WESTERN AUSTRALIA.

REPORT

OF THE

DEPARTMENT OF MINES

FOR THE YEAR

1903.

1903

1904.

WESTERN AUSTRALIA.

REPORT

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FOR THE YEAR

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

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

1904

MAP OF

WESTERN AUSTRALIA

Showing the Goldfields and other Mining Districts
also the distribution of useful Minerals
To accompany Report on
THE MINERAL PRODUCTION OF WESTERN AUSTRALIA
UP TO THE END OF 1903

BY

A. GIBB MAITLAND
GOVERNMENT GEOLOGIST.

Scale of English statute miles

30 40 50 20 10 0 50 100 150 200

REFERENCE

Towns	shown thus	◉ EUCLA
Railways	..	
Land District Boundaries	..	
Land Division	..	
Goldfields	..	
Telegraph Lines & Stations	..	
Agricultural Areas	..	
Stock Routes	..	
Heights in feet	..	(1263)
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	
COAL	CC	GRAPHITE	CG
SILVER	Ag	COBALT	Co
ALUMINIUM	Al	BISMUTH	Bi
MANGANESE	Mn	DIATOM-EARTH	Si
OTHER GEMSTONES	Gm		

Longitude 121° East of Greenwich.

H.J. Pether, Government Photolithographer, Perth, W.A.
150

ANNUAL REPORT OF THE DEPARTMENT OF MINES, WESTERN AUSTRALIA, 1903.

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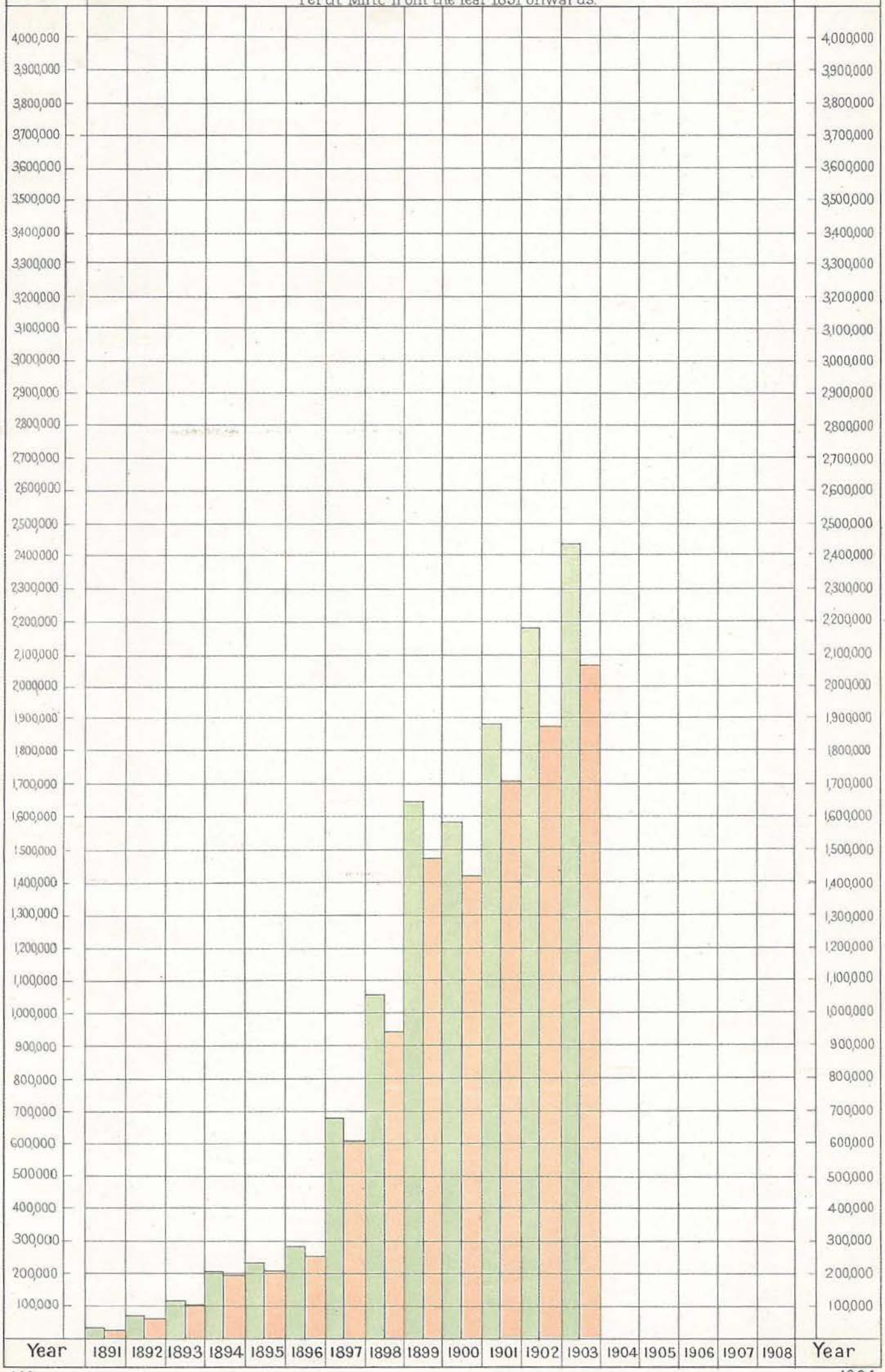
of Gold output showing the gross Weights & fine contents of Gold exported & received at the Perth Mint from the Year 1891 onwards.



COMMONWEALTH OF AUSTRALIA.

STATE OF WESTERN AUSTRALIA.

Report of the Department of Mines of the State of Western Australia for the Year 1903.

To the Honourable H. Gregory, M.L.A., Minister for Mines.

SIR,

I have the honour to submit the Annual Report of the Department for the year 1903, 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 Government Geologist, State Mining Engineer, Superintendent of State Batteries, Chief Inspector of Boilers, Chief Inspector of Explosives and Government Analyst, Director of the School of Mines, and Engineer for Mines Water Supply; attached, also, is a Report by J. S. Haldane, M.D., F.R.S., to the Secretary of State for the Home Department on Ankylostomiasis in Westphalian Collieries, in the form of an appendix.

The Mining Statistics, giving details of the output of each producing mine and other statistical information relating to mining, are also submitted.

I have, etc.,

L. L. CROCKETT,
Acting Secretary for Mines.

Department of Mines, Perth, 1st August, 1904.

DIVISION I.

Summary by the Under Secretary for Mines.

PART I.—GENERAL REMARKS.

The total mineral output for 1903 amounted to the value of £8,971,937, or an increase of nearly 11 per cent. on the value of the previous year's output, 97 per cent. of this being gold; the total gold output for the year being valued at £8,770,719.

The dividends paid during the year amounted to £2,024,152, being an increase of £599,880, or 42 per cent.

The number of men engaged in gold-mining was 20,716, being an increase of 240.

The value of gold produced per man engaged in gold-mining was £423·37 as against £388·14 for the previous year.

The above figures testify to the general prosperity of the mining industry in this State; especially so is this evident with regard to the dividends paid during the year, which give a return of 26 per cent. on the nominal capital of the dividend-paying mines.

GOLD.

The gold output for the year has, for the first time, exceeded 2,000,000oz. fine, the total amounting to 2,064,801oz., or an increase of 10·35 per cent. over the previous year's output, being about the same percentage of increase over 1902 as that year had compared with 1901.

The following goldfields show substantial increases in the yields as reported to the department:—East Coolgardie, with an increase of 157,012oz.; Murchison, 30,977oz.; East Murchison, 11,587oz.; North Coolgardie, 10,410oz.; Broad Arrow, 10,294oz.; and West Pilbarra, with a total of 5,936oz., has more than doubled last year's output of 2,223oz.; this is principally owing to the return from the Pilgrim's Rest mine, which contributed 5,287oz.

Two new centres, the Black Range, on the East Murchison Goldfield, and Duketon, in the North Erlistoun district of the Mount Margaret Goldfield, have a promising future before them, and should add materially to the gold output in the coming year.

Tin.

The output of black tin for the year shows a substantial increase in value compared with 1902, being an increase of £16,107, with an excess of 197 tons, or an increase in tonnage of nearly 32 per cent.; both the tin-producing centres, Greenbushes and Pilbarra, showing a very substantial advance on the previous year's output.

Coal.

The quantity of coal raised shows a decrease of 7,457 tons, the value of the output being £17,060 less than that of the previous year; the decrease is owing to the temporary stoppage of the Collie Proprietary mine, on account of a labour dispute. Boring operations for coal are still being carried on near Mingenew, but nothing of a definite nature has yet been met with; the syndicate are, however, hopeful of ultimately striking coal.

Copper.

The copper ore produced during the year shows an immense increase, the total for the year being 20,526 tons, valued at £56,541, as against 2,262 tons for 1902, valued at £8,090.

Both the Mount Margaret and the Phillips River districts show substantial increases; the increased output of the latter is owing to the arrangements made by the Department as to the purchase of ores on their assay value, this being an inducement to the owners to work their properties. The appointment of a Government ore buyer was fully justified.

Other Minerals.

The increased production of silver obtained as a by-product is most noticeable, the amount and value having doubled that of the previous year, the total exported (fine ounces) being 168,113oz., valued at £19,153.

The production of ironstone and limestone has fallen to an insignificant amount, only 220 tons of the former and 1,280 tons of the latter being raised.

An opal find has been reported at Coolgardie, but requires development to prove its value.

Another attempt is being made to work the shale deposit situated to the south-east of Coolgardie, but further experiments require to be made to prove its marketable value as a fuel.

The 1904 Mining Act, which was passed during the last session of Parliament, should lead to increased activity in mining for minerals other than gold, as this Act now provides for other minerals as well as gold being mined on private property.

PART II.—MINERALS RAISED.

TABLE 1.

Quantity and Value of all the Minerals produced during 1902 and 1903.

Description of Mineral.	1902.		1903.		Increase or Decrease for Year compared with 1902.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
		£		£		£
1. Antimony (exported), statute tons ...	...	...	22	230	+ 22	+ 230
2. Asbestos (exported) do. ...	...	...	[1]†	10	+ [1]†	+ 10
3. Black Tin (raised) do. ...	620	39,783	817	55,890	+ 197	+ 16,107
4. Coal (raised) do. ...	140,884	86,188	133,427	69,128	— 7,457	— 17,060
5. Cobalt Ore (exported) do. ...	2	41	...	...	— 2	— 41
6. Copper Ore (raised) do. ...	2,262	8,090	20,526	56,541	+ 18,264	+ 48,451
7. Gold (export and mint), ounces (fine) ...	1,871,037	7,947,662	2,064,801	8,770,719	+ 193,764	+ 823,057
8. Ironstone (raised), statute tons ...	4,800	2,040	220	88	— 4,580	— 1,952
9. Limestone (raised) do. ...	5,080	1,340	1,280	178	— 3,800	— 1,162
10. Plumbago Ore (exported) do. ...	1	6	...	...	— 1	— 6
11. Silver (exported), ounces (fine)	83,293	9,190	168,113	19,153	+ 84,820	+ 9,963
12. Silver-Lead Ore (raised), statute tons ...	36	277	...	...	— 36	— 277
Total Values	...	8,094,617	...	8,971,937	...	+ 877,320

[1]† 4cwts.

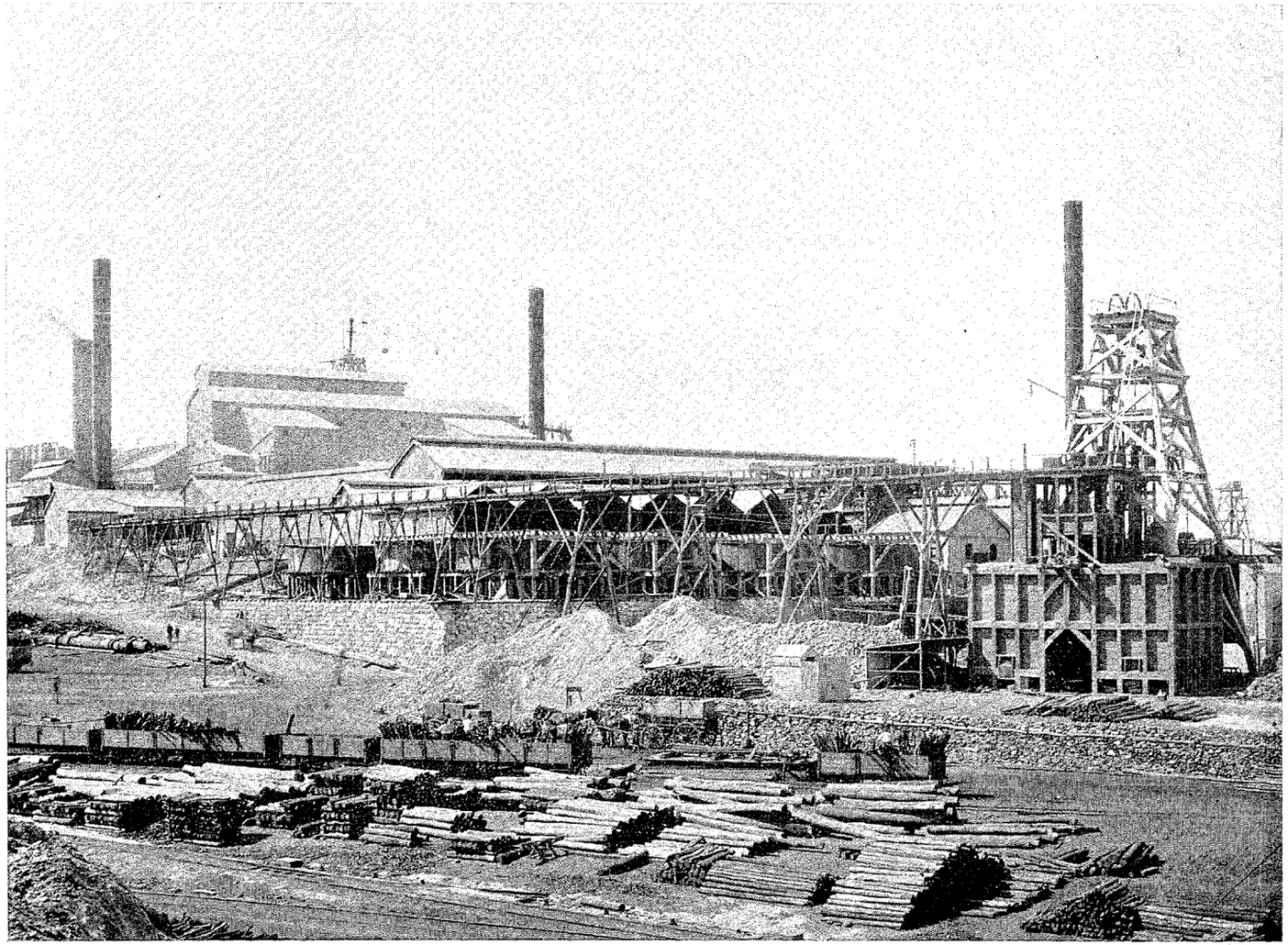
From the above table it will be seen that the value of the minerals produced during 1903 exceeded that for the year before by no less than £877,320, and that most of the minerals mentioned show a substantial increase, and, as before stated, the production of silver as a by-product has more than doubled the previous year's output; that of ironstone and limestone having dwindled away to very small proportions according to the returns received, but there is no doubt limestone is being obtained in much larger quantities by private quarry owners, the returns from which do not reach the Department.

TABLE 2.

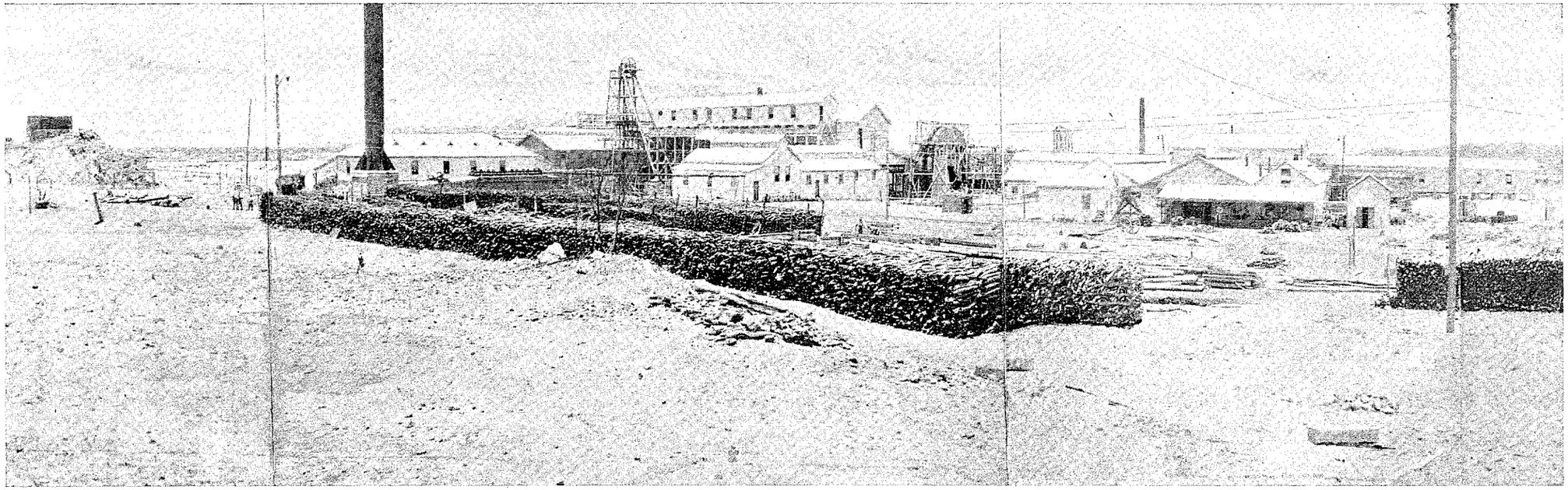
Summary of Gold Exported and received at the Perth Branch of the Royal Mint during 1902 and 1903, compared with the yields reported to the Mines Department; also the percentage of the latter for the several Goldfields, and the average yield per ton of Ore milled.

