..	..	1,727·29	536·00	884·45	..
Do.	..	Sundry claims	..	..	22·00	2·78	..	..	..	104·50	45·99	..
Bulong	1063Y	Bull's Eye	..	..	289·00	48·00	..	..	..	289·00	48·00	..
Do.	1062Y	Bulong Proprietary	..	..	689·00	176·22	..	..	..	1,081·00	292·04	..
Do.	(100 Y)	Little Wonder	..	..	..	..	..	..	..	159·50	84·84	..
Do.	11Y	(Melbourne United G.M. Co., N.L.)	..	..	..	..	..	..	..	236·20	200·79	..
Do.	1020Y	Melbourne United North	..	102·45	3·00	17·66	..	..	102·45	3·00	17·66	..
Do.	1065Y	New Golden West	..	109·79	30·31	265·57	..	..	109·79	30·31	265·57	..
Do.	957Y	Oversight	..	6·97	6·11	31·38	..	..	12·61	74·61	299·25	..
Do.	(74Y, 564Y)	(Princess Margaret G.M. Co., N.L.)	..	..	..	..	..	..	..	632·00	969·09	..
Do.	(9Y)	Queen Margaret	..	1·03	537·00	252·43	..	..	1·03	537·00	252·43	..
Do.	(9Y), 11Y, 14Y, (74Y, 142Y, 564Y, 693Y), 1020Y	(Queen Margaret G.M. Co., Ltd.)	..	..	..	..	..	79	2,807·07	62,707·05	61,895·42	..
Do.	(1054Y)	Queen Margaret South	..	..	13·00	19·48	..	..	6·17	13·00	19·48	..
Do.	1067Y	Southern Cross	..	..	544·66	175·08	..	..	..	544·66	175·08	..
Do.	(1059Y)	Storm King	..	..	9·14	4·04	..	..	23·66	107·14	34·60	..
Do.	14Y	(White Horse)	..	..	..	..	..	..	730·72	336·50	745·65	..
Do.	14Y	White Horse	..	..	390·50	82·40	..	..	..	390·50	82·40	..
Do.	14Y	(White Horse : Queen Margaret G.M. Co., Ltd.)	..	..	..	..	..	..	..	2,230·00	1,623·61	..
Do.	..	Voided leases	..	..	..	..	..	106·75	4,495·00	15,823·65	13,364·03	..
Do.	..	Sundry claims	..	..	153·62	98·06	..	1,628·30	911·09	6,213·52	13,929·34	..
Hogan's Find	..	Voided leases	..	..	..	..	..	..	908·82	309·50	276·51	..
Majestic	(1030Y)	Majestic	..	..	131·00	29·86	..	..	..	959·75	290·48	..
Do.	..	Voided leases	..	..	..	..	..	..	..	41·50	28·30	..
Do.	..	Sundry claims	..	43·20	..	..	..	..	43·20	..	..	..
Mt. Monger	..	Voided leases	..	..	..	..	..	..	1,862·57	1,121·35	969·69	..
Do.	..	Sundry claims	..	..	..	..	..	215·60	..	345·00	218·37	..

andall's	910y	Agnes	..	..	250.00	46.69	..	..	..	1,676.25	512.80	..	
Do.	805y, 892y, 990y	New Santa Claus G.M. Co., Ltd.	..	..	1,224.00	473.77	..	..	..	7,342.80	3,817.50	..	
Do.	(1061y)	Rumble	..	..	144.00	18.40	..	..	..	144.00	18.40	..	
Do.	805y, 892y	(Santa Claus G.M. Co., Ltd.)	..	..	..	..	..	..	..	50.00	41.29	..	
Do.	..	Voided leases	..	..	..	..	..	60.04	..	2,240.05	1,192.28	..	
Do.	..	Sundry claims	..	20.45	396.50	87.54	..	20.45	..	841.55	210.82	..	
Sudden Jerk	..	Voided leases	..	..	..	..	..	..	63.91	14.25	53.67	..	
Do.	..	Sundry claims	..	..	..	..	..	..	..	15	10.23	..	
Taurus	..	Voided leases	..	..	..	..	..	2.06	3.70	1,678.15	760.83	..	
Do.	..	Sundry claims	..	..	..	..	..	112.69	..	260.00	346.86	..	
Woodline	..	Voided leases	..	..	..	..	..	..	..	792.75	610.57	..	
Do.	..	Sundry claims	..	..	..	..	..	..	..	39.33	61.57	..	
		<i>From District generally:—</i>											
		Sundry claims	..	..	..	..	..	3.34	41.85	790.75	284.26	..	
		Sundry parcels treated at:											
		Hilda Mill	..	..	..	15.01	..	..	..	..	15.01	..	
		State Battery—Randall's	..	..	..	72.61	..	..	..	..	96.49	..	
		Various Works	..	..	..	..	..	..	..	6,102.15	5,600.98	..	
		Reported by Banks and Gold Dealers	..	11.77	..	..	..	24,384.95	52.39	..	..	..	
		<b>Total</b>	..	32.22	286.00	5,328.84	2,070.90	..	26,474.93	14,034.36	117,313.42	110,937.28	..

**Coolgardie Goldfield.**  
COOLGARDIE DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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	(595, 1405, 1741)	Gem leases	..	..	..	..	..	..	7,550.00	5,715.18	..	..
Do.	(1741)	(Golden Drop)	..	..	..	..	..	..	283.50	240.83	..	..
Do.	(595, 1405, 1741)	(New Victoria Consols G.M. Co., N.L.)	..	..	..	..	..	..	12,725.50	5,096.84	..	..
Do.	4313	New Victoria South	..	..	..	..	..	..	442.00	204.08	..	..
Do.	1552, 3947	Vale of Coolgardie G.Ms., Ltd.	..	..	770.00	221.80	..	..	74,835.00	38,993.49	..	..
Do.	144, 1151, (1639, 2146, 2266, 3572, 3575, 4012, 4099, 4113, 4314), 4375, 4376	Westralia and East Extension Mines, Ltd.	..	..	259.50	526.87	..	..	226,290.15	116,054.85	..	..
Do.	..	Voided leases	..	..	..	..	..	..	2.26	19,935.70	17,698.51	..
Do.	..	Sundry claims	..	..	167.50	100.70	..	..	..	503.50	315.88	..



TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Coolgardie Goldfield—continued.

COOLGARDIE DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					TOTAL GOLD PRODUCTION.						
			Alluvia .	Dollied and Specimens.	Ore Treated.	Gold therefrom.	Silver.	Alluvial.	Dollied and Specimens.	Ore Treated.	Gold therefrom.	Silver.		
			Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Tons (2,240lbs.)	Fine ozs.	Fine ozs.		
Bulla Bulling	..	Voided leases .. ..	..	..	..	..	..	..	..	..	..	..	..	..
Do. ..	..	Sundry claims .. ..	..	..	74.50	15.47	..	..	..	12.82	426.50	281.51	..	..
Burbanks	(4324) .. ..	Another Try .. ..	..	..	19.00	15.78	..	..	..	..	150.50	176.38	..	..
Do. ..	(4029) .. ..	Boshter .. ..	..	..	..	..	..	..	..	..	1,107.50	675.12	..	..
Do. ..	4378 .. ..	Brothers Home .. ..	..	..	75.50	98.06	..	..	..	..	75.50	98.06	..	..
Do. ..	134, 135, 136, 1527, 1705, 2761, 3571, 3661, 3806, 3996, 4025, 4032	(Burbanks Birthday Gift G.M., Ltd.)	..	..	..	..	..	..	..	..	132,706.00	126,351.59	..	..
Do. ..	134, 135, 136, 1527, 1705, 2761, 3571, 3661, 3806, 3996, 4025, 4032	Burbanks Birthday G.Ms., Ltd.	..	..	2,640.00	1,725.87	11.17	..	..	..	30,410.00	22,145.63	287.27	..
Do. ..	(4344) .. ..	Burbanks Extended .. ..	..	..	84.00	67.18	..	..	..	..	272.75	283.31	..	..
Do. ..	2985, 2986, 3444, 3870, 4059	(Burbanks Main Lode, Ltd.)	..	..	..	..	..	..	..	..	3,209.00	1,671.63	..	..
Do. ..	2985, 2986, 3444, 3870, 4059	(Burbanks Main Lode (1902), Ltd.)	..	..	..	..	..	..	..	..	4,824.00	3,214.50	..	..
Do. ..	2985, 2986, 3444, 3870, 4059	Burbanks Main Lode (1904), Ltd.	..	..	11,249.00	6,676.30	..	..	..	..	56,431.10	32,550.36	..	..
Do. ..	1705 .. ..	(Burbanks North G.M., Ltd.)	..	..	..	..	..	..	..	..	22.50	7.70	..	..
Do. ..	(4374) .. ..	Catherine .. ..	..	..	25.00	8.44	..	..	..	..	25.00	8.44	..	..
Do. ..	4381 .. ..	Coalition .. ..	..	..	6.50	15.64	..	..	..	..	6.50	15.64	..	..
Do. ..	4168 .. ..	Glenloth South .. ..	..	..	61.50	120.50	..	..	..	79.67	319.00	519.70	..	..
Do. ..	4310 .. ..	Grosmont .. ..	..	..	399.50	170.94	..	..	..	..	1,225.50	421.27	..	..
Do. ..	4379 .. ..	Ivanhoe Burbanks .. ..	..	..	75.50	55.08	..	..	..	..	75.50	55.08	..	..
Do. ..	2160 .. ..	(Lady Robinson)	..	..	..	..	..	..	..	..	5,315.40	3,327.12	..	..
Do. ..	2160, 3950, 4125	Lady Robinson G.M. Co., N.L.	..	..	126.00	62.30	..	..	..	..	16,263.50	7,685.77	..	..
Do. ..	4241 .. ..	(Lord Bobs)	..	..	..	..	..	..	..	..	1,264.00	2,829.90	..	..
Do. ..	4241 .. ..	Lord Bobs .. ..	..	..	150.00	147.07	..	..	..	..	150.00	147.07	..	..
Do. ..	4241, (4286, 4287)	(Lord Bobs G.M. Syndicate)	..	..	189.00	302.73	..	..	..	..	1,744.00	2,151.90	..	..
Do. ..	4362 .. ..	Quartette .. ..	..	..	139.00	101.68	..	..	..	..	139.00	101.68	..	..
Do. ..	(3939) .. ..	Shamrock Ale .. ..	..	..	..	..	..	..	..	..	40.81	815.50	675.44	..
Do. ..	4296 .. ..	Sunbeam .. ..	..	..	..	..	..	..	..	..	35.00	51.70	..	..
Do. ..	..	Voided leases .. ..	..	..	..	..	..	..	..	..	..	..	..	..
Do. ..	..	Sundry claims .. ..	..	1.67	458.50	453.31	..	..	13.36	64.43	12,834.38	12,484.22	80.73	..
Do. ..	..	..	..	..	..	..	..	..	..	56.60	1,782.00	1,149.16	..	..

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			2,581-00	1,432-30	164-50	4,413-00	6,023-89
Do.	133, 139, 142	(Bayley's Mines, Ltd.)					15-10	2,319-74	2,323-66
Do.	4261	Big Blow	17-52		193-00	123-20	45-18	1,156-00	478-00
Do.	4389	Columbia Park			35-00	215-74		35-00	215-74
Do.	4363	Coolgardie Enterprise			252-00	98-82		252-00	98-82
Do.	4093, 4117, (4345, 4347)	Coolgardie Prospecting Development and Mining Co., N.L.			618-00	237-56		818-00	275-48
Do.	3918	(Coolgardie Redemption)					1,257-62	4,419-00	3,747-28
Do.	3918, 4052	Coolgardie Redemption G.M. Co., N.L.			202-00	68-80		202-00	68-80
Do.	4094	Coolgardie Redemption Extended						242-00	192-70
Do.	(4305)	Coolgardie Surprise			10-00	4-24		240-00	196-34
Do.	1865	Empress of Coolgardie			167-00	55-53		1,098-50	464-20
Do.	1865	(Empress of Coolgardie G.M. (1896), Ltd.)						2,868-00	950-53
Do.	4359	Excelecon			454-00	57-30		483-00	65-92
Do.	(4189)	(Garden Gully)						129-00	24-89
Do.	(4189, 4197)	(Garden Gully G.M. Co., N.L.)						44-00	4-56
Do.	4189, 4197)	(Garden Gully leases)						428-00	90-95
Do.	(4189, 4197, 4334)	Garden Gully leases						1,134-00	113-49
Do.	3827	Garfield	22-54		55-00	27-66		462-21	850-00
Do.	(4267)	Glueck Auf						148-79	177-00
Do.	(4329)	Golden Square						28-00	58-00
Do.	73, 1902, 3556, 3701, 3811, 3813, 3998	Griffith's leases			4,051-00	900-62		31,935-00	12,993-38
Do.	Block 53	Hampton Plains Estate, Ltd.					358-42	67-00	112-49
Do.	Block 59	Hampton Plains Estate, Ltd.			426-00	378-27		5,352-00	5,413-24
Do.	4288	Indicator	2-94	19-26	110-00	133-03	2-94	19-26	133-03
Do.	4288, (4294)	(Indicator leases)						81-52	98-00
Do.	4370	Iron Duke			98-00	46-26		98-00	46-26
Do.	4122	(King's Cross)						792-00	561-39
Do.	4297	King Solomon			451-00	187-63		556-00	348-07
Do.	4369	Lady Mary			45-00	5-56		45-00	5-56
Do.	3556	(Lily)						342-75	217-64
Do.	(4360)	Little Lena						10-00	8-21
Do.	3701	(Morning Star South)						250-00	30-63
Do.	4306	New Australasian			65-00	70-05		160-00	227-59
Do.	4067, 4122, 4372	New Bayley's Mines, Ltd.			47-00	28-39		77-00	37-62
Do.	4318	New Hopeful			107-00	40-02		718-00	303-11
Do.	1865	(Phoenix G.Ms., Ltd.)						12,028-50	4,524-96
Do.	4152, 4153	Queen's Cross leases			1,553-00	986-47	26-20	26,909-00	4,179-15
Do.	4373	Redeemer			39-00	63-55		39-00	63-55
Do.	4384	Resource			40-00	6-76		40-00	6-76
Do.	4295, 4319	Richmond G.M. Syndicate			106-00	197-40		106-00	197-40
Do.	4295, 4319	(Richmond leases)			96-00	90-85		144-00	171-95
Do.	73	(Star of the South)						975-00	819-75
Do.	(4354)	Thistle						20-00	17-99
Do.	33, 3824, 3830, 4227, 4323, 4326	Tindal's Coolgardie G.M. Co., N.L.			16,023-00	4,332-27		81,315-25	19,923-84
Do.	4328	Tindal's South						20-00	4-75
Do.	4033	(Undaunted)						565-81	156-39
Do.	4093, 4117	(Undaunted leases)						1,737-00	462-21
Do.	4260	W.A. Mint		56	152-50	29-60		491-50	131-01
Do.	4067, 4122	(W.A. Sluicing Syndicate, Ltd.)						742-00	373-22

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Coolgardie Goldfield—continued.

COOLGARDIE DISTRICT—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.
Coolgardie	4368	Waterfall Prospecting Syndicate	..	..	116.00	585.86	..	..	..	116.00	585.86	..
Do.	..	Voided leases	..	..	..	..	..	389.14	546.47	188,675.87	120,984.55	..
Do.	..	Sundry claims	..	95.07	1,355.00	1,293.38	..	..	595.36	10,459.45	5,398.99	..
Eundynie	4361	Brilliant South	..	..	32.00	23.98	..	..	..	32.00	23.98	..
Do.	4255	Brilliant Syndicate	..	..	527.00	242.27	1.75	..	..	1,108.00	500.70	1.75
Do.	4302	(Hidden Secret Central)	..	..	..	..	..	..	..	94.00	22.42	..
Do.	4301, 4302	Hidden Secret leases	..	..	186.00	69.80	..	..	..	186.00	69.80	..
Do.	4253	(Hidden Secret North)	..	..	..	..	..	..	..	68.00	60.72	..
Do.	4251, 4253, 4266	Hidden Secret North leases	..	..	1,470.00	756.98	..	..	..	1,470.00	756.98	..
Do.	(4330)	Little Gladys	..	..	20.00	8.30	..	..	..	20.00	8.30	..
Do.	4366	Rainbow	..	..	18.50	8.10	..	..	..	18.50	8.10	..
Do.	..	Sundry claims	..	..	53.00	12.03	..	..	..	79.00	19.90	..
Gibraltar	(4356)	Portland	..	..	..	..	..	..	..	15.50	3.06	..
Do.	..	Voided leases	..	..	..	..	..	..	..	212.00	67.14	..
Do.	..	Sundry claims	..	..	..	..	..	..	..	29.00	16.64	..
Gnarlbine	4365	Kim	..	..	90.00	7.68	..	..	..	90.00	7.68	..
Do.	..	Voided leases	..	..	..	..	..	..	10.94	1,627.75	1,014.50	..
Do.	..	Sundry claims	..	..	27.50	6.71	..	..	1.31	63.50	28.21	..
Higginsville	(4309)	Fair Play	..	..	616.00	85.00	..	..	..	966.00	146.78	..
Do.	4382	Fair Play	..	..	803.00	107.76	..	..	..	803.00	107.76	..
Do.	(4341)	Harp of Erin	..	..	108.00	38.72	..	..	..	108.00	38.72	..
Do.	4184, 4185, 4191, 4207	Red Hill Westralia G.Ms., Ltd.	..	..	1,859.00	1,266.15	..	..	..	15,981.00	6,133.26	127.78
Do.	4184, 4185	(Sons of Erin G.M. Co., N.L.)	..	..	..	..	..	..	285.20	4,742.00	2,938.77	..
Do.	4191	(Sons of Erin North Extended)	..	..	..	..	..	..	..	172.00	194.44	..
Do.	..	Voided leases	..	..	..	..	..	..	2.06	578.00	236.14	..
Do.	..	Sundry claims	..	..	20.00	84.59	..	..	16.52	403.00	333.66	..
Londonderry	3834	Cheapside	..	..	239.50	99.38	..	..	..	2,740.75	1,590.95	..
Do.	4352	Cheapside North: Westralia Waihi G.Ms., N.L.	..	..	235.00	80.63	..	..	..	235.00	80.63	..
Do.	..	Voided leases	..	..	..	..	..	..	46.25	13,680.66	12,776.16	..
Do.	..	Sundry claims	..	..	11.00	29.62	..	..	..	568.85	309.30	..

Mungari	4385	Good Luck	19-50	2-90				19-50	2-90			
Do.		Voided leases					17-71	715-50	328-88			
Do.		Sundry claims						106-00	32-72			
Red Hill		Voided leases					1,427-62	40,775-70	31,015-40			
Do.		Sundry claims					50	110-00	6-29			
Widgiemooltha	4364	Doyle's Choice	13-00	4-79				13-00	4-79			
Do.	(4342)	Finniss					59-32					
Do.	4028	Flinders	52-50	222-64			23-11	304-00	1,643-59			
Do.	4357	Flinders South	29-00	8-09				29-00	8-09			
Do.	(4282)	Independence	11-00	2-40				396-00	123-01			
Do.	(4317)	Last Shot						26-00	86-44			
Do.	4383	Lone Hand	11-00	2-94				11-00	2-94			
Do.	4350	Nottingham Castle	45-00	24-92				45-00	24-92			
Do.	3906	Yorkshire Lass	143-00	41-62				1,611-25	933-73			
Do.		Voided leases						379-86	1,972-44		17	
Do.		Sundry claims	2-40	402-00	104-25		3-62	2-88	1,701-15	699-95		
<i>From District generally:—</i>												
Sundry parcels treated at:												
		Allsop and Howell's Works, Kalgoorlie		287-94					360-85			
		Carswell's Cyanide Works		26-56					26-56			
		Fremantle Smelting Works		15-65					15-65			
		Highgate Works		21-01				100-00	268-71			
		King Solomon Works		339-14					469-68			
		Lady Robinson Cyanide Works		66-45					135-23			
		Moss' Cyanide Works		675-22					2,880-45			
		Orotava Works, Kalgoorlie		100-78					163-28			
		Red Hill Westralia Works		16-29					16-29			
		State Battery—Coolgardie		387-92					647-50	1,447-46		
		State Battery—Widgiemooltha							38-50	176-36		
		Various Works					7-75	3,672-61	10,271-35	108-89		
		Reported by Banks and Gold Dealers	358-61				4,547-54	543-04				
		<b>Total</b>	<b>363-95</b>	<b>156-62</b>	<b>53,458-50</b>	<b>27,862-05</b>	<b>12-92</b>	<b>5,861-59</b>	<b>6,915-85</b>	<b>1,179,647-44</b>	<b>778,607-63</b>	<b>607-55</b>

### KUNANALLING DISTRICT.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.	
Balgarrrie	622s	(Balgarrrie G.M. Co., N.L.)											
Do.	622s	United Australia			217-00	185-93		1-64	340-00	81-43			
Do.	565s	Zuleika						8-53	953-50	553-38			
Do.		Voided leases							628-50	1,773-98			1-38
Do.		Sundry claims					10-94	65-31	2,902-25	2,262-94			
								18-57	912-25	358-01			

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 LEASE.	TOTAL FOR 1909.					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.
Carbine ..	33s .. ..	Carbine .. ..	..	..	392.00	531.00	..	..	687.98	12,043.50	6,785.15	..
Do. ..	758s .. ..	(Carbine South) .. ..	..	..	..	..	..	..	..	22.00	10.29	..
Do. ..	776s .. ..	Spearmint .. ..	..	..	50.00	87.77	..	..	..	224.00	359.63	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	1,653.00	1,977.02	..
Do. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	..	..	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 ..	716s, [1289w] ..	Lady Evelyn .. ..	..	..	..	..	..	..	..	241.75	479.81	..
Do. ..	(715s, [1288w]) ..	Orabanda .. ..	..	..	..	..	..	..	..	689.50	333.75	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	67.51	793.44	6,498.40	6,061.58	..
Do. ..	.. ..	Sundry claims .. ..	..	..	..	..	..	..	6.16	116.00	67.61	..
Dunnsville ..	796s .. ..	Herbert .. ..	..	..	98.50	65.68	..	..	..	185.00	162.42	..
Do. ..	(17s) .. ..	(New Standard Exploration Co., Ltd.) .. ..	..	..	..	..	..	..	..	13,681.00	5,788.52	..
Do. ..	(17s) .. ..	North Coolgardie G.Ms., Ltd. .. ..	..	..	34.00	3.13	..	..	..	600.50	713.94	..
Do. ..	(17s) .. ..	(Wealth of Nations) .. ..	..	..	..	..	..	..	..	1,695.00	513.11	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	178.14	1,090.50	707.55	..
Do. ..	.. ..	Sundry claims .. ..	..	..	27.50	18.96	..	..	..	267.08	201.51	..
Jourdie Hills ..	789s .. ..	Derry's Own .. ..	..	10.46	188.00	50.25	..	..	18.00	730.00	293.72	..
Do. ..	(801s) .. ..	Halifax .. ..	..	..	..	..	..	..	..	64.00	27.44	..
Do. ..	793s .. ..	Jourdie Enterprise Extended .. ..	..	..	..	..	..	..	..	115.00	135.36	..
Do. ..	773s, 786s .. ..	Jourdie Enterprise leases .. ..	..	..	3,116.00	791.72	..	..	..	4,762.00	1,852.81	..
Do. ..	786s .. ..	(Jourdie Enterprise South) .. ..	..	..	..	..	..	..	..	91.00	39.42	..
Do. ..	369s, 661s .. ..	(Jourdie Hills G.M. Co., Ltd.) .. ..	..	..	..	..	..	..	..	9,635.00	7,868.08	..
Do. ..	369s, 661s .. ..	Jourdie United G.Ms., Ltd. .. ..	..	..	533.00	357.56	..	..	..	858.00	627.97	..
Do. ..	514s .. ..	Pride of Jaudie North .. ..	..	..	278.00	314.36	..	..	..	1,811.00	1,445.35	..
Do. ..	369s .. ..	(Pride of the Jourdies) .. ..	..	..	..	..	..	..	..	410.74	465.47	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	545.00	202.52	..
Do. ..	.. ..	Sundry claims .. ..	..	..	29.50	33.52	..	..	..	747.50	395.82	..
Kandana ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	465.00	68.12	..

Kintore	802s	..	..	Last Chance	..	..	42-00	97-89	..	..	..	53-00	167-88	..	
Do.	(740s)	..	..	London	..	..	..	..	..	..	..	724-00	864-32	..	
Do.	808s	..	..	London	..	..	31-00	7-19	..	..	..	31-00	7-19	..	
Do.	797s	..	..	Sugarloaf	..	..	64-00	186-97	..	..	..	182-00	342-09	..	
Do.	..	..	..	Voided leases	..	..	..	..	..	..	143-66	41,565-81	29,914-00	..	
Do.	..	..	..	Sundry claims	..	..	29-00	56-62	..	..	..	669-50	757-78	..	
Siberia	674s, [1286w]	..	..	Golden	..	..	..	..	..	..	82-17	22-40	120-37	..	
Do.	720s, [1292w]	..	..	Invincible	..	..	..	..	..	..	..	185-00	368-63	..	
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.	124s, [1283w]	..	..	Waverley	..	..	..	..	..	..	496-67	1,466-80	1,873-81	..	
Do.	..	..	..	Voided leases	..	..	..	..	..	1-07	977-13	5,871-15	7,555-41	..	
Do.	..	..	..	Sundry claims	..	..	27-00	214-71	..	30-91	..	223-00	349-86	..	
25-Mile	696s	..	..	(Blue Bell)	..	..	..	..	..	..	8-05	697-00	429-47	..	
Do.	727s	..	..	(Blue Bell Extended)	..	..	..	..	..	..	..	113-00	71-32	..	
Do.	696s, 727s	..	..	Blue Bell leases	..	..	110-00	210-86	..	..	..	1,189-00	1,276-69	..	
Do.	777s	..	..	Bow's Mine No. 1	..	..	192-50	60-29	..	..	..	933-59	329-51	..	
Do.	(795s)	..	..	Eureka Extended	..	..	39-00	24-61	..	..	..	69-50	79-23	..	
Do.	783s	..	..	Hopeful	..	..	212-50	397-83	..	..	..	425-50	636-28	..	
Do.	757s	..	..	Inkermann	..	..	77-00	60-88	..	..	..	837-00	1,549-59	..	
Do.	(803s)	..	..	Lady Agnes	..	..	..	..	..	..	..	8-00	6-80	..	
Do.	(79s)	..	..	Premier	..	..	27-00	16-77	..	..	..	59-00	38-93	..	
Do.	(79s)	..	..	(Premier G.M. Co., N.L.)	..	..	..	..	..	..	..	62,214-00	46,930-06	18-84	
Do.	586s, 602s	..	..	Shamrock leases	..	..	302-00	640-34	..	..	192-12	3,249-35	4,342-48	..	
Do.	645s	..	..	Star of Fremantle	..	..	260-00	120-98	..	..	..	4,768-00	3,044-12	..	
Do.	603s	..	..	Sydney Mint	..	..	..	403-61	..	..	169-74	701-75	2,456-82	..	
Do.	..	..	..	Voided leases	..	..	..	..	..	..	251-06	14,686-35	9,492-49	..	
Do.	..	..	..	Sundry claims	..	..	1-72	501-50	..	..	87-17	2,791-85	1,436-61	..	
61-Mile	Rush 813s	..	..	Magdala	..	..	178-00	100-87	..	..	..	178-00	100-87	..	
Do.	..	..	..	Sundry claims	..	..	238-50	286-27	..	..	..	238-50	286-27	..	
<i>From District generally :-</i>															
Sundry parcels treated at:															
	Blue Bell Works	..	..	..	..	..	26-00	14-11	..	..	..	26-00	14-11	..	
	Bow and Carswell's Works	..	..	..	..	..	..	86-90	..	9-22	..	239-00	640-13	..	
	Lindsay's Works	..	..	..	..	..	..	6-40	..	..	..	..	6-40	..	
	Orotava Works, Kalgoorlie	..	..	..	..	..	..	12-60	..	..	..	..	71-90	..	
	Stanley Works	..	..	..	..	..	24-00	30-52	..	..	..	..	146-99	..	
	Various Works	..	..	..	..	..	..	..	..	14-86	..	1,331-66	1,339-88	..	
	Reported by Banks and Gold Dealers	..	..	..	..	..	..	..	..	20-56	1-10	..	..	..	
	<b>Total</b>	..	..	..	..	..	<b>13-04</b>	<b>7,344-50</b>	<b>5,739-24</b>	..	<b>331-11</b>	<b>4,848-65</b>	<b>213,987-68</b>	<b>162,493-96</b>	<b>20-22</b>

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Yilgarn Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.	
Blackbourne..	887	.. ..	Blackbourne .. ..	..	..	96·00	22·43	..	..	..	96·00	22·43	..
Do. ..	..	..	Voided leases .. ..	..	..	..	..	..	..	..	796·00	226·88	..
Golden Valley	829	.. ..	Pioneer .. ..	..	..	..	19·60	..	..	..	..	19·60	..
Do. ..	835	.. ..	Violet .. ..	..	..	65·00	133·26	..	..	..	65·00	133·26	..
Do. ..	..	..	Voided leases .. ..	..	..	..	..	..	..	..	137·00	220·76	..
Do. ..	..	..	Sundry claims .. ..	..	..	27·00	17·06	..	..	..	42·50	47·46	..
Greenmount	503, (535), 555	.. ..	(Greenmount G Ms., Ltd.) .. ..	..	..	..	..	..	..	..	5·00	2·11	..
Do. ..	503, (535), 555	.. ..	Greenmount Mines, N.L. .. ..	..	..	6,998·00	1,490·94	58·05	..	..	63,155·00	14,398·46	364·72
Do. ..	(565)	.. ..	(Royal George) .. ..	..	..	..	..	..	..	..	1,806·00	602·41	..
Do. ..	550	.. ..	(Sunbeam) .. ..	..	..	..	..	..	14·00	..	4,472·00	1,427·25	..
Do. ..	550	.. ..	Sunbeam .. ..	..	..	60·00	17·59	..	..	..	60·00	17·59	..
Do. ..	550, (565)	.. ..	(Sunbeam leases) .. ..	..	..	108·00	32·39	..	..	..	3,191·00	816·42	..
Do. ..	536	.. ..	Transvaal .. ..	..	..	60·00	18·09	..	..	..	30,233·00	7,317·08	579·78
Do. ..	503	.. ..	(United Australia) .. ..	..	..	..	..	..	..	..	410·00	120·15	..
Do. ..	..	..	Voided leases .. ..	..	..	..	..	..	31·99	21·62	3,834·00	936·34	..
Do. ..	..	..	Sundry claims .. ..	..	4·12	4·00	24·37	..	..	4·12	201·00	115·11	..
Hope's Hill	893	.. ..	Corinthian .. ..	..	..	42·00	30·86	..	..	..	42·00	30·86	..
Do. ..	795	.. ..	Hope's Hill .. ..	..	..	171·00	90·72	..	..	..	204·00	103·13	..
Do. ..	895	.. ..	Hope's Hill Perseverance .. ..	..	..	42·00	47·35	..	..	..	42·00	47·35	..
Do. ..	841	.. ..	Lady Kathe .. ..	..	..	30·00	5·44	..	..	..	30·00	5·44	..
Do. ..	877	.. ..	Maud .. ..	..	..	114·00	26·98	..	..	..	114·00	26·98	..
Do. ..	(801)	.. ..	Pryores .. ..	..	..	..	5·06	..	..	..	104·00	67·61	..
Do. ..	815	.. ..	Reward South .. ..	..	..	20·00	2·44	..	..	..	20·00	2·44	..
Do. ..	..	..	Voided leases .. ..	..	..	..	..	..	..	..	125,246·35	31,790·83	..
Do. ..	..	..	Sundry claims .. ..	..	2·09	128·00	45·25	..	..	2·71	278·50	113·86	..
Jacoletti	(819)	.. ..	Christmas Gift .. ..	..	..	..	..	..	..	..	49·00	16·76	..
Do. ..	884	.. ..	Democrat .. ..	..	..	187·00	101·07	..	..	..	187·00	101·07	..
Do. ..	768	.. ..	(Donovan's Find) .. ..	..	..	..	..	..	..	..	1,768·00	1,999·43	..
Do. ..	768	.. ..	Donovan's Find: Greenmount Mines, N.L. .. ..	..	..	440·00	516·18	..	..	..	677·00	656·27	..
Do. ..	823	.. ..	Exhibition .. ..	..	..	539·00	253·86	..	..	..	539·00	253·86	..
Do. ..	858	.. ..	Firelight .. ..	..	..	200·00	49·80	..	..	..	200·00	49·80	..
Do. ..	779	.. ..	Frances Firness .. ..	..	..	738·00	247·59	..	..	..	1,412·00	627·61	..
Do. ..	825	.. ..	Geelong .. ..	..	..	87·00	41·89	..	..	..	140·00	95·80	..
Do. ..	820	.. ..	Gentle Annie .. ..	..	..	166·00	61·23	..	..	..	276·00	95·06	..
Do. ..	490, 517, 558, 804	.. ..	Jacoletti G.Ms., Ltd. .. ..	..	..	1,630·00	458·34	..	..	..	3,622·00	1,603·88	..

Do.	(821)	Lady Agnes								77.00	14.72	
Do.	490, 517, 558	(Lady Loch Mines, Ltd.)								2,091.00	674.01	
Do.	714	(Marvel Loch)								500.00	316.81	
Do.	714, 723, 822	Marvel Loch G.M. Co., N.L.			7,759.00	2,728.26	150.03			9,968.00	4,553.18	213.11
Do.	739	Marvel Loch North			271.00	187.78				329.00	305.48	
Do.	852	May Queen			38.00	462.85				58.00	462.85	
Do.	(792)	Mountain King			64.00	56.84				387.00	245.73	
Do.	803	Mountain Queen			572.00	143.14				748.00	208.39	
Do.	(812)	Pariah			120.50	89.61				120.50	89.61	
Do.	(807)	Queen Mab			199.00	84.99				260.00	125.79	
Do.	839	Scorpio			389.00	441.95				389.00	441.95	
Do.	490, 517	(Turnbull leases)								2,143.00	1,481.72	
Do.		Voided leases								1,967.00	979.83	
Do.		Sundry claims		12.36	557.00	582.61			28.14	1,695.25	1,135.83	
Kennyville	813	Catherine			150.00	74.48				179.50	86.90	
Do.	776	Cornishman			309.00	342.68				536.00	671.38	
Do.	828	Cresus			10.00	1.41				10.00	1.41	
Do.	856	Glen Dower			67.00	53.09				67.00	53.09	
Do.	570	(Great Leviathan)								3,821.85	2,948.67	
Do.	570	Great Leviathan			460.00	357.63				706.00	490.22	
Do.	570	(Northern Blocks Syndicate, Ltd.)								10,705.00	2,974.64	
Do.		Voided leases							5.58	225.00	78.56	.09
Do.		Sundry claims			170.00	101.20				194.00	127.77	
Koolyanobbing	641	Chadwick's Reward								6.00	2.65	
Do.	783	St. Clair No. 2 South								23.00	16.07	
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.)								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.	(212, 217, 658, 659)	Mt. Jackson leases			150.00	88.02				250.00	119.55	
Do.		Voided leases								801.50	224.71	
Mt. Rankin	870	No Trumps			100.00	22.48				100.00	22.48	
Do.		Voided leases						3.84	5.20	252.00	69.50	
Parker's Range	508	Australia			36.00	43.84				2,207.00	1,424.13	
Do.	(771)	Battler's Hill		10.92					10.92	6.00	5.97	
Do.	830	Brilliant			224.00	114.74				278.50	163.22	
Do.	(746)	Dulcie Jean								108.75	161.35	
Do.	707	Golden Cube							12.85	1,206.00	422.57	
Do.	719	Great Victoria								1,356.00	281.53	
Do.	(797)	McIntosh			62.00	20.39				172.00	101.66	
Do.	665	Never Never			8,635.00	2,161.76				28,185.00	7,294.19	
Do.	824	Newry			512.50	114.17				512.50	114.17	
Do.	827	New Year's Gift			1,574.00	384.79				1,574.00	384.79	
Do.	(769)	Piemonte							5.96	259.50	38.97	
Do.	724	Spring Hill			2,402.00	731.54				4,676.00	1,291.97	
Do.	760	Spring Hill North								20.00	5.56	
Do.		Voided leases							33.49	4,007.50	4,028.52	
Do.		Sundry claims			111.00	26.45				438.75	123.87	



TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

**Yilgarn Goldfield—continued.**

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.
Southern Cross	(13, 29, 279, 505, 506), 881, 882, 888, 889, 890	British and Foreign Development Syndicate, Ltd.	..	..	6,954·00	5,332·55	78·00	..	..	82,001·75	59,536·64	254·57
Do. ..	(279) .. ..	(Central) .. ..	..	..	..	..	..	..	..	44,958·00	19,702·85	..
Do. ..	749 .. ..	Central Extended .. ..	..	..	372·00	283·97	2·00	..	28·39	671·82	674·25	8·00
Do. ..	(13) .. ..	(Fraser's G.M. Co., N.L.) .. ..	..	..	..	..	..	..	..	151,771·00	67,870·33	..
Do. ..	(29) .. ..	(Fraser's South G.M. Co., N.L.) .. ..	..	..	..	..	..	..	..	48,233·00	20,013·23	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	182·83	88,062·38	33,056·03	·06
Do. ..	.. ..	Sundry claims .. ..	..	..	88·00	15·51	..	3·73	592·81	941·25	231·26	..
<i>From Goldfield generally:—</i>												
Sundry parcels treated at:												
		Allsop and Howell's Works, Kalgoorlie .. ..	..	..	..	653·87	..	..	..	..	786·41	..
		Andre's Cyanide Works .. ..	..	..	..	167·45	..	..	..	..	167·45	..
		Barnett's Cyanide Works .. ..	..	..	..	40·88	..	..	..	..	40·88	..
		British and Foreign Development Works .. ..	..	..	..	6·60	..	..	..	..	199·85	..
		Fraser's South Extended Tailings Works .. ..	..	..	..	..	..	..	..	..	1,443·31	2·64
		Fremantle Smelting Works .. ..	..	..	..	21·25	..	..	..	21·28	576·69	33·90
		Greemount Works .. ..	..	..	..	87·58	..	..	..	..	87·58	..
		Higgins' Cyanide Works .. ..	..	..	..	5·05	..	..	..	..	39·19	..
		Jacoletti Works .. ..	..	..	..	408·06	..	..	..	..	669·03	..
		Lather's Cyanide Works .. ..	..	..	..	115·24	..	..	..	..	381·00	..
		Miller's Cyanide Works .. ..	..	..	..	54·96	..	..	..	..	54·96	..
		Orotava Works, Kalgoorlie .. ..	..	..	..	..	..	..	..	..	238·22	..
		Spring Hill Works .. ..	..	..	..	96·69	..	..	..	..	140·34	..
		Sunbeam Works .. ..	..	..	..	413·48	..	..	..	8·00	581·98	..
		Various Works .. ..	..	..	..	..	..	..	..	59·00	4,737·69	..
		Reported by Banks and Gold Dealers .. ..	..	..	..	..	..	..	17·01	..	..	..
		<b>Total .. ..</b>	..	29·49	44,337·00	20,879·63	288·08	70·57	934·62	772,895·93	329,420·57	3,762·15

## Dundas Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY FOR LEASE.	TOTAL FOR 1909.					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.
Buldanian ..	1040 .. ..	Pathway: Pathway Hill G.M. Co., N.L.	..	..	244.50	91.71	..	..	..	244.50	91.71	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	497.55	504.95	..
Do. ..	.. ..	Sundry claims .. ..	..	..	23.00	21.12	..	..	..	111.00	95.17	..
Dundas ..	(1042) .. ..	Revivification .. ..	..	..	12.00	6.27	..	..	..	12.00	6.27	..
Do. ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	4,531.23	2,202.21	..
Do. ..	.. ..	Sundry claims .. ..	..	..	55.50	58.65	..	..	385.37	119.50	96.45	..
Killaloe ..	.. ..	Voided leases .. ..	..	..	..	..	..	..	..	20.65	6.88	..
Norseman ..	1044 .. ..	(Acme) .. ..	..	..	133.00	41.66	..	..	..	266.50	82.15	..
Do. ..	987 .. ..	After Years .. ..	..	..	..	..	..	..	..	39.00	61.01	..
Do. ..	39, (97) .. ..	(All Nations G.Ms., Ltd.) .. ..	..	..	..	..	..	..	..	200.00	47.74	..
Do. ..	999 .. ..	(Austral Mararoa) .. ..	..	..	..	..	..	..	..	605.00	169.42	..
Do. ..	1018 .. ..	Bandit King .. ..	..	..	78.50	42.13	..	..	..	200.10	117.89	..
Do. ..	1051 .. ..	Battler .. ..	..	8.71	54.00	6.73	..	..	8.71	54.00	6.73	..
Do. ..	1061 .. ..	Bohemian .. ..	..	..	14.50	2.33	..	..	..	36.00	8.10	..
Do. ..	(1084) .. ..	Caledonian .. ..	..	..	111.50	20.56	..	..	..	111.50	20.56	..
Do. ..	42, 43, 53, 579, 690, 889, 898, 1011	Cumberland G.M. Co., N.L. ..	..	..	5,663.50	3,428.91	..	..	..	42,468.60	41,539.21	..
Do. ..	(1072) .. ..	Cumberland South .. ..	..	..	299.00	121.06	..	..	..	299.00	121.06	..
Do. ..	966 .. ..	Esperanza No. 2 .. ..	..	..	174.00	208.06	..	..	..	553.50	815.97	..
Do. ..	1003 .. ..	Glory .. ..	..	..	58.00	85.60	..	..	12.63	488.00	314.95	..
Do. ..	938, 945, 988 ..	Hampton Plains Estate (1906), Ltd. ..	..	..	..	..	..	..	..	8,493.00	1,951.81	..
Do. ..	1079 .. ..	Hill End .. ..	..	..	10.00	3.53	..	..	..	10.00	3.53	..
Do. ..	1005 .. ..	Hopetoun .. ..	..	..	84.00	40.26	..	..	..	293.00	123.18	..
Do. ..	908 .. ..	(Iris) .. ..	..	..	..	..	..	..	..	70.00	23.14	..
Do. ..	908 .. ..	Iris G.M. Co., N.L. .. ..	..	..	12.50	9.60	..	..	..	12.50	9.60	..
Do. ..	(1008) .. ..	Iron King .. ..	..	..	11.00	2.82	..	..	..	187.50	44.64	..
Do. ..	(1087) .. ..	Jewell .. ..	..	27.70	..	..	..	..	..	27.70	..	..
Do. ..	53 .. ..	(John Bull) .. ..	..	..	..	..	..	..	..	314.00	281.93	..
Do. ..	956 .. ..	Kirkpatrick West .. ..	..	..	51.50	84.15	..	..	3.68	265.50	413.69	..
Do. ..	1002 .. ..	Lady Gladys Gwendolen .. ..	..	..	112.50	27.31	..	..	..	267.50	81.93	..
Do. ..	945 .. ..	(Lady Miller South) .. ..	..	..	..	..	..	..	..	17.00	4.36	..
Do. ..	(1081) .. ..	Little Gladys .. ..	..	4.32	..	..	..	..	4.32	..	..	..
Do. ..	1052 .. ..	Lucky Call .. ..	..	55.37	..	..	..	..	55.37	..	..	..
Do. ..	852 .. ..	(Mararoa) .. ..	..	..	..	..	..	..	..	9,167.00	4,484.90	..
Do. ..	992 .. ..	(Mararoa Extended) .. ..	..	..	..	..	..	..	..	169.50	24.08	..
Do. ..	852, 912, 977, 979, 980, 985, 1031	Mararoa G.M. Co., N.L. .. ..	..	..	26,481.50	12,749.79	11,043.36	..	..	44,158.00	23,543.96	15,319.19
Do. ..	991 .. ..	(Mararoa North No. 1) .. ..	..	..	..	..	..	..	..	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. ..	(1036) .. ..	Nellie May .. ..	..	..	12.00	38.98	..	..	17.48	21.00	67.82	..

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Dundas Goldfield—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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	964	(New Moon)	..	..	..	..	..	..	983.00	940.25	64.27	
Do.	964, 1017, 1025	New Moon leases	..	..	980.00	850.87	83.98	..	1,293.50	1,129.35	115.58	
Do.	991, 992, 999, 1044	North Mararoa G.M. Co., N.L.	..	..	548.00	107.01	..	..	548.00	107.01	..	
Do.	821	(Northern Star)	..	..	11.50	23.95	..	..	355.36	717.00	1,137.32	
Do.	821	Northern Star: Westralia Waihi G.Ms., N.L.	..	..	111.00	55.65	22.42	..	..	111.00	55.65	
Do.	903	O.K.	..	..	276.00	327.03	..	..	21.23	1,104.25	1,267.24	
Do.	995	O.K. Extended	..	..	136.50	112.96	..	..	..	660.00	535.65	
Do.	914	(Oversight)	..	..	..	..	..	..	..	373.00	534.12	
Do.	914, 1020, 1037	Oversight leases	..	..	746.50	1,064.57	..	..	..	1,293.00	1,698.11	
Do.	1094	Pearl	..	..	24.00	8.53	..	..	..	24.00	8.53	
Do.	(1033)	Plain Bill	..	..	10.00	16.95	..	..	..	373.00	35.89	
Do.	106, 187, 587, 840, 972	Princess Royal G.M. Co., N.L.	..	..	7,639.00	2,164.47	189.00	..	..	159,870.50	138,207.53	
Do.	1021	Princess Royal North	..	..	443.00	509.00	..	..	..	443.00	509.00	
Do.	1021	(Princess Royal North G.M. Co., N.L.)	..	..	210.00	160.00	..	..	..	1,311.00	1,197.01	
Do.	187	(Princess Royal South)	..	..	..	..	..	..	..	358.00	568.05	
Do.	(1065)	Reta Alice	..	18.06	171.00	76.96	..	..	..	171.00	76.96	
Do.	1063	Southern Cross	..	..	8.50	3.99	..	..	..	8.50	3.99	
Do.	(1004)	St. Clare	..	..	41.00	9.24	..	..	..	41.00	9.24	
Do.	84	St. Patrick	..	..	48.50	39.72	..	..	160.91	916.50	2,267.83	
Do.	1032	Sun	..	..	191.50	133.15	..	..	..	191.50	133.15	
Do.	989	Surprise	..	..	148.00	90.11	..	..	..	328.00	226.95	
Do.	1100	Tanami	..	98.72	..	..	..	..	..	98.72	..	
Do.	1016	Valkyrie	..	..	..	..	..	..	110.10	72.50	419.67	
Do.	1026	Venture	..	..	16.50	18.35	..	..	..	16.50	18.35	
Do.	990	V king No. 1	..	..	447.00	764.86	..	..	..	1,721.00	3,860.81	
Do.	986	Veni Vidi Vici	..	1,262.17	202.50	395.28	..	..	1,732.75	258.00	655.90	
Do.	..	Voided leases	..	..	..	..	..	..	4.23	2,704.81	149,583.35	
Do.	..	Sundry claims	4.49	106.81	1,611.75	733.83	..	996.60	416.06	9,514.15	4,881.94	
Peninsula	..	Voided leases	..	..	..	..	..	..	17.61	7,764.00	4,705.10	
<i>From Goldfield generally:—</i>												
Sundry parcels treated at:												
Break-o'-Day Cyanide Works			..	..	..	74.06	..	..	..	..	179.38	
Hill's Cyanide Works			..	..	..	100.07	..	..	..	..	100.07	
Lady Mary Works			..	..	..	672.45	..	..	..	..	672.45	
Little Wonder Cyanide Works			..	..	..	..	..	..	..	..	174.54	
Mararoa Crushing and Cyanide Works			..	..	..	..	..	..	..	80.00	409.67	
State Battery—Norseman			..	..	..	2,330.78	..	..	..	225.50	8,900.94	
Various Works			..	..	..	..	..	..	54.52	255.50	4,708.35	
Reported by Banks and Gold Dealers			27.85	..	..	..	..	..	908.81	..	..	
<b>Total</b>			<b>32.34</b>	<b>1,581.86</b>	<b>47,717.75</b>	<b>27,935.07</b>	<b>11,338.76</b>	<b>1,909.64</b>	<b>6,205.39</b>	<b>460,142.78</b>	<b>369,298.88</b>	<b>26,352.47</b>