Goldfield.	Export and Mint.		Reported Yield.					
					Percentage for each Goldfield.		Average per ton of Ore milled.	
	1902.	1903.	1902.	[1903.	1902.	1903.	1902.	1903.
	ozs.	ozs.	ozs.	ozs.			ozs.	ozs.
1. Kimberley	442	512	346	740	·02	·03	·44	·61
2. Pilbarra	10,706	14,220	12,170	11,330	·57	·49	1·59	1·68
3. West Pilbarra	3,284	6,482	2,223	5,936	·11	·25	1·02	1·19
4. Ashburton	...	135	978	960	·05	·04	...	...
5. Gascoyne	125	36	...	...	...	...	...	...
6. Peak Hill	32,737	34,924	37,487	35,656	1·77	1·53	·65	·54
7. East Murchison	91,976	102,904	91,309	102,896	4·31	4·41	·64	·66
8. Murchison	212,570	245,851	210,814	241,791	9·95	10·35	1·36	1·33
9. Yalgoo	5,679	1,744	5,853	3,842	·28	·16	1·46	1·59
10. Mt. Margaret	216,637	225,193	211,309	212,491	9·98	9·10	·76	·79
11. North Coolgardie	187,273	198,820	185,016	195,427	8·74	8·37	1·17	·92
12. Broad Arrow	18,380	27,665	19,675	29,969	·93	1·28	·78	·75
13. North-East Coolgardie	54,541	47,734	67,109	62,920	3·17	2·69	1·03	·80
14. East Coolgardie	1,172,405	1,358,375	1,118,616	1,275,628	52·83	54·62	1·31	1·32
15. Coolgardie	97,477	90,854	87,860	84,303	4·15	3·61	·89	·77
16. Yilgarn	25,878	26,856	23,130	23,615	1·09	1·01	·56	·46
17. Dundas	36,211	41,554	34,751	40,174	1·64	1·72	1·27	1·50
18. Phillips River	8,576	8,941	8,494	7,689	·40	·33	·90	·91
19. Donnybrook	73	98	101	58	·01	·01	·19	·15
Goldfields generally	2,471	3,413	...	...	...	...	...	...
Totals and Averages ...	2,177,441	2,436,311	2,117,241	2,335,425	100·00	100·00	1·10	1·07
Fine contents	1,871,037	2,064,801	1,819,308	1,979,300				

The East Coolgardie Goldfield, it will be seen, has increased its percentage of the total output of the State by $1\frac{3}{4}$ per cent., the percentage being 54·62, and at the same time maintaining its average value per ton of ore milled, 1·32oz., and having an increase of 157,012oz. on the previous year.



ASSOCIATED GOLD MINES, KALGOORLIE.
(*East Coolgardie G.F.*)



THE GREAT FINGALL G.M., DAY DAWN.
(*Murchison G.F.*)

COMPARATIVE STATISTICAL DIAGRAMS

RELATING TO

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

IN WESTERN AUSTRALIA

AND THE GOLD PRODUCTION OF AUSTRALASIA FOR THE YEAR 1903.

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

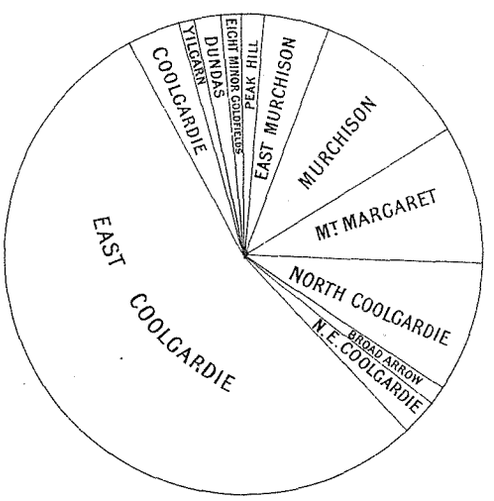


Fig. 2. Gold produced from various Goldfields as given by the Export and Mint returns

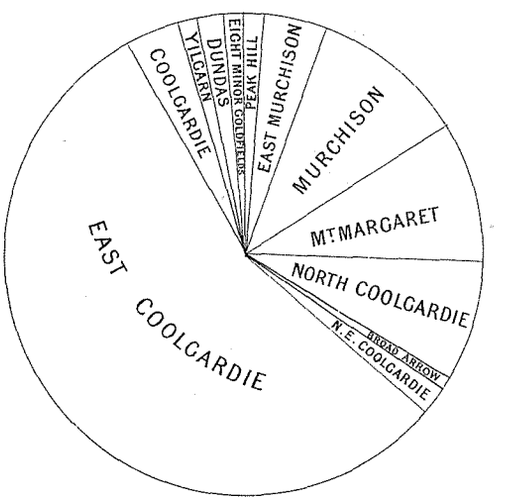


Fig. 3. Value of Gold and other minerals

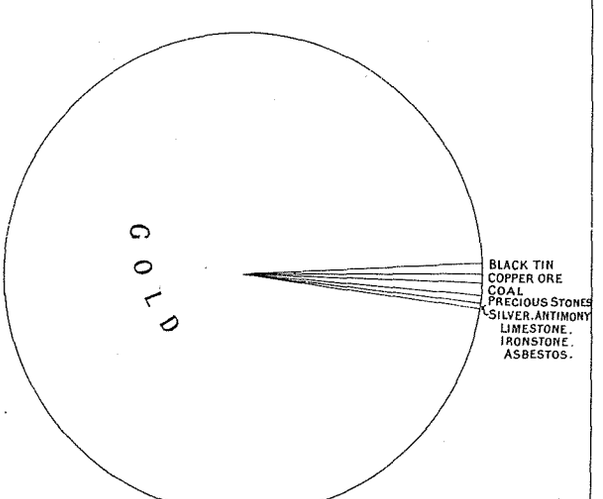


Fig. 4. Value of Minerals other than Gold

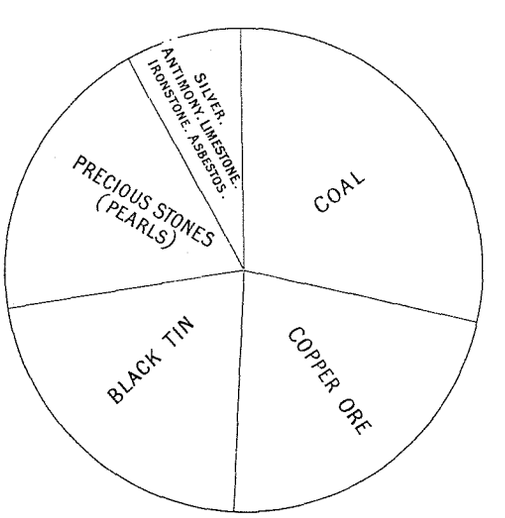


Fig. 5 Areas of Land leased for Gold Mining on the various Goldfields

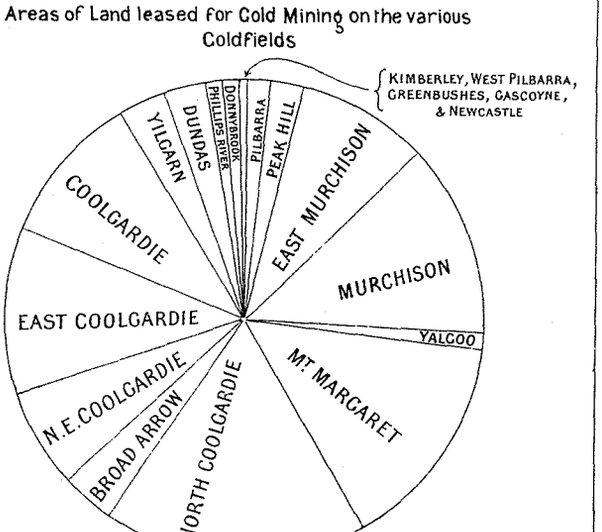
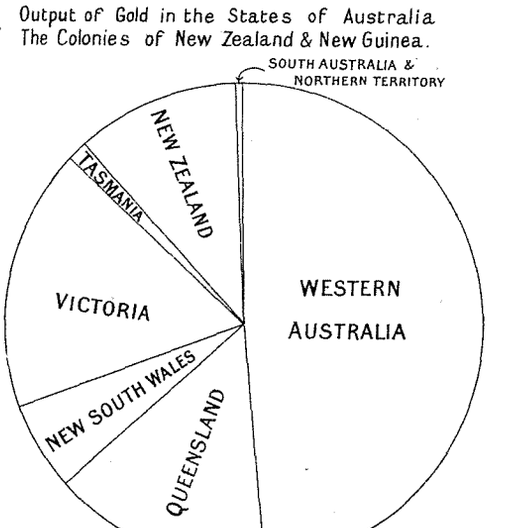


Fig. 6. Output of Gold in the States of Australia The Colonies of New Zealand & New Guinea.



The Murchison Goldfield, previously third on the list, this year ranks second, with a yield, as reported to the Department, of 241,791oz., being an increase of 30,977oz., which can be attributed to the output from the Great Fingall mine, Day Dawn.

The Mount Margaret Goldfield has dropped to third place, with a slight increase of 1,182ozs. over the previous year's output.

North Coolgardie is again fourth on the list, with an increase of 10,411oz. over last year.

East Murchison follows, and has an increase to show of 11,587oz. over the previous year.

Of the rest, Dundas, Broad Arrow, and West Pilbarra have made good progress, the first-named having an increase of 16 per cent., Broad Arrow having an increase of 10,294oz., or 52 per cent., and West Pilbarra nearly trebling the previous year's output.

Pilbarra heads the list for the highest average per ton of ore milled, being 1·68oz.; then follow Yalgoo and Dundas, with 1·59oz. and 1·50oz. respectively, the latter showing an increased value of ·23oz. over the previous year's average of 1·27oz. per ton.

The average for the whole State per ton of ore milled being 1·07oz., as against 1·10oz. for the previous year, or a slight decrease of ·03oz.

TABLE 3.

Number of Gold-producing Mines in the several Goldfields and Districts during 1902 and 1903.

Goldfield.	District.	1902.		1903.	
		District.	Goldfield.	District.	Goldfield.
Kimberley	... ...	...	2	...	1
Pilbarra	Marble Bar ...	13	28	12	21
	Nullagine ...	15		9	
West Pilbarra	... ...	...	3	...	2
Peak Hill...	... ...	...	11	...	10
East Murchison	... ...	...	59	...	77
Murchison ...	Cue	44	172	51	206
	Nannine	44		53	
	Day Dawn ...	14		21	
	Mt. Magnet ...	70		81	
Yalgoo	... ...	...	12	...	9
Mt. Margaret ...	Mt. Morgans ...	13	142	23	151
	Mt. Malcolm ...	42		49	
	Mt. Margaret ...	87		79	
North Coolgardie	Ularring	86	276	62	283
	Niagara	76		85	
	Yerilla	36		62	
	Menzies	78		74	
Broad Arrow	... ...	...	32	...	28
N.E. Coolgardie ...	Kanowna... ...	50	82	46	81
	Bulong	29		32	
	Kurnalpi	3		3	
East Coolgardie	... ...	...	68	...	52
Coolgardie ...	Coolgardie ...	85	130	70	106
	Kunanalling ...	45		36	
Yilgarn	... ...	...	13	...	32
Dundas	... ...	...	36	...	29
Phillips River	... ...	...	31	...	14
Donnybrook	... ...	...	4	...	3
		...	1,101	...	1,105

From the above table it will be seen that the number of gold-producing mines has only increased by four compared with the year 1902. The Murchison Goldfield showing the largest increase, with 206 mines producing gold, as against 172 for the previous year; next, Yilgarn, with 32 against 13, or nearly double that of the previous year; and East Murchison with 77 against 59.

Coolgardie shows a reduction of 24, Phillips River 17, and East Coolgardie 16 gold-producing mines.

TABLE 4.

Averages of Gold Ore raised, and Ounces of Gold produced therefrom, per man employed on the several Goldfields of the State, during 1902 and 1903.

GOLDFIELD.	1902.				1903.			
	Tons of Gold Ore raised.		Ounces of Gold produced therefrom.		Tons of Gold Ore raised.		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.	ozs.	ozs.	tons.	tons.	ozs.	ozs.
1. Kimberley	146·66	73·33	65·00	32·50	...	296·67	...	181·00
2. Pilbarra	65·12	38·30	104·09	61·23	49·87	29·55	84·00	49·78
3. West Pilbarra	639·50	45·68	656·00	46·86	...	150·74	...	179·49
4. Ashburton	...	...	...	...	...	...	...	...
5. Gascoyne	...	...	...	...	...	...	...	...
6. Peak Hill	419·66	174·75	273·63	113·94	393·29	182·02	212·24	98·23
7. East Murchison	255·80	124·67	164·71	80·28	271·37	134·74	177·96	88·36
8. Murchison	146·55	76·23	200·61	104·35	222·43	115·50	296·00	153·70
9. Yalgoo	107·92	49·30	157·84	72·10	83·17	32·59	132·49	51·92
10. Mt. Margaret	218·95	128·37	168·13	98·58	225·10	136·70	176·36	107·10
11. North Coolgardie	138·22	80·09	162·54	94·18	181·70	109·95	166·37	100·67
12. Broad Arrow	135·35	78·17	105·88	61·15	160·66	92·81	120·90	69·85
13. N.E. Coolgardie	117·65	70·16	121·18	72·26	149·37	91·90	118·94	73·18
14. East Coolgardie	278·50	134·66	366·65	177·29	310·37	158·00	408·94	208·18
15. Coolgardie	101·07	57·30	90·92	51·54	110·01	61·07	85·03	47·20
16. Yilgarn	248·30	112·62	139·25	63·16	296·04	133·22	136·86	61·59
17. Dundas	113·58	68·57	144·37	87·15	102·99	60·50	154·27	90·62
18. Phillips River	146·72	75·72	131·95	68·10	113·61	65·44	103·11	59·39
19. Donnybrook	15·65	8·31	2·97	1·58	14·81	9·09	2·15	1·32
Total Averages ...	201·17	105·97	222·26	117·08	231·11	124·68	247·10	133·31

Amount of ore raised per man employed exceeds that for 1902 by 18·71 tons; and the ounces of gold produced per man employed above and below ground are increased by 16·23ozs. per man.

The average value of gold for the year being £3 12s. per ounce, over £479 worth of gold was produced for every man employed above and under ground, as against £427 for the previous year.

TABLE 5.

Output of Gold from the several States of Australia and the Colony of New Zealand during 1903.

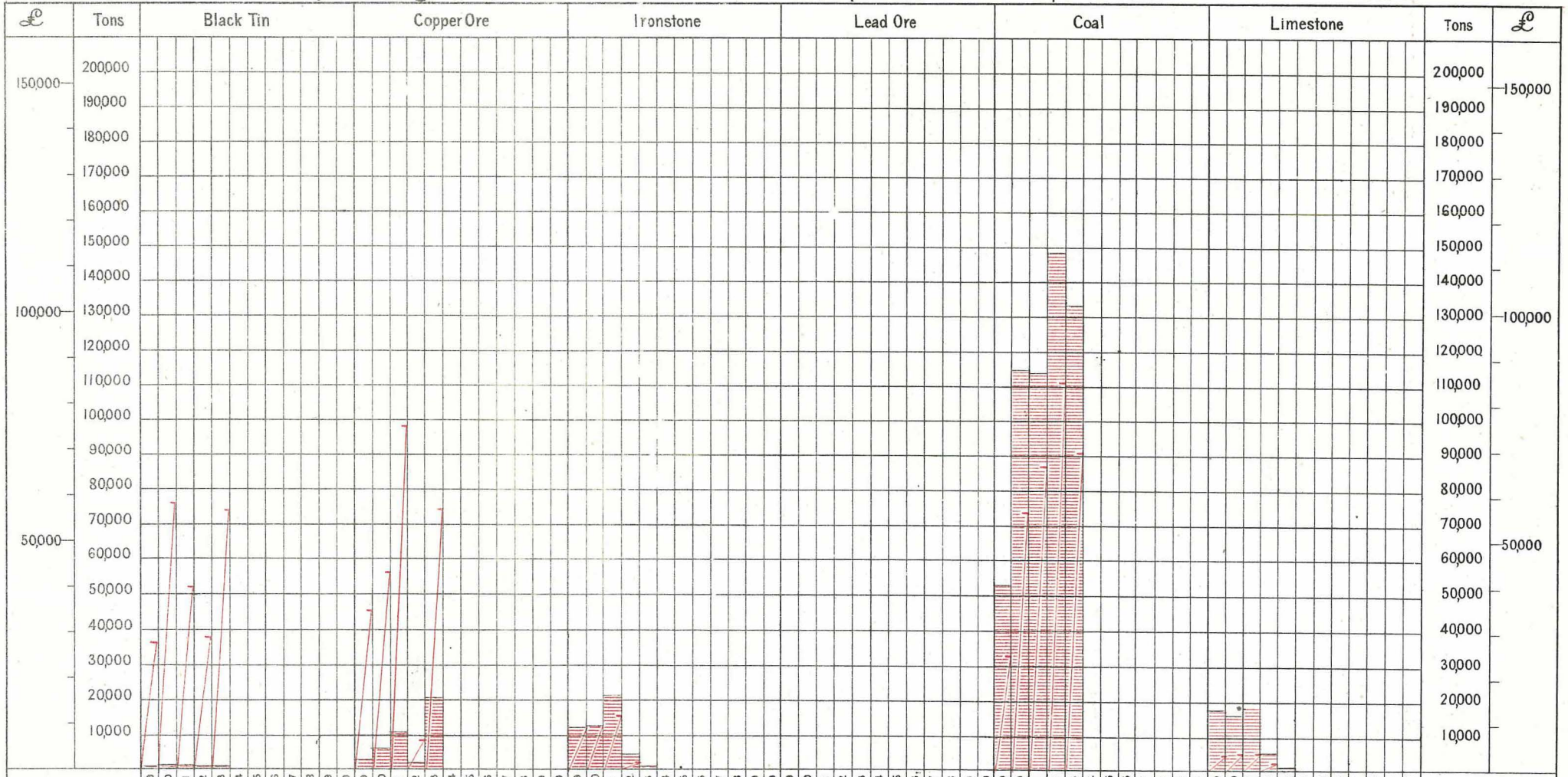
State.	Gross Weight.	Fine Contents.	Value.	Percentage of Value of Total Output.
	ozs.	ozs.	£	
1. Western Australia	2,436,311	2,064,801	8,770,719	47·84
2. Victoria	822,424	767,347	3,259,483	17·78
3. Queensland	921,363	668,546	2,839,813	15·49
4. New South Wales	295,778	254,157	1,080,029	5·89
5. Tasmania	†	59,892	254,403	1·39
6. South Australia and Northern Territory	27,829	21,195	90,031	·49
New Zealand	533,314	479,746	2,037,832	11·12
Total	...	4,315,684	18,332,310	100·00

† Unknown.