# Phillips River Goldfield.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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.
Kundip	99	Alice Mary	..	..	3-28	9-01	..	..	10-61	23-28	12-84	..
Do.	(107)	Ard Patrick	..	..	..	..	..	..	..	295-00	253-74	..
Do.	(132)	Charmion	..	..	..	..	..	..	..	27-00	8-42	..
Do.	M.L. 184	Christmas Gift	..	..	116-00	24-33	71-55	..	..	935-00	506-55	71-55
Do.	147	Fair Play	..	..	32-25	48-99	12-63	..	..	32-25	40-73	12-63
Do.	136, 137, 138, 139	Flag Gold and Copper Mining Co., Ltd.	..	..	2,454-50	9-61	797-47	..	..	3,564-50	3,188-51	797-47
Do.	65	(Gem)	..	..	..	31-12	..	..	..	687-50	613-34	..
Do.	151	Gem Consolidated	..	..	513-00	722-28	..	..	..	513-00	458-92	..
Do.	65, 79	Gem leases	..	..	2,260-00	*1,338-41	..	..	..	5,358-35	1,987-08	..
Do.	M.Ls. 52, 94	(Harbour View leases)	..	..	..	..	..	379-86	..	3,619-25	1,560-86	61-41
Do.	M.Ls. 52, 94	Harbour View leases	..	..	..	39-40	1-88	..	..	500-00	235-77	1-88
Do.	(81)	Harbour View North	..	..	..	..	..	..	..	155-00	75-81	..
Do.	98	Hillsborough	..	..	195-50	57-38	118-03	..	..	657-34	1,739-73	118-03
Do.	(152)	Kia Ora	..	33-75	..	*819-95	..	33-75	..	..	..	..
Do.	150	Kundip	..	..	75-00	21-54	5-59	..	..	108-50	50-58	5-59
Do.	(66)	Medic	..	..	..	*13-21	..	..	6-85	677-46	591-13	..
Do.	(129)	Queen of the Earth	..	..	..	..	..	63-00	..	..	..	..
Do.	M.Ls. 52, 94	(Ravensthorpe G.M. Syndicate, N.L.)	..	..	..	..	..	..	..	1,124-00	433-94	164-98
Do.	(M.L. 60)	(Red, White, and Blue)	..	..	..	45-17	..	..	..	1,005-60	1,167-32	107-29
Do.	(M.L. 60)	Red, White, and Blue: Flag Gold and Copper Mining Co., Ltd.	..	..	..	11-20	..	..	..	933-00	608-69	..
Do.	74	Two Boys	..	..	481-50	771-14	..	3-90	..	2,394-62	2,739-56	..
Do.	(80)	Western Gem	..	..	..	..	..	..	..	177-67	134-66	..
Do.	..	Voided leases	..	..	..	..	..	50-28	94-86	1,242-74	846-81	1,776-19
Do.	..	Sundry claims	..	..	74-00	25-07	14-56	48-68	15-50	293-54	249-39	14-56
Do.	..	..	..	..	..	*23-75	..	..	..	..	..	..
Mt. Desmond	M.L. 203	(British Flag)	..	..	..	..	..	..	..	..	7-76	..
Do.	M.L. 208	(Desmond)	..	..	..	..	..	..	..	..	..	..
Do.	M.L. 95	Elverdton: Phillips River Gold and Copper Co., Ltd.	..	..	..	*143-75	78-81	..	..	..	188-19	78-81
Do.	M.L. 95	(Elverdton: Phillips River Options Syndicate, N.L.)	..	..	..	..	..	..	..	..	9-63	..
Do.	M.L. 275	Ironclad	..	..	..	..	..	..	..	..	13-78	..
Do.	M.L. 109	(Mt. Desmond)	..	..	..	..	..	1-40	..	..	36-97	..
Do.	M.L. 109	Mt. Desmond: Phillips River Gold and Copper Co., Ltd.	..	..	..	..	..	..	..	..	123-98	14-10
Do.	M.L. 199	P.L.P.	..	..	..	..	..	..	..	..	10-91	..
Do.	(M.L. 257)	Thistle and Shamrock	..	..	..	*53	4-21	..	..	..	6-53	4-21

\* From Copper Ore.

TABLE IV.—Production of Gold and Silver from all sources, etc.—continued.

Phillips River Goldfield—continued.

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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. Desmond	..	Voided leases .. .. .	..	..	..	..	..	..	9.00	17.61	..	
Do.	..	Sundry claims .. .. .	..	..	..	..	..	..	..	.56	..	
Mt. Purchas	89	Mt. Agnes Reward .. .. .	..	..	41.00	40.04	..	..	225.00	170.69	..	
Do.	..	Voided leases .. .. .	..	..	..	..	..	4.38	17.05	30.45	..	
Do.	..	Sundry claims .. .. .	..	..	..	..	..	..	4.75	4.68	..	
Ravensthorpe	(M.L. 207)	Andante .. .. .	..	..	..	..	..	..	17.00	6.60	..	
Do.	M.L. 205	Ballarat .. .. .	..	..	..	*2.84	..	..	..	2.84	..	
Do.	M.L. 295	Commonwealth .. .. .	..	..	..	*3.30	..	..	..	3.30	..	
Do.	82	Gilbert G.M., Ltd. .. .. .	..	..	..	..	..	..	236.00	148.47	..	
Do.	M.L. 116	Last Chance .. .. .	..	..	..	..	..	..	..	5.31	..	
Do.	153	Maori Queen .. .. .	..	..	72.00	46.11	..	..	72.00	46.11	..	
Do.	M.L. 16	(Marion Martin) .. .. .	..	..	..	..	..	..	..	20.09	..	
Do.	M.L. 16	Marion Martin: Phillips River Gold and Copper Co., Ltd. .. .. .	..	..	..	*22.63	43.40	..	..	79.49	43.40	
Do.	M.L. 7	Mary .. .. .	..	..	..	*9.24	30.18	..	..	18.71	30.18	
Do.	M.L. 175	(Mt. Benson) .. .. .	..	..	..	..	..	..	..	287.88	..	
Do.	M.L. 175	Mt. Benson: Phillips River Gold and Copper Co., Ltd. .. .. .	..	..	..	*188.62	87.15	..	..	419.77	123.63	
Do.	M.L. 15	(Mt. Cattlin) .. .. .	..	..	..	..	..	..	49	200.00	85.50	
Do.	M.L. 15	Mt. Cattlin: Mt. Cattlin Copper Mining Co., Ltd. .. .. .	..	..	..	*13.55	40.77	..	..	1,496.92	52.92	
Do.	M.L. 15	(Mt. Cattlin: Phillips River Gold and Copper Co., Ltd.) .. .. .	..	..	..	..	..	..	..	387.33	..	
Do.	M.L. 15	Mt. Cattlin: Phillips River Gold and Copper Co., Ltd. .. .. .	..	..	..	*826.06	320.83	..	..	826.06	320.83	
Do.	M.L. 219	Mt. Cattlin West .. .. .	..	..	..	*2.12	6.28	..	..	2.71	6.28	
Do.	M.L. 204	New Moon .. .. .	..	..	..	..	..	..	..	.70	..	
Do.	..	Voided leases .. .. .	..	..	..	..	..	114.35	20,135.44	16,627.07	..	
Do.	..	Sundry claims .. .. .	..	..	103.35	101.57	12.48	134.79	393.35	291.51	16.63	
West River	M.L. 293	Last Venture .. .. .	..	..	..	*2.03	..	..	..	10.13	31.06	
Do.	..	Voided leases .. .. .	..	..	..	*10.13	31.06	..	..	.21	..	
Do.	..	Sundry claims .. .. .	..	..	..	..	..	..	..	1.69	3.44	
<i>From Goldfield generally:—</i>												
		Sundry parcels treated at:										
		Various Works .. .. .	..	..	..	..	..	..	..	13.77	..	
		Reported by Banks and Gold Dealers .. .. .	2.78	..	..	..	..	114.68	..	..	..	
		<b>Total</b> .. .. .	<b>2.78</b>	<b>33.75</b>	<b>6,421.38</b>	<b>6,676.99</b>	<b>1,676.88</b>	<b>411.43</b>	<b>665.95</b>	<b>45,634.19</b>	<b>38,909.06</b>	<b>3,857.07</b>

\* From Copper Ore.

**\* Donnybrook Goldfield.**

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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 .. ..	..	..	..	..	..	23·24	..	1,613·30	816·23	..
	..	Sundry claims .. ..	..	..	..	..	..	..	..	40·00	2·29	..
		<b>Total</b> .. ..	..	..	..	..	..	<b>23·24</b>	..	<b>1,653·30</b>	<b>818·52</b>	..

\* Abolished, 4th March, 1908.

**State generally.**

MINING CENTRE.	NUMBER OF LEASE.	REGISTERED NAME OF COMPANY OR LEASE.	TOTAL FOR 1909.					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:										
		Allsop and Howell's Works, Kalgoorlie .. ..	..	..	..	..	..	..	..	..	69·13	..
		Hacke's Works, Boulder .. ..	..	..	..	..	..	..	..	..	22·16	..
		Hannan's Proprietary Works, Kalgoorlie .. ..	..	..	..	..	..	..	..	10·00	·90	..
		Orotava Works, Kalgoorlie .. ..	..	..	..	..	..	..	..	..	164·67	..
		Rasmussen's Works, Boulder .. ..	..	..	..	..	..	..	..	..	1,082·21	..
		Seabrook Works, Northam .. ..	..	..	..	348·09	..	..	..	..	348·09	..
		Various Works .. ..	..	..	..	..	..	..	..	17·00	2,723·98	481·77
		Sundry specimens .. ..	..	..	..	..	..	..	2·87	..	..	..
		Reported by Banks and Gold Dealers .. ..	..	..	..	..	..	124·89	153·03	..	..	..
		<b>Total</b> .. ..	..	..	..	<b>348·09</b>	..	<b>124·89</b>	<b>155·90</b>	<b>27·00</b>	<b>4,411·14</b>	<b>481·77</b>

TOTAL OUTPUT OF GOLD BULLION ENTERED FOR EXPORT, AND RECEIVED AT THE PERTH BRANCH OF THE QUANTITY OBTAINED EACH YEAR FROM THE RESPECTIVE

Year.	KIMBERLEY.			PILBARA.			a WEST PILBARA.			ASHBURTON.		
	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.
1886	fine ozs. 270-17	...	270-17	fine ozs. ...	...	...	fine ozs. ...	...	...	fine ozs. ...	...	...
1887	4,359-37	...	4,359-37	...	...	...	...	...	...	...	...	...
1888	3,124-82	...	3,124-82	...	...	...	...	...	...	...	...	...
1889	2,204-28	...	2,204-28	9,992-63	...	9,992-63	...	...	...	...	...	...
1890	4,002-42	...	4,002-42	14,363-01	...	14,363-01	...	...	...	...	...	...
1891	2,415-07	...	2,415-07	10,623-32	...	10,623-32	...	...	...	750-31	...	750-31
1892	974-08	...	974-08	11,533-84	...	11,533-84	...	...	...	...	...	...
1893	1,450-77	...	1,450-77	10,465-43	...	10,465-43	...	...	...	418-43	...	418-43
1894	526-59	...	526-59	14,541-20	...	14,541-20	...	...	...	255-20	...	255-20
1895	784-27	...	784-27	17,464-65	...	17,464-65	...	...	...	483-76	...	483-76
1896	797-85	...	797-85	10,565-27	...	10,565-27	...	...	...	598-64	...	598-64
1897	495-67	...	495-67	10,685-67	...	10,685-67	...	...	...	928-75	...	928-75
1898	257-54	...	257-54	10,433-27	...	10,433-27	1,814-48	...	1,814-48	402-46	...	402-46
1899	728-52	275 94	1,004-46	17,888-69	473-96	18,362-65	1,749-39	...	1,749-39	214-26	252-10	466-36
1900	29-16	576-14	605-30	8,629-83	6,708-99	15,338-82	522-76	122-85	645-61	44-82	424-27	469-09
1901	...	601-26	601-26	36-68	10,223-75	10,260-43	78-38	357-46	435-84	7-70	50-24	57-94
1902	1-48	378-02	379-50	...	9,199-50	9,199-50	...	2,822-20	2,822-20	...	...	...
1903	...	433-71	433-71	2-26	12,049-52	12,051-78	...	5,493-23	5,493-23	...	114-67	114-67
1904	...	31-51	31-51	...	6,931-27	6,931-27	...	4,320-82	4,320-82	...	125-96	125-96
1905	...	545-95	545-95	48-38	13,353-49	13,401-82	...	1,164-92	1,164-92	...	42-05	42-05
1906	...	647-77	647-77	...	4,956-14	4,956-14	...	755-35	755-35	...	138-84	138-84
1907	...	362-08	362-08	...	4,130-48	4,130-48	...	332-30	332-30	...	41-85	41-85
1908	...	338-00	338-00	...	8,172-26	8,172-26	...	1,076-68	1,076-68	...	45-67	45-67
1909	...	168-95	168-95	...	5,529-19	5,529-19	...	1,396-22	1,396-22	...	228-16	228-16
Total	22,422-06	4,359-31	26,781-37	147,284-08	81,723-55	229,007-63	4,165-01	17,842-03	22,007-04	4,104-96	1,464-01	5,568-97

Year.	d YALGOO.			c MT. MARGARET.			e NORTH COOLGARDIE.			f BROAD ARROW.		
	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.
1886	fine ozs. ...	...	...	fine ozs. ...	...	...	fine ozs. ...	...	...	fine ozs. ...	...	...
1887	...	...	...	...	...	...	...	...	...	...	...	...
1888	...	...	...	...	...	...	...	...	...	...	...	...
1889	...	...	...	...	...	...	...	...	...	...	...	...
1890	...	...	...	...	...	...	...	...	...	...	...	...
1891	...	...	...	...	...	...	...	...	...	...	...	...
1892	...	...	...	...	...	...	...	...	...	...	...	...
1893	...	...	...	...	...	...	...	...	...	...	...	...
1894	...	...	...	...	...	...	...	...	...	...	...	...
1895	...	...	...	...	...	...	...	...	...	...	...	...
1896	...	...	...	...	...	...	...	...	...	...	...	...
1897	1,819-81	...	1,819-81	7,770-22	...	7,770-22	15,351-71	...	15,351-71	...	...	...
1898	3,360-44	...	3,360-44	38,706-19	...	38,706-19	66,697-57	...	66,697-57	3,720-87	...	3,720-87
1899	5,089-88	4,643-00	9,732-88	58,064-19	15,128-98	73,193-17	54,489-26	40,059-43	94,548-69	32,324-04	7,607-18	39,931-22
1900	462-55	7,918-53	8,381-08	65,998-38	60,607-45	126,605-83	15,660-11	79,340-01	95,000-12	29,955-07	12,860-80	42,815-87
1901	6-80	8,330-42	8,337-22	65,352-46	114,840-17	180,192-63	4,064-18	156,856-06	160,920-24	2,128-49	17,066-09	26,379-59
1902	483-32	4,396-91	4,880-23	61,846-01	124,306-49	186,152-50	4,064-18	156,856-06	160,920-24	2,128-49	13,665-52	15,794-01
1903	47-08	1,430-59	1,477-67	65,416-09	125,437-19	190,853-28	1,348-74	167,153-90	168,502-64	5,201-12	18,245-41	23,446-53
1904	...	2,796-23	2,796-23	63,180-89	119,889-93	183,070-82	1,614-64	139,518-37	141,133-01	318-83	20,660-78	20,979-61
1905	76-75	4,549-25	4,626-00	34,949-75	153,203-05	188,152-80	1,193-71	145,615-47	146,809-18	603-66	15,300-58	15,904-24
1906	...	4,883-17	4,883-17	21,869-88	137,022-23	158,892-11	1,140-45	107,890-76	109,031-21	1,245-75	16,841-70	18,087-45
1907	...	3,199-60	3,199-60	23,989-43	154,059-92	178,049-35	13,240-87	72,701-05	85,941-92	4,392-34	13,610-81	17,903-15
1908	...	456-43	456-43	19,324-02	147,879-90	167,203-92	6,701-28	76,700-77	83,402-05	3,613-64	7,946-35	11,559-99
1909	...	626-80	626-80	24,123-15	135,914-94	160,038-09	6,889-19	66,631-79	73,020-98	6,711-37	4,863-50	11,574-87
Total	11,346-58	43,230-93	54,577-51	550,590-66	1,288,290-25	1,838,880-91	257,693-62	1,175,374-19	1,432,967-81	121,363-85	148,668-72	270,032-57

Year.	h DUNDAS.			i PHILLIPS RIVER.			j DONNYBROOK.			STATE GENERALLY.		
	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.
1886	fine ozs. ...	...	...	fine ozs. ...	...	...	fine ozs. ...	...	...	fine ozs. ...	...	...
1887	...	...	...	...	...	...	...	...	...	...	...	...
1888	...	...	...	...	...	...	...	...	...	...	...	...
1889	...	...	...	...	...	...	...	...	...	...	...	...
1890	...	...	...	...	...	...	...	...	...	...	...	...
1891	...	...	...	...	...	...	...	...	...	...	...	...
1892	...	...	...	...	...	...	...	...	...	...	...	...
1893	132-37	...	132-37	...	...	...	...	...	...	...	...	...
1894	204-31	...	204-31	...	...	...	...	...	...	...	...	...
1895	216-40	...	216-40	...	...	...	...	...	...	...	...	...
1896	3,891-77	...	3,891-77	...	...	...	...	...	...	...	...	...
1897	17,275-36	...	17,275-36	...	...	...	...	...	...	...	...	...
1898	28,655-52	...	28,655-52	...	...	...	...	...	...	...	...	...
1899	39,980-65	423-71	40,404-36	...	...	...	277-27	175-49	452-76	...	809-07	809-07
1900	8,144-72	28,254-19	36,398-91	...	...	...	...	237-56	237-56	5,644-83	1,450-08	7,094-91
1901	5,411-46	29,732-16	35,143-62	...	...	...	...	4-20	4-20	215-91	1,511-63	1,727-54
1902	4,401-31	26,714-16	31,115-47	2,946-53	4,422-56	7,369-09	4-94	57-64	62-58	7-77	2,115-52	2,123-29
1903	1,311-53	33,905-88	35,217-41	2,136-09	5,441-68	7,577-77	...	82-64	82-64	53-44	2,839-44	2,892-88
1904	1,834-03	31,347-06	33,181-09	936-76	2,047-59	2,984-35	...	...	...	...	1,344-25	1,348-50
1905	1,324-48	27,411-31	28,735-79	2,060-16	1,458-44	3,518-60	...	...	...	...	1,515-58	1,535-99
1906	1,111-18	20,198-62	21,309-80	945-65	1,439-03	2,384-68	...	...	...	...	763-15	1,047-53
1907	...	22,830-71	22,830-71	4,043-86	1,514-90	5,558-76	...	...	...	...	284-38	1,084-95
1908	...	41,203-39	41,203-39	969-00	3,631-02	4,600-02	...	...	...	...	15-91	1,953-56
1909	...	35,894-72	35,894-72	4,025-81	3,605-75	7,631-56	...	...	...	...	46-78	1,969-47
Total	113,995-09	297,935-91	411,831-00	18,064-16	23,560-97	41,625-13	282-21	557-63	839-74	7,139-77	15,043-09	22,182-86

a Prior to 1st May, 1898, included with Pilbara. d Prior to 1st April, 1897, included with Murchison. e From 1st August, 1897, prior to 1st May, 1896, included with Coolgardie. f From 1st September, 1897. h Prior to 1893 included with Yilgarn, i Prior to 1902 included in State generally. j Abolished, 4th March, 1903.

V.  
ROYAL MINT, FROM 1ST JANUARY, 1886, TO 31ST DECEMBER, 1909, 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.
1886	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.
1887	...	...	...	...	...	...	...	...	...	...	...	...
1888	...	...	...	...	...	...	...	...	...	...	...	...
1889	...	...	...	...	...	...	...	...	...	...	...	...
1890	...	...	...	...	...	...	...	...	...	...	...	...
1891	...	...	...	...	...	...	...	...	...	1,846'83	...	1,846'83
1892	...	...	...	...	...	...	...	...	...	...	...	...
1893	...	...	...	...	...	...	...	...	...	18,974'77	...	18,974'77
1894	...	...	...	...	...	...	...	...	...	47,365'54	...	47,365'54
1895	...	...	...	...	...	...	...	...	...	58,575'66	...	58,575'66
1896	...	...	...	...	...	...	...	...	...	63,769'17	...	63,769'17
1897	...	...	...	4,571'38	...	4,571'38	8,457'34	...	8,457'34	74,154'67	...	74,154'67
1898	...	...	...	12,288'93	...	12,288'93	35,393'19	...	35,393'19	83,794'22	...	83,794'22
1899	297'96	76'63	374'59	14,064'24	14,558'64	28,622'88	33,826'08	3,361'95	37,188'03	61,586'09	22,074'71	83,660'80
1900	...	77'02	9,528'14	16,119'79	25,647'93	25,545'54	28,671'55	52,217'09	53,815'70	43,423'77	97,239'47	131,145'66
1901	6'59	16'82	23'41	19,352'41	19,554'29	29,780'63	40,557'07	70,337'70	92,149'56	38,996'10	182,657'99	224,398'41
1902	...	107'29	107'29	28,044'55	28,130'48	25,450'63	53,583'03	79,033'73	141,731'91	40,826'08	208,361'41	217,915'83
1903	...	30'76	30'76	29,395'32	29,598'92	21,878'06	65,384'15	87,212'11	154,012'88	54,348'53	224,398'41	224,398'41
1904	...	10'95	10'95	17,475'33	17,475'33	21,296'85	64,550'36	85,847'21	165,232'67	52,683'16	189,108'49	189,108'49
1905	...	21'34	21'34	13,371'75	13,496'76	1,361'68	89,249'93	90,611'61	131,656'36	92,742'05	170,309'24	170,309'24
1906	...	78'73	78'73	2,038'62	2,038'62	140'68	95,168'89	95,309'57	79,172'69	109,936'80	157,023'59	157,023'59
1907	...	8'44	8'44	5,918'75	5,918'75	2,891'66	117,735'69	120,627'35	54,511'74	115,497'50	131,849'74	131,849'74
1908	...	31'82	31'82	9,864'36	9,864'36	10,701'24	137,028'14	147,729'38	45,485'05	111,540'54	157,023'59	157,023'59
1909	...	7'37	7'37	7,322'29	7,322'29	11,569'83	136,637'67	143,237'50	24,862'47	107,167'27	131,849'74	131,849'74
Total	304'55	467'17	771'72	41,099'08	163,461'84	204,560'92	226,323'41	831,878'40	1,058,201'81	1,374,605'17	789,336'51	2,163,941'68

Year.	e NORTH-EAST COOLGARDIE.			e EAST COOLGARDIE.			g COOLGARDIE.			YILGARN.		
	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.	Export.	Mint.	Total.
1886	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.
1887	...	...	...	...	...	...	...	...	...	...	...	...
1888	...	...	...	...	...	...	...	...	...	...	...	...
1889	...	...	...	...	...	...	...	...	...	1,662'61	...	1,662'61
1890	...	...	...	...	...	...	...	...	...	2,086'99	...	2,086'99
1891	...	...	...	...	...	...	...	...	...	11,480'61	...	11,480'61
1892	...	...	...	...	...	...	...	...	...	18,973'91	...	18,973'91
1893	...	...	...	...	...	...	...	...	...	67,780'73	...	67,780'73
1894	...	...	...	...	...	...	...	...	...	28,178'31	...	28,178'31
1895	...	...	...	...	...	...	...	...	...	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	16,097'78	...	16,097'78
1898	112,039'58	...	112,039'58	402,847'31	...	402,847'31	113,816'75	...	113,816'75	10,463'35	...	10,463'35
1899	57,674'82	14,940'55	72,615'37	796,696'63	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	60,988'33	46,167'62	107,155'95	688'47	25,628'83	26,317'30
1901	6,798'56	39,024'18	45,822'74	698,042'56	238,840'93	936,883'49	9,584'35	70,720'21	80,304'56	49'15	26,677'85	26,727'00
1902	549'07	46,316'67	46,865'74	460,462'26	546,964'68	1,007,426'94	2,872'61	80,887'85	83,760'46	3'31	22,232'80	22,236'11
1903	4,308'99	36,145'75	40,454'74	570,447'27	580,790'97	1,151,238'24	7,318'63	69,681'38	77,000'01	...	22,761'00	22,761'00
1904	55'09	33,262'10	33,317'19	555,016'48	584,579'88	1,139,596'36	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	613,103'20	1,092,357'57	177'80	62,066'34	62,244'14	...	25,291'11	25,291'11
1906	1,590'31	30,943'82	32,534'13	454,645'84	612,546'81	1,067,192'65	103'78	60,474'81	60,578'59	...	25,570'77	25,570'77
1907	3,132'83	25,399'75	28,532'58	323,550'05	643,139'11	966,689'16	1,050'88	61,670'65	62,721'53	...	23,311'41	23,311'41
1908	925'44	23,902'44	24,827'88	267,748'62	657,936'80	925,685'51	871'76	40,982'65	41,854'41	...	20,866'10	20,866'10
1909	1,774'45	24,566'87	26,341'32	306,462'21	620,612'07	927,074'28	350'91	36,311'70	36,662'61	204'41	20,958'23	21,162'64
Total	234,553'85	350,956'22	585,510'07	6,260,211'36	5,253,187'36	11,513,398'62	661,131'91	£14,737'21	1,275,869'12	197,033'06	251,378'07	448,411'13

Year.	GRAND TOTAL.			
	Export.	Mint.	Total.	Value.
1886	fine ozs.	fine ozs.	fine ozs.	£ s. d.
1887	270'17	...	270'17	1,147 12 2½
1888	4,359'37	...	4,359'37	18,517 8 6½
1889	3,124'82	...	3,124'82	13,273 7 10
1890	13,859'52	...	13,859'52	58,871 9 11½
1891	20,402'42	...	20,402'42	86,663 19 5½
1892	27,116'14	...	27,116'14	115,182 0 10
1893	53,271'65	...	53,271'65	226,283 11 8½
1894	99,202'50	...	99,202'50	421,385 8 8½
1895	185,298'73	...	185,298'73	787,098 19 6
1896	207,110'20	...	207,110'20	879,748 4 2½
1897	251,618'69	...	251,618'69	1,068,808 5 2
1898	603,846'44	...	603,846'44	2,564,876 12 9½
1899	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 7½
1900	894,887'27	519,923'59	1,414,810'86	6,007,610 13 4½
1901	923,686'96	779,729'56	1,703,416'52	7,235,653 9 1
1902	707,039'75	1,163,997'60	1,871,037'35	7,947,661 9 7½
1903	833,685'78	1,231,115'62	2,064,801'40	8,770,718 17 0½
1904	810,616'04	1,172,614'03	1,983,230'07	8,424,225 17 5½
1905	655,08'83	1,303,226'00	1,958,315'88	8,305,653 18 5½
1906	562,250'59	1,232,296'01	1,794,546'60	7,622,749 8 7
1907	431,803'14	1,265,750'44	1,697,553'59	7,210,749 6 2½
1908	356,353'96	1,291,557'17	1,647,911'13	6,999,881 10 10½
1909	386,370'53	1,208,898'83	1,595,269'41	6,776,273 14 7½
TOTAL	10,253,614'34	11,353,353'27	21,606,967'61	91,780,564 10 6

b. Prior to March, 1899, included with Ashburton. c. From 1st August, 1897. e. Prior to 1st May, 1896, included with Coolgardie. g. Declared 5th April, 1894, to which date included with Yilgarn.



TABLE VI.

COMPARATIVE RETURN OF GOLD BULLION ENTERED FOR EXPORT AND RECEIVED AT THE PERTH BRANCH OF THE ROYAL MINT, DURING THE YEARS 1907, 1908, AND 1909, SHOWING IN FINE OUNCES THE QUANTITY RECORDED EACH MONTH, AND ITS VALUE.

MONTHS AND QUARTERS.	1907.				1908.				1909.			
	EXPORT.	MINT.	TOTAL.	VALUE.	EXPORT.	MINT.	TOTAL.	VALUE.	EXPORT.	MINT.	TOTAL.	VALUE.
JANUARY ... ..	fine ozs. 45,337·32	fine ozs. 116,900·96	fine ozs. 162,238·28	£ s. d. 689,144 8 2½	fine ozs. 35,246·82	fine ozs. 114,572·09	fine ozs. 149,818·91	£ s. d. 636,390 5 6½	fine ozs. 34,327·33	fine ozs. 97,959·53	fine ozs. 132,286·86	£ s. d. 561,918 17 3½
FEBRUARY ... ..	34,538·33	99,654·82	134,193·15	570,016 5 4½	29,629·79	101,865·97	131,495·76	558,558 9 8½	35,169·25	87,947·32	123,116·57	522,965 18 11½
MARCH ... ..	33,663·00	96,062·63	129,725·63	551,039 9 0	20,476·89	108,849·37	129,326·26	549,343 0 8½	26,514·54	100,478·57	126,993·11	539,432 8 10½
<i>1st January to 31st March ...</i>	113,538·65	312,618·41	426,157·06	1,810,200 2 6½	85,353·50	325,287·43	410,640·93	1,744,291 15 11½	96,011·12	286,385·42	382,396·54	1,624,317 5 1
APRIL ... ..	38,768·04	91,317·91	130,085·95	552,569 19 10½	32,497·52	113,217·14	145,714·66	618,956 10 7½	30,240·42	107,523·57	137,763·99	585,184 4 8
MAY ... ..	40,448·34	105,042·78	145,491·12	618,006 19 11	34,143·82	99,811·37	133,955·19	569,005 9 7½	29,243·46	100,165·38	129,408·84	549,693 16 3
JUNE ... ..	39,721·27	96,800·61	136,521·88	579,908 1 8½	28,802·38	107,905·66	136,708·04	580,698 16 10½	35,294·44	97,207·00	132,501·44	562,830 6 10
<i>1st January to 30th June ...</i>	232,476·30	605,779·71	838,256·01	3,560,685 4 0½	180,797·22	646,221·60	827,018·82	3,512,952 13 0½	190,789·44	591,281·37	782,070·81	3,322,025 12 10
JULY ... ..	26,848·64	101,706·68	128,555·32	546,068 5 9½	27,365·04	106,058·47	133,423·51	566,747 0 11	31,986·34	101,131·82	133,118·16	565,450 0 0½
AUGUST ... ..	41,090·45	98,051·65	139,142·10	591,038 1 5½	32,904·49	103,783·24	136,687·73	580,612 11 5½	36,027·77	100,590·16	136,617·93	580,316 1 7
SEPTEMBER ... ..	27,560·29	113,642·71	141,203·00	599,792 4 4½	26,400·06	111,840·80	138,240·86	587,209 16 11½	34,787·10	110,131·24	144,918·34	615,573 19 7½
<i>1st January to 30th September</i>	327,975·68	919,180·75	1,247,156·43	5,297,583 15 8	267,466·81	967,904·11	1,235,370·92	5,247,522 2 4½	293,590·65	903,134·59	1,196,725·24	5,083,365 14 0½
OCTOBER ... ..	37,367·25	112,749·57	150,116·82	637,655 14 4½	30,695·67	105,684·54	136,380·21	579,306 6 2½	34,776·69	96,522·47	131,299·16	557,723 7 7½
NOVEMBER ... ..	25,171·43	120,653·60	145,825·03	619,425 7 1	31,443·67	105,556·62	137,000·29	581,940 4 10	31,877·03	101,287·40	133,164·43	565,646 10 10½
DECEMBER ... ..	41,288·78	113,166·53	154,455·31	656,084 9 1	26,747·81	112,411·90	139,159·71	591,112 17 6	26,126·21	107,954·37	134,080·58	569,538 2 0½
<b>Total ... ..</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>	<b>356,353·96</b>	<b>1,291,557·17</b>	<b>1,647,911·13</b>	<b>6,999,881 10 10½</b>	<b>386,370·58</b>	<b>1,208,898·83</b>	<b>1,595,269·41</b>	<b>6,776,273 14 7½</b>

TABLE VII.

MONTHLY RETURN OF GOLD, CONTAINED IN BULLION, FURNACE PRODUCTS, AND ORE, ENTERED FOR EXPORT DURING 1909.

MONTH.	UNITED KINGDOM.			VICTORIA.			U.S. OF AMERICA.			GERMANY.			TOTALS.			Minted Gold Exported.*
	Bullion.	Furnace Products.	Ore.	Bullion.	Furnace Products.	Ore.	Bullion.	Furnace Products.	Ore.	Bullion.	Furnace Products.	Ore.	Bullion.	Furnace Products.	Ore.	
1909.	Fine ozs.	Estimated fine ozs.	Estimated fine ozs.	Fine ozs.	Estimated fine ozs.	Estimated fine ozs.	Fine ozs.	Estimated fine ozs.	Estimated fine ozs.	Fine ozs.	Estimated fine ozs.	Estimated fine ozs.	Fine ozs.	Estimated fine ozs.	Estimated fine ozs.	Fine ozs.
January ...	32,505.18	...	...	1,822.15	...	...	...	...	...	...	...	...	34,327.33	...	...	14,233.43
February ...	31,693.87	1,373.09	...	1,300.23	...	...	...	...	...	...	802.06	...	32,994.10	2,175.15	...	{ † 123.81
March ...	24,502.50	434.63	...	1,527.41	...	...	...	...	...	...	...	...	26,029.91	434.63	...	{ 5,925.98
April ...	27,300.71	713.01	...	1,388.98	...	...	...	837.72	...	...	...	...	28,689.69	1,550.73	...	{ 7,105.65
May ...	26,212.51	657.92	...	2,373.03	...	...	...	...	...	...	...	...	28,585.54	657.92	...	{ † 78.32
June ...	33,997.27	...	...	1,297.17	...	...	...	...	...	...	...	...	35,294.44	...	...	{ 22,527.31
July ...	29,963.12	704.87	...	1,318.35	...	...	...	...	...	...	...	...	31,281.47	704.87	...	{ 14,213.58
August ...	33,865.86	832.73	16.18	682.72	...	...	...	630.28	...	...	...	...	34,548.58	1,463.01	16.18	{ 11,864.79
September	31,192.29	1,093.96	174.50	1,331.54	...	...	...	994.81	...	...	...	...	32,523.83	2,088.77	174.50	{ † 125.51
October ...	31,421.11	440.52	421.78	2,118.78	...	...	...	374.50	...	...	...	...	33,539.89	815.02	421.78	{ 5,919.86
November...	28,738.25	1,186.02	...	1,365.44	...	...	...	587.32	...	...	...	...	30,103.69	1,773.34	...	{ 11,859.99
December...	23,480.45	1,739.80	295.78	...	...	...	...	601.18	...	...	...	...	23,489.45	2,340.98	295.78	{ † 309.64
TOTALS ...	354,882.12	9,226.55	908.24	16,525.80	...	...	...	4,025.81	...	...	802.06	...	371,407.92	14,054.42	908.24	{ 7,114.05

\* 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.

TABLE VIII.

RETURN OF GOLD BULLION RECEIVED AT THE PERTH BRANCH OF THE ROYAL MINT FROM MAY, 1899, TO THE 31ST DECEMBER, 1909, SHOWING IN GROSS OUNCES THE QUANTITY OBTAINED FROM THE RESPECTIVE GOLDFIELDS AND OTHER COUNTRIES, AND THE ACTUAL VALUE THEREOF.

Year.	Kimberley.	Pilbara.	West Pilbara.	Ashburton.	Gascoyne.	Peak Hill.	East Murchison.	Murchison.	Yalgoo.	Mt. Margaret.	North Coolgardie.	Broad Arrow.	North-East Coolgardie.
1899	308.45	529.80	...	281.80	85.65	16,274.00	3 758.07	24,675.64	5,190.05	16,911.54	44,779.38	8,503.50	16,700.90
1900	644.02	7,493.88	137.33	474.26	86.10	18,019.08	32,049.74	48,540.12	8,851.52	67,748.45	88,688.14	14,376.10	40,503.12
1901	663.37	11,279.93	394.38	55.42	18.56	21,351.67	44,746.88	43,024.65	9,191.01	126,703.91	135,493.31	18,829.13	43,055.63
1902	439.93	10,706.03	3,284.37	...	124.86	32,637.17	62,357.98	47,628.18	5,116.94	144,663.12	182,543.06	15,903.42	53,901.58
1903	511.75	14,217.53	6,481.58	135.30	36.29	34,684.27	77,089.29	64,127.18	1,687.99	148,006.49	197,229.08	21,528.20	42,649.25
1904	37.69	8,293.58	5,170.06	150.73	13.10	20,909.99	77,237.31	63,037.71	3,345.82	143,453.51	166,939.82	24,721.53	39,799.55
1905	656.34	16,053.42	1,400.46	50.54	25.65	16,075.36	107,295.17	111,493.34	5,469.06	184,178.87	175,057.14	18,394.17	48,352.22
1906	785.23	6,007.79	915.63	168.30	95.43	2,471.21	115,363.22	133,264.79	5,919.37	166,097.63	130,784.60	20,415.43	37,509.91
1907	431.72	4,924.97	396.22	49.89	10.06	7,057.22	140,382.15	137,713.43	3,815.06	183,693.29	86,685.09	16,228.85	30,285.39
1908	400.19	9,676.11	1,292.97	54.32	37.68	11,679.58	162,243.76	132,066.00	2,625.14	175,092.47	90,815.08	9,408.64	28,300.91
1909	203.59	6,662.82	1,682.49	274.93	8.89	8,823.58	164,652.43	129,139.74	755.31	163,781.55	80,293.29	5,860.66	29,603.84
<b>Total</b>	<b>5,082.28</b>	<b>95,845.86</b>	<b>21,155.49</b>	<b>1,695.49</b>	<b>542.27</b>	<b>189,983.13</b>	<b>987,176.00</b>	<b>934,710.78</b>	<b>51,967.27</b>	<b>1,520,330.83</b>	<b>1,379,307.99</b>	<b>174,169.63</b>	<b>410,862.30</b>

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Year.	East Coolgardie.	Coolgardie.	Yilgarn.	Dundas.	* Phillips River.	Donnybrook. †	State generally.	TOTAL.				GRAND TOTAL.	
								Western Australia.		Other Countries.		Quantity.	Actual Value.
								Quantity.	Actual Value.	Quantity.	Actual Value.		
1899	33,051.33	27,611.24	9,070.70	473.63	...	196.17	904.39	209,306.24	762,546 11 6	103.46	336 18 3	209,409.70	762,883 9 9
1900	139,845.60	51,607.26	28,648.51	31,583.20	...	265.55	1,620.93	581,182.91	2,096,212 14 2	17.49	44 15 7	581,200.40	2,096,257 9 9
1901	263,514.75	78,026.07	29,433.84	32,825.75	...	4.64	1,667.79	860,230.69	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	1,403,033.89	4,955,870 9 0	263.05	614 11 9	1,403,346.94	4,956,485 0 9
1905	737,065.14	74,615.36	30,404.65	32,953.56	1,753.32	...	1,821.99	1,563,115.76	5,475,841 2 10	525.80	1,491 0 7	1,563,641.56	5,477,332 3 5
1906	742,525.99	73,307.24	30,996.76	24,484.65	1,744.38	...	925.10	1,493,782.66	5,330,245 12 1	413.86	974 16 0	1,494,196.52	5,331,220 8 1
1907	766,846.83	73,532.99	27,795.35	27,222.21	1,806.30	...	340.39	1,509,217.41	5,416,812 0 7	640.51	1,663 4 3	1,509,857.92	5,418,475 4 10
1908	779,009.10	48,524.18	22,835.58	48,785.54	4,299.19	...	2,080.42	1,529,226.86	5,386,858 15 8	1,313.84	3,885 2 3	1,530,540.70	5,390,743 17 11
1909	747,856.04	43,756.68	25,255.30	43,254.22	4,345.04	...	548.71	1,456,759.11	5,143,035 17 1	882.56	1,109 1 3	1,457,641.67	5,144,145 3 8
<b>Total</b>	<b>6,231,016.47</b>	<b>720,410.64</b>	<b>293,025.52</b>	<b>350,186.17</b>	<b>27,965.85</b>	<b>630.96</b>	<b>17,330.49</b>	<b>13,413,195.42</b>	<b>47,531,890 13 1</b>	<b>4,563.87</b>	<b>11,159 0 7</b>	<b>13,417,759.29</b>	<b>47,543,049 19 0</b>

\* Prior to 1902 included in State generally.

† Abolished 4th March, 1908.

## PART II.—MINERALS OTHER THAN GOLD.

TABLE IX.

GENERAL RETURN OF ORE AND MINERALS, OTHER THAN GOLD, SHOWING THE QUANTITY PRODUCED AND THE VALUE THEREOF, AS REPORTED TO THE MINES DEPARTMENT FROM THE RESPECTIVE GOLDFIELDS AND MINERAL FIELDS, DURING 1909, AND PREVIOUS YEARS.

Period.	BLACK TIN.												
	PILBARRA GOLDFIELD—Marble Bar District.				GREENBUSHES MINERAL FIELD.				TOTAL.				
	Quantity.			Value.	Quantity.			Value.	Quantity.			Value.	
	Lode.	Stream.	Total.		Lode.	Stream.	Total.		Lode.	Stream.	Total.		
Previous to 1899	...	...	...	£	tons.	tons.	tons.	£	tons.	tons.	tons.	£	
1899	...	75'45	75'45	4,419	...	1,590'33	1,590'33	66,108	...	1,665'78	1,665'78	70,527	
1900	...	57'50	57'50	3,612	...	277'32	277'32	21,658	...	334'82	334'82	25,270	
1901	...	387'87	387'87	27,174	...	435'62	435'62	29,528	...	823'49	823'49	56,702	
1902	...	412'98	412'98	21,148	...	321'34	321'34	18,852	...	734'32	734'32	40,000	
1903	...	216'35	216'35	15,103	...	403'21	403'21	24,680	...	619'56	619'56	39,783	
1904	...	292'11	292'11	21,528	...	524'94	524'94	34,362	...	817'05	817'05	55,890	
1905	...	320'86	320'86	24,355	...	533'64	533'64	34,462	...	854'50	854'50	58,817	
1906	...	435'74	435'74	33,880	...	643'52	643'52	52,960	...	1,079'26	1,079'26	86,840	
1907	...	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
1908	...	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
1909	...	31'00	372'03	403'03	30,636	13'90	562'43	576'33	41,046	44'90	934'46	979'36	71,682
1909	...	81'75	212'21	293'96	22,431	44'40	414'35	458'75	34,786	126'15	*628'08	*754'23	+57,335
<b>Total</b>	...	<b>253'47</b>	<b>4,207'72</b>	<b>4,461'19</b>	<b>368,338</b>	<b>124'88</b>	<b>7,193'40</b>	<b>7,318'28</b>	<b>510,682</b>	<b>378'35</b>	<b>11,402'64</b>	<b>11,780'99</b>	<b>879,138</b>

\* Includes tons 1'52, the produce of Cue District.

† Includes £118, value of tons 1'52, the produce of Cue District.

Period.	TANTALITE.												
	PILBARRA GOLDFIELD—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	...	...	...	£	tons.	tons.	tons.	£	tons.	tons.	tons.	£	
1899	...	...	...	...	...	...	...	...	...	...	...	...	
1900	...	...	...	...	...	...	...	...	...	...	...	...	
1901	...	...	...	...	...	...	...	...	...	...	...	...	
1902	...	...	...	...	...	...	...	...	...	...	...	...	
1903	...	...	...	...	...	...	...	...	...	...	...	...	
1904	...	...	...	...	...	...	...	...	...	...	...	...	
1905	...	70'95	70'95	8,925	...	2'34	2'34	1,590	...	73'29	73'29	10,515	
1906	...	1'80	12'85	14'65	2,644	...	...	...	...	1'80	12'85	14'65	2,644
1907	...	...	...	...	...	...	...	...	...	...	...	...	
1908	...	...	...	...	...	...	...	...	...	...	...	...	
1909	...	'45	...	'45	113	...	'85	'85	214	'45	'85	1'30	327
<b>Total</b>	...	<b>2'25</b>	<b>83'80</b>	<b>86'05</b>	<b>11,682</b>	...	<b>3'19</b>	<b>3'19</b>	<b>1,804</b>	<b>2'25</b>	<b>86'99</b>	<b>89'24</b>	<b>13,486</b>

Period.	COPPER ORE.																
	PILBARRA GF.		WEST PILBARRA GF.		ASHBURTON GF.		E. MURCHISON GF.		MURCHISON GF.				YALGOO GF.		NORTHAMPTON MF.		
	Marble Bar D.		Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	
	Quantity.	Value.															Lawlers D.
Previous to 1899	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...		
1899	...	...	7,018'00	55,270	...	...	...	...	...	...	...	...	...	98'00	1,715		
1900	...	...	2,555'00	29,478	...	...	...	...	...	...	...	...	...	...	...		
1901	...	...	1,605'00	12,139	...	...	...	...	...	...	...	5'15	91	...	...		
1902	...	...	1,162'00	15,891	...	...	...	...	...	...	...	10'50	76	...	277		
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		
1908	...	...	...	1,486'00	17,691	188'00	2,311	6'77	69	...	...	...	...	9'50	97		
1909	...	...	...	7,135'50	62,447	10'75	259	...	...	608'00	2,823	...	...	...	...		
<b>Total</b>	...	<b>7'77</b>	<b>190</b>	<b>24,327'00</b>	<b>256,464</b>	<b>198'75</b>	<b>2,570</b>	<b>6'77</b>	<b>69</b>	<b>741'50</b>	<b>5,639</b>	<b>47'36</b>	<b>441</b>	<b>51'41</b>	<b>318</b>	<b>136'50</b>	<b>1,992</b>

TABLE IX.—Minerals other than Gold, etc.—continued.

Period.	COPPER ORE—continued.															
	YANDANOOKA MF.		MT. MARGARET GOLDFIELD.				NORTH COOLGARDIE GOLDFIELD.		EAST COOLGARDIE GOLDFIELD.		PHILLIPS RIVER GOLDFIELD.		STATE GENERALLY.		TOTAL.	
	Quantity.	Value.	Mt. Morgans District.		Mt. Margaret District.		Menzies District.		E. Coolgardie D.		Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
			Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.						
tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	
Previous to 1899	...	...	...	...	...	...	...	...	...	...	...	...	...	...	7,018·00	55,270
1899	38·00	407	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	10,934	...	...	20,526·33	56,541
1904	...	...	500·00	900	...	...	...	...	...	...	3,468·89	24,230	...	...	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	50,337
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
1908	133·55	1,482	4,404·10	20,221	...	...	...	...	50·67	330	2,015·71	9,233	...	...	8,294·30	51,434
1909	...	...	...	...	...	...	...	...	...	...	7,330·70	29,815	...	...	15,084·95	95,344
<b>Total</b>	<b>171·55</b>	<b>1,889</b>	<b>47,857·67</b>	<b>230,820</b>	<b>2·85</b>	<b>26</b>	<b>6·12</b>	<b>51</b>	<b>50·67</b>	<b>330</b>	<b>31,436·63</b>	<b>187,328</b>	<b>16·58</b>	<b>233</b>	<b>105,059·13</b>	<b>688,360</b>

Period.	IRONSTONE.								LEAD ORE.		SILVER LEAD ORE.		COAL.			
	W. PILBARA GF.		E. COOLGARDIE GF.		STATE GENERALLY.		TOTAL.		NORTHAMPTON MF.		ASHBURTON GF.		COLLIE RIVER COAL MF.			
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	
Previous to 1899	100·00	300	...	...	...	...	100·00	300	...	...	...	...	...	3,508·00	1,761	
1899	...	...	...	...	12,852·00	8,939	12,852·00	8,939	82·75	912	...	...	...	54,336·00	25,951	
1900	...	...	...	...	12,251·00	9,258	12,251·00	9,258	268·00	533	...	...	...	118,410·10	54,835	
1901	...	...	450·00	247	20,119·00	12,999	20,569·00	13,246	...	...	21·05	152	...	117,335·80	68,561	
1902	...	...	...	...	4,800·00	2,040	4,800·00	2,040	...	...	35·85	277	...	140,883·90	86,188	
1903	...	...	...	...	220·00	88	220·00	88	...	...	...	...	...	133,426·62	69,128	
1904	...	...	...	...	1,441·50	577	1,441·50	577	...	...	...	...	...	138,550·04	67,174	
1905	...	...	...	...	3,212·60	1,285	3,212·60	1,285	...	...	...	...	...	127,364·06	55,312	
1906	...	...	...	...	1,279·87	512	1,279·87	512	...	...	...	...	...	149,755·27	57,998	
1907	...	...	...	...	1,093·53	438	1,093·53	438	10·00	128	...	...	...	142,372·54	55,158	
1908	...	...	...	...	...	...	...	...	57·00	461	727·25	6,914	...	175,247·92	75,694	
1909	...	...	...	...	...	...	...	...	...	...	440·00	3,520	...	214,301·98	90,965	
<b>Total</b>	<b>100·00</b>	<b>300</b>	<b>450·00</b>	<b>247</b>	<b>57,269·50</b>	<b>36,136</b>	<b>57,819·50</b>	<b>36,683</b>	<b>417·75</b>	<b>2,034</b>	<b>1,224·15</b>	<b>10,863</b>	<b>1,515,992·23</b>	<b>708,725</b>		

Period.	WOLFRAM ORE.		ASBESTOS.		LIMESTONE.								DIAMONDS.	
	STATE GENERALLY.		PILBARA GF.		MURCHISON GF.		YILGARN GOLDFIELD.		STATE GENERALLY.		TOTAL.		PILBARA GF.	
	Quantity.	Value.	Quantity.	Value.	Cue District.		Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
					Quantity.	Value.								
tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	carats.	£	
Previous to 1899	...	...	...	...	...	...	...	...	...	...	...	...	...	...
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	...
1908	...	...	40·00	1,600	...	...	...	...	...	...	...	...	...	...
1909	5·00	90	2·83	154	...	...	...	...	...	...	...	...	...	...
<b>Total</b>	<b>5·00</b>	<b>90</b>	<b>42·83</b>	<b>1,754</b>	<b>298·00</b>	<b>772</b>	<b>2,548·85</b>	<b>1,607</b>	<b>90,858·89</b>	<b>15,911</b>	<b>93,705·73</b>	<b>18,290</b>	<b>...</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 XXI, pages 300-3. \* Weight unknown.