From the above table it will be noticed that it only requires an increase of less than three per cent. on the value of the present output of gold from this State to equal the total value of the gold output of the Eastern States and New Zealand.

DIAGRAM

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



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

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

Black Tin	1738	76227
Copper Ore	10641	166855
Lead Ore	33601	364418
Pig	607	12229
Total Value		£619728

1904

TABLE 6.

Quantity and Value of Minerals, other than Gold, reported to the Mines Department during 1903.

Goldfield, District, or Mining District.	Quantity.	Value.	Increase or Decrease for year compared with 1902.	
			Quantity.	Value.
	tons.	£	tons.	£
BLACK TIN.				
Greenbushes Mining District	524·94	34,362	+ 121·73	+ 9,682
Pilbarra Goldfield (Marble Bar District) ...	292·11	21,528	+ 75·76	+ 6,425
Total	817·05	55,890	+ 197·49	+ 16,107
COPPER ORE.				
Mt. Margaret Goldfield (Mt. Malcolm District)	18,965·00	45,557	+ 17,011·00	+ 38,705
Phillips River Goldfield	1,561·33	10,984	+ 1,253·08	+ 9,746
Total	20,526·33	56,541	+ 18,264·08	+ 48,451
IRONSTONE.				
From State generally	220·00	88	— 4,580·00	— 1,952
SILVER-LEAD ORE.				
Ashburton Goldfield	...	...	— 35·85	— 277
LIMESTONE.				
Yilgarn Goldfield	102·00	75	— 433·00	— 265
From State generally	1,177·50	103	— 3,367·85	— 897
Total	1,279·50	178	— 3,800·85	— 1,162

Both tin and copper, as will be seen from this table, show a large increase in output. Black tin with an increase of 197·49 tons, and an increase in value of £16,107 over the previous year; the increase from Greenbushes being 30 per cent. over the previous year and from Marble Bar 35 per cent. Copper ore shows an increase in output of 18,264 tons, and an increase in value of £48,451, the output from the Mount Margaret Goldfield being over nine times that of the previous year, and from Phillips River five times; the previous year's development work with regard to the former field enabling smelting to be carried on uninterruptedly, and thus accounting for the output; the increased output from the latter field is owing to the arrangements made by the Department by which leaseholders could have their ore purchased on assay values prior to smelting.

TABLE 7.

Quantity of Coal raised during 1902 and 1903, and Estimated Value thereof, with Number of Men employed and Output per Man.

Coalfield.	Year.	Quantity raised.	Estimated value.	Men employed.		Quantity raised.	
				Above ground.	Under ground.	Per man employed under ground.	Per man employed above and under ground.
		tons.	£			tons.	tons.
Collie	1902	140,884	86,188	84	284	496	383
	1903	133,427	69,128	94	308	433	332

From the above table it will be seen that the output of coal shows a decrease for the year of 7,457 tons. As before stated, this was due to the temporary closing of the Collie Proprietary Co. owing to labour disputes.

TABLE 8.

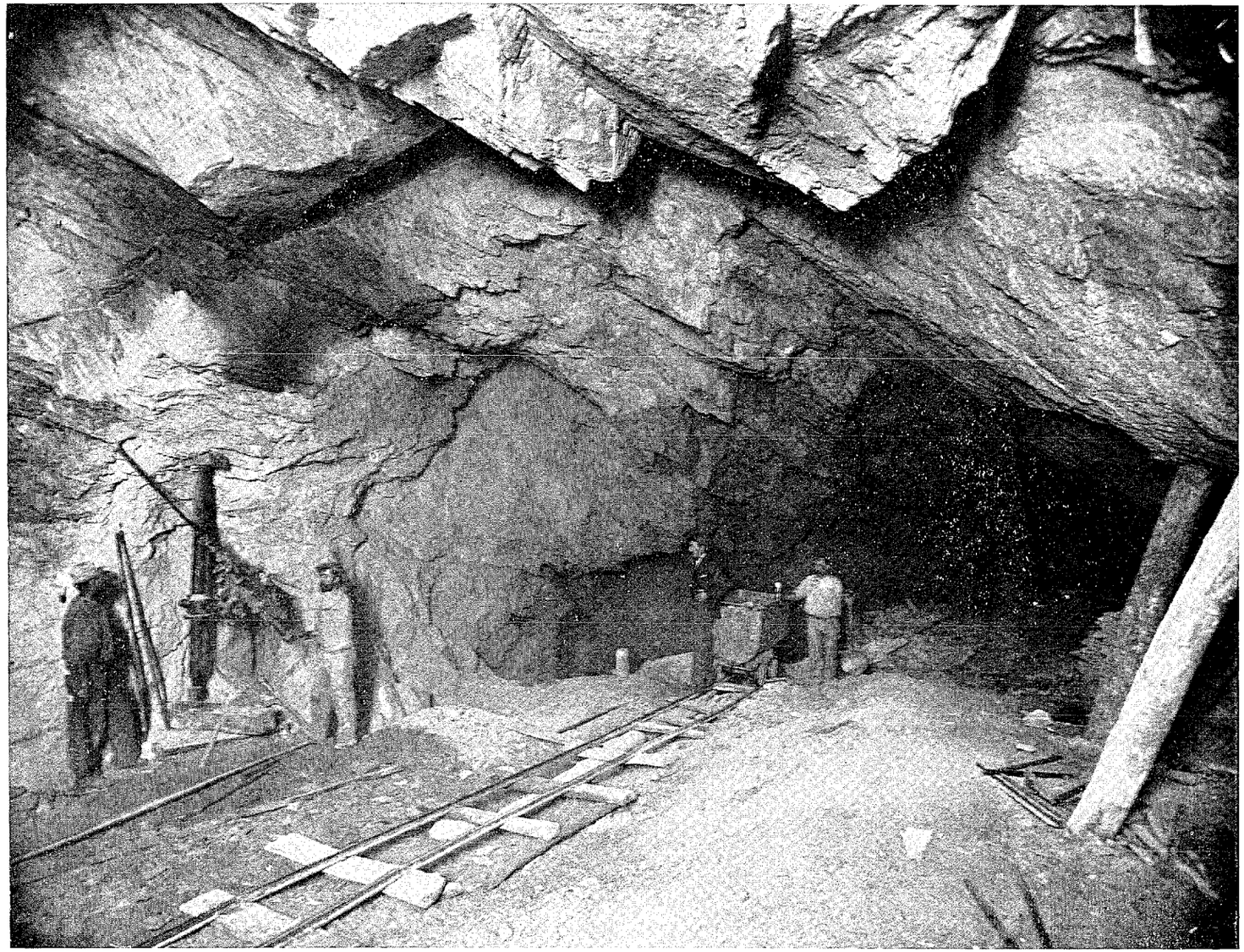
Dividends paid by Western Australian Gold Mining Companies during 1902 and 1903.

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

Goldfield.	Name of Company.	Par Value of Shares.	Paid up to	Nominal Capital.	No. of Shares issued.	1902.		1903.	
						No. of Dividends paid.	Total Amount paid.	No. of Dividends paid.	Total Amount paid.
		£ s. d.	£ s. d.	£			£		£
Murchison	Great Fingall Consolidated Gold Mines, Ltd.	0 10 0	0 10 0	125,000	250,000	3	143,750	3	200,000
	Island Eureka G.M. Co., Ltd.	0 2 6	0 0 3½	10,000	80,000	11	10,667	1	1,000
Mount Margaret ...	Westralia Mount Morgans G.M. Co., Ltd.	0 5 0	0 5 0	125,000	480,000	4	61,327	4	60,000
	Lancefield G.M. Co., Ltd.	1 0 0	1 0 0	25,000	21,600	12	4,320	11	3,960
	Ida H. Gold Mining Co. (Laverton) ...	0 5 0	0 5 0	60,000	216,000	2	12,406	4	28,606
	Sons of Gwalia G.M. Co., Ltd. ...	1 0 0	1 0 0	350,000	318,000	...	...	2	79,500
Coolgardie	Burbanks Birthday Gift G.M. Co., Ltd.	1 0 0	1 0 0	180,000	180,000	3	22,500	...	4,500
	Lady Robinson G.M. Co., Ltd. ...	1 0 0	1 0 0	48,000	48,000	2	1,152	...	...
North Coolgardie ...	Lady Shenton G.M. Co., Ltd.	1 0 0	1 0 0	160,000	160,000	1	8,000	...	...
	Queensland Menzies G.M. Co., N.L. ...	0 5 0	0 5 0	33,000	132,000	3	9,900	6	19,800
	Cosmopolitan Proprietary, Limited ...	1 0 0	1 0 0	400,000	400,000	1	10,000	3	60,000
	Menzies Alpha G.M. Co., Ltd. ...	Ord., £1 Pref., £1	1 0 0 0 10 0	120,000	100,002 ord. 19,998 pref.	...	...	1	* 1,000
North-East Coolgardie	White Feather Main Reef, Limited ...	1 0 0	1 0 0	160,000	160,000	2	8,000	2	8,000
East Coolgardie ...	Great Boulder Proprietary G.M., Ltd.	0 2 0	0 2 0	175,000	1,750,000	5	218,750	4	262,500
	Ivanhoe Gold Corporation, Limited ...	5 0 0	5 0 0	1,000,000	200,000	4	130,000	4	180,000
	Golden Horseshoe Estates Co., Ltd. ...	5 0 0	5 0 0	1,500,000	300,000	3	270,000	3	270,000
	Associated Northern Blocks, Ltd. ...	1 0 0	1 0 0	350,000	350,000	1	87,500	1	† 87,500
	Kalgurli Gold Mines, Limited ...	1 0 0	1 0 0	120,000	120,000	1	15,000	4	60,000
	Great Boulder Perseverance G.M. Co., Ltd.	1 0 0	1 0 0	1,500,000	1,400,000	4	350,000	4	350,000
	Oroya Brown Hill Co., Limited ...	1 0 0	1 0 0	450,000	450,000	1	45,000	4	191,250
	Associated Gold Mines of W.A., Ltd.	1 0 0	1 0 0	500,000	495,408	...	...	1	49,536
	Brown Hill Extended G.M. Co., Ltd.	1 0 0	1 0 0	100,000	100,000	...	...	2	45,000
Dundas	Princess Royal G.M. Co., No Liability	0 10 0	35,000 fully paid, 45,000 con. (6s. 6d. paid)	40,000	80,000	4	16,000	8	32,000
Peak Hill	Peak Hill Goldfield Co., Limited ...	1 0 0	1 0 0	300,000	300,000	...	...	2	30,000
	Totals	...	...	7,831,000	8,111,008	...	1,424,272	...	2,024,152

* On preference shares. † This amount is exclusive of 1s. per share paid in fully paid shares in the Northern Blocks Syndicate (May, 1903). If the cash equivalent (£17,500) be added, the distribution for the year 1903 will be increased to £105,000, and the total accordingly.

It will be seen from the above table that the year shows a substantial increase of £599,880 over the previous year, or an increase of 42 per cent. of the dividends paid; the total dividends paid amounting to £2,024,152, being a return of 26 per cent. on the nominal capital. This must be considered eminently satisfactory. Figures of this nature are more likely to attract the attention of the investing public, both at home and abroad, than any other form of advertisement. The following mines all paid dividends exceeding an amount of £100,000, as last year the Great Boulder Perseverance heads the list with £350,000; next the Golden Horseshoe with £270,000; then the Great Boulder Proprietary with £262,500, being an increase on last year's dividend of



UPPER STOPES BETWEEN NO. 4 LEVEL AND NO. 5 LEVEL, BROWN HILL G.M., KALGOORLIE.
(*East Coolgardie G.F.*)

£43,750; then follow the Great Fingall with £200,000, being an increase over last year of £56,250; the Oroya Brown Hill with £191,250, which more than quadrupled the amount paid last year; and the Ivanhoe Gold Corporation £180,000, showing an increase of £50,000.

Part III.—Leases and other Holdings under the various Acts relating to Mining.

Table 9.

Total Number and Acreage of Leases held for Mining on 31st December, 1902 and 1903.

Title of Act under which held.	1902.		1903.	
	No.	Acreage.	No.	Acreage.
Goldfields Acts	2,406	32,334	2,308	30,173
Mining on Private Property Act (Gold) ...	18	236	20	242
Mineral Lands Acts	308	34,739	244	33,083
Total	2,732	67,309	2,572	63,498

The total area leased for mining shows a decrease of 5·6 per cent. compared with the previous year, the decrease in the acreage held for gold mining being 2,155 acres; of this the area held under the Private Property Act is practically the same as last year; the acreage for other minerals shows a decrease of 1,656 acres.

Table 10.

Number and Acreage of Gold Mining Leases in force each year for the Five Years ending 31st December, 1903.

Goldfields.		Districts.		1899.		1900.		1901.		1902.		1903.		Percentage of Total Acreage.		Increase or Decrease for 1903 compared with 1902.		Goldfields.
Name.	Proclaimed.	Name.	Proclaimed.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	1902.	1903.	Increase.	Decrease.	
Kimberley ...	20-5-86	... ...	...	3	32	4	38	3	19	3	19	3	19	·06	·06	...	...	Kimberley
Yilgarn	1-10-88	... ...	...	46	788	48	765	32	497	37	584	74	985	1·79	3·24	401	...	Yilgarn
Pilbarra	1-10-88	Marble Bar ...	6-11-96	34	277	43	379	36	316	28	256	27	258	1·56	1·65	2	...	Pilbarra
		Nullagine ...	6-11-96	24	195	16	150	16	193	22	252	20	244	...	...	...	8	
Ashburton ...	11-12-90	... ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
Murchison ...	24-9-91	Cue	10-1-96	78	776	70	678	92	800	95	933	89	810	...	...	...	123	Murchison
		Nannine ...	7-12-94	105	1,119	110	1,266	75	891	82	973	93	1,114	12·98	13·05	141	...	
		Day Dawn ...	10-1-96	53	503	63	679	96	1,099	117	1,281	112	1,209			...	72	
		Mount Magnet	7-12-94	115	1,047	95	906	91	840	116	1,044	94	834	...	...	...	210	
Dundas	31-8-93	... ...	...	110	1,352	93	1,164	85	986	68	733	72	793	2·27	2·61	60	...	Dundas
Coolgardie ...	6-4-94	Coolgardie ...	1-9-97	272	3,427	212	2,786	197	2,464	188	2,274	170	2,076	...	...	...	198	Coolgardie
		Kunanalling ...	1-9-97	122	1,583	123	1,570	96	1,195	86	1,097	73	908	10·34	9·80	...	189	
East Coolgardie ...	21-9-94	... ...	...	393	6,535	382	6,368	295	4,665	254	3,936	231	3,469	12·07	11·40	...	467	East Coolgardie
Yalgoo	23-1-95	... ...	...	49	495	39	480	41	512	35	417	28	365	1·28	1·20	...	52	Yalgoo
North Coolgardie	28-6-95	Menzies ...	20-3-96	105	1,415	86	1,183	95	1,155	100	1,364	129	1,508	...	...	144	...	North Coolgardie
		Ularring ...	20-3-96	81	1,109	133	1,707	129	1,766	85	1,105	81	937	14·53	17·90	...	168	
		Yerilla ...	20-3-96	38	574	46	725	48	852	49	838	96	1,539			701	...	
		Niagara ...	12-3-97	79	907	88	1,028	109	1,312	119	1,431	121	1,455	...	...	24	...	
East Murchison ...	28-6-95	... ...	...	112	1,524	147	2,064	151	2,133	190	2,960	192	2,746	9·08	9·03	...	214	East Murchison
West Pilbarra ...	20-9-95	... ...	...	9	101	13	161	3	36	7	96	6	66	·38	·21	...	30	West Pilbarra
North-East Coolgardie	20-3-96	Kanowna ...	13-11-96	125	1,602	133	1,625	112	1,336	112	1,322	89	1,118	...	...	...	204	North-East Coolgardie
		Bulong ..	13-11-96	59	818	38	509	59	798	73	887	67	909	6·94	6·68	22	...	
		Kurnalpi ...	13-11-96	8	133	8	133	5	73	4	54	...	...	...	...	...	54	
Broad Arrow ...	17-11-96	... ...	...	128	1,711	113	1,445	97	1,251	89	1,151	86	1,098	3·53	3·61	...	53	Broad Arrow
Peak Hill	19-3-97	... ...	...	117	1,697	120	1,744	98	1,334	66	747	59	693	2·29	2·28	...	54	Peak Hill
Mount Margaret	12-3-97	Mount Margaret	12-3-97	88	1,634	123	2,510	222	3,970	169	2,767	132	2,089	...	...	...	678	Mt. Margaret
		Mount Malcolm	12-3-97	206	3,885	154	2,990	161	2,939	140	2,515	103	1,836	18·41	14·93	...	679	
		Mount Morgans	2-4-02	...	...	...	...	...	...	41	720	33	614	...	...	...	106	
Gascoyne	25-6-97	... ...	...	5	72	5	72	1	12	2	36	2	36	·11	·11	...	...	Gascoyne
Donnybrook ...	11-11-99	Crown Land ...	...	45	807	36	575	10	141	8	123	8	123	1·10	1·08	...	...	Donnybrook
		Private Property	...	...	...	15	210	21	306	18	236	16	206	...	...	...	30	
Phillips River ...	21-9-00	... ...	...	...	...	5	114	27	607	21	419	17	298	1·28	·98	...	121	Phillips River
Greenbushes ...	...	... ...	...	...	...	...	...	...	...	...	...	1	24	...	·07	24	...	
Newcastle ...	...	Private Property	...	...	...	...	...	...	...	...	...	4	36	...	·11	36	...	
Totals ...	...	...	...	2,609	36,118	2,561	36,024	2,503	34,498	2,424	32,570	2,328	30,415	100·00	100·00	1,555	3,710	

96 Leases : 2,155 acres decrease for 1903.

Compared with the previous year there is a total decrease of 96 leases, with a corresponding decrease in area of 2,155 acres.