TABLE X.

QUANTITY AND VALUE OF BLACK TIN REPORTED TO THE MINES DEPARTMENT DURING 1909,  
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1909.				TOTALS 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 ..	..	87.70	87.70	7,038	..	1,264.04	1,264.04	99,012
Mills Find ..	..	Sundry claims ..	..	..	..	..	..	.85	.85	69
Moolyella ..	..	Voided leases ..	..	..	..	..	..	330.53	330.53	21,340
Do. ..	..	Sundry claims ..	..	124.01	124.01	9,603	..	2,326.56	2,326.56	205,217
Old Shaw ..	..	Voided leases ..	..	..	..	..	..	6.75	6.75	424
Do. ..	..	Sundry claims ..	..	..	..	..	..	214.04	214.04	14,525
Wodgina ..	(88) ..	Chamberlain ..	..	..	..	..	..	.35	.35	60
Do. ..	(85) ..	Commonwealth ..	..	..	..	..	..	2.95	2.95	348
Do. ..	84 ..	(Mount Cassiterite) ..	..	..	..	..	133.52	13.85	147.37	14,184
Do. ..	84, 93, 148	Mount Cassiterite leases ..	79.00	..	79.00	5,530	91.50	..	91.50	6,342
Do. ..	93 ..	(Mount Cassiterite North) ..	..	..	..	..	9.67	..	9.67	971
Do. ..	8) ..	Tinstone ..	2.75	..	2.75	220	14.70	..	14.70	1,390
Do. ..	..	Voided leases ..	..	..	..	..	..	6.10	6.10	461
Do. ..	..	Sundry claims ..	..	.50	.50	40	.78	45.00	45.78	3,995
		<b>Totals ..</b>	<b>81.75</b>	<b>212.21</b>	<b>293.96</b>	<b>22,431</b>	<b>253.47</b>	<b>4,207.72</b>	<b>4,461.19</b>	<b>368,338</b>
<b>MURCHISON GOLDFIELD.</b>										
<b>CUE DISTRICT.</b>										
Poona ..	..	Sundry claims ..	..	1.52	1.52	118	..	1.52	1.52	118
		<b>Totals ..</b>	<b>..</b>	<b>1.52</b>	<b>1.52</b>	<b>118</b>	<b>..</b>	<b>1.52</b>	<b>1.52</b>	<b>118</b>
<b>GREENBUSHES MINERAL FIELD.</b>										
Greenbushes	(357, 359, 360, 367, 408)	Aurora leases ..	..	..	..	..	..	19.95	19.95	1,472
Do. ..	(496) ..	Birthday ..	..	.15	.15	9	..	1.65	1.65	107
Do. ..	296 ..	(Central) ..	..	..	..	..	..	100.16	100.16	9,728
Do. ..	(484) ..	Champion ..	..	1.60	1.60	128	..	3.05	3.05	248
Do. ..	(357, 359, 360, 367, 408)	(Consolidated Tin Sluicing and Mining Co., N.L.)	..	..	..	..	..	36.85	36.85	3,429
Do. ..	356 ..	Cornwall ..	14.76	..	14.76	1,161	32.25	13.63	45.88	3,950
Do. ..	369 ..	Enterprise ..	..	..	..	..	..	3.67	3.67	284
Do. ..	497 ..	Excelsior Tin Mining Co., Ltd. ..	..	2.20	2.20	146	..	4.05	4.05	281
Do. ..	337 ..	Gladstone ..	..	6.48	6.48	468	..	56.45	56.45	4,828
Do. ..	375 ..	(Glasgow) ..	..	..	..	..	..	.93	.61	150
Do. ..	35, 169, 218, 272, 287, 295, 296, 331, 375, 395, 421, 425	Greenbushes Development Co., Ltd.	.35	139.35	139.70	10,463	.35	460.25	460.60	35,742
Do. ..	(357, 359, 360)	(Greenbushes Sluicing Co., Ltd.)	..	..	..	..	..	25.33	25.33	2,234
Do. ..	147 ..	Haphazard ..	..	.15	.15	9	.28	8.79	9.07	573
Do. ..	35 ..	(Horan's) ..	..	..	..	..	..	188.35	188.35	11,605
Do. ..	16) ..	(Horan's No. 1 North) ..	..	..	..	..	..	9.50	9.50	684
Do. ..	73, 233, 271	King Tin leases ..	1.81	2.98	4.79	308	3.76	18.83	22.59	2,194
Do. ..	331 ..	(Lady Esther) ..	..	..	..	..	..	10.00	10.00	744
Do. ..	454 ..	(Legado) ..	..	..	..	..	..	5.60	5.60	555
Do. ..	470 ..	Little Wonder ..	5.00	25.38	30.38	2,812	5.00	31.08	36.08	3,308
Do. ..	374 ..	Lost and Found ..	..	..	..	..	8.35	.85	9.20	937
Do. ..	(393) ..	Lost and Found North ..	1.70	..	1.70	119	11.02	..	11.02	915
Do. ..	460, 461	Mt. Jones leases ..	..	13.75	13.75	1,310	..	13.75	13.75	1,310
Do. ..	73 ..	(Nelson) ..	..	..	..	..	..	22.40	22.40	1,675
Do. ..	73, 233	(Nelson's leases) ..	..	..	..	..	..	61.01	61.01	4,164
Do. ..	(423, 471)	Nickel Kramer Tin Mining Co., Ltd.	..	.48	.48	40	..	9.17	9.17	726

TABLE X.—Quantity and Value of BLACK TIN, etc.—continued.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1909.				TOTALS TO DATE.			
			Quantity.			Value.	Quantity.			Value.
			Lode.	Stream.	Total.		Lode.	Stream.	Total.	
			tons.	tons.	tons.	£	tons.	tons.	tons.	£
GREENBUSHES MINERAL FIELD—continued.										
Greenbushes	(396, 397) 460, 461, (479, 480)	(Norilup Tin Mining and Dredging Co., Ltd.)	..	..	..	..	..	3·82	3·82	291
Do.	(399)	North Cornwall	..	..	..	..	1·72	..	1·72	184
Do.	504	Old Bunbury	..	8·65	8·65	605	..	8·65	8·65	605
Do.	271	(Pioneer)	..	..	..	..	..	1·84	1·84	117
Do.	505	Scotia	..	5·25	5·25	332	..	5·25	5·25	332
Do.	300	South Cornwall	11·00	..	11·00	843	15·55	15·09	30·64	2,407
Do.	450, 458, 485, 486, 487, 488, 489	Stanhope United leases	..	33·05	33·05	3,051	..	111·49	111·49	9,280
Do.	218	(W.A. Mt. Bischoff)	..	..	..	..	..	5·38	5·38	342
Do.	(391), 454	(Westralia and Legado leases)	..	3·05	3·05	226	..	20·89	20·89	1,645
Do.	454, 501	Westralia and Legado leases	..	13·99	13·99	944	..	13·99	13·99	944
Do.	(381, 435), 436, 472, 478	Westralian Gully Tin Co., Ltd.	5·53	·85	6·38	537	5·53	34·38	39·91	3,183
Do.	35, 169, 218, 272, 287, 295	(Westralian Stanneries, Ltd.)	..	..	..	..	..	109·33	109·33	8,171
Do.	..	Voided leases	..	..	..	..	24·45	228·75	253·20	18,924
Do.	Loc. 289, 290	Freehold ground (Clarth and others)	..	10·55	10·55	660	..	318·04	318·04	28,959
Do.	..	Sundry claims	425	146·44	150·69	10,615	15·69	5,211·52	5,227·21	343,455
		<b>Totals</b>	<b>44·40</b>	<b>414·35</b>	<b>458·75</b>	<b>34,786</b>	<b>124·88</b>	<b>7,193·40</b>	<b>7,318·28</b>	<b>510,682</b>

TABLE XI.

QUANTITY AND VALUE OF TANTALITE REPORTED TO THE MINES DEPARTMENT DURING 1909, AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1909.				TOTAL TO DATE.			
			Quantity.			Value.	Quantity.			Value.
			Lode.	Stream.	Total.		Lode.	Stream.	Total.	
			tons.	tons.	tons.	£	tons.	tons.	tons.	£
PILBARA GOLDFIELD.										
MARBLE BAR DISTRICT.										
Wodgina	86, 87..	H.M. and Anchorite leases	·45	..	·45	113	2·25	32·30	34·55	5,558
Do.	..	Sundry claims	..	..	..	..	..	51·50	51·50	6,124
		<b>Totals</b>	<b>·45</b>	<b>..</b>	<b>·45</b>	<b>113</b>	<b>2·25</b>	<b>83·80</b>	<b>86·05</b>	<b>11,682</b>
GREENBUSHES MINERAL FIELD.										
Greenbushes	369	Enterprise	..	·85	·85	214	..	3·19	3·19	1,804
		<b>Totals</b>	<b>..</b>	<b>·85</b>	<b>·85</b>	<b>214</b>	<b>..</b>	<b>3·19</b>	<b>3·19</b>	<b>1,804</b>

TABLE XII.

QUANTITY AND VALUE OF COPPER ORE REPORTED TO THE MINES DEPARTMENT DURING 1909,  
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1909.			TOTALS TO DATE.		
			Quantity.		Value.	Quantity.		Value.
			Ore.	Metallic Copper.		Ore.	Metallic Copper.	
			tons.	tons.	£	tons.	tons.	£
<b>PILBARA GOLDFIELD.</b>								
<b>MARBLE BAR DISTRICT.</b>								
North Shaw ..	147 ..	Roy Hill Copper Mine ..	..	..	..	7.77	1.90	190
		<b>Totals ..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>7.77</b>	<b>1.90</b>	<b>190</b>
<b>WEST PILBARA GOLDFIELD.</b>								
Croydon ..	31 ..	Evelyn : British Exploration of Aus- tralasia, Ltd.	30.00	5.80	100	549.00	..	6,463
Do.	..	Voided leases..	..	..	..	55.00	..	870
Egina ..	(91) ..	Egina ..	..	..	..	12.00	1.20	72
Do.	..	Voided leases..	..	..	..	530.00	..	6,571
Roebourne ..	(65) ..	(Carlow Castle) ..	..	..	..	6.00	1.00	100
Do.	(65) ..	Carlow Castle : Roebourne Copper and Gold Mines (W.A.), N.L.	..	..	..	81.00	19.88	1,415
Do.	(73) ..	Ena Extended ..	..	..	..	6.50	.77	55
Do.	118 ..	Ena Reward ..	..	..	..	20.00	2.87	150
Do.	64 ..	Fortune ..	20.40	4.24	248	30.40	6.74	393
Do.	77 ..	Lilly Blanche Copper Mine ..	..	..	..	997.00	186.99	17,541
Do.	G.M.L., 150	Q.E. ..	41.10	6.65	391	41.10	6.65	391
Do.	P.A. 100..	(Smallpage, F.) ..	37.00	8.43	482	37.00	8.43	482
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.	7,007.00	1,016.40	61,226	19,742.00	..	206,929
Do.	..	Voided leases..	..	..	..	30.00	..	250
		<b>Totals ..</b>	<b>7,135.50</b>	<b>1,041.52</b>	<b>62,447</b>	<b>24,327.00</b>	<b>..</b>	<b>256,464</b>
<b>ASHBURTON GOLDFIELD.</b>								
Red Hill ..	(62) ..	Cane Copper Mine ..	..	..	..	175.50	33.85	2,126
Uaroo ..	(60) ..	Pedan ..	..	..	..	6.00	1.00	71
Do.	(52) ..	Phoenix Copper Mine ..	..	..	..	6.50	1.94	114
Do.	81 ..	Walgo Copper Mine ..	10.75	4.31	259	10.75	4.31	259
		<b>Totals ..</b>	<b>10.75</b>	<b>4.31</b>	<b>259</b>	<b>198.75</b>	<b>41.10</b>	<b>2,570</b>
<b>EAST MURCHISON GOLDFIELD.</b>								
<b>LAWLERS DISTRICT.</b>								
Kathleen Valley	12 ..	Shepherd ..	..	..	..	6.77	1.32	69
		<b>Totals ..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>6.77</b>	<b>1.32</b>	<b>69</b>
<b>MURCHISON GOLDFIELD.</b>								
<b>NANNINE DISTRICT.</b>								
Gabanintha ..	4N ..	(Lady Alma) ..	..	..	..	6.50	..	135
Do.	4N ..	Lady Alma : Star of the East G.M., Co., Ltd.	608.00	44.00	2,823	608.00	44.00	2,823
Do.	G.M.Ls. 379N, 504N, 505	Mountain View leases ..	..	..	..	127.00	..	2,681
		<b>Totals ..</b>	<b>608.00</b>	<b>44.00</b>	<b>2,823</b>	<b>741.50</b>	<b>..</b>	<b>5,639</b>
<b>DAY DAWN DISTRICT.</b>								
Day Dawn ..	G.M.L. 14D	Crocus : Murchison Associated G.Ms., Ltd.	..	..	..	6.50	1.02	84
Do.	P.A. 65D..	(Canning G.C.) ..	..	..	..	25.21	2.50	190
Do.	..	Voided leases..	..	..	..	15.65	..	167
		<b>Totals ..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>47.36</b>	<b>..</b>	<b>441</b>



TABLE XII.—Quantity and Value of COPPER ORE, etc.—continued.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1909.			TOTALS TO DATE.		
			Quantity.		Value.	Quantity.		Value.
			Ore.	Metallic Copper.		Ore.	Metallic Copper.	
			tons.	tons.	£	tons.	tons.	£
<b>YALGOO GOLDFIELD.</b>								
Twin Peaks ..	P.A. 155..	(Summers, S. D.) .. ..	..	..	..	19·50	3·49	227
Wadingarra ..	6 ..	Olive Queen .. ..	..	..	..	31·91	·98	91
		<b>Totals .. ..</b>	..	..	..	<b>51·41</b>	<b>4·47</b>	<b>318</b>
<b>NORTHAMPTON MINERAL FIELD.</b>								
Geraldine ..	..	Voided leases .. ..	..	..	..	136·50	..	1,992
		<b>Totals .. ..</b>	..	..	..	<b>136·50</b>	..	<b>1,992</b>
<b>YANDANOOKA MINERAL FIELD.</b>								
Arriño ..	..	Sundry claims .. ..	..	..	..	126·05	18·48	1,386
Yandanooka ..	Freehold Gd.	Muggawa Copper Mine .. ..	..	..	..	7·50	1·20	96
Do. ..	..	Voided leases .. ..	..	..	..	38·00	..	407
		<b>Totals .. ..</b>	..	..	..	<b>171·55</b>	..	<b>1,889</b>
<b>MOUNT MARGARET GOLDFIELD.</b>								
<b>MOUNT MORGANS DISTRICT.</b>								
Eulaminna ..	[10c, 11c, (12c, 37c)]	(Mount Malcolm Copper Mine)..	..	..	..	13,516·00	..	70,754
Do. ..	[10c, 11c, 4F, 5F]	(Mount Malcolm Copper Mine)..	..	..	..	3,839·00	..	17,065
Do. ..	[10c, 11c, (12c, 37c)]	(Murrin Copper Mines, Ltd.) ..	..	..	..	19,165·00	..	45,817
Do. ..	4F, 5F, 11F, 12F	West Australian Copper Co., Ltd... ..	..	..	..	9,749·05	..	80,199
Murrin Murrin..	(G.M.L. 207F)	Bound to Win .. ..	..	..	..	8·12	3·55	156
Do. ..	18F ..	Nangeroo .. ..	..	..	..	6·80	3·00	160
Do. ..	(13F) ..	Trafalgar .. ..	..	..	..	15·20	..	267
Do. ..	..	Voided leases .. ..	..	..	..	1,501·97	..	16,239
Mt. Margaret ..	G.M.L. 66F	Mt. Morven .. ..	..	..	..	11·53	..	163
		<b>Totals .. ..</b>	..	..	..	<b>47,857·67</b>	..	<b>230,820</b>
<b>MOUNT MARGARET DISTRICT.</b>								
Burtville ..	16T ..	Dreadnought .. ..	..	..	..	2·85	·29	26
		<b>Totals .. ..</b>	..	..	..	<b>2·85</b>	<b>·29</b>	<b>26</b>
<b>NORTH COOLGARDIE GOLDFIELD.</b>								
<b>MENZIES DISTRICT.</b>								
Goongarrie ..	13z ..	(Providence Copper Mining Co., N.L.) ..	..	..	..	4·70	·42	33
Do. ..	..	Sundry claims .. ..	..	..	..	1·42	·40	18
		<b>Totals .. ..</b>	..	..	..	<b>6·12</b>	<b>·82</b>	<b>51</b>
<b>EAST COOLGARDIE GOLDFIELD.</b>								
<b>EAST COOLGARDIE DISTRICT.</b>								
Boorara ..	100E ..	Premier Copper Mine .. ..	..	..	..	50·67	6·22	330
		<b>Totals .. ..</b>	..	..	..	<b>50·67</b>	<b>6·22</b>	<b>330</b>

TABLE XII.—Quantity and Value of COPPER ORE, etc.—continued.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1909.			TOTALS TO DATE.		
			Quantity.		Value.	Quantity.		Value.
			Ore.	Metallic Copper.		Ore.	Metallic Copper.	
			tons.	tons.	£	tons.	tons.	£
<b>PHILLIPS RIVER GOLDFIELD.</b>								
Kundip	G.M.L. 99	Alice Mary	..	..	..	10.53	..	97
Do.	184	Christmas Gift	75.34	4.77	268	189.05	..	1,226
Do.	G.M.L. 147	Fair Play	34.04	.03	2	34.04	.03	2
Do.	G.M.Ls. 136, 137, 138	Flag Gold and Copper Mining Co., Ltd.	1,406.95	96.09	5,880	1,709.84	120.76	7,118
Do.	52, 94	(Harbour View leases)	..	..	..	604.36	..	4,524
Do.	52, 94	Harbour View leases	69.07	9.07	526	435.39	51.66	2,667
Do.	G.M.L. 81	Harbour View North	..	..	..	2.92	..	29
Do.	G.M.L. 98	Hillsborough	456.66	4.71	282	667.84	10.04	666
Do.	G.M.L. 150	Kundip	5.08	.93	56	5.08	.93	56
Do.	52, 94	(Ravensthorpe G.M. Syndicate, N.L.)	..	..	..	132.56	..	1,582
Do.	(M.L. 60)	(Red, White and Blue)	32.18	6.95	709	481.62	..	3,741
Do.	(M.L. 60)	(Red, White and Blue): Flag Gold and Copper M. Co., Ltd.	..	1.49	103	84.29	5.82	327
Do.	..	Voided leases	..	..	..	435.50	..	3,701
Do.	..	Sundry claims	37.24	4.45	262	55.58	..	605
Mt. Desmond	95	(Elverdtton)	..	..	..	130.00	..	570
Do.	95	(Elverdtton: Phillips River Option Syndicate, Ltd.)	..	..	..	2,946.02	..	22,657
Do.	95	Elverdtton: Phillips River Gold and Copper Co., Ltd.	1,242.62	140.27	7,329	2,514.78	235.19	13,174
Do.	168	(Elverton South)	..	..	..	18.48	..	119
Do.	275	Ironclad	..	..	..	73.77	10.38	518
Do.	109	(Mt. Desmond)	..	..	..	198.87	..	1,640
Do.	109	Mt. Desmond: Phillips River Gold and Copper Co., Ltd.	..	..	..	1,285.91	..	13,775
Dn.	199	P.L.P.	..	..	..	193.83	..	2,126
Do.	257	Thistle and Shamrock	10.51	.71	42	80.59	12.53	779
Do.	..	Voided leases	..	..	..	211.68	..	2,240
Do.	..	Sundry claims	..	..	..	34.10	..	433
Ravensthorpe	205	Ballarat	79.39	8.32	492	199.70	..	1,876
Do.	295	Commonwealth	19.98	2.08	103	19.98	2.08	103
Do.	124	Emily Hale	..	..	..	132.27	..	1,192
Do.	(210)	Great Oversight	..	..	..	73.28	..	524
Do.	116	Last Chance	68.84	7.15	334	943.83	..	8,782
Do.	(200)	Last Chance Proprietary	..	..	..	238.07	..	2,257
Do.	16	(Marion Martin)	..	..	..	865.69	..	6,650
Do.	16	Marion Martin: Phillips River Gold and Copper Co., Ltd.	179.94	22.49	1,304	876.92	73.59	5,165
Do.	7	Mary	79.52	9.63	547	875.26	..	6,174
Do.	175	(Mount Benson)	..	..	..	605.19	..	3,702
Do.	175	Mount Benson: Phillips River Gold and Copper Co., Ltd.	296.29	25.51	1,405	1,087.66	..	5,227
Do.	15	(Mt. Cattlin)	..	..	..	281.56	..	1,716
Do.	15	(Mt. Cattlin: Mount Cattlin Copper Mining Co., Ltd.)	251.09	11.24	674	6,608.76	333.59	28,841
Do.	15	(Mt. Cattlin: Phillips River Gold and Copper Co., Ltd.)	..	..	..	1,263.76	80.26	7,646
Do.	15	Mt. Cattlin: Phillips River Gold and Copper Co., Ltd.	2,866.65	166.95	8,905	2,866.65	166.95	8,905
Do.	219	Mount Cattlin West	12.02	2.09	125	61.50	..	487
Do.	204	New Moon	9.82	1.04	61	62.37	..	618
Do.	(115)	Sunset	..	..	..	553.70	..	3,460
Do.	114	Surprise	5.16	.89	52	471.62	..	3,605
Do.	..	Voided leases	..	..	..	510.42	..	3,273
Do.	..	Sundry claims	67.42	2.69	156	140.81	..	652
West River	293	Last Venture	22.12	2.93	167	35.57	5.23	276
Do.	..	Voided leases	..	..	..	4.47	.68	68
Do.	..	Sundry claims	..	..	..	118.29	..	1,698
		From Goldfield generally	2.77	.51	31	2.77	3.65	259
<b>Totals</b>			<b>7,330.70</b>	<b>532.99</b>	<b>29,815</b>	<b>31,436.63</b>	<b>..</b>	<b>187,328</b>
<b>STATE GENERALLY.</b>								
Jerramungup	(59H)	Netty Copper Mine	..	..	..	3.08	1.26	40
Twin Peaks	(P.A. 105H)	(Tibbets, W. H.)	..	..	..	13.15	2.27	193
<b>Totals</b>			<b>..</b>	<b>..</b>	<b>..</b>	<b>16.58</b>	<b>3.53</b>	<b>233</b>

TABLE XIII.

QUANTITY AND VALUE OF IRONSTONE REPORTED TO THE MINES DEPARTMENT DURING 1909,  
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1909.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons.	£
WEST PILBARA GOLDFIELD.						
Whim Creek ...	...	Voided leases ...	...	...	100'00	300
		<b>Totals ...</b>	...	...	<b>100'00</b>	<b>300</b>
EAST COOLGARDIE GOLDFIELD.						
EAST COOLGARDIE DISTRICT.						
Boulder ...	...	Voided leases ...	...	...	450'00	247
		<b>Totals ...</b>	...	...	<b>450'00</b>	<b>247</b>
STATE GENERALLY.						
Avon ...	...	...	...	...	22,223 00	16,241
Clackline ...	...	...	...	...	18,253 50	8,789
Coates' Paddock ...	...	...	...	...	4,712 00	3,277
Greenbushes ...	...	...	...	...	7,481 00	4,629
Werribee ...	...	...	...	...	4,600 00	3,200
		<b>Totals ...</b>	...	...	<b>57,269 50</b>	<b>36,136</b>

TABLE XIV.

QUANTITY AND VALUE OF LEAD ORE REPORTED TO THE MINES DEPARTMENT DURING 1909,  
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1909.			TOTALS TO DATE.		
			Lead Ore.	Metal therefrom.	Value.	Lead Ore.	Metal therefrom.	Value.
			tons.	tons.	£	tons.	tons.	£
<b>NORTHAMPTON MINERAL FIELD.</b>								
Geraldine ...	112	Kingdom Come ...	...	...	...	57·00	41·61	461
Narra Tarra ...	...	Sundry claims ...	...	...	...	225·00	...	185
Northampton ...	80	Ethel Maude ...	...	...	...	10·00	6·50	128
Do. ...	...	Voided leases ...	...	...	...	106·75	...	1,048
Victoria ...	...	Voided leases ...	...	...	...	19·00	...	212
		<b>Totals ...</b>	...	...	...	<b>417·75</b>	...	<b>2,084</b>

TABLE XV.

QUANTITY AND VALUE OF SILVER-LEAD ORE REPORTED TO THE MINES DEPARTMENT DURING 1909,  
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1909.		T TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons	£
<b>ASHBURTON GOLDFIELD.</b>						
Ashburton ...	...	Voided leases ...	...	...	56·90	429
Uaroo ...	43, 49	Uaroo Silver-Lead Mines ...	440·00	3,520	1,167·25	10,434
		<b>Totals ...</b>	<b>440·00</b>	<b>3,520</b>	<b>1,224·15</b>	<b>10,863</b>

TABLE XVI.

QUANTITY AND VALUE OF COAL REPORTED TO THE MINES DEPARTMENT DURING 1909,  
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1909.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons.	£
<b>COLLIE RIVER MINERAL FIELD.</b>						
Collie ...	197	Cardiff Coal Mining Co., Ltd. ... ..	28,266·90	12,460	203,806·53	88,431
Do. ...	151	(Collie-Boulder Coal Co., Ltd.) ... ..	...	...	71,512·70	26,139
Do. ...	244	Collie Co-operative Collieries, Ltd. ... ..	48,241·78	21,971	156,341·40	68,464
Do. ...	88 (part of)	Collie Proprietary Coalfields of W.A., Ltd. (No. 1 Pit)	1,604·00	723	427,553·55	217,834
Do. ...	85-100	Collie Proprietary Coalfields of W.A., Ltd. (No. 2 Pit)	74,115·00	33,966	489,083·40	245,066
Do. ...	151	Scottish Collieries Company ... ..	60,939·25	21,322	140,989·75	49,338
Do. ...	250-254, 256	Westralian Coal Mining Co., Ltd. ... ..	1,135·05	523	1,135·05	523
Do. ...	...	Voided leases ... ..	...	...	25,569·85	12,930
		<b>Totals ... ..</b>	<b>214,301·98</b>	<b>90,965</b>	<b>1,515,992·23</b>	<b>708,725</b>

TABLE XVII.

QUANTITY AND VALUE OF LIMESTONE REPORTED TO THE MINES DEPARTMENT DURING 1909,  
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1909.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons.	£
<b>MURCHISON GOLDFIELD.</b>						
CUE DISTRICT.						
Cuddingwarra	3	Linella ... ..	...	...	298·00	772
		<b>Totals ... ..</b>	...	...	<b>298·00</b>	<b>772</b>
<b>YILGARN GOLDFIELD.</b>						
Southern Cross	...	Voided leases ... ..	...	...	2,548·85	1,607
		<b>Totals ... ..</b>	...	...	<b>2,548·85</b>	<b>1,607</b>
<b>STATE GENERALLY.</b>						
Fremantle ...	...	... ..	...	...	90,858·88	15,911
		<b>Totals ... ..</b>	...	...	<b>90,858·88</b>	<b>15,911</b>

TABLE XVIII.

QUANTITY AND VALUE OF ASBESTOS REPORTED TO THE MINES DEPARTMENT DURING 1909,  
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1909.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			tons.	£	tons.	£
PILBARA GOLDFIELD.						
MARBLE BAR DISTRICT.						
Soansville ...	155, etc.	Pilbara Asbestos Co., Ltd. ... ..	2·83	154	42·83	1,754
		Totals ... ..	2·83	154	42·83	1,754

TABLE XIX.

QUANTITY AND VALUE OF WOLFRAM REPORTED TO THE MINES DEPARTMENT DURING 1909,  
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1909.			TOTALS TO DATE.		
			Ore.	Metallic contents.	c.	Ore.	Metallic contents.	Value.
			tons.	tons.	£	tons.	tons.	£
STATE GENERAL								
Derby ...	146H	Taylor's Wolfram Reward ... ..	5·00	1·00	90	5·00	1·00	90
		Totals ... ..	5·00	1·00	90	5·00	1·00	90

TABLE XX.

QUANTITY AND VALUE OF DIAMONDS REPORTED TO THE MINES DEPARTMENT DURING 1909,  
AND TOTALS TO DATE.

LOCALITY.	NUMBER OF LEASE, CLAIM, OR AREA.	REGISTERED NAME OF COMPANY OR LEASE.	1909.		TOTALS TO DATE.	
			Quantity.	Value.	Quantity.	Value.
			carats.	£	carats.	£
PILBARA GOLDFIELD.						
NULLAGINE DISTRICT.						
Nullagine ...	M.R.C.6L	(Morgans, A. E.) ... ..	...	...	...	24
		Totals ... ..	...	...	...	24

TABLE

## RETURN OF ORE AND MINERALS OTHER THAN GOLD

YEAR.	COPPER.													Total Value of Copper Exported.
	COPPER ORE.										COPPER INGOT, MATTE, Etc.			
	West Pilbara Gf.		Northampton Mf.		Phillips River Gf.		State generally.		Total.		State generally.			
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.		
	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	£	
1850	...	...	...	...	...	...	...	...	...	...	...	...	...	
1	...	...	...	...	...	...	...	...	...	...	...	...	...	
2	...	...	...	...	...	...	...	...	...	...	...	...	...	
3	...	...	2†	7	...	...	...	...	...	7	...	...	7	
4	...	...	...	...	...	...	...	...	...	...	...	...	...	
5	...	...	2	26	...	...	...	...	2	26	...	...	26	
6	...	...	57	1,018	...	...	...	...	57	1,018	...	...	1,018	
7	...	...	80	1,920	...	...	...	...	80	1,920	...	...	1,920	
8	...	...	433	9,531	...	...	...	...	433	9,531	...	...	9,531	
9	...	...	941	14,122	...	...	...	...	941	14,122	...	...	14,122	
1860	...	...	517	8,021	...	...	...	...	517	8,021	...	...	8,021	
1	...	...	409	6,339	...	...	...	...	409	6,339	...	...	6,339	
2	...	...	783	12,536	...	...	...	...	783	12,536	...	...	12,536	
3	...	...	763	12,208	...	...	...	...	763	12,208	...	...	12,208	
4	...	...	1,076	17,216	...	...	...	...	1,076	17,216	...	...	17,216	
5	...	...	886	13,290	...	...	...	...	886	13,290	...	...	13,290	
6	...	...	557	8,362	...	...	...	...	557	8,362	...	...	8,362	
7	...	...	337	5,055	...	...	...	...	337	5,055	...	...	5,055	
8	...	...	83	1,245	...	...	...	...	83	1,245	...	...	1,245	
9	...	...	155	2,325	...	...	...	...	155	2,325	...	...	2,325	
1870	...	...	.6	90	...	...	...	...	6	90	...	...	90	
1	...	...	...	...	...	...	...	...	...	...	...	...	...	
2	...	...	...	...	...	...	...	...	...	...	...	...	...	
3	...	...	56	848	...	...	...	...	56	848	...	...	848	
4	...	...	67	998	...	...	...	...	67	998	...	...	998	
5	...	...	205	3,071	...	...	...	...	205	3,071	...	...	3,071	
6	...	...	279	4,185	...	...	...	...	279	4,185	...	...	4,185	
7	...	...	54	803	...	...	...	...	54	803	...	...	803	
8	...	...	9	135	...	...	...	...	9	135	...	...	135	
9	...	...	...	...	...	...	...	...	...	...	...	...	...	
1880	...	...	8	120	...	...	...	...	8	120	...	...	120	
1	...	...	...	...	...	...	...	...	...	...	...	...	...	
2	...	...	2	23	...	...	...	...	2	23	...	...	23	
3	...	...	5	75	...	...	...	...	5	75	...	...	75	
4	...	...	118	1,770	...	...	...	...	118	1,770	...	...	1,770	
5	...	...	120	1,793	...	...	...	...	120	1,793	...	...	1,793	
6	...	...	249	3,735	...	...	...	...	249	3,735	...	...	3,735	
7	...	...	23	345	...	...	...	...	23	345	...	...	345	
8	...	...	88	1,488	...	...	...	...	88	1,488	...	...	1,488	
9	...	...	112	1,904	...	...	...	...	112	1,904	...	...	1,904	
1890	...	...	8	136	...	...	...	...	8	136	...	...	136	
1	263	4,462	...	...	...	...	...	...	263	4,462	...	...	4,462	
2	† 412	6,319	155	2,377	...	...	...	...	567	8,696	...	...	8,696	
3	50	606	...	...	...	...	...	...	50	606	...	...	606	
4	...	...	...	...	...	...	...	...	...	...	...	...	...	
5	802	12,832	24	120	...	...	...	...	826	12,952	...	...	12,952	
6	6	100	...	...	...	...	...	...	6	100	...	...	100	
7	65	731	21	302	...	...	...	...	86	1,033	...	...	1,033	
8	281	3,334	75	932	...	...	...	...	356	4,266	...	...	4,266	
9	1,404	31,979	587	9,473	...	...	...	...	1,991	41,452	...	...	41,452	
1900	544	10,696	...	...	105	2,411	197	3,355	846	16,462	249	17,475	33,937	
1	1,058	26,464	1	10	1,205	22,107	397	6,322	2,661	54,903	880	55,866	110,769	
2	68	1,698	20	330	162	2,469	33	489	283	4,986	175	7,918	12,904	
3	4	180	25	460	302	3,538	15	349	346	4,527	1,075	33,288	37,815	
4	50	500	...	...	11	154	310	3,378	371	4,032	102	3,827	7,859	
5	...	...	...	...	80	2,808	713	8,576	793	11,384	794	53,867	65,251	
6	112	3,232	...	...	...	...	224	2,930	336	6,162	343	30,867	36,529	
7	...	...	...	...	...	...	3,727	61,493	3,727	61,493	1,602	141,883	203,376	
8	...	...	...	...	...	...	2,503	29,272	2,503	29,272	479	27,819	57,091	
9	...	...	...	...	...	...	6,959	59,541	6,959	59,541	833	45,103	104,644	
Total	...	...	...	...	...	...	...	...	31,458	461,069	6,532	417,413	878,482	

† See Woodward's Mining Handbook, Perth: By Authority, 1895; page 123.

‡ Weight not stated.

## XXI.

ENTERED FOR EXPORT FROM 1850 TO 1909, INCLUSIVE.

TIN.											YEAR.
BLACK TIN (Dressed Tin).								TIN INGOT. (White tin.)		Total Value of Tin Exported.	
Pilbarra Gf.		Greenbushes Mf.		State generally.		Total.		Greenbushes Mf.			
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.		
tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	£	
...	...	...	...	...	...	...	...	...	...	...	1850
...	...	...	...	...	...	...	...	...	...	...	1
...	...	...	...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	...	...	...	...	...	3
...	...	...	...	...	...	...	...	...	...	...	4
...	...	...	...	...	...	...	...	...	...	...	5
...	...	...	...	...	...	...	...	...	...	...	6
...	...	...	...	...	...	...	...	...	...	...	7
...	...	...	...	...	...	...	...	...	...	...	8
...	...	...	...	...	...	...	...	...	...	...	9
...	...	...	...	...	...	...	...	...	...	...	1860
...	...	...	...	...	...	...	...	...	...	...	1
...	...	...	...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	...	...	...	...	...	3
...	...	...	...	...	...	...	...	...	...	...	4
...	...	...	...	...	...	...	...	...	...	...	5
...	...	...	...	...	...	...	...	...	...	...	6
...	...	...	...	...	...	...	...	...	...	...	7
...	...	...	...	...	...	...	...	...	...	...	8
...	...	...	...	...	...	...	...	...	...	...	9
...	...	...	...	...	...	...	...	...	...	...	1870
...	...	...	...	...	...	...	...	...	...	...	1
...	...	...	...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	...	...	...	...	...	3
...	...	...	...	...	...	...	...	...	...	...	4
...	...	...	...	...	...	...	...	...	...	...	5
...	...	...	...	...	...	...	...	...	...	...	6
...	...	...	...	...	...	...	...	...	...	...	7
...	...	...	...	...	...	...	...	...	...	...	8
...	...	...	...	...	...	...	...	...	...	...	9
...	...	...	...	...	...	...	...	...	...	...	1880
...	...	...	...	...	...	...	...	...	...	...	1
...	...	...	...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	...	...	...	...	...	3
...	...	...	...	...	...	...	...	...	...	...	4
...	...	...	...	...	...	...	...	...	...	...	5
...	...	...	...	...	...	...	...	...	...	...	6
...	...	...	...	...	...	...	...	...	...	...	7
...	...	...	...	...	...	...	...	...	...	...	8
...	...	...	...	...	...	...	...	...	...	...	9
...	...	5	300	...	...	5	300	...	...	300	1890
...	...	68	5,400	...	...	68	5,400	...	...	5,400	1
...	...	204	10,200	...	...	204	10,200	...	...	10,200	2
...	...	265	13,843	...	...	265	13,843	...	...	13,843	3
57	3,470	171	7,664	...	...	228	11,134	...	...	11,134	4
19	949	371	14,325	...	...	390	15,274	...	...	15,274	5
...	...	277	9,703	...	...	277	9,703	...	...	9,703	6
...	...	137	4,338	...	...	137	4,338	...	...	4,338	7
...	...	96	3,275	...	...	96	3,275	...	...	3,275	8
...	...	68	2,760	...	...	68	2,760	...	...	2,760	9
30	2,025	278	21,138	...	...	308	23,163	...	...	23,163	1900
368	30,146	102	8,032	...	...	470	38,178	142	18,872	57,050	1
439	34,600	68	4,895	...	...	507	39,495	97	12,607	52,102	2
248	19,698	31	2,870	...	...	279	22,568	141	16,830	39,398	3
267	20,988	25	1,868	...	...	292	22,856	235	29,277	52,133	4
64	4,932	24	1,389	3† 379	20,797	467	27,118	129	16,155	43,273	5
188	16,853	119	8,177	3† 666	51,748	973	76,778	...	1	76,779	6
329	28,375	444	46,254	3† 624	64,005	1,397	138,634	45	8,746	147,380	7
...	...	...	...	3† 1,424	151,414	1,424	151,414	78	14,725	166,139	8
...	...	...	...	3† 1,093	83,294	1,093	83,594	2†	1	83,595	9
...	...	...	...	3† 698	65,959	698	65,959	...	...	65,959	Total
...	...	...	...	...	...	9,646	765,984	867	117,214	883,198	

3† Probably the produce of Pilbara Goldfield and Greenbushes Mineral Field



TABLE XXI.—Return of Ore and Minerals other than Gold

YEAR.	SILVER.		LEAD ORE.		SILVER-LEAD ORE.		PIG LEAD.	
	State generally.		Northampton Mf.		State generally.		State generally.	
	Quantity.	Value	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	ozs.	£	tons.	£	tons.	£	tons.	£
1850	...	...	5	55	...	...	...	...
1	...	...	...	...	...	...	...	...
2	...	...	...	...	...	...	...	...
3	...	...	2†	4	...	...	...	...
4	...	...	...	...	...	...	55	1,200
5	...	...	...	...	...	...	122	2,440
6	...	...	25	250	...	...	134	2,675
7	...	...	...	...	...	...	60	1,200
8	...	...	...	...	...	...	120	2,410
9	...	...	...	...	...	...	61	1,220
1860	...	...	13	135	...	...	25	495
1	...	...	98	985	...	...	...	...
2	...	...	79	790	...	...	...	...
3	...	...	9	90	...	...	...	...
4	...	...	230	2,300	...	...	...	...
5	...	...	80	800	...	...	...	...
6	...	...	703	8,436	...	...	...	...
7	...	...	273	3,282	...	...	...	...
8	...	...	902	10,824	...	...	4‡	50
9	...	...	1,100	13,206	...	...	...	...
1870	...	...	699	8,394	...	...	...	...
1	...	...	1,209	14,514	...	...	...	...
2	...	...	420	5,040	...	...	...	...
3	...	...	364	4,368	...	...	...	...
4	...	...	965	11,586	...	...	...	...
5	...	...	2,144	25,725	...	...	...	...
6	...	...	2,289	27,468	...	...	4	89
7	...	...	2,192	26,298	...	...	4‡	155
8	...	...	3,956	47,466	...	...	4‡	15
9	...	...	3,618	43,410	...	...	...	...
1880	...	...	2,775	33,300	...	...	...	...
1	...	...	1,921	15,368	...	...	4‡	89
2	...	...	1,401	11,204	...	...	4‡	20
3	...	...	1,794	14,348	...	...	...	...
4	...	...	1,038	7,266	...	...	...	...
5	...	...	696	4,872	...	...	...	...
6	...	...	465	3,255	...	...	...	...
7	...	...	611	4,277	...	...	...	...
8	...	...	471	4,710	...	...	4‡	120
9	...	...	532	5,320	...	...	4‡	40
1890	...	...	250	2,500	...	...	...	...
1	...	...	214	2,135	...	...	...	...
2	...	...	25	250	...	...	...	...
3	...	...	30	150	...	...	...	...
4	...	...	...	...	...	...	...	...
5	...	...	...	...	...	...	...	...
6	...	...	...	...	...	...	...	...
7	...	...	2‡	4	...	...	4‡	11
8	...	...	5	33	...	...	...	...
9	...	...	16	96	...	...	77	1,077
1900	28,749	3,594	27	242	...	...	...	...
1	60,869	7,609	...	...	...	...	...	...
2	83,293	9,190	...	...	...	...	...	...
3	168,113	19,153	...	...	...	...	...	...
4	399,190	45,912	...	...	...	...	...	...
5	359,744	44,278	...	...	...	...	...	...
6	282,145	37,612	...	...	...	...	...	...
7	189,265	25,382	...	...	211	1,866	...	...
8	168,455	18,877	...	...	518	5,006	...	...
9	176,843	18,778	...	...	211	1,199	...	...
Total	1,916,666	230,335	33,644	334,756	940	8,071	684	13,306

† Weight not stated. ‡ Estimated. § 4 cwts. ¶ Includes Cobalt ore, 2 tons, valued at £41: Plumbago ore, 1 ton, valued at £6.

entered for EXPORT from 1850 to 1909, inclusive—continued.

NON-METALLIC MINERALS.						MINERALS NOT ELSEWHERE INCLUDED.		Total Value of Minerals other than Gold, Exported to Date.	YEAR.
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.	£	£	
...	...	...	...	...	...	...	...	55	1850
...	...	...	...	...	...	...	...	...	1
...	...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	...	...	1,211	3
...	...	...	...	...	...	...	...	2,440	4
...	...	...	...	...	...	...	...	2,951	5
...	...	...	...	...	...	...	...	2,218	6
...	...	...	...	...	...	...	...	4,330	7
...	...	...	...	...	...	...	...	10,751	8
...	...	...	...	...	...	...	...	14,752	9
...	...	...	...	...	...	...	...	9,006	1860
...	...	...	...	...	...	...	...	7,129	1
...	...	...	...	...	...	...	...	12,626	2
...	...	...	...	...	...	...	...	14,508	3
...	...	...	...	...	...	...	...	18,016	4
...	...	...	...	...	...	...	...	21,726	5
...	...	...	...	...	...	...	...	11,644	6
...	...	...	...	...	...	...	...	15,929	7
...	...	...	...	...	...	...	...	14,451	8
...	...	...	...	...	...	...	...	10,719	9
...	...	...	...	...	...	...	...	14,604	1870
...	...	...	...	...	...	...	...	5,040	1
...	...	...	...	...	...	...	...	4,368	2
...	...	...	...	...	...	...	...	12,434	3
...	...	...	...	...	...	...	...	26,723	4
...	...	...	...	...	...	...	...	30,628	5
...	...	...	...	...	...	...	...	30,638	6
...	...	...	...	...	...	...	...	48,284	7
...	...	...	...	...	...	...	...	43,545	8
...	...	...	...	...	...	...	...	33,300	9
...	...	...	...	...	...	...	...	15,577	1880
...	...	...	...	...	...	...	...	11,224	1
...	...	...	...	...	...	...	...	14,371	2
...	...	...	...	...	...	...	...	7,341	3
...	...	...	...	...	...	...	...	6,642	4
...	...	...	...	...	...	...	...	5,048	5
...	...	...	...	...	...	...	...	8,012	9
...	...	...	...	...	...	...	...	5,175	7
...	...	...	...	...	...	...	...	6,848	8
...	...	...	...	...	...	...	...	4,704	9
...	...	...	...	...	...	...	...	7,671	1890
...	...	...	...	...	...	...	...	14,912	1
...	...	...	...	2†	25	...	...	22,714	2
...	...	...	...	2†	4	...	...	11,744	3
...	...	...	...	...	...	...	...	15,274	4
...	...	...	...	2†	3	...	...	22,658	5
...	...	...	...	...	...	...	...	4,438	6
...	...	...	...	2†	209	...	...	4,532	7
...	...	1	1	...	...	...	...	7,060	8
2†	1	798	772	2†	50	...	...	66,611	9
...	...	355	350	2†	3	...	...	95,261	1900
...	...	971	969	...	...	5	85	171,453	1
...	...	12	12	...	...	...	4	61,551	2
5†	10	110	127	...	...	3	47	109,468	3
...	...	11	7	...	...	7	81	97,132	4
...	...	108	87	...	...	8	5,856	192,251	5
...	...	86	65	...	...	10	1,035	222,621	6
...	...	26	28	...	...	...	...	402,906	7
...	...	*1,447	1,188	...	...	173	4,977	...	...
2†	1,242	13	11	2†	10	53	3,248	176,827	8
...	...	353	183	...	...	...	...	...	...
...	...	*85,647	93,781	...	...	283	1,079	285,623	9
...	1,253	99,550	105,278	...	304	...	16,642	2,501,675	Total.

7† Antimony ore. 8† Includes Tantalite, 18 tons, valued at £5,729. 9† Includes Antimony ore, 25 tons ... = £ 630  
 Scheelite, 4 tons ... = 140  
 Spelter, 73 tons ... = 3,390  
 N.E.I., 71 tons ... = 817  
 Total ... £4,977

\* Bunker Coal.

10† Includes Spelter, 11 tons, valued at ... = £98  
 Tantalite ... = £400  
 N.E.I., 42 tons ... = £2,750  
 Total ... £3,248

11† Includes Wolfram, 1 ton ... = £100  
 Zinc Ingots, 6 tons ... = £113  
 Zinc Concentrates, 13 tons ... = £131  
 Other Concentrates, 29 tons ... = £108  
 N.E.I., 234 tons ... = £627  
 Total ... £1,079



TABLE XXII.—Milling and Cyaniding Plants erected in the respective Goldfields, Districts, etc.—continued.