The North Coolgardie Goldfield shows an increased acreage leased of 701 acres, and Yilgarn 401 acres. The following goldfields show decreases:—Mount Margaret, 1,463 acres; East Coolgardie, 467 acres; Coolgardie, 387 acres; Murchison, 264 acres; North-East Coolgardie, 236 acres; and East Murchison, 214 acres.

The total acreage of gold-mining leases in force on all the goldfields amounts to 30,415 acres; of this area 17·90 per cent. is leased on the North Coolgardie Goldfield, which this year is the largest contributor to the total acreage; then follows Mount Margaret Goldfield with 14·93 per cent., Murchison Goldfield with 13·05 per cent., and East Coolgardie with 11·40 per cent.

TABLE 11.

Number and Acreage of Mineral Leases in force 31st December each year, for the Five Years ending 31st December, 1903.

Mining Districts.		Sub-Districts.		1899.		1900.		1901.		1902.		1903.		Increase or Decrease for 1903, compared with 1902.		Districts.
Name.	Proclaimed.	Name.	Pro-claimed.	Leases.	Average.	Leases.	Average.	Leases.	Average.	Leases.	Average.	Leases.	Average.	Increase.	Decrease.	
Kimberley ...	....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Kimberley
Ashburton ...	11-12-90	...	...	...	...	...	...	2	80	7	286	...	...	...	286	Ashburton
		Cue	7-12-94	...	...	...	...	...	...	...	...	...	...	...	...	
		Nannine ...	7-12-94	...	...	...	...	...	...	...	...	...	...	...	...	
Murchison ...	24-9-91	Day Dawn ...	10-1-96	...	...	3	15	3	16	...	...	...	...	...	...	Murchison
		Mount Magnet	7-12-94	1	5	1	5	2	10	2	10	**2**	**10**	...	...	
Greenbushes ...	7-4-92	...	...	88	1,977	51	1,179	100	2,259	54	1,192	**38**	**703**	...	489	Greenbushes
Pilbarra	16-6-92	Marble Bar ...	16-6-92	16	601	21	756	20	655	7	176	**3**	**80**	...	96	Pilbarra
		Nullagine ...	6-11-96	2	300	...	...	1	10	1	10	...	...	...	10	
Yalgoo	23-1-95	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Yalgoo
Yilgarn	22-3-95	...	...	...	...	3	30	3	30	3	21	**1**	**6**	...	15	Yilgarn
Coolgardie ...	22-3-95	Coolgardie ...	22-3-95	5	45	4	40	2	14	1	12	**2**	**22**	10	...	Coolgardie
		Kunanalling ...	1-9-97	...	...	...	...	...	...	...	...	...	...	...	...	
East Coolgardie...	22-3-95	...	...	27	383	35	360	20	156	15	110	**13**	**180**	70	...	East Coolgardie
East Murchison...	28-6-95	...	...	...	...	2	4	1	2	3	14	**1**	**2**	...	12	East Murchison
		Menzies ...	15-4-96	4	20	3	20	1	12	1	12	**1**	**12**	...	...	
		Ularring ...	15-4-96	...	...	1	80	...	...	...	...	...	...	...	...	
North Coolgardie	16-8-95	Yerilla ...	15-4-96	...	...	...	...	...	...	...	...	...	...	...	...	North Coolgardie
		Niagara ...	1-3-97	...	...	...	...	1	10	...	...	**1**	**1**	1	...	
West Pilbarra ...	1-11-95	...	...	16	499	20	551	20	564	10	358	**8**	**284**	...	74	West Pilbarra
Dundas	27-12-95	...	...	1	6	1	6	1	6	1	6	**1**	**6**	...	...	Dundas
Collie	21-2-96	...	...	71	22,213	98	30,743	96	29,785	94	29,145	**94**	**29,145**	...	...	Collie
		Kanowna ...	15-4-96	2	17	2	17	...	...	...	...	...	...	...	...	
North-East Coolgardie	15-4-96	Bulong ...	15-4-96	...	...	...	...	...	...	...	...	...	...	...	...	N.E. Coolgardie
		Kurnalpi ...	15-4-96	...	...	...	...	1	12	1	12	...	...	...	12	
Broad Arrow ...	20-11-96	...	...	5	120	...	...	1	20	1	20	...	...	...	20	Broad Arrow
Northampton ...	1-1-97	...	...	20	313	6	65	6	68	4	50	**5**	**125**	75	...	Northampton
Peak Hill ...	1-4-97	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Peak Hill
		Mt. Margaret	1-4-97	...	...	3	26	1	3	3	11	**2**	**6**	...	5	
Mount Margaret	1-4-97	Mt. Malcolm ...	1-4-97	...	...	18	374	21	452	20	538	**14**	**317**	...	221	Mt. Margaret
		Mt. Morgans...	2-4-02	...	...	...	...	...	...	1	6	**1**	**6**	...	...	
Gascoyne ...	15-4-97	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Gascoyne
Yandanooka ...	1-12-97	...	...	5	128	2	40	1	20	2	90	**13**	**855**	765	...	Yandanooka
Phillips River ...	1-7-99	...	...	5	750	53	2,265	65	2,099	67	2,122	**39**	**1,093**	...	1,029	Phillips River
Donnybrook ...	27-11-99	...	...	...	...	...	...	4	78	4	78	...	...	...	78	Donnybrook
Crown Land ...	....	Cane River ...	...	...	...	4	140	...	...	1	40	...	...	...	40	
		Other Localities	...	...	...	...	...	1	50	5	420	**5**	**230**	...	190	
Totals ...	...	...	...	268	27,337	331	36,716	374	36,411	308	34,739	**244**	**33,083**	921	2,577	

64 leases; 1,656 acres decrease for 1903.

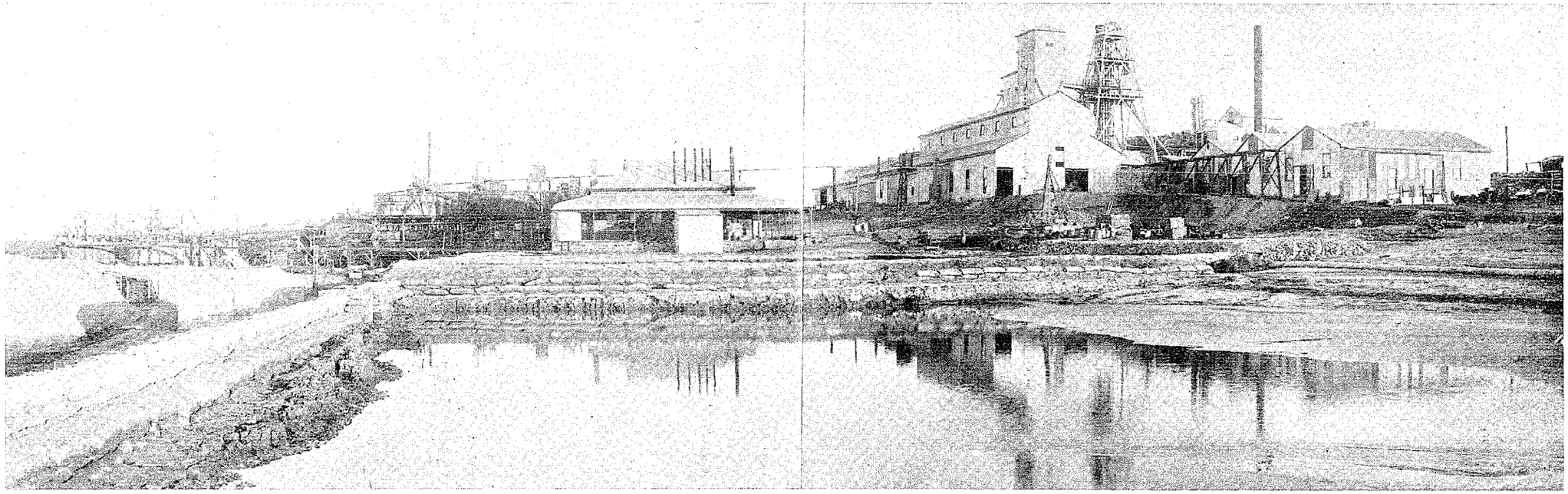
The above table shows a decrease of 64 leases, with a decrease in acreage of 1,656 acres. Of the various fields Phillips River shows the largest decrease, viz.:—1,029 acres; then follows Greenbushes with a decrease of 489 acres. Of those districts showing increases Yandanooka is first with an increase of 765 acres; this was owing to applications for copper leases made in this district during the year. The total acreage in force during the year amounted to 33,083 acres; of this area 29,145 acres were leased for coal, which was the same as leased last year; 2,478 acres for copper, being an increase of 62 acres; and 783 acres for tin, being a decrease of 585 acres.

Table 12.

Number and Acreage of Mineral Leases in force on 31st December, 1903, showing Minerals for which they are worked.

Minerals.	Ashburton.		Murchison.		Greenbushes.		Pilbarra.				Yilgarn.		Coolgardie.		East Coolgardie.		East Murchison.		North Coolgardie.		Niagara.		West Pilbarra.		Dundas.		Yalgoo.		Peak Hill.	
	Uaroo.		Mt. Magnet.				Marble Bar.		Nullagine.				Coolgardie.						Menzies.											
	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.
Antimony	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	80	...	...	...	...	...	...
Gypsum	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Coal	...	...	...	...	...	...	...	...	...	...	...	...	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Copper	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	100	...	...	1	12	...	...	5	194	...	...	...	...	...	...
Ironstone	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Limestone	...	...	1	5	...	...	...	...	...	...	1	6	...	...	...	...	...	...	...	...	...	...	1	10	1	6	...	...	...	...
Copper, Silver, and Lead	...	...	...	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Copper and Ironstone	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tin	...	...	...	...	38	703	3	80	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Silver	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..	...	...	...	...	...	...
Silver and Lead	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Copper and other Minerals	...	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Copper and Silver	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Clay	...	...	1	5	...	...	...	...	...	...	...	...	1	12	10	75	..	...	...	...	...	...	...	...	...	...	...	...	...	...
Building Stone	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	5	...	...	...	...	1	1	...	...	...	...	...	...	...	...
Building Stone and Mica	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Lime	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	2	...	...	...	...	...	...	...	...	...	...	...	...
Copper and Lead	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..	...	...	...	..	...	...	...	...	...	...	...	...	...	...
Copper, Lead, and Blend	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Lead	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cobalt	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Graphite	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Mica	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Asbestos	...	...	...	...	...	...	...	...	...	...	...	...	1	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Totals	...	...	2	10	38	703	3	80	...	...	1	6	2	22	13	180	1	2	1	12	1	1	8	284	1	6	...	...	...	...

Minerals.	Collie.		North-East Coolgardie.		Broad Arrow.		North-ampton.		Mt. Margaret.						Yandanooka.		Phillips River.		Donnybrook.		Crown Lands outside proclaimed Mining Districts.				Total acreage.	Increase or Decrease for 1903 compared with 1902.	
			Kurnalpi.						Mt. Margaret.		Mt. Malcolm.		Mt. Morgans.								Cane River.		Other places.			Increase.	Decrease.
	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.	Leases.	Acres.			
Antimony	...	...	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	80	80	...
Gypsum	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	80	80	80	...
Coal	94	29,145	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	29,145	...	...
Copper	...	...	...	...	...	...	...	...	...	...	7	232	...	...	13	855	34	935	...	...	...	...	1	150	2,478	62	...
Ironstone	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	350
Limestone	...	...	...	...	...	...	...	...	...	...	1	10	...	...	...	...	1	3	...	...	...	...	...	...	40	...	105
Copper, Silver, and Lead	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Copper and Ironstone	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tin	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	783	...	585
Silver	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	126
Silver and Lead	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Copper and other Minerals	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	155	...	...	..	...	...	...	155	...	243
Copper and Silver	...	...	...	...	...	...	...	...	...	...	2	45	...	...	...	...	...	...	...	...	...	...	...	...	45	...	..
Clay	...	...	...	...	...	...	...	...	2	6	2	15	1	6	...	...	...	...	...	...	...	...	...	...	119	...	44
Building Stone	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	6	...	83
Building Stone and Mica	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Lime	...	...	...	...	..	...	...	...	...	...	1	10	...	...	...	...	...	...	...	...	...	...	...	...	12	...	...
Copper and Lead	...	...	...	...	...	...	5	125	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	125	80	...
Copper, Lead, and Blend	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5
Lead	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	12
Cobalt	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Graphite	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	420
Mica	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	10	10	...
Asbestos	...	...	...	..	...	...	...	...	...	...	1	5	...	...	...	...	...	...	...	...	...	...	...	...	5	5	...
Total	94	29,145	...	...	...	...	5	125	2	6	14	317	1	6	13	855	39	1,093	...	...	...	...	5	230	33,083	317	1,973



WESTRALIA MT. MORGANS GOLD MINES, MT. MORGANS.
(*Mt. Margaret G.F.*)

Table 13.

Claims and Authorised Holdings under the Goldfields Acts and Regulations, existing on 31st December, 1902 and 1903.

Claims, etc.	Kimberley.		Yilgarn.		Pilbarra.				Ashburton.		Murchison.								Dundas.		Coolgardie.				East Coolgardie.		Yalgoo.		North Coolgardie.							
					Marble Bar.		Nullagine.				Cue.		Day Dawn.		Nannine.		Mt. Magnet.				Coolgardie.		Kunanalling.						Menzies.		Ularring.		Yerilla.		Niagara.	
	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.
Water Rights ...	...	...	18	10	11	1	...	9	...	...	8	10	18	22	4	4	...	1	26	28	25	36	48	46	71	54	4	...	33	33	13	15	6	6	23	23
Area of Water Rights	...	...	57	36	15	6	...	9	...	...	18	24	103	113	8	8	...	1	213	218	82	198	134	134	1107	1102	4	...	870	852	70	76	20	13	58	57
Quartz Claims ...	...	...	...	...	26	28	...	14	...	...	3	2	1	2	3	2	11	15	39	32	87	113	23	35	55	55	14	2	5	10	2	2	1	1	8	5
Alluvial Claims ...	...	...	1	...	...	...	...	...	...	...	...	1	2	2	2	2	1	1	2	...	...	...	...	...	18	22	...	...	...	1	...	...	...	...	...	...
Reward Claims ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Prospecting Areas ..	...	...	1	...	4	1	...	...	1	...	6	3	3	2	14	15	5	3	13	12	8	..	13	...	32	29	49	7	1	4	...	1	1	1	3	3
Residence Areas ...	...	...	61	23	19	13	...	10	...	...	15	12	7	8	35	18	22	23	63	71	54	3	4	...	779	698	7	14	289	124	...	...	...	...	5	6
Business Areas ...	...	...	33	14	14	12	...	4	...	...	5	7	1	1	20	21	5	9	18	17	50	11	75	22	59	58	10	14	3	9	57	55	88	91	8	9
Machinery Areas ...	...	...	...	...	6	3	...	4	...	...	2	3	2	2	2	1	...	1	6	6	10	12	10	10	8	10	...	2	...	1	1	1	2	2	3	5
Tailings Areas ...	...	...	7	11	2	...	...	2	...	...	2	2	1	1	2	2	3	3	5	5	6	5	...	1	2	2	...	1	1	...	...	...	1	1	4	4
Garden Areas ...	...	...	1	...	14	14	...	4	...	...	4	5	7	8	4	6	9	9	1	1	16	23	...	...	75	68	...	...	5	5	...	...	...	...	7	12
Tunnelling Areas ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Poultry Farms ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		*								*																										

Claims, etc.	East Murchison.		West Pilbarra.		North-East Coolgardie.						Broad Arrow.		Peak Hill.		Mount Margaret.						Gascoyne.		Donny-brook.		Phillips River.		Outside Goldfields.		Total.		Increase or Decrease for 1903 compared with 1902.	
					Kanowna.		Bulong.		Kurnalpi.						Mount Margaret.		Mount Malcolm.		Mount Morgans.														
	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	In-crease.	De-crease.
Water Rights	21	20	2	2	11	9	1	3	1	1	15	13	15	14	22	25	42	59	21	19	...	...	...	...	7	9	...	...	466	472	6	...
Area of Water Rights ...	53	54	12	10	33	33	1	5	2	2	52	40	146	151	78	84	97	326	96	89	...	...	...	...	35	40	...	...	3364	3681	317	...
Quartz Claims	7	14	1	...	42	60	41	27	5	8	10	10	3	...	8	8	112	122	7	7	...	...	...	...	2	2	...	...	516	576	60	...
Alluvial Cla ms	...	3	5	...	196	201	7	4	4	2	...	4	...	...	2	3	1	...	...	...	...	...	...	...	3	1	...	...	244	247	3	...
Reward Claims	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	1	1	...	...
Prospecting Areas... ...	17	13	...	...	70	74	3	2	...	...	6	3	2	...	111	90	53	42	14	20	...	...	...	...	6	8	164	200	600	533	...	67
Residence Areas	11	32	10	...	9	9	61	61	1	1	2	...	26	24	110	110	28	44	...	...	...	...	...	...	16	16	...	...	1634	1320	...	314
Business Areas	12	47	17	4	11	11	1	3	2	2	11	15	9	6	85	76	36	40	6	6	...	...	...	...	52	53	...	...	688	617	...	71
Machinery Areas	6	7	2	...	7	9	1	2	2	2	5	5	2	2	4	6	1	1	1	1	...	...	...	...	1	1	...	...	84	99	15	...
Tailings Areas	4	3	...	...	2	3	1	...	...	...	4	4	...	1	2	2	1	2	1	...	...	...	...	...	...	...	...	...	51	55	4	...
Garden Areas	22	24	2	1	1	2	...	...	...	...	2	3	6	3	8	8	19	19	3	3	...	...	...	...	11	16	...	...	217	234	17	...
Tunnelling Areas	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Poultry Farms	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	*	...	...	...	...	...	...	...	...	...	...

* No returns received.

It will be noticed from the above table that there was an increase of 317 acres in the area of Water Rights, and an increase in the number of Quartz Claims of sixty.

Table 14.

Claims and Authorised Holdings under the Mineral Lands Acts and Regulations existing on 31st December, 1902 and 1903.

Claims, etc.	Kimberley.		Ashburton.		Murchison.		Geeenbushes.		Pilbarra.		Yalgoo.		Yilgarn.		Coolgardie.		East Coolgardie.		East Murchison.		North Coolgardie.		West Pilbarra.		Dundas.	
	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.
Water Rights	...	...	...	...	...	...	50	50	1	1	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...
Area of Water Rights	...	...	...	...	...	...	...	...	2	2	...	...	...	...	...	...	10	10	...	...	...	...	...	...	...	...
Lode Claims	...	...	...	...	...	...	...	...	5	5	...	...	...	...	...	...	2	2	...	...	...	...	...	...	...	...
Alluvial Claims ...	...	...	...	...	...	...	50	52	4	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Reward Claims ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Prospecting Areas ...	...	...	1	...	...	...	...	...	4	1	...	...	...	...	1	1	3	3	...	1	1	...	...	...	...	...
Residence Areas ...	...	...	...	...	...	...	49	50	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Business Areas ...	...	...	...	...	...	...	2	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Machinery Areas ...	...	...	...	...	...	...	3	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tailings Areas ...	...	...	...	...	...	...	4	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Garden Areas	...	...	..	...	...	...	1	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Washing Areas ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Pipe Tracks	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		*		*																						

Claims, etc.	Collie.		North-East Coolgardie.		Broad Arrow.		Northampton.		Peak Hill.		Mt. Margaret.		Gascoyne.		Yandanooka.		Phillips River.		Donnybrook.		Crown Lands.		Totals.		Increase or Decrease for 1903, compared with 1902.	
	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	Increase.	Decrease.
Water Rights ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	52	52	...	...
Area of Water Rights	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	12	12	...	...
Lode Claims	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	7	8	1	...
Alluvial Claims ...	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	54	54	...	...
Reward Claims ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Prospecting Areas ...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	10	...	...	15	12	27	28	1	...
Residence Areas ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	49	50	1	...
Business Areas ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	3	1	...
Machinery Areas ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	4	1	...
Tailings Areas ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	5	1	...
Garden Areas	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	4	2	...
Washing Areas ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Pipe Tracks	...	...	...	...	...	...	...	...	...	...	...	...	...	*	...	...	...	...	...	...	2	2	2	2	...	...

* No returns received.

TABLE 15.

Miners' Rights, and Mining, Business, and Quarry Licenses issued during 1902 and 1903.

PLACE OF ISSUE.	GOLDFIELDS ACTS.						MINERAL LANDS ACTS.							
	Miners' Rights.		Consolidated Miners' Rights.		Business Licenses.		Mining Licenses.		Consolidated Mng. Licenses.		Quarry Licenses.		Business Licenses.	
	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.
Albany	8	...	...	...	...	...	...	4	...	...	...	...	...	...
Ashburton	13	20	...	...	1	1	4	...	...	...	...	...	...	...
Broad Arrow ...	186	267	...	...	4	5	1	3	...	...	...	...	...	...
Broome	3	3	...	...	...	...	...	1	...	...	...	...	...	...
Bulong	408	219	...	1	1	6	...	...	...	...	...	...	...	...
Bunbury	1	3	...	...	...	...	2	1	...	...	...	4	...	...
Busselton	2	3	...	...	...	...	5	5	...	...	...	...	...	...
Carnarvon	11	5	...	...	...	...	...	...	...	...	...	...	...	...
Collie	8	6	...	...	...	...	16	1	...	...	...	...	...	...
Coolgardie	459	448	...	...	20	8	2	...	...	...	...	...	...	...
Cue	367	334	...	...	7	10	2	1	...	...	7	5	...	...
Derby	1	...	...	...	...	...	...	...	...	...	...	...	...	...
Donnybrook ...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
Esperance	5	...	...	...	...	...	1	...	...	...	...	...	...	...
Gascoyne †	3	...	...	...	...	...	...	...	...	...	...	...	...	...
Geraldton	7	7	...	...	...	...	1	3	...	...	...	...	...	...
Greenbushes ...	9	11	...	...	...	...	200	276	...	...	...	2	3	3
Kalgoorlie	1,361	1,223	1	...	15	6	13	21	...	...	...	...	...	...
Kanowna	411	362	...	...	9	15	3	...	...	...	...	...	...	...
Katanning	1	7	...	...	...	...	...	...	...	...	...	...	...	...
Kimberley	19	22	...	...	1	1	...	...	...	...	...	...	...	...
Kookynie	436	313	...	...	138	21	1	...	...	...	2	...	...	...
Kurnalpi	45	46	...	...	1	...	1	...	...	...	...	...	...	...
Lawlers	408	588	...	...	23	51	2	2	...	...	6	13	...	...
Marble Bar ...	244	110	...	...	13	15	103	100	...	...	...	...	...	...
Menzies	297	298	...	...	17	6	1	1	...	...	1	...	...	...
Mt. Magnet ...	247	345	...	...	5	12	1	1	...	...	...	...	...	...
Mt. Malcolm ...	343	310	...	...	24	22	4	10	...	...	...	...	...	...
Mt. Margaret ...	252	329	...	...	20	25	6	3	...	...	...	...	...	...
Mt. Morgans ...	99	171	...	...	6	2	...	...	...	...	...	...	...	...
Nannine	137	113	...	...	17	17	...	...	...	...	...	1	...	...
Newcastle	...	7	...	...	...	...	...	...	...	...	...	...	...	...
Norseman	396	278	...	...	18	20	...	...	...	...	...	...	...	...
Northam	7	6	...	...	...	...	...	...	...	...	...	...	...	...
Northampton ...	...	...	...	...	...	...	12	6	...	...	...	...	...	...
Nullagine * ...	...	114	...	...	...	3	...	...	...	...	...	...	...	...
Peak Hill	103	83	...	...	6	5	...	...	...	...	...	...	...	...
Perth	84	114	2	...	...	...	62	29	...	...	...	...	...	...
Phillips River ...	155	60	...	...	1	2	31	49	...	...	...	...	...	...
Pinjarra	1	5	...	...	...	...	...	...	...	...	...	...	...	...
Southern Cross ...	99	116	...	...	9	12	1	...	...	...	...	...	...	...
Uaroo †	12	...	...	...	1	...	...	...	...	...	...	...	...	...
Ularring	74	70	...	...	15	12	...	...	...	...	...	...	...	...
West Pilbarra ...	89	106	...	...	12	8	10	7	...	...	...	...	...	...
Williams	3	...	...	...	...	...	...	...	...	...	...	...	...	...
Yalgoo	40	37	...	...	8	9	...	...	...	...	...	...	...	...
York	1	...	...	...	...	...	...	2	...	...	...	...	...	...
Total ...	6,855	6,554	3	1	392	294	486	526	...	...	16	25	3	3

* *See* Marble Bar. † Ashburton.

From the above table it will be seen that there were 301 less Miners' Rights issued compared with the previous year, and 98 less Business Licenses; whereas forty more Mining Licenses were issued.

TABLE 16.

Number and Acreage of Miners' Homestead Leases in force on 31st December, 1902 and 1903.

Goldfield.	District.	1902.		1903.		Increase.		Decrease.	
		Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.	Leases.	Acreage.
Dundas	... .	3	80	17	964	14	884	...	...
Broad Arrow	... ...	1	500	3	70	2	...	...	430
Yilgarn	... ...	1	3	2	23	1	20	...	...
Mt. Margaret ...	Mt. Morgans ...	...	...	1	20	1	20	...	...
	Mt. Malcolm ...	7	1,940	8	1,530	1	...	...	410
	Mt. Margaret ...	4	110	5	310	1	200	...	...
Murchison ...	Cue	3	555	8	1,395	5	840	...	...
	Day Dawn ...	1	20	4	57	3	37	...	...
	Nannine	3	1,020	14	1,930	11	910	...	...
Coolgardie	... ...	1	10	36	4,869	35	4,859	...	...
East Coolgardie ...	... ...	4	75	23	894	19	819	...	...
Phillips River ...	... ...	15	1,760	27	2,413	12	653	...	...
Peak Hill	... ...	8	1,750	9	1,788	1	38	...	...
North-East Coolgardie	Kanowna	2	40	15	290	13	250	...	...
North Coolgardie	Menzies	...	...	1	20	1	20	...	...
	Niagara	...	...	4	365	4	365	...	...
East Murchison ...	... ...	...	...	3	565	3	565	...	...
		53	7,863	180	17,503	127	10,480	...	840

The number of Miners' Homestead Leases in force during the year was 180, or more than treble the number in force during the previous year, with an increase in acreage of 10,480, thus showing the increased favour with which these holdings are looked upon. It is satisfactory to know also that the great majority of the lessees have complied with the conditions as to improvements.

Of the various goldfields in which Miners' Homestead Leases have been taken up Coolgardie heads the list with 35, with an area of 4,859 acres; then follows Murchison with 26 leases and an area of 3,382 acres; then Phillips River, with 27 leases, totalling 2,413 acres.

PART IV.—MEN EMPLOYED.

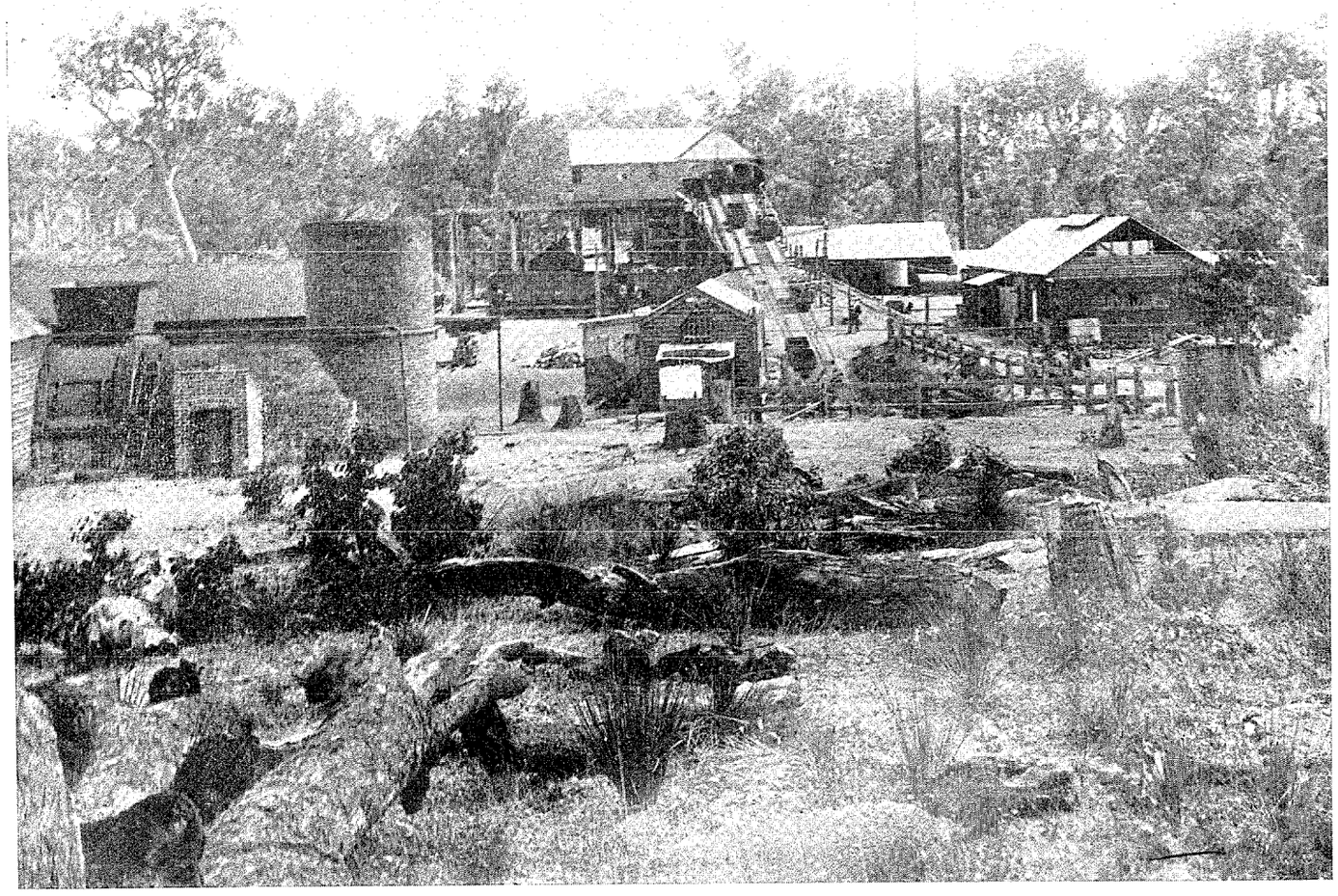
TABLE 17.

Average Number of Men engaged in Mining during 1902 and 1903.

Goldfield.	District.	Reef or Lode.		Alluvial.		Total.	
		1902.	1903.	1902.	1903.	1902.	1903.
1. Kimberley	...	6	3	12	11	18	14
2. Pilbarra	Marble Bar	87	76	28	121	115	197
	Nullagine	100	113	16	15	116	128
3. West Pilbarra	...	28	31	88	100	116	131
4. Ashburton	...	...	...	32	35	32	35
5. Gascoyne	...	...	...	...	...	...	...
6. Peak Hill	...	329	363	11	7	340	370
7. East Murchison	...	1,108	1,150	91	626	1,199	1,776
8. Murchison	Cue	236	243	24	18	260	261
	Nannine	261	239	58	44	319	283
	Day Dawn	891	619	35	31	926	650
	Mt. Magnet	621	457	28	14	649	471
9. Yalgoo	...	81	74	12	12	93	86
10. Mt. Margaret	Mt. Morgans	469	505	1	...	470	505
	Mt. Malcolm	923	798	41	45	964	843
	Mt. Margaret	745	678	26	38	771	716
11. North Coolgardie	Menzies	676	652	26	26	702	678
	Ularring	304	282	31	53	335	335
	Niagara	716	683	52	68	768	751
	Yerilla	256	300	78	112	334	412
12. Broad Arrow	...	303	386	166	161	469	547
13. North-East Coolgardie	Kanowna	630	627	89	87	719	714
	Bulong	170	138	190	178	360	316
	Kurnalpi	15	7	70	61	85	68
14. East Coolgardie	...	6,254	6,119	1,200	1,200	7,454	7,319
15. Coolgardie	Coolgardie	1,234	1,305	142	232	1,376	1,537
	Kunanalling	447	428	50	53	497	481
16. Yilgarn	...	366	380	...	...	366	380
17. Dundas	...	381	429	29	25	410	454
18. Phillips River	...	124	125	25	14	149	139
19. Donnybrook	...	64	44	...	...	64	44
Goldfields generally	...	...	75	...	...	...	75
	Total—Gold Mining ...	17,825	17,329	2,651	3,387	20,476	20,716
MINERALS OTHER THAN GOLD.							
Tin	Greenbushes M.D.	...	...	* 139	* 168	139	168
	Marble Bar D.	...	...	* 110	* 126	110	126
Copper	Mt. Malcolm D.	41	128	...	...	41	128
	Northampton D.	5	1	...	...	5	1
	Phillips River Gf.	56	64	...	...	56	64
	West Pilbarra Gf.	9	...	...	...	9	...
	Yandanooka M.D.	2	...	...	...	2	...
Lead	Northampton M.D.	2	...	...	...	2	...
Coal	Collie River Coal M.D.	368	402	...	...	368	402
Limestone	Yilgarn Gf.	2	1	...	...	2	1
	Total—Other Minerals ...	485	596	249	294	734	890
	GRAND TOTAL ...	18,310	17,925	2,900	3,681	21,210	21,606

* Classified elsewhere as employed at mines.

From the above table it will be seen that there were 396 more men engaged in mining than in 1902, 240 of these being employed in gold-mining.



COLLIE PROPRIETARY COAL MINE.
(*Collie Coalfields.*)

TABLE 18.

Average Number of Men employed at Mines during 1903.

Mineral.	Above ground.	Under ground.	Total.	Percentage of total men employed.	Increase or decrease compared with 1902.
Tin	* 234	60	294	1·61	+ 45
Coal	94	308	402	2·21	+ 34
Copper	95	98	193	1·06	+ 80
Gold	7,980	9,349	17,329	95·11	- 496
Lead	...	...	...	...	- 2
Limestone	1	...	1	·01	- 1
Total	8,404	9,815	18,219	100·00	- 340

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

It will be seen that there were 340 less men employed this year. Of those employed in connection with the production of gold there were 496 less this year than last. No doubt the necessity for economical management has been generally recognised, and thus led to less men being employed.

TABLE 19.

Average Number of Men employed at Gold Mines during 1903, 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 1902.	Percentage of total men employed.	
					1902.	1903.
1. Kimberley	3	...	3	- 3	·03	·02
2. Pilbarra	77	112	189	+ 2	1·05	1·09
3. West Pilbarra	31	...	31	+ 3	·16	·18
4. Ashburton	...	...	...	...	...	...
5. Gascoyne	...	...	...	...	...	...
6. Peak Hill	195	168	363	+ 34	1·85	2·09
7. East Murchison	579	571	1,150	+ 42	6·22	6·64
8. Murchison	749	809	1,558	- 451	11·27	8·99
9. Yalgoo	45	29	74	- 7	·45	·43
10. Mt. Margaret	778	1,203	1,981	- 156	11·99	11·43
11. North Coolgardie	757	1,160	1,917	- 35	10·95	11·06
12. Broad Arrow	163	223	386	+ 83	1·70	2·23
13. North-East Coolgardie ...	297	475	772	- 43	4·57	4·46
14. East Coolgardie	3,004	3,115	6,119	- 135	35·08	35·31
15. Coolgardie	771	962	1,733	+ 52	9·43	10·00
16. Yilgarn	209	171	380	+ 14	2·05	2·19
17. Dundas	177	252	429	+ 48	2·14	2·48
18. Phillips River	53	72	125	+ 1	·70	·72
19. Donnybrook	17	27	44	- 20	·36	·25
Goldfields generally	75	...	75	+ 75	...	·43
Total	7,980	9,349	17,329	- 496	100·00	100·00

It will be noticed that the three largest producing goldfields—viz., East Coolgardie, Murchison, and Mount Margaret—show the greatest decrease in the number of men employed; this is no doubt owing to increased economy in working, as the two first-named fields show a large increase in gold-production.

TABLE 20.