Lease or Area.	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 Mills.	Ball Mills.	Krupp Mills.	Griffin Mills.	Huntington Mills.	Salford Mills.	Tremain Mills.	Flint Mills.	Other Crushers.					Puddlers.
<b>EAST MURCHISON GOLD-FIELD.</b>																
<b>LAWLERS DISTRICT.</b>																
24, etc.	Bellevue, Ltd. . . . .	40	..	..	..	..	..	..	..	..	..	..	..	..	..	..
532	Brilliant . . . . .	5	..	..	..	..	..	..	..	..	..	6	..	..	..	..
1017	Bronzewing . . . . .	3	..	..	..	..	..	..	..	..	..	2	..	..	..	..
946	Bulletin . . . . .	5	..	..	..	..	..	..	..	..	..	4	..	..	..	..
M.A. 24	Cinderella Battery . . . . .	5	..	..	..	..	..	..	..	..	..	7	..	..	..	..
140	Golden Age . . . . .	20	..	..	..	..	..	..	..	..	..	3	..	..	..	..
542, etc.	Gwalia Consolidated, Ltd.	30	..	..	..	..	..	..	..	..	4	10	5	V.2	..	..
162	Lake Way . . . . .	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
M.A. 11	Lawlers Public Battery . . . . .	10	..	..	..	..	..	..	..	..	1	4	..	..	..	..
113	Nil Desperandum . . . . .	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..
37, etc.	Northern Mines, Ltd. . . . .	40	..	..	..	..	..	..	..	..	..	6	5	V.2	..	..
^11723	State Battery, Lake Darlot . . . . .	10	..	..	..	..	..	..	..	..	..	4	..	..	..	..
^9909	State Battery, Wiluna . . . . .	10	..	..	..	..	..	..	..	..	..	5	..	..	..	..
408, etc.	Vivien G.M. Co., Ltd. . . . .	20	..	..	..	..	..	..	..	..	2	9	5	{ 1 } V.2	..	..
382	Yellow Aster G.M. Co., N.L. . . . .	10	..	..	..	..	..	..	..	..	..	4	..	..	..	..
633	Zangbar . . . . .	10	..	..	..	..	..	..	..	..	..	6	2	..	..	..
	<b>Total . . . . .</b>	<b>228</b>	<b>1</b>	..	..	..	..	..	..	..	<b>7</b>	<b>75</b>	<b>17</b>	<b>7</b>		<b>£183,561</b>
<b>BLACK RANGE DISTRICT.</b>																
4B, etc.	Black Range Mining Co., N.L. . . . .	30	..	..	..	..	..	..	..	..	..	12	..	..	..	..
203B, etc.	Havilah G.M. Co., N.L. . . . .	10	..	..	..	..	..	..	..	..	..	6	..	..	..	..
M.A. 6B	Maning Marley leases . . . . .	10	..	..	..	..	..	..	..	..	..	5	..	..	..	..
135B	Montagu Boulder . . . . .	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6B, etc.	Oroya Black Range, Ltd. . . . .	20	..	..	..	..	..	..	..	..	..	8	4	V.1	..	..
128B, etc.	Pelerin leases . . . . .	5	..	..	..	..	..	..	..	..	..	4	..	..	..	..
M.A. 8B	Reply Battery . . . . .	5	..	..	..	..	..	..	..	..	..	4	..	..	..	..
196B, etc.	Sandstone Development G.M. Co., N.L.	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..
^5254	State Battery, Nunngarra . . . . .	10	..	..	..	..	..	..	..	..	..	10	..	..	..	..
	State Battery, Youanme . . . . .	5	..	..	..	..	..	..	..	..	..	2	..	..	..	..
	<b>Total . . . . .</b>	<b>115</b>	..	..	..	..	..	..	..	..	..	<b>51</b>	<b>4</b>	<b>1</b>		<b>£98,497</b>
<b>MURCHISON GOLDFIELD.</b>																
<b>CUE DISTRICT.</b>																
1458, etc.	Barrambie Ranges G.M. Co., N.L. . . . .	10	..	..	..	..	..	..	..	..	..	4	..	..	..	..
M.A. 24	Blue Bell Battery . . . . .	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..
203, etc.	Cue No. 1 . . . . .	20	..	..	..	..	..	..	..	..	..	8	..	..	..	..
1694	Cue Victory . . . . .	10	..	..	..	..	..	..	..	..	..	4	..	..	..	..
1020	Gem of Cue Extended . . . . .	15	..	..	..	..	..	..	..	..	..	5	..	..	..	..
1661	Golden Gate . . . . .	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1743	Great Saddle . . . . .	10	..	..	..	..	..	..	..	..	..	10	2	..	..	..
T.A. 19	Haydon's Cyanide Works . . . . .	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
1609	Mindoolah Main Reef . . . . .	10	..	..	..	..	..	..	..	..	..	3	..	..	..	..
T.A. 20	McIntyre Cyanide Works . . . . .	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..
1643	Rhinegold . . . . .	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1374	Salisbury . . . . .	10	..	..	..	..	..	..	..	..	..	8	..	..	..	..
^10256	State Battery, Tuckanarra . . . . .	10	..	..	..	..	..	..	..	..	..	4	..	..	..	..
595, etc.	Victory United G.M. Co., N.L. . . . .	20	..	..	..	..	..	..	..	..	..	4	..	..	..	..
	<b>Total . . . . .</b>	<b>128</b>	..	..	..	..	..	..	..	..	..	<b>55</b>	<b>2</b>	..		<b>£49,131</b>
<b>NANNINE DISTRICT.</b>																
238N	Alliance . . . . .	4	..	..	..	..	..	..	..	..	..	3	..	..	..	..
T.A. 62H	Champion Cyanide Works . . . . .	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..
(685N)	Champion Extd. Cyanide Works . . . . .	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..
509N, etc.	Federal City leases . . . . .	10	..	..	..	..	..	..	..	..	..	5	..	..	..	..
477N	Fenian . . . . .	10	..	..	..	..	..	..	..	..	..	4	..	V.1	..	..
708N	Gibraltar . . . . .	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..
475N	Ingliston Consols Extended . . . . .	10	..	..	..	..	..	..	..	..	..	5	..	..	..	..
398N, etc.	Ingliston Extended G.Ms., Ltd. . . . .	10	..	..	..	..	..	..	..	..	..	5	3	1	..	..
666N	Karangahake . . . . .	10	..	..	..	..	..	..	..	..	..	4	..	..	..	..
593N, etc.	Kohinoor South G.M. Co., Ltd. . . . .	10	..	..	..	..	..	..	..	..	..	8	..	..	..	..
361N	Margueritta . . . . .	10	..	..	..	..	..	..	..	..	..	4	..	..	..	..
533N	Marmont . . . . .	10	..	..	..	..	..	..	..	..	..	6	..	..	..	..
379N	Mountain View . . . . .	5	..	..	..	..	..	..	..	..	..	2	1	..	..	..
171N	Mt. Vranizan . . . . .	10	..	..	..	..	..	..	..	..	..	3	..	..	..	..

TABLE XXII.—Milling and Cyaniding Plants erected in the respective Goldfields, Districts, etc.—continued.

Lease or Area.	NAME OF MINE, COMPANY, OR WORKS.	MILLING.											CYANIDING.			Total Value of all Mining Machinery.				
		Batter-ies.	Other Mills.										Leaching Vats.	Agitating Vats.	Filter Presses.					
		Number of Heads of Stampers.	Prospecting Mills.	Ball Mills.	Krupp Mills.	Griffin Mills.	Huntington Mills.	Salford Mills.	Tremain Mills.	Flint Mills.	Other Crushers.	Puddlers.								
<b>MURCHISON GOLDFIELD— continued.</b>																				
<b>NANNINE DISTRICT—continued.</b>																				
32N, etc. 16N, etc.	Nannine Goldfield, Ltd. . . . .	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Mt. Hall, Royalist Consolidated and Nannine leases	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
408N	New Alliance ..	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
172N, etc.	New Murchison King G.Ms. . . . .	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
622N	Phoenix ..	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
843N	Princess Dagmar ..	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
174N	Star of the East, Ltd. . . . .	20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
^9142	State Battery, Meekatharra ..	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
^10910	State Battery, Nannine ..	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	<b>Total .. ..</b>	<b>189</b>	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	<b>DAY DAWN DISTRICT.</b>																			
	Creme D'Or leases ..	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
389D, etc. 1D, etc.	Great Fingall Constd., Ltd. . . . .	40	..	..	..	..	..	..	..	..	..	..	..	..	19	10	V.2	..	..	
370D, etc. 14D, etc.	Hill End leases ..	5	..	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..	
	Murchison Associated G.Ms., Ltd.	10	..	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..	
	<b>Total .. ..</b>	<b>60</b>	..	..	..	..	..	..	..	..	..	..	..	..	27	10	2	..	£215,500	
	<b>MT. MAGNET DISTRICT.</b>																			
	Black Hill Development Co., Ltd.	10	..	..	..	..	..	..	..	..	..	..	..	..	7	..	..	..	..	..
314M, etc. 953M	Britannia ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
964M	Empress ..	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
752M, etc.	Great Boulder No. 1, Ltd. . . . .	10	..	..	..	..	..	..	..	..	..	..	..	..	..	5	V.1	..	..	
30M	Long Reef ..	15	..	..	..	..	..	..	..	..	..	..	..	..	5	..	..	..	..	
784M	New Chum ..	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
M.A. 2M	New Chum Cyanide Works ..	..	..	..	..	..	..	..	..	..	..	..	..	..	12	..	..	..	..	
766M	Ophir ..	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
951M	Paris ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
693M	Piedmont ..	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
^7499	State Battery, Lennonville ..	10	..	2	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..	
^9769 57M	State Battery, Mt. Magnet ..	10	..	..	..	..	..	..	..	..	..	..	..	..	9	..	..	..	..	
	Welcome ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	<b>Total .. ..</b>	<b>85</b>	..	2	..	..	1	..	2	..	..	..	..	..	36	5	1	..	£36,963	
	<b>YALGOO GOLDFIELD.</b>																			
	Baron Rothschild G.Ms., Ltd. . . . .	10	..	..	..	..	..	..	..	..	..	..	..	..	5	..	..	..	..	..
501, etc. 576	Christmas Gift ..	10	..	..	..	..	..	..	..	..	..	..	..	..	7	..	..	..	..	
P.A. 119	(Gloster, A. B.) ..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
495, etc.	Ivanhoe G.M. Co., N.L. . . . .	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
170, etc.	Monarch leases ..	10	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..	
414, etc.	Reward G.Ms., Ltd. . . . .	20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
549	Royal Mint ..	5	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..	
M.A. 8	Royal Standard leases ..	15	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
M.A. 11	Standard Grade ..	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
^11670	State Battery, Messenger's Patch ..	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
(192, etc.)	(Woodleys G.Ms., Ltd.) ..	20	..	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..	
	<b>Total .. ..</b>	<b>105</b>	4	..	..	..	..	..	2	..	..	..	..	..	22	..	..	..	£25,444	
	<b>MT. MARGARET GOLDFIELD.</b>																			
	<b>MT. MORGANS DISTRICT.</b>																			
	Alicia ..	10	..	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..	
254F	Alix Junior leases ..	5	..	..	..	..	..	..	..	..	..	..	..	..	6	2	..	..	..	
208F, etc. 216F	Australia United Cyanide Works	..	..	..	..	..	..	..	..	..	..	..	..	..	7	..	..	..	..	
8F	Millionaire, Ltd. . . . .	5	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..	
174F	Mt. Margaret, Lake View ..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
29F, 30F	Mt. Morgans Transvaal G.Ms., Ltd.	10	..	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..	
66F	Mt. Morven ..	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
200F	Princess Alix ..	5	..	..	..	..	..	..	..	..	..	..	..	..	7	..	..	..	..	
193F, etc.	Proprietary Extended G.Ms. . . . .	20	..	..	..	..	..	..	..	..	..	..	..	..	12	..	..	..	..	
5F, etc.	Westralia Mt. Morgans G.Ms., Co., Ltd.	60	..	..	..	..	..	..	..	..	..	..	..	..	36	..	3	..	..	
	<b>Total .. ..</b>	<b>122</b>	..	..	..	..	..	..	..	..	..	..	..	..	79	2	3	..	£181,850	

TABLE XXII.—Milling and Cyaniding Plants erected in the respective Goldfields, Districts, etc.—continued.

Lease or Area.	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 Mills.	Ball Mills.	Krupp Mills.	Griffin Mills.	Huntington Mills.	Salford Mills.	Tremain Mills.	Flint Mills.					Other Crushers.	Puddlers.
<b>MT. MARGARET GOLDFIELD</b>																	
<i>—continued.</i>																	
<b>Mt MALCOLM DISTRICT.</b>																	
987c	Anglo Saxon .. .. .	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1261c	Bannockburn G.M. Co. .. .	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1120c	Great Western .. .. .	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
218c	Gwalia Proprietary .. .. .	40	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
W.R. 84c	(Hill & party) .. .. .	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..
1083c	Katie .. .. .	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..
1179c	King of the Hills .. .. .	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1172c	Leeta G.M. Co., Ltd. .. .	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
195c, etc.	Leonora Gold Blocks .. .	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
210c	Leonora Main Reefs, Ltd. ..	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
..	Mulcahy Cyanide Works .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
638c	Merton's Reward G.M. Co. ..	15	..	..	..	..	..	..	..	1	..	..	..	2	1	..	..
1168c	Mt. Clifford Battery .. .	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1175c	North Star .. .. .	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
991c	Richmond Gem .. .. .	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
190c, etc.	Sons of Gwalia, Ltd. .. .	50	..	..	..	..	..	..	..	5	..	..	16	11	V.2	..	..
198c, etc.	Sons of Gwalia South G.Ms., Ltd.	10	..	..	..	..	..	..	..	2	1	..	6	5	V.2	..	..
^7121	State Battery, Leonora .. .	10	..	..	..	..	..	..	..	..	..	..	5	3	V.1	..	..
^9681	State Battery, Pig Well .. .	10	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..
263c	Trump .. .. .	10	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..
<b>Total .. .. .</b>		<b>225</b>	..	..	..	..	..	..	1	..	8	1	97	25	6	<b>£174,538</b>	
<b>MT. MARGARET DISTRICT.</b>																	
371T	Augusta .. .. .	10	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..
1771T	Childe Harold .. .. .	..	..	..	..	..	..	..	..	..	..	..	5	..	..	..	..
1797T, etc.	Craggiemore leases .. .	10	..	..	..	..	..	..	..	..	1	..	6	4	..	..	..
1546T, etc.	Euro leases .. .. .	10	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..
1816T	Golden Spinnifex .. .. .	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
829T, etc.	Ida H. G.M. Co., Ltd. .. .	10	..	..	..	..	..	..	..	..	..	..	7	..	..	..	..
1783T	Just-in-Time .. .. .	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
715T, etc.	Lancefield G.M. Co., Ltd. ..	50	..	5	..	..	..	..	..	..	..	..	..	7	6	..	..
P.A. 480T	Little Doris Battery .. .	5	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..
943T	Mikado G.M. Co., Ltd. .. .	5	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..
(1818T)	Mistake .. .. .	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
P.A. 496T	Mulga Queen Battery .. .	10	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..
781T, etc.	Sailor Prince leases .. .	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1644T	Specimen Hill .. .. .	5	..	..	..	..	..	..	..	..	..	..	5	..	..	..	..
^8914	State Battery, Burtville .. .	10	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..
^8386	State Battery, Laverton .. .	10	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..
1726T	Sunrise .. .. .	8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1665T	Westralia Tasmania .. .	5	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..
<b>Total .. .. .</b>		<b>173</b>	..	5	..	..	..	..	..	..	1	..	46	14	6	<b>£145,399</b>	
<b>NORTH COOLGARDIE GOLD-FIELD.</b>																	
<b>MENZIES DISTRICT.</b>																	
2821z, etc.	Florence G.Ms., Ltd. .. .	10	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..
5217z	Gladstone .. .. .	10	..	..	..	..	..	..	..	..	..	..	5	..	..	..	..
..	Goongarrie Cyanide Works ..	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..
(5304z)	Heart's Content South .. .	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5302z	Lady Harriett .. .. .	5	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..
..	Lady Isobel .. .. .	3	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
2835z	Lady Sherry .. .. .	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4855z, etc.	Lusitania leases .. .. .	10	..	..	..	..	..	..	..	..	..	..	3	..	1	..	..
4895z, etc.	Mararoa leases .. .. .	5	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..
..	Menzies Constd. G.Ms., Ltd. ..	20	..	..	..	..	..	..	..	..	..	..	35	..	..	..	..
2820z	Menzies Gold Mine .. .. .	10	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..
..	Menzies G.M. Cyanide Plant ..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
..	Menzies Milling Co., Ltd. .. .	20	..	..	..	..	..	..	..	..	..	..	1	3	V.1	..	..
3100z	Menzies Mining and Exploration Corporation, Ltd. ..	10	..	..	..	..	..	..	..	..	..	..	11	3	1	..	..
..	Mt. Ida Copperfield Cy. Works ..	..	..	..	..	..	..	..	..	..	..	..	6	..	..	..	..
5242z	Mt. Ida Meteor .. .. .	5	..	..	..	..	..	..	..	..	..	..	6	..	..	..	..
5211z, etc.	Sand Queen G.Ms., Ltd. .. .	10	..	..	..	..	..	..	..	..	..	..	6	..	..	..	..
..	Seddon Syndicate .. .. .	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
^10253	State Battery, Menzies .. .	10	..	..	..	..	..	..	..	..	..	..	3	3	V.1	..	..
^10173	State Battery, Mt. Ida .. .	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<b>Total .. .. .</b>		<b>151</b>	..	..	..	..	..	..	..	..	..	..	95	9	4	<b>£64,883</b>	

TABLE XXII.—Milling and Cyaniding Plants erected in the respective Goldfields, Districts, etc.—continued.

Lease or Area.	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 Mills.	Ball Mills.	Krupp Mills.	Griffin Mills.	Huntington Mills.	Salford Mills.	Tremain Mills.	Flint Mills.	Other Crushers.					Puddlers.
<b>NORTH COOLGARDIE GOLD-FIELD—continued.</b>																
<b>ULARRING DISTRICT.</b>																
854v, etc.	Callion G.M. Co., W.A., N.L. ..	10	..	..	..	..	..	..	..	..	..	..	4	..	..	..
Λ7250	Edmonds & Gidney Cyanide Works	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..
459v, etc.	Golden Pole G.Ms., Ltd. ..	20	..	..	..	..	..	..	..	..	..	..	11	3	1	..
613	Great Ophir Gold Corporation, Ltd.	..	..	..	..	..	..	..	..	..	..	..	44	..	..	..
123v	Riverina .. .. .	10	..	..	..	..	..	..	..	..	..	..	6	..	..	..
324	Riverina South .. .. .	5	..	..	..	..	..	..	..	..	..	..	3	..	..	..
Λ7250	State Battery, Mulline .. ..	20	..	..	..	..	..	..	..	..	..	..	5	2	1	..
Λ8045	State Battery, Mulwarrie .. ..	10	..	..	..	..	..	..	..	..	..	..	4	..	..	..
438v	Westralia Waihi G.Ms., N.L. ..	10	..	..	..	..	..	..	..	..	..	..	6	..	..	..
	<b>Total</b> .. .. .	<b>85</b>	..	..	..	..	..	..	..	..	..	..	<b>85</b>	<b>5</b>	<b>2</b>	<b>£36,256</b>
<b>NIAGARA DISTRICT.</b>																
673G	Desdemona .. .. .	5	..	..	..	..	..	..	..	..	..	..	5	..	..	..
M.A. 35G	Eaglehawk Heather .. .. .	10	..	..	..	..	..	..	..	..	..	..	4	..	..	..
26G	Englishman: Cosmopolitan Proprietary, Ltd.	50	..	..	..	..	..	..	..	..	1	..	14	4	{ 2 }	..
340G	Grafter Battery .. .. .	5	..	..	..	..	..	..	..	..	..	..	3	..	..	..
419G	Orion Mines, Ltd. .. .. .	10	..	..	..	..	..	..	..	..	..	..	6	..	..	..
685G	Othello .. .. .	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..
P.A. 271G	Sovereign .. .. .	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..
..	State Battery, Desdemona .. ..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Λ7494	State Battery, Niagara .. .. .	10	..	..	..	..	..	..	..	..	..	..	6	..	..	..
505G	W.E.G. .. .. .	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	<b>Total</b> .. .. .	<b>112</b>	..	..	..	..	..	..	..	..	1	..	<b>38</b>	<b>4</b>	<b>3</b>	<b>£76,158</b>
<b>YERILLA DISTRICT.</b>																
P.A. 234R	(Clan Donachaich) .. .. .	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
904R	Devon .. .. .	5	..	..	..	..	..	..	..	..	..	..	7	2	..	..
541R	Golden Treasure M. Co., N.L. ..	10	..	..	..	..	..	..	..	..	..	..	4	..	..	..
928R	Great Carbine .. .. .	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
401R	Neta .. .. .	5	..	..	..	..	..	..	..	..	..	..	5	..	..	..
M.A. 3R	Pauley & McCoy's Works .. ..	10	..	..	..	..	..	..	..	..	..	..	2	..	..	..
450R	Potosi Const'd. (1905), Ltd. ..	10	..	..	..	..	..	..	..	..	..	..	12	..	..	..
539R	Senate .. .. .	5	..	..	..	..	..	..	..	..	..	..	5	..	..	..
Λ11295	State Battery, Linden .. .. .	2	..	..	..	..	..	..	..	..	..	..	3	..	..	..
Λ10190	State Battery, Pinjin .. .. .	5	..	..	..	..	..	..	..	..	..	..	3	..	..	..
Λ10255	State Battery, Yarri .. .. .	10	..	..	..	..	..	..	..	..	..	..	4	..	..	..
W.R. 28R	State Battery, Yerilla .. .. .	5	..	..	..	..	..	..	..	..	..	..	3	..	..	..
	<b>Total</b> .. .. .	<b>67</b>	<b>1</b>	..	..	..	..	1	..	1	..	..	<b>48</b>	<b>2</b>	..	<b>£25,558</b>
<b>BROAD ARROW GOLDFIELD.</b>																
75w	(Broad Arrow Consols G.M. Co., N.L.)	10	..	..	..	..	..	..	..	..	..	..	5	..	..	..
3w, etc.	Claremont G.M., Ltd. .. .. .	20	..	..	..	..	..	..	..	..	..	..	4	..	..	..
1286w	Golden .. .. .	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
1384w	Lady Bountiful .. .. .	{ 3 }	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M.A. 19w	Milne's Battery .. .. .	{ 10 }	..	..	..	..	..	..	..	..	..	..	..	..	..	..
45w	Mount Corlic .. .. .	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..
W.R. 68w	Northey's Venture Works .. ..	10	..	..	..	..	..	..	..	..	..	..	6	..	..	..
M.A. 23w	Ora Banda Battery; .. .. .	15	..	..	..	..	..	..	..	..	..	..	6	..	..	..
53w, etc.	Paddington Consols Battery ..	10	..	..	..	..	..	..	..	..	..	..	12	..	..	..
1300w	Pole .. .. .	5	1	..	..	..	..	..	..	..	..	..	5	..	..	..
M.A. 22w	Regan's Carnage Battery .. ..	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Λ10254	State Battery, Siberia .. .. .	5	..	..	..	..	..	..	..	..	..	..	3	..	..	..
T.A. 28w	Vettesburg Cyanide Works .. ..	..	..	..	..	..	..	..	..	..	..	..	6	..	..	..
M.A. 21w	Zoroastrian Works}} .. .. .	10	..	..	..	..	..	..	..	..	..	..	8	..	..	..
	<b>Total</b> .. .. .	<b>123</b>	<b>2</b>	..	..	..	..	1	..	..	..	..	<b>55</b>	..	..	<b>£36,350</b>





TABLE XXII.—Milling and Cyaniding Plants erected in the respective Goldfields, Districts, etc.—continued.