Alluvial (Gold) Workers.

	Goldfield.	1902.	1903.	Increase or decrease compared with 1902.
1.	Kimberley	12	11	− 1
2.	Pilbarra	44	136	+ 92
3.	West Pilbarra	88	100	+ 12
4.	Ashburton	32	35	+ 3
5.	Gascoyne	...	...	...
6.	Peak Hill	11	7	− 4
7.	East Murchison	91	* 626	+ 535
8.	Murchison	145	107	− 38
9.	Yalgoo	12	12	=
10.	Mt. Margaret	68	83	+ 15
11.	North Coolgardie...	187	259	+ 72
12.	Broad Arrow	166	161	− 5
13.	North-East Coolgardie	349	326	− 23
14.	East Coolgardie	1,200	1,200	=
15.	Coolgardie	192	285	+ 93
16.	Yilgarn	...	...	...
17.	Dundas	29	25	− 4
18.	Phillips River	25	14	− 11
19.	Donnybrook	...	...	...
	Total	2,651	3,387	+ 736

* Accounted for by rush at Black Range.

The number of alluvial workers has increased by 736; the principal increase being on the East Murchison Goldfield, due to the Black Range discovery.

PART V.—ACCIDENTS.

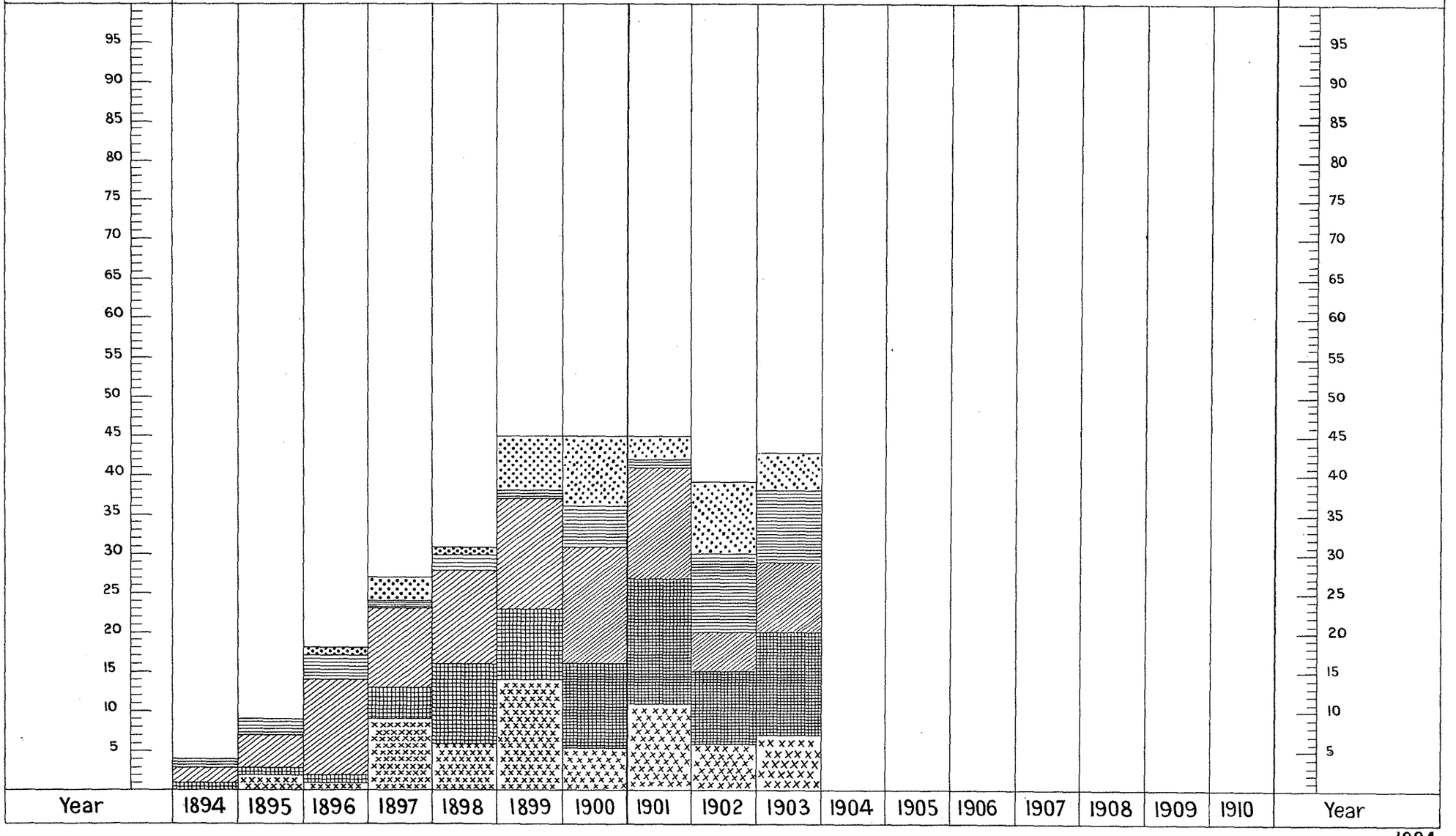
TABLE 21.

Men Killed and Injured in Mining Accidents during 1902 and 1903.

	GOLDFIELD.	Killed.		Injured.		Total Killed and Injured.	
		1902.	1903.	1902.	1903.	1902.	1903.
1.	Kimberley	...	...	...	...	...	...
2.	Pilbarra	...	2	...	...	...	2
3.	West Pilbarra	...	...	...	...	...	...
4.	Ashburton	...	...	...	...	...	...
5.	Gascoyne	...	...	...	...	...	...
6.	Peak Hill	1	...	5	3	6	3
7.	East Murchison	4	4	10	8	14	12
8.	Murchison	5	4	15	11	20	15
9.	Yalgoo	...	...	...	...	...	...
10.	Mt. Margaret { on Gold Mines	3	4	13	19	16	23
	Mt. Margaret { on Copper Mines	...	...	...	4	...	4
11.	North Coolgardie	1	4	12	15	13	19
12.	Broad Arrow	1	4	3	2	4	6
13.	North-East Coolgardie... ...	3	1	10	5	13	6
14.	East Coolgardie...	17	14	43	90	60	104
15.	Coolgardie	2	3	9	9	11	12
16.	Yilgarn	2	1	...	1	2	2
17.	Dundas	...	...	3	...	3	...
18.	Phillips River	...	...	1	...	1	...
19.	Donnybrook	...	...	...	...	...	...
	MINING DISTRICTS.						
	Northampton	...	...	...	...	...	...
	Yandanooka	...	...	...	...	...	...
	Greenbushes	...	1	...	4	...	5
	Collie	...	1	8	8	8	9
	Total	39	43	132	179	171	222

The number of fatalities for 1903 exceeds the total for the previous year by four, and the number of injured exceeds the previous year by 47: this is accounted for principally by the extension and the deepening of the underground workings in the various mines in the State, thus necessarily adding to the chances of more frequent accidents.

DIAGRAM SHEWING THE NUMBER OF DEATHS FROM ACCIDENTS ARRANGED IN FIVE CLASSES, IN THE MINES OF WESTERN AUSTRALIA DURING THE YEARS 1894 AND ONWARDS.



1904.

TABLE 22.

Deaths from Accidents at Mines during 1902 and 1903.

KIND OF MINES.	1902.						1903.					
	Number of Persons killed.			Death Rate per 1,000 Persons employed.			Number of Persons killed.			Death Rate per 1,000 Persons employed.		
	Above ground.	Under ground.	Total.	Above ground.	Under ground.	Total.	Above ground.	Under ground.	Total.	Above ground.	Under ground.	Total.
Coal	...	...	...	...	...	...	..	1	1	...	3·25	2·49
Gold	9	30	39	1·07	3·19	·2·19	7	34	41	·88	3·64	2·37
Other mines	...	...	...	...	...	...	...	1	1	...	6·33	2·05
Total for all mines...	9	30	39	1·03	3·06	2·10	7	36	43	·83	3·77	2·36

The total death rate for the year shows a slight increase, being 2·36 per 1,000, as against 2·10 for 1902; the accidents above ground showing a decrease, being ·83 as against 1·03 per 1,000 for 1902.

TABLE 23.

Deaths from Accidents in Gold Mines during 1903, and the Death Rate per 1,000 Men employed, and per 1,000 Tons of Gold Ore raised, in the different Goldfields during 1902 and 1903.

GOLDFIELD.	Number of Deaths.			Death Rate per 1,000 Men employed.				Number of Deaths per 1,000 Tons of Gold Ore raised.	
	1903.			1903.			1902.		
	Above ground.	Under ground.	Total.	Above ground.	Under ground.	Total.	Total.	1903.	1902.
1. Kimberley	...	...	...	...	...	...	...	...	...
2. Pilbarra	...	2	2	...	17·86	10·58	...	·36	...
3. West Pilbarra	...	...	...	...	...	...	...	...	...
4. Ashburton	...	...	...	...	...	...	...	...	...
5. Gascoyne	...	...	...	...	...	...	...	...	...
6. Peak Hill	...	...	...	...	...	...	3·04	...	·02
7. East Murchison	2	2	4	3·45	3·50	3·48	3·61	·03	·03
8. Murchison	2	2	4	2·67	2·47	2·57	2·49	·02	·03
9. Yalgoo	...	...	...	...	...	...	...	...	...
10. Mt. Margaret	2	2	4	2·57	1·66	2·02	1·40	·01	·01
11. North Coolgardie	...	4	4	...	3·45	2·09	·51	·02	·01
12. Broad Arrow	...	4	4	...	17·94	10·36	3·30	·11	·04
13. North-East Coolgardie ...	...	1	1	...	2·11	1·30	3·68	·01	·05
14. East Coolgardie	1	13	14	·33	4·17	2·29	2·72	·01	·02
15. Coolgardie	...	3	3	...	3·12	1·73	1·19	·03	·02
16. Yilgarn	...	1	1	...	5·85	2·63	5·46	·02	·05
17. Dundas	...	...	...	...	...	...	...	...	...
18. Phillips River	...	...	...	...	...	...	...	...	...
19. Donnybrook	...	...	...	...	...	...	...	...	...
Totals and Averages ...	7	34	41	·88	3·64	2·37	2·19	·02	·02

The death rate resulting from accidents in Gold Mines, as shown in above Table, is slightly higher than for 1902, being 2·37, as against 2·19 per 1,000.

North-East Coolgardie has the lowest death rate for the year, viz., 1·30, and Coolgardie next with 1·73. Thirteen deaths occurred through accidents underground on the East Coolgardie Goldfield, being the same number exactly as occurred during 1902; the total above and underground for the field being 14, as against 17 for 1902.

The total deaths caused by explosives was only increased by one, those injured being increased by three.

Fatalities through falls of ground increased by four; those injured, by two.

Fatalities in shafts increased by four; those injured, by one.

Miscellaneous underground fatalities decreased by one, and those injured increased by sixteen.

Fatalities on surface decreased by four; those injured increased by twenty-five.

PART VI.—STATE AID TO MINING.

STATE BATTERIES.

At the end of the year there were 16 batteries (seven of which are equipped with cyanide plants), one tin dressing plant, and one Huntington mill in operation.

The total quantity of stone treated at the State batteries during the year amounted to 49,233 tons, yielding 58,305ozs., valued at £221,567, showing an increase of 25 per cent. over the tonnage for the year 1902, and an increase in gold yield of 1,050ozs.

The total tonnage cyanided for the year amounts to 32,369 tons, which produced 6,582ozs. fine gold, valued at £28,016, as against £23,551 for the previous year.

Thus the total value of gold produced by battery and cyanide treatment during the year amounted to £249,583, and the total value of gold produced since the inception of State batteries to the end of 1903, including return from cyanide plants, is £783,890.

Considerable trouble has been experienced at many of the batteries as regards water supply; though ample water may be available at the commencement of a battery's operations, it is frequently found that the supply runs short, which necessitates deepening the water shaft or extending drives to add to the supply.

During the year a sliding scale was adopted with regard to the crushing charges, the charge per ton being lowered in accordance with the value of the stone treated, and, as pointed out by the Superintendent of State batteries in his report, a considerable increase has resulted in the tonnage treated.

It was found necessary to appoint an Inspector of Batteries, also a draftsman, to cope with the extra work entailed by the extension of the State battery system during the period under review.

WATER SUPPLY.

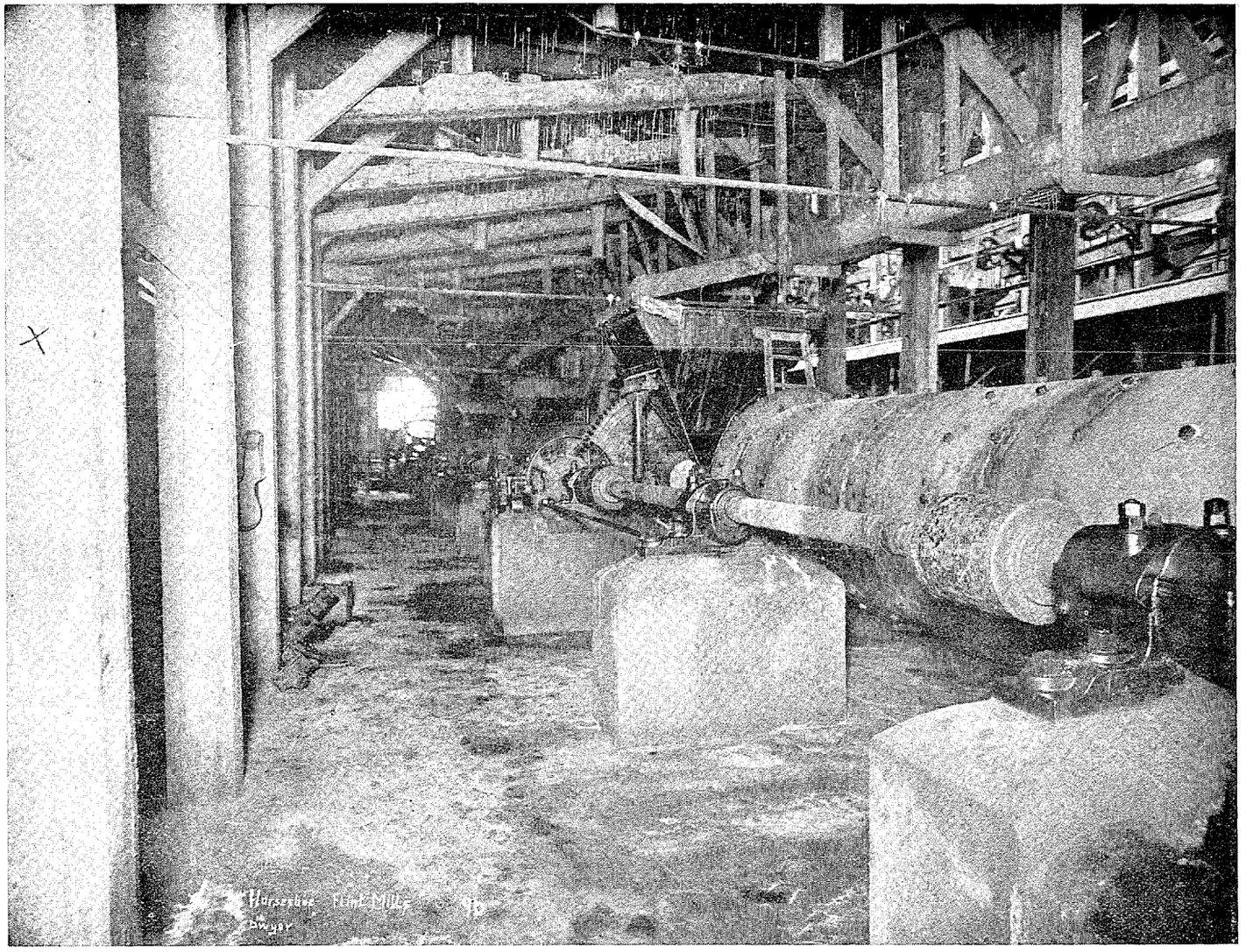
In July of this year the control of the water supplies on all the Goldfields of the State, with the exception of the stock routes and the Coolgardie Water Scheme, was handed over to this Department for administration, and a staff of officers was transferred from the Works Department, and an Engineer appointed in charge of this Branch, which was named the Mines Water Supply Branch. In addition to the numerous wells which were sunk and equipped for the use of the mining public and for State Battery purposes, the following tanks were constructed:—

Mulgabbie, 250,000 gallons capacity; Emu Lake, 150,000 gallons; Edjudina Tanks (2), 370,000 gallons; and Davyhurst, 4,000,000 gallons.

Pipe lines have been laid also between Menzies Tank and the town, and Menzies Well and the State Battery, and Norseman Tank to Princess Royal group of mines.

During the year the Government decided that a water supply should be provided for the towns of Cue and Day Dawn, and a scheme was drawn up by the Engineer and approved of by both Councils and the Department; the Government to carry out the work and the expenditure being repaid as provided for in the "Water Boards Act," which was passed during the last session, and which provided for Districts being constituted as Water Areas, and empowered local authorities to form Boards of Management.

The receipts from sales of water amounted to £5,249 15s. 6d., whilst the expenditure amounted to £10,671 19s. This result is only what must be expected, as new works are constantly being undertaken which of necessity are not directly revenue producing; it must be borne in mind, however, that indirectly the revenue is greatly benefited, for were it not on account of the various Water



FLINT MILLS, SULPHIDE PLANT, GOLDEN HORSESHOE G.M., KALGOORLIE.

(East Coolgardie G.F.)

Supplies now in existence, many districts now prosperous would have to be abandoned, with the resultant loss to the State.

ASSISTANCE PROVIDED UNDER THE MINING DEVELOPMENT ACT, 1902.

A total sum of £39,925 11s. 11d. was expended during the year in rendering assistance to mining in various ways, of which the following were the principal heads under which advances were made:—

Advance to mining companies to assist them to test their properties at depth by boring, £1,727 19s. 3d.

Advance to battery owners to enable them to purchase and erect machinery, £353 12s. 4d.

Subsidies in connection with schemes for sluicing for alluvial, £168 15s. 2d.; though authorised during the year only £18 15s. 2d. was expended during the period under review.

Subsidies to prospecting parties to assist them in sinking shafts in search of deep alluvial, £250; of this amount only £220 was spent during the year.

Subsidies to prospecting parties to assist them in boring for alluvial leads, £379 18s. 9d.

Advances to miners to assist them to deepen their shafts, £121 15s.

Purchase and erection of State batteries, £31,816. This amount includes the erection of three new ten-head batteries and five cyanide plants, also cost of additional plant in connection with other batteries, further particulars in connection with which can be seen on reference to the Superintendent of State Batteries' report: £29,557 of the amount being expended from Revenue and the balance from Loan.

Subsidies to crushing plants for each ton crushed for the public, £502 17s. 7d.; this proved of great assistance, as it enabled battery owners to lower their rates to the public, who were then able to afford to have their stone crushed.

Purchase and erection of public puddler at Broad Arrow for treating alluvial dirt, £1,219 19s. 9d.; this plant was erected so as to give a proper trial of the payable nature of the alluvial in this district, and it proved, unfortunately, that it was of too low a grade to pay.

Expenditure in connection with attempted drainage of the North Lead at Kanowna, £1,208 8s. 8d. A determined attempt was made, by erecting a pumping plant on the lead, to drain it of water, in order to enable mining to be carried on; but, so far, the effort has not proved successful.

Expenditure in connection with purchase of camels, horses, and equipment for loan to prospecting parties, £2,356 5s. 5d. A new departure was essayed in the direction of equipping a number of parties with camels, etc., for prospecting purposes; 21 parties altogether were equipped, proceeding to all parts of the State in search of mineral country, from the Bremer Ranges in the South to Kimberley in the North. So far, however, no important discoveries have been announced with regard to mineral belts. One party, however, which proceeded across to the South Australian border as far as Oodanatta, appears to have discovered a practicable stock route, which should ultimately prove of value both to this State and South Australia.

From the foregoing, therefore, it will be seen that assistance has been rendered in a diversity of ways though the majority of which, at present, show no direct apparent benefit with exception of expenditure in connection with erection of State batteries, the benefits from which are already obvious. For further remarks in connection with the works referred to, reference is made in the State Mining Engineer's valuable report.

PART VII.—REMARKS ON THE GOLDFIELDS AND MINING DISTRICTS, AND SUMMARIES OF WARDENS' AND REGISTRARS' REPORTS.

BROAD ARROW GOLDFIELD.

It is pleasing to note that after two successive years of decrease in the output of gold, the year under review should show an increase of 52 per cent., the yield being 29,969oz. as against 19,675oz. for the previous year.

The Golden Arrow mine produced £15,678 worth of gold, £2,397 worth being the result of treatment of tailings by the cyanide plant erected.

The Broad Arrow Consols G.M. Co. (N.L.) has been greatly hampered owing to shortness of water, but now that a larger supply has been obtained the Warden anticipates a considerable increase in the tonnage treated for next year. During the year a 10-head battery and cyanide plant were erected on the mine.

The New Standard Exploration Co., Ltd., is going in for a policy of active development, and it is to be hoped that the ensuing year will prove a satisfactory one for this company as regards gold output.

It is anticipated that mining matters will still further improve during the coming year.

COLLIE MINING DISTRICT.

The output of coal for the year was 133,427 tons, as against 140,884 tons for the previous year, or a decrease of five per cent., this the Registrar attributes to the Collie Proprietary Company being idle for about three weeks, owing to labour disputes. Of the companies raising coal during the year, the Collie Proprietary Company is by far the largest producer, as out of the total output 101,384 tons came from this company's mines alone. Ten serious accidents occurred during the year, one of which resulted fatally.

COOLGARDIE GOLDFIELD.

The total output of this field was 84,303oz., or a decrease of 4 per cent. on the previous year; nevertheless, developments have been satisfactory, and the erection of the State battery, which has been decided upon, should add to the prosperity of the field.

A considerable number of men continue to be employed in obtaining alluvial gold.

Thirty-six miners' homestead leases were applied for during the year, containing an aggregate area of 5,372 acres; the supply of fresh water from the Goldfields Water Scheme has been the principal reason for these areas being taken up, the existence of which should prove a benefit to the field, owing to the supply of vegetables, etc, which they could produce.

An application for opal mining was received, but the value of the discovery has yet to be proved.

DONNYBROOK GOLDFIELD.

Mining on this field was practically at a standstill. The Donnybrook Goldfields, Limited, has been testing the property by putting down three bores, and an aggregate of 1,240 feet of boring was carried out. The cores have been forwarded to Berlin by the company, and on the result of the report the future of this field will depend.

Dundas Goldfield.

This field has shown good progress during the year, the yield of gold being 40,174oz., or an increase of 16 per cent. on the previous year's output. The Warden reports that good development work has been carried on, especially in the Princess Royal, Cumberland, Lady Mary, Valkyrie, St. Patrick, Northern Star, Mararoa, and the Venture leases, and that the future outlook of mining is promising. Early in the year immensely rich ore was struck on the Nellie May lease, five miles north of Norseman; six and a-half tons crushed at the State battery returning 803oz. 13dwt. of gold, and subsequent parcels amounting to 69 tons 14cwt. crushed for 604oz. 8dwt.

The discovery of a deep lead between the Lady Mary lease and Lake Dundas caused a rush to take place; the wash was struck at from 80 feet to 100 feet, and about 120 men were working on the lead, but only a few claims obtained payable gold, and the rush soon died out.

The State battery crushed 3,910 tons for 4,965oz., an average of 1oz. 5dwt. 9gr. per ton; and 4,324 tons of tailings were cyanided for 964oz. of gold bullion. A new 10-head battery is being erected in place of the present one, and the results should be still better.

A satisfactory water supply has now been completed by the Mines Water Supply Department connecting Norseman and Princess Royal with the Government tank near Norseman.

East Coolgardie Goldfield.

This field is again responsible for more than half the total output of the State, the yield being 1,275,628oz., an increase of 157,012oz. on the yield for the previous year, or 14 per cent.

The Warden reports that mining operations are still principally confined to the Golden Mile, but a considerable amount of prospecting is being carried on, especially at the northern end of the field and at Boorara. The satisfactory developments at the Devon Consols have evidently encouraged prospecting at the northern end, and a number of leases have been taken up, and it is anticipated that further discoveries will be made in this locality.

Steady progress has been made at Boorara, which is the most promising of the outlying centres, the principal leases being the Golden Ridge Proprietary and the Waterfall.

The value of the mining machinery for the year is estimated to be £1,699,702, as against £1,851,644 for 1902, showing a decrease of £151,942; this is probably owing to various plants being written down to allow for depreciation.

The main shaft of the Great Boulder, being the deepest in the State, has reached a depth of 1,800 feet during the year.

The Miners' Homestead Act has been largely availed of during the year, 23 Miners' Homestead leases being in force, with an area of 894 acres, compared with four for the previous year, with an area of 75 acres.

The Coolgardie Water Scheme has been largely availed of by the local mines; from information supplied by the Goldfields Water Supply Administration, it appears that 95,936,000 gallons have been purchased during the year, which should tend to considerably reduce working costs.

During the year advances have been made under the Mines Development Act, as follows:—

An amount of £100 was advanced to Messrs. Blamire, Waite, and party, the holders of Alluvial Claim No. 209E, Boulder, to enable them to continue sinking their

shaft below 60 feet. At 86 feet four feet of wash was passed through, assaying 5½dwt. per ton; at 118 feet six feet of wash was met with, assaying 7dwt. 3gr. per ton.

An advance was also made to Messrs. Foran and party of £100, in order to sink for alluvial in Egan Street, Kalgoorlie. A shaft was sunk to a depth of 114 feet; nothing of any particular value, however, was struck, but a cementy quartz wash was met with 12 feet west of the shaft, averaging nine inches in thickness, showing traces of gold.

An advance of £500 was agreed to be paid to the Hannan's Reward and Mount Charlotte Co., Ltd., to put down two bore holes—one horizontally and the other an incline bore—to test the ground; of this amount the sum of £364 was expended by the end of the year; but nothing of great value was met with.

East Murchison Goldfield.

The output of gold for this field amounts to 102,896oz., or an inc ease of 13 per cent. over the previous year; the Warden, however, is of the opinion that this amount could be swelled with the addition of some hundreds of ounces of alluvial gold obtained in the Black Range district but not reported. Sixty-eight leases were applied for during the year in this locality alone, and a State battery is being erected to assist in the advancement of the field. The Darlot State battery has proved its usefulness by crushing 2,372 tons of stone for a yield of 9,536oz., or an average of four ounces to the ton; this high average was principally due from some rich crushings from the St. George lease. At Mount Sir Samuel the Bellevue Consolidated are erecting a forty stamp battery, and a large increase in the output is therefore expected during the coming year.

Greenbushes Mining District.

The output of black tin for the year is the record for this district, the output being 525 tons, valued at £34,362, as against 403 tons, valued at £24,680, for the previous year, or an increase of 30 per cent. on the output.

The State battery shows a substantial increase in the amount of tin treated compared with the previous year, the amount treated being 2,009 tons for 60 tons black tin, as against 1,115 tons of dirt producing 30 tons 12cwt. of black tin.

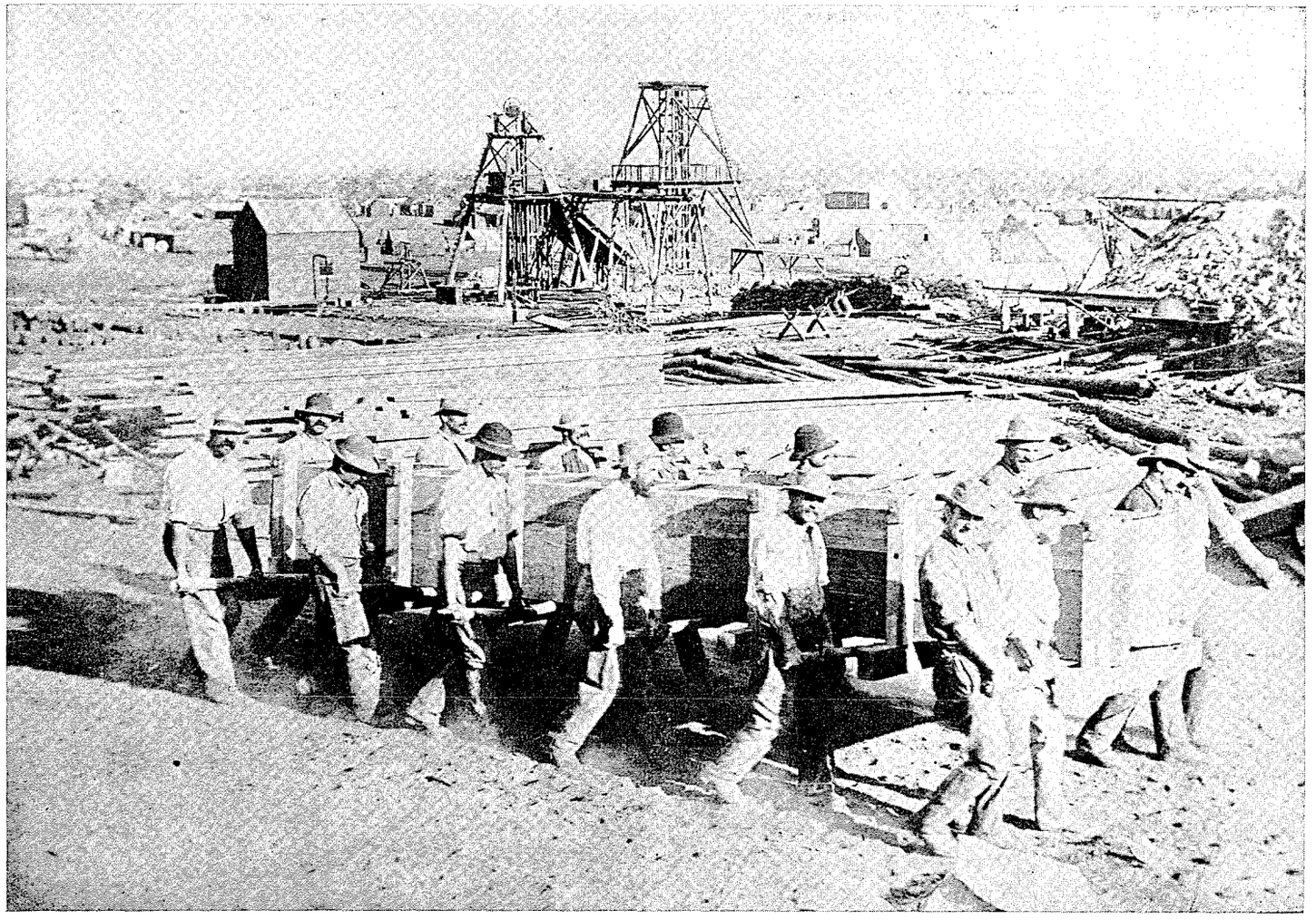
The scheme for bringing water from the Blackwood River to Greenbushes, a distance of over six miles, was successfully accomplished, and should prove a boon to the tin-mining industry. The smelter erected by the same company has been fully occupied.

Mount Margaret Goldfield.

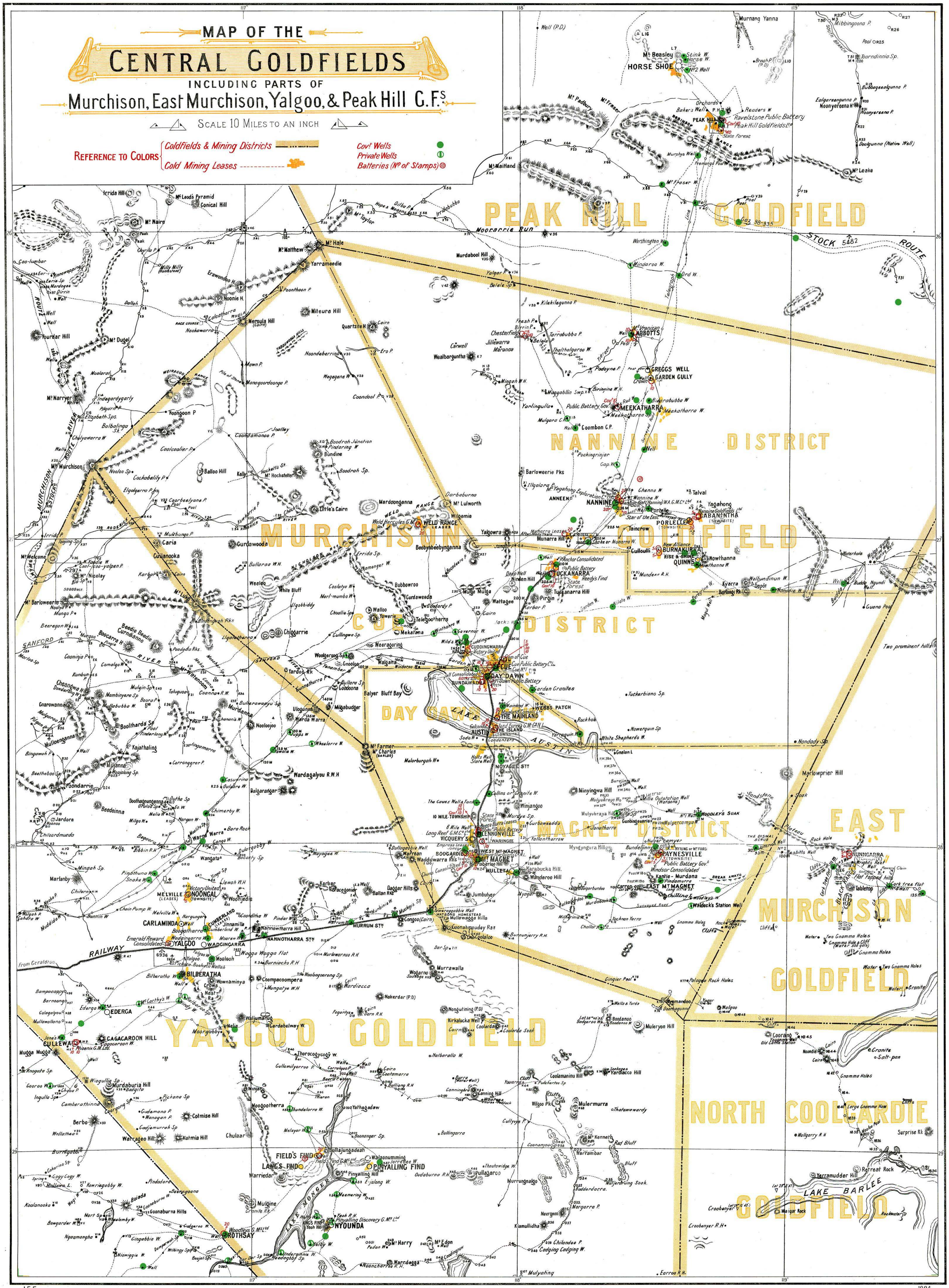
The Warden reports that the progress of this goldfield has proved satisfactory, although the increase in the output is only 1,182oz. over that of the previous year, being 212,491oz., as against 211,309oz. Each year, however, has been a year of progress since the commencement of the field, and this cannot be said of many of the goldfields.

The Sons of Gwalia, in the Mount Malcolm district, the Westralia Mount Morgan, in the Mount Morgans district, also the Ida H. and the Lancefield, have been the most consistent, as well as the largest producers, during the last year. The Sons of Gwalia shaft has reached a depth of 1,700 feet on the underlay, and is one of the leading mines of the State, both as regards output and development.

During the year a number of new reefs were discovered and pegged out in the North Erlistoun district, which is a very promising mining centre.



FIRST ZINC BOX FOR TREATING TAILINGS IN KALGOORLIE. LAKE VIEW CONSOLS G.M.
(East Coolgardie G.F.)



155 H. J. Pether, Government Photolithographer, Perth, W. A. 1904

The Warden reports that the establishment of State batteries has proved a great benefit to prospectors.

The Anaconda copper mine, owned by the Murrin Copper Mines, Ltd., treated 18,965 tons of ore, valued at £45,557, by far the largest output since the company started operations, and it is regrettable to have to state that at the end of the year the mine was shut down.

There were 25 accidents during the year, of which four were fatal.

During the year the railway was extended from Malcolm through Mount Morgans to Laverton, and should materially assist in reducing working costs and the cost of living, and prove a boon to the districts thus connected with the railway system of the State.