Lease or Area.	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 Mills.	Ball Mills.	Krupp Mills.	Griffin Mills.	Huntington Mills.	Salford Mills.	Tremain Mills.	Flint Mills.	Other Crushers.				
<b>EAST COOLGARDIE GOLD-FIELD—continued.</b>																
<b>EAST COOLGARDIE DISTRICT—continued.</b>																
946E	Ironside North .. .. .	10	..	..	..	..	..	..	..	..	..	..	7	..	..	..
983E	Isobel .. .. .	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..
31E, etc.	Ivanhoe Gold Corporation, Ltd.	100	..	..	..	..	..	..	..	..	..	..	32	11	8	..
6E, etc.	Kalgoorlie Amalgamated, Ltd. ..	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..
22E, etc.	Kalgurli G.Ms., Ltd. .. .	..	..	..	9	..	..	..	..	..	..	..	..	20	7	..
25E, etc.	Lake View Consols, Ltd. .. .	75	..	1	..	..	..	..	..	..	..	..	6	20	13	..
4359E	Lord Nolan .. .. .	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4209E	Lucey .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4293E	Milanese .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4037E, etc.	North End Mines, Ltd. .. .	15	..	..	..	..	..	..	..	..	..	..	4	..	..	..
4277E	Off Chance .. .. .	..	..	..	..	..	..	..	..	..	..	..	12	..	..	..
287E, etc.	North Kalgurli Co., Ltd. .. .	20	..	..	..	..	..	..	..	..	..	..	9	3	1	..
M.L. 2E	Orotava Works .. .. .	..	..	..	1	..	..	..	..	..	..	..	11	6	2	..
410E, etc.	Oroya Links, Ltd. .. .. .	50	..	..	2	..	..	..	..	..	..	..	25	..	6	..
..	Rasmussen's Works .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..
796E	Raven Battery .. .. .	5	..	..	..	..	..	..	..	..	..	..	6	..	..	..
1208E, etc.	South Kalgurli G.Ms., Ltd	..	..	..	4	..	..	..	..	..	..	..	..	5	7	..
W.R. 249E	Taylor Exceleon P.C. and G.M. Co., Ltd.	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4187E	Trurant .. .. .	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3880E, etc.	Westralian Machinery Corporation, Ltd.	20	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	<b>Total .. .. .</b>	<b>727</b>	<b>1</b>	<b>1</b>	<b>40</b>	<b>12</b>	<b>8</b>	<b>..</b>	<b>..</b>	<b>23</b>	<b>13</b>	<b>3</b>	<b>287</b>	<b>173</b>	<b>132</b>	<b>£1,501,770</b>
<b>BULONG DISTRICT.</b>																
1085Y	Balagundi .. .. .	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..
(W.R. 24Y)	Berry's Works .. .. .	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M.A. 67Y	Bulong Proprietary .. .. .	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Λ9553	State Battery, Randall's .. .	10	..	..	..	..	..	..	..	..	..	..	4	..	..	..
	<b>Total .. .. .</b>	<b>30</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>4</b>	<b>..</b>	<b>..</b>	<b>£4,850</b>
<b>COOLGARDIE GOLDFIELD.</b>																
<b>COOLGARDIE DISTRICT.</b>																
133, etc.	Bayley's leases .. .. .	10	..	..	..	..	..	..	..	..	..	..	6	..	..	..
134, etc.	Burbanks Birthday G.Ms., Ltd. ..	60	..	..	..	..	..	..	..	..	..	..	6	..	..	..
2985, etc.	Burbanks Main Lode (1904), Ltd.	20	..	..	..	..	..	..	..	..	..	..	12	..	..	..
4223	Clayton's Works .. .. .	5	..	..	..	..	..	..	..	..	..	..	3	..	..	..
3918, etc.	Coolgardie Redemption G.M. Co., N.L.	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4331	Edquist .. .. .	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4189	Garden Gully .. .. .	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..
595, etc.	Gem leases .. .. .	15	..	..	..	..	..	..	..	..	..	..	2	..	..	..
73, etc.	Griffiths leases .. .. .	10	..	..	..	..	..	..	..	..	..	..	5	..	..	..
4253, etc.	Hidden Secret leases .. .. .	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M.A. 63	Highgate Works .. .. .	3	..	..	..	..	..	..	..	..	..	..	..	2	..	..
4297	King Solomon .. .. .	10	..	..	..	..	..	..	..	..	..	..	4	..	..	..
M.A. 71	King Solomon South .. .. .	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
2160	Lady Robinson G.M. Co., N.L. ..	10	..	..	..	..	..	..	..	..	..	..	9	..	..	..
4152/3	Queen's Cross leases .. .. .	11	..	..	..	..	..	..	..	..	..	..	..	..	..	..
..	Queen's Cross Consolidated Cy. Works	..	..	..	..	..	..	..	..	..	..	..	8	..	..	..
4184, etc.	Red Hill Westralia G.Ms., Ltd. ..	10	..	..	..	..	..	..	..	..	..	..	8	..	..	..
Λ9435	State Battery, Coolgardie .. .. .	10	..	..	..	..	..	..	..	..	..	..	3	..	..	..
Λ7497	State Battery, Widgiemooltha ..	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..
33	Tindal's Coolgardie G.M. Co., N.L.	10	..	..	..	..	..	..	..	..	..	..	10	..	..	..
(3415)	Trude's Cyanide Works .. .. .	..	..	..	..	..	..	..	..	..	..	..	10	..	..	..
1552, etc.	Vale of Coolgardie G.Ms., Ltd. ..	10	..	..	..	..	..	..	..	..	..	..	5	..	..	..
144, etc.	Westralia and East Extension Ms., Ltd.	40	..	..	..	..	..	..	..	..	..	..	30	4	2	..
	<b>Total .. .. .</b>	<b>284</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>2</b>	<b>..</b>	<b>..</b>	<b>121</b>	<b>6</b>	<b>2</b>	<b>£135,862</b>

TABLE XXII.—Milling and Cyaniding Plants erected in the respective Goldfields, Districts, etc.—continued.

Lease or Area.	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 Mills.	Ball Mills.	Krupp Mills.	Griffin Mills.	Huntington Mills.	Salford Mills.	Tremain Mills.	Flint Mills.	Other Crushers.					Puddlers.
<b>COOLGARDIE GOLDFIELD</b>																
<i>—continued.</i>																
<b>KUNANALLING DISTRICT.</b>																
M.A. 14s	Berliner & Besta Works	5	..	..	..	..	..	..	..	..	..	..	5	..	..	..
696s, etc.	Blue Bell leases	5	..	..	..	..	..	..	..	..	..	..	7	..	..	..
M.A. 18s	Bow's Battery	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Carswell Cyanide Plant	..	..	..	..	..	..	..	..	..	..	..	6	..	..	..
33s	Carbine	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..
773s, etc.	Jourdie Enterprise	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..
661s, etc.	Jourdie United G.Ms., Ltd.	10	..	..	..	..	..	..	..	..	..	..	6	..	..	..
514s	Pride of Jourdie North	5	..	..	..	..	..	..	..	..	..	..	5	..	..	..
586s, etc.	Shamrock leases	5	..	..	..	..	..	..	..	..	..	..	5	..	..	..
M.A. 13s	Stanley Battery	5	..	..	..	..	..	..	..	..	..	..	6	..	..	..
645s	Star of Fremantle	10	..	..	..	..	..	..	..	..	..	..	4	..	..	..
	<b>Total</b>	<b>60</b>	..	..	..	..	..	..	..	..	2	..	<b>44</b>	..	..	<b>£15,980</b>
<b>YILGARN GOLDFIELD.</b>																
T.A. 23	Allsop and Howell's Works	..	..	..	..	..	..	..	..	..	..	..	6	..	..	..
T.A. 32	Andre's Cyanide Works	..	..	..	..	..	..	..	..	..	..	..	6	..	..	..
(212, etc.)	Associated Nil Desperandum	10	..	..	..	..	..	..	..	..	..	..	7	..	..	..
508	Australia	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..
520	Blue Hill	5	..	..	..	..	..	..	..	..	..	..	4	..	..	..
888	British and Foreign Development Synd., Ltd.	30	..	..	..	..	..	..	..	..	..	..	6	..	1	..
570	Great Leviathan	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..
503	Greenmount Mines, N.L.	10	..	..	..	..	..	..	..	..	..	..	6	..	..	..
(552)	(Haddon)	10	..	..	..	..	..	..	..	..	..	..	9	..	..	..
854	Miller's Cyanide Plant	..	..	..	..	..	..	..	..	..	..	..	7	..	..	..
490, etc.	Jacoletti G.Ms., Ltd.	10	..	..	..	..	..	..	..	..	..	..	4	..	..	..
749	Layther's Cyanide Works	..	..	..	..	..	..	..	..	..	..	..	6	..	..	..
714	Marvel Loch G.M. Co., N.L.	10	..	..	..	..	..	..	..	..	..	..	6	..	..	..
665	Never Never	10	..	..	..	..	..	..	..	..	..	..	10	..	..	..
829	Pioneer	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..
724	Spring Hill	5	..	..	..	..	..	..	..	..	..	..	5	..	..	..
550	Sunbeam	5	..	..	..	..	..	..	..	..	..	..	4	..	..	..
536	Transvaal	20	..	..	..	..	..	..	..	..	..	..	8	..	..	..
	<b>Total</b>	<b>140</b>	..	..	..	..	..	..	..	..	..	..	<b>98</b>	..	<b>1</b>	<b>£55,176</b>
<b>DUNDAS GOLDFIELD.</b>																
M.A. 32	Break-o'-Day Works	10	..	..	..	..	..	..	..	..	..	..	4	..	..	..
42, etc.	Cumberland G.M. Co., Ltd.	10	..	..	..	..	..	..	..	..	..	..	6	..	..	..
M.A. 33	Lady Mary Works	20	..	..	..	..	..	..	..	..	..	..	6	..	..	..
938	Lady Miller: Hampton Plains Estate (1906), Ltd.	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..
(T.A. 21)	Liquid Gem Cyanide Works	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..
M.A. 18	Mararoa Crushing and Cyaniding Works	10	..	..	..	..	..	..	..	..	..	..	4	..	..	..
852	Mararoa G.M. Co., N.L.	20	..	..	..	..	..	..	..	..	..	..	16	..	..	..
(M.A. 28)	Pathway Battery	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Crown Land	Pike and Ross's Battery	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
106, etc.	Princess Royal G.M. Co., N.L.	20	..	..	..	..	..	..	..	..	..	..	5	3	2	..
1021	Princess Royal North	10	..	..	..	..	..	..	..	..	..	..	2	2	..	..
^10257	State Battery, Norseman	10	..	..	..	..	..	..	..	..	..	..	5	2	1	..
	<b>Total</b>	<b>120</b>	<b>1</b>	..	..	..	..	..	..	..	..	..	<b>51</b>	<b>7</b>	<b>3</b>	<b>£61,725</b>
<b>PHILLIPS RIVER GOLDFIELD.</b>																
136, etc.	Flag Gold and Copper M. Co., Ltd.	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..
82	Floater	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..
65, 79	Gem leases	5	..	..	..	..	..	..	..	..	..	..	4	..	..	..
153	Maori Queen	..	1	..	..	..	..	..	..	..	..	..	4	..	..	..
W.R. 19	Mount Agnes Reward	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
74	Two Boys	10	..	..	..	..	..	..	..	..	..	..	3	..	..	..
T.A. 4	Wallace Cyanide Works	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..
	<b>Total</b>	<b>30</b>	<b>2</b>	..	..	..	..	..	..	..	..	..	<b>15</b>	..	..	<b>£28,462</b>
<b>STATE GENERALLY</b>																
	<b>Total</b>	..	..	..	<b>1</b>	..	..	..	..	..	<b>1</b>	..	..	..	..	<b>58,000</b>
	<b>Total</b>	..	..	..	<b>1</b>	..	..	..	..	..	<b>1</b>	..	..	..	..	<b>£58,000</b>

TABLE XXII.—Milling and Cyaniding Plants erected in the respective Goldfields, Districts, etc.—continued.

GOLDFIELD.	DISTRICT.	MILLING.											CYANIDING.			Total Value of all Mining Machinery.		
		Batteries.	Other Mills.										Leaching Vats.	Agitating Vats.	Filter Presses.			
		Number of Heads of Stampers.	Prospecting Mills.	Ball Mills.	Krupp Mills.	Griffin Mills.	Huntington Mills.	Salford Mills.	Tremain Mills.	Flint Mills.	Other Crushers.	Puddlers.						
<b>GOLD MINING.</b>																		
KIMBERLEY .. ..		45	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	5,000
PILBARA .. ..	{ Marble Bar .. ..	65	..	..	..	..	..	..	..	..	..	..	..	..	17	4	..	16,000
	{ Nullagine .. ..	40	..	..	..	..	..	..	..	..	..	..	..	..	6	2	..	8,009
WEST PILBARA .. ..		30	1	..	..	..	..	..	..	..	..	..	..	..	5	..	..	2,650
ASHBURTON .. ..		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
GASCOYNE .. ..		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
PEAK HILL .. ..		50	1	..	..	..	..	..	..	..	..	2	2	12	3	9	..	74,050
EAST MURCHISON .. ..	{ Lawlers .. ..	228	1	..	..	..	..	..	..	..	..	7	1	75	17	7	..	183,561
	{ Black Range .. ..	115	..	..	..	..	..	..	..	..	..	..	..	51	..	1	..	93,497
	{ Cue .. ..	128	..	..	..	..	..	..	..	..	..	..	..	55	2	..	..	49,131
MURCHISON .. ..	{ Nannine .. ..	189	..	..	..	..	..	..	..	..	..	..	..	84	4	2	..	94,711
	{ Day Dawn .. ..	60	..	..	..	..	..	..	..	..	..	..	..	27	10	2	..	215,500
	{ Mt. Magnet .. ..	85	..	2	..	..	..	1	..	2	..	..	1	36	5	1	..	36,963
YALGOO .. ..		105	4	..	..	..	..	..	..	2	..	..	..	22	..	..	..	25,444
MT. MARGARET .. ..	{ Mt. Morgans .. ..	122	..	..	..	..	..	..	..	..	..	3	..	79	2	3	..	181,850
	{ Mt. Malcolm .. ..	225	..	..	..	..	..	..	..	1	..	8	1	97	25	6	..	174,538
	{ Mt. Margaret .. ..	173	..	5	..	..	..	..	..	..	..	..	1	46	14	6	..	145,399
NORTH COOLGARDIE .. ..	{ Menzies .. ..	151	..	..	..	..	..	..	..	..	..	..	..	95	9	4	..	64,883
	{ Ularring .. ..	85	..	..	..	..	..	..	..	..	..	..	..	85	5	2	..	36,256
	{ Niagara .. ..	112	..	..	..	..	..	..	..	..	..	1	..	38	4	3	..	76,158
	{ Yerilla .. ..	67	1	..	..	..	..	1	..	1	..	..	..	48	2	..	..	25,558
BROAD ARROW .. ..		123	2	..	..	..	..	..	..	..	..	..	..	55	..	..	..	36,350
N.E. COOLGARDIE .. ..	{ Kanowna .. ..	158	1	..	..	..	..	..	..	..	..	1	1	64	3	2	..	49,638
	{ Kurnalpi .. ..	5	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	225
EAST COOLGARDIE .. ..	{ East Coolgardie .. ..	727	1	1	40	12	8	..	..	23	13	3	287	173	132	..	..	1,501,770
	{ Bulong .. ..	30	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	4,850
COOLGARDIE .. ..	{ Coolgardie .. ..	284	..	..	..	..	..	..	..	..	2	..	121	6	2	..	..	135,862
	{ Kunanalling .. ..	60	..	..	..	..	..	..	..	..	2	..	44	..	..	..	..	15,980
YILGARN .. ..		140	..	..	..	..	..	..	..	..	..	..	..	98	..	1	..	55,176
DUNDAS .. ..		120	1	..	..	..	..	..	..	1	..	..	..	51	7	3	..	61,725
PHILLIPS RIVER .. ..		30	2	..	..	..	..	..	..	..	..	..	..	15	..	..	..	28,462
STATE GENERALLY .. ..		..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	58,000
	<b>Total Gold Mining Machinery ..</b>	<b>3,752</b>	<b>16</b>	<b>8</b>	<b>41</b>	<b>12</b>	<b>12</b>	<b>1</b>	<b>6</b>	<b>23</b>	<b>40</b>	<b>11</b>	<b>1,617</b>	<b>301</b>	<b>186</b>	..	..	<b>£3,457,196</b>
<b>TIN MINING.</b>																		
PILBARA .. ..	{ Marble Bar .. ..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	15,000
	{ Greenbushes Tinfield .. ..	5	..	..	..	..	3	..	..	..	1	3	..	..	..	..	..	13,656
	<b>Total Tin Mining Machinery ..</b>	<b>5</b>	..	..	..	..	<b>4</b>	..	..	..	<b>1</b>	<b>3</b>	..	..	..	..	..	<b>£28,656</b>
<b>COPPER MINING.</b>																		
WEST PILBARA .. ..		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	24,000
PHILLIPS RIVER .. ..		10	..	..	..	..	..	..	..	..	2	1	..	..	..	..	..	79,000
	<b>Total Copper Mining Machinery ..</b>	<b>10</b>	..	..	..	..	..	..	..	..	<b>2</b>	<b>1</b>	..	..	..	..	..	<b>£103,000</b>
<b>COAL MINING.</b>																		
COLLIE RIVER COAL-FIELD .. ..		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	59,186
	<b>Total Coal Mining Machinery ..</b>	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	<b>£59,186</b>
	<b>Total Machinery other than for Gold Mining</b>	<b>15</b>	..	..	..	..	<b>4</b>	..	..	..	<b>3</b>	<b>4</b>	..	..	..	..	..	<b>£190,842</b>
	<b>Total, all Mining Machinery ..</b>	<b>3,767</b>	<b>16</b>	<b>8</b>	<b>41</b>	<b>12</b>	<b>16</b>	<b>1</b>	<b>6</b>	<b>23</b>	<b>43</b>	<b>15</b>	<b>1,617</b>	<b>301</b>	<b>186</b>	..	..	<b>£3,648,038</b>

## APPENDIX.

## ROYAL MINT, PERTH BRANCH.

Subject to the Regulations, any person may deposit gold at the Mint in his own name. Those who cannot attend personally for the purpose may send the gold by an agent or under Police escort.

A circular can be obtained from the Deputy Master of the Mint giving all necessary information for intending depositors, conditions of the Escort Service, Coining Regulations, etc., etc.

An Escort Service is provided by the Police Department for parcels of all sizes. The consignor pays for the carriage by coach or train, but the escort charges may be collected by the Mint.

Forms for use in connection with gold sent to the Mint by post or under Police escort can be obtained at the Mint.

*Charges for Assaying, Refining, and Coinage.*

Gross Weight of Deposit in ounces.	Mint Charge.	Gross Weight of Deposit in ounces.	Mint Charge.	Gross Weight of Deposit in ounces.	Mint Charge.
Up to and including—	£ s. d.	Up to and including—	£ s. d.	Up to and including—	£ s. d.
24	0 5 0	400	4 3 4	1,300	10 4 2
30	0 6 3	410	4 5 5	1,400	10 16 8
40	0 8 4	420	4 7 6	1,500	11 9 2
50	0 10 5	430	4 9 7	1,600	12 1 5
60	0 12 6	440	4 11 8	1,700	12 14 2
70	0 14 7	450	4 13 9	1,800	13 6 8
80	0 16 8	460	4 15 10	1,900	13 19 2
90	0 18 9	470	4 17 11	2,000	14 11 8
100	1 0 10	480	5 0 0	2,100	15 4 2
110	1 2 11	490	5 2 1	2,200	15 16 8
120	1 5 0	500	5 4 2	2,300	16 9 2
130	1 7 1	520	5 6 8	2,400	17 1 8
140	1 9 2	540	5 9 2	2,500	17 14 2
150	1 11 3	560	5 11 8	2,600	18 6 8
160	1 13 4	580	5 14 2	2,700	18 19 2
170	1 15 5	600	5 16 8	2,800	19 11 8
180	1 17 6	620	5 19 2	2,900	20 4 2
190	1 19 7	640	6 1 8	3,000	20 16 8
200	2 1 8	660	6 4 2	3,100	21 9 2
210	2 3 9	680	6 6 8	3,200	22 1 8
220	2 5 10	700	6 9 2	3,300	22 14 2
230	2 7 11	720	6 11 8	3,400	23 6 8
240	2 10 0	740	6 14 2	3,500	23 19 2
250	2 12 1	760	6 16 8	3,600	24 11 8
260	2 14 2	780	6 19 2	3,700	25 4 2
270	2 16 3	800	7 1 8	3,800	25 16 8
280	2 18 4	820	7 4 2	3,900	26 9 2
290	3 0 5	840	7 6 8	4,000	27 1 8
300	3 2 6	860	7 9 2	4,100	27 14 2
310	3 4 7	880	7 11 8	4,200	28 6 8
320	3 6 8	900	7 14 2	4,300	28 19 2
330	3 8 9	920	7 16 8	4,400	29 11 8
340	3 10 10	940	7 19 2	4,500	30 4 2
350	3 12 11	960	8 1 8	4,600	30 16 8
360	3 15 0	980	8 4 2	4,700	31 9 2
370	3 17 1	1,000	8 6 8	4,800	32 1 8
380	3 19 2	1,100	8 19 2	4,900	32 14 2
390	4 1 3	1,200	9 11 8	5,000	33 6 8

For every additional 100ozs. the charge is increased by 12s. 6d.

NOTE.—Additional charges (see Regulation No. 6) are collected when base metals in a deposit exceed 2 per cent. of its weight.

The following table illustrates the operation of these charges in case of gold of the value of £3 17s. 10½d. an ounce:—

Weight of Deposit.	Rate of Charge per ounce.	Amount of Charge.	Net Value of Deposit.
ozs.	d.	£ s. d.	£ s. d.
50	2·5	0 10 5	194 3 4
100	2·5	1 0 10	388 6 8
600	2·3	5 16 8	2,330 8 4
1,000	2·0	8 6 8	3,885 8 4
5,000	1·6	33 6 8	19,435 8 4
10,000	1·55	64 11 8	38,872 18 4

NOTE.—A proportion of silver in deposits of gold is paid for by the Mint as follows:—

In deposits under 1,000ozs. gross: all silver in excess of 8 per cent. of the weight of the deposit after melting.

“ from 1,000 „ to 5,000 „ „ 6 „ „ „ „

“ „ 5,000 „ „ 10,000 „ „ 5 „ „ „ „

“ „ 10,000 „ upwards „ „ 4 „ „ „ „

The rate at which payment for silver is made is liable to fluctuation.

## GOLD ESCORT SERVICE.

## TABLE OF ESCORT RATES.

Fixed by the Commissioner of Police.

From	To	Period.	Rate per Ounce.	Remarks.
Burtville ... ..	Malcolm ... ..	Monthly ...	d. 0 $\frac{7}{8}$	Actual cost: 19s. 3d.
Do. ... ..	Laverton ... ..	Every two months	...	
Field's Find ... ..	Yalgoo ... ..	Monthly ...	2	For a minimum of 5,500ozs. Not less than 2,900ozs. If special escort, actual cost. By regular Peak Hill to Nannine escort, regulation charge per hour.
Lawlers ... ..	Leonora ... ..	Do. ...	0 $\frac{1}{2}$	
Laverton ... ..	Malcolm ... ..	Do. ...	0 $\frac{3}{4}$	
Meekatharra ... ..	Nannine ... ..	Do. ...	...	
Mt. Sir Samuel ... ..	Lawlers ... ..	Do. ...	0 $\frac{1}{2}$	Not less than 1,600ozs.
Morgans ... ..	Malcolm ... ..	Do. ...	0 $\frac{1}{2}$	
Norseman ... ..	Coolgarde ... ..	Do. ...	2	Not less than 4,300ozs.
Peak Hill ... ..	Nannine ... ..	Do. ...	2 $\frac{1}{2}$	
Do. ... ..	Do. ... ..	Do. ...	2	2,000ozs. to 2,500ozs.
Do. ... ..	Do. ... ..	Do. ...	1 $\frac{3}{4}$	2,500ozs. to 3,000ozs.
Ravensthorpe ... ..	Hopetoun ... ..	Do. ...	1 $\frac{3}{4}$	Over 3,000ozs.
Do. ... ..	Do. ... ..	Do. ...	0 $\frac{5}{8}$	Not less than 500ozs.
Do. ... ..	Do. ... ..	Do. ...	...	Not less than 1,000ozs.
Sandstone ... ..	Magnet ... ..	Do. ...	...	Under 500ozs.: Actual cost.
Wiluna ... ..	Nannine ... ..	Do. ...	...	Actual cost.

Police Gold Escort Services not provided for in the Table may be arranged on application to the District Police Officer or the Commissioner of Police.

## RATES FOR CARRIAGE OF GOLD ON GOVERNMENT RAILWAYS.

	Distance not over—							
	25 miles.	50 miles.	100 miles.	150 miles.	200 miles.	250 miles.	300 miles.	350 miles.
Gold dust and bullion per 100ozs. ...	s. d. 1 0	s. d. 2 0	s. d. 3 0	s. d. 3 9	s. d. 4 6	s. d. 5 0	s. d. 5 6	s. d. 6 0

6d. per 100ozs. for every additional 50 miles, or part thereof.

NOTE.—A special reduction of 25 per cent. is made for all gold dust or bullion consigned to the Perth Mint.

To find the value per ounce of gold sent from a mine to the Mint.—Divide the standard gold by the weight before melting, and multiply the result by £3 17s. 10 $\frac{1}{2}$ d. For instance, supposing the Mint return to show:—

Weight before melting ... ..	Ozs. 47.41
Standard gold ... ..	38.19

The calculation would be as follows:—

47.41)3819.0(.805	.805 × £3 17s. 10 $\frac{1}{2}$ d. =
3792.8	.805 × £3.894
	.805
26200	19470
23705	311520
2495	£3.134(670)
	20
	s. 2.680
	12
	d. 8.160 = £3 2s. 8d., value per ounce of gold as produced from the mine.

18th June, 1910.

J. F. CAMPBELL,  
Deputy Master.