Several Miners' Homestead Leases have been taken up for market gardening and dairying purposes during the year.

The Warden is of opinion that the mining prospects for the ensuing year are of an encouraging nature, and that the progress of the field will be eminently satisfactory.

Murchison Goldfield.

The Warden reports that nothing of any particular importance in mining took place during the year.

The present position of this field as a gold producer depends to a great extent on the output from that now famous mine the Great Fingall, this mine producing 157,272oz. out of the total yield from the field of 241,791oz., or 65 per cent.; the total output for the field shows an increase of 15 per cent on that of the previous year.

The completion of the railway to Nannine proved a benefit to the northern part of the field.

During the year a subsidy of £1,000 was granted to the South Fingall Co., on the basis of an expenditure of £ for £, in order to assist them in testing the ground at depth. Three bore holes were put down: the first hole, at a depth of 506 feet, met a 12-inch seam with an assay value of 4dwt. 14gr.; at 760 feet a crushed sample of lode assayed 5oz. 18dwt. 16gr. (an assay of pieces of core gave a result of 7dwt. 2gr.). The boring was continued to a depth of 966 feet without any further values being obtained.

No. 2 bore hole was sunk to a depth of 550 feet; at 194 feet a quartz leader assaying 4dwt. 22gr. was met, but no further values.

No. 3 bore hole was sunk to a depth of 762 feet 8 inches, but nothing of value was obtained during the course of boring.

Northampton and Yandanooka Mining Districts.

Considerable activity took place during the year in applications for leases at Yandanooka, 19 applications for copper leases being received for mining in the Yandanooka district; but, owing to the want of capital, not much development has taken place.

North Coolgardie Goldfield.

Mining operations on this field continue to be in a prosperous condition, the output of gold being 195,426oz., or over five per cent. more than the production for the year before.

The progress of the mining centres of Mulwarrie and Davyhurst has been greatly retarded, so the Warden states, owing to the scarcity of water; water having to be carted to the first-mentioned centre, a distance of 18 miles.

A revival of mining is taking place in the Yerilla district. The Melba Consols are, with Government assistance, erecting a battery; one of the conditions of the assistance is that the company is to crush for the public as well as for themselves.

A Kalgoorlie Company—the Hannan's Main Reef—has purchased the Pearl and Opal leases in the Niagara district, and is erecting a 10-head mill.

In the Kookynie district, the Cosmopolitan, the Cumberland-Niagara, and the Champion leases are vigorously carrying on mining operations. The first-named company has its shaft down to a depth of 1,200 feet, and the Warden reports that the reef maintains its size and value at this depth.

The erection of a State battery at Menzies has led to a number of leases being taken up, and this, with the increased supply of water recently obtained, should prove a boon to the Menzies district.

North-East Coolgardie Goldfield.

The output for this field shows a decrease of 4,189oz., or a decrease of 6 per cent. on the yield for the previous year.

In the Kanowna district the Warden reports the successful development of the White Feather Main Reef and the North White Feather mines.

The alluvial leads, with the exception of the Moonlight lead, were almost deserted, several claims on this lead furnishing good returns.

A great deal of work was carried out on the Red Hill mine in prospecting for lodes, and good crushings resulted. Prospecting is being continued on the Gordon line of reef, and the Sirdar mine gave a return of 871·45oz. of gold from 42 tons.

In the Gindalbie district the South Gippsland mine, taken over by the Queen Margaret, has been developed to a depth of 400ft., and a fair amount of gold has been obtained.

In the Bulong district a new mining centre was started, known as Randell's, about 38 miles east of Bulong. Two batteries are in course of erection, one a ten-head and the other a Griffin mill. Some very large lodes have been discovered, which seem to improve in size and value as they go down.

The closing down of the Queen Margaret Company was a great blow to the district; but on the management letting the mine on tribute the results were so satisfactory that they have discontinued the tributes, and it is believed will try and prove the permanency of the field by further mining operations.

In October last a rush set in at Mulgabbie, where a find of rich telluride ore created considerable excitement, and some 34 leases were pegged out.

Peak Hill Goldfield.

The Warden reports that mining has been very quiet during the year.

The total output of gold being 35,656oz. as against 37,487oz. for 1902, being a decrease of 1,831oz.

The Warden again draws attention to the disadvantage under which the field at present suffers through the absence of railway communication, the cost of carriage and scarcity of firewood and timber for mining purposes militating against the progress of the field.

MAP OF PORTION OF PHILLIPS RIVER GOLDFIELD

Scale

Chains 100 0 100 200 300 400 500 600 700 800 900

Miles 1 0 1 2 3 4 5 6 7 8 9 10 Miles

Reference to Colors

- Goldfields & Mining Districts
- Gold Mining Leases
- Batteries (No. of Stamps) ⑩
- Wells

DUNDAS G. F.

PHILLIPS RIVER GOLDFIELD

120°0′ 120°30′ 33°0′ 33°30′ 34°0′

HATTER HILL P.D

Mt GIBBS P.D

130 M.P 140 M.P 150 M.P 160 M.P 170 M.P 180 M.P 190 M.P 200 M.P 210 M.P

RABBIT PROOF FENCE

Fresh P.D

Well P.D

3 Small Gnamma Holes 640a 8392

Salt Lakes P.D

Mt MADDEN P.D

Well P.D

COWJENUP HILL

8649 Water

Good Water (Not Permanent) 1280a

Fresh Water

Mt SHORT

Good Stock Water Permanent

Geordie's Soak

Mt McMAHON

N.Z. Well

Mt Caitlin

Maori Win

Loc 5

MHL 12

Claypan

Carlingup

Carlingup Creek

Cordinup Creek

RAVENSTHORPE TOWNSITE

Soak

Cordinup Soak

MHL 13

Mt DESMOND

Elverdton

Manyutup

Carlcatup

Big Creek

Cocanarup

Quagilup

Stevenson Creek

Pool

Manyutup Creek

Twertatup CK

Udarrup Spring

Permanent Water (Fresh)

Norndup Spring

Carracarrup P.

Kybulup

Cowerdup

NO TREE HILL

Mainnerup

Pool Fresh Water

Mainnerup Rock Hole

Temp: Spring

No 3 Well Fresh Water

KUNDIP

Bandalup Rock Hole

Good Water

Burlabup CK

Gnamma CK

Good R. Holes

Small Rock Holes

Deep Pool nearly Fresh

Fresh Water

Pool Fresh Water

Temp Res

Post 5

Spring 513 Jerdacuttup

Racecourse 7377

Cemetery 7376

Sanitary 7375

No 1 Well

JERDACUTTUP LAKES

Swamp

to Eucla

ANNIES PEAK

EYRES RANGE

ULHAM INLET

EAST Mt BARREN

MID Mt BARREN

HOPETOUN

Mary Ann Haven

Starvation Boat Harbour

Drummonds Spring

Woolbarnup

Red Id

Point Charles

Fitzgerald Inlet

From Albany

HAMERSLEY (Approx) RIVER

Telegraph Line

WEST RIVER

PHILLIPS RIVER

STEERE RIVER

JERDACUTTUP RIVER

Kybulup CK

Waldeitzup Pool

SOUTHERN OCEAN

DEPARTMENT OF MINES, WESTERN AUSTRALIA

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

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H. J. Pether, Government Photolithographer, Perth, W. A.

1904

Phillips River Goldfield.

The Warden reports that mining shows signs of improvement, especially copper mining. In order to assist the latter industry, sampling works were established, with an ore buyer in charge; and since the 15th June, 1903, to the end of the year about 3,386 tons of copper ore have been purchased, the average assay value being 15 per cent. The amount of payable ore reported to be available seems to warrant the erection of a smelter, in which case the prosperity of the field should be assured. The output of gold for the year was 7,689oz., being 805oz. less than for the previous year, or a decrease of nine per cent.

Pilbarra Goldfield.

Mining during the year appears to have been quiet, the output of gold being 11,330oz., or about seven per cent. less than the previous year. The Warden states, however, that owing to the want of water for crushing purposes a considerable quantity of stone though raised was not crushed, hence the decrease in output The output of black tin, however, shows an increase of 36 per cent., the total being 292 tons against 216 tons for the previous year. Two nice finds of specimens were reported during the year. In July last a man named Clive reported the finding of two specimens of a total weight of 240oz. 4dwt., estimated to contain 190oz. of gold. This was the same man who found the Bobbie Dazzler nugget in the year 1899, weighing 490oz., only one hundred feet away from the present find, and in December J. Cain reported finding a specimen at Talga Talga, weighing 175oz., estimated to contain 130oz. of gold. The Warden again emphasises the necessity for cheaper transport from the coast reducing the cost of mining and living on the goldfield, and states that, unless this is brought about, mining matters cannot progress as they should.

Yalgoo Goldfield.

This field again shows a decrease in its output of gold, the total return being 3,842oz., or 2,012oz. less than the previous year; nevertheless the Warden reports that mining operations have been more active than that of the previous year; but in the early part of the year most of the mines were closed down, and this accounts for the decrease in the output.

At Field's Find, the Field's Reward G.M. Co. expect to employ 200 men shortly.

At Gullewa the Monarch leases have had a 10-head mill erected, and the Phoenix gold mines have had a cyanide plant erected capable of treating 960 tons per month; this plant has proved very satisfactory.

At Yuin the Royal Standard leases have been consistently worked, and a cyanide plant, capable of treating 700 tons per month, has also been erected in connection with the battery.

Yilgarn Goldfield.

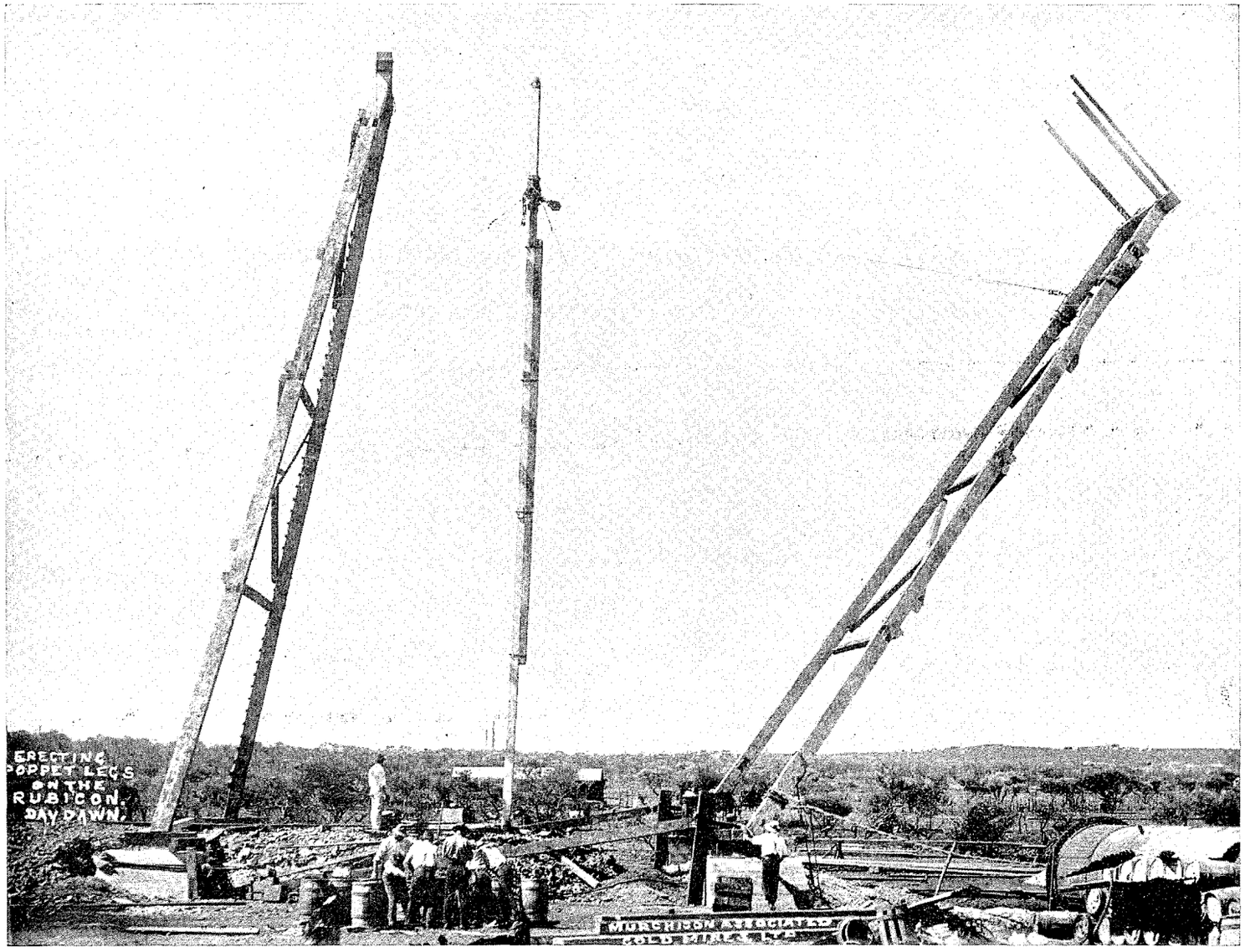
The revival of mining operations on this field which took place the previous year has been well sustained, though the output (23,615oz.) shows an increase of only 485oz.; the number of gold mining leases in force being 74, or exactly double the number for 1902; the population also has increased 28 per cent. A new find six miles south-east of Southern Cross, reported in July last, was also of assistance in reviving mining operations.

The erection of a ten-head State battery for public crushing has evidently induced a number of leases to be taken up, and it is to be hoped that the battery will be of service in developing the low grade shows in this district.

TABLE 24.

Value of Mining Machinery and Number of Stamps and other Mills erected on the 31st December, 1903, compared with the previous year.

Goldfield.	District.	Value of Mining Machinery.		Number of Stamps.		Number of other Mills.																				
						1902.											1903.									
		1902.	1903.	1902.	1903.	Ball Mills.	Griffin Mills.	Huntington Mills.	Prospecting Mills.	Tremain Mills.	Arrastras.	Crushing Rollers.	Dry Crushers.	Puddlers.	Salford Mills.	Flint Mills.	Ball Mills.	Griffin Mills.	Huntington Mills.	Prospecting Mills.	Tremain Mills.	Arrastras.	Crushing Rollers.	Dry Crushers.	Puddlers.	Salford Mills.	Flint Mills.
		£	£																							
1. Kimberley	...	5,500	5,500	25	25	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2. Pilbarra	Marble Bar ...	17,900	20,909	60	55	...	...	...	1	1	...	...	...	...	...	...	...	...	...	2	2	...	...	...	...	...
	Nullagine ...	6,450	20,162	20	50	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3. West Pilbarra	...	2,500	4,700	10	20	...	...	...	1	1	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...	...
4. Ashburton	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
5. Gascoyne	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
6. Peak Hill	...	126,754	107,699	50	50	...	...	...	1	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...
7. East Murchison	...	247,740	327,780	215	250	1	...	...	6	...	1	...	...	...	...	...	1	...	...	3	1	...	...	...	...	...
8. Murchison	Cue ...	55,288	52,384	125	110	1	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
	Nannine ...	94,033	98,040	188	199	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...
	Day Dawn ...	176,238	222,778	110	140	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...
	Mt. Magnet ...	70,309	64,900	115	100	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...
9. Yalgoo	...	26,647	29,470	70	80	...	...	1	1	3	...	...	...	...	...	...	...	...	3	1	...	...	...	...	...	...
10. Mt. Margaret	Mt. Morgans ...	146,600	258,362	95	90	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Mt. Malcolm ...	211,214	185,002	246	206	...	...	...	...	2	...	...	...	...	...	...	...	...	1	...	2	...	...	...	...	...
	Mt. Margaret ...	139,120	142,398	181	195	...	...	...	1	...	...	...	...	...	...	...	...	...	...	2	...	...	...	1	...	...
11. North Coolgardie	Menzies ...	162,281	138,408	163	160	...	...	...	1	...	...	...	...	1	...	...	...	...	...	2	...	...	...	...	...	...
	Ularring ...	35,254	48,602	50	60	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Niagara... ...	133,188	142,394	160	135	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...
	Yerilla	7,490	28,187	25	45	...	...	...	1	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...
12. Broad Arrow	...	120,122	118,212	240	210	1	...	...	1	...	...	1	...	...	...	...	1	...	...	1	...	...	...	...	...	...	...
13. North-East Coolgardie	Kanowna ...	99,357	98,145	205	200	...	1	4	3	...	...	1	...	3	...	...	...	...	3	2	...	...	...	5	1	...
	Bulong	16,818	15,798	20	30	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...
	Kurnalpi ...	1,150	550	5	5	...	...	...	1	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
14. East Coolgardie	...	1,851,644	1,699,702	560	590	33	31	13	2	1	...	10	...	1	...	...	28	32	4	...	...	...	8	1	1	...	6
15. Coolgardie	Coolgardie ...	175,578	219,972	371	376	...	...	...	1	1	1	...	1	1	...	...	...	...	...	2	...	...	2	1	...	...	...
	Kunanalling ...	53,392	33,985	135	135	...	...	...	...	1	...	...	...	...	...	...	2	...	...	1	1	...	...	...	...	...	...
16. Yilgarn	...	76,463	89,755	185	200	...	4	...	...	...	...	...	1	...	...	...	...	4	...	1	...	...	...	1	...	...	...
17. Dundas	...	79,576	103,272	120	130	2	...	...	1	...	...	...	1	...	...	...	2	...	...	...	...	...	...	...	...	1	...
18. Phillips River	...	17,550	27,700	40	40	...	...	...	1	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
19. Donnybrook	...	9,000	11,500	5	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Goldfields generally	...	86,060	96,000	60	60	...	...	...	1	...	...	3	1	...	...	...	1	...	...	1	...	...	3	1	...	...	...
Total Gold-extracting Machinery	...	4,251,216	4,412,266	3,854	3,951	38	36	18	24	15	2	15	4	6	...	...	36	36	13	24	9	...	13	5	6	2	6
Total Machinery, other than Gold-extracting		53,181	120,471	5	5	...	...	1	...	...	...	4	3	15	...	...	...	...	1	...	...	...	2	1	7	...	...
TOTAL MINING MACHINERY	...	4,304,397	4,532,737	3,859	3,956	38	36	19	24	15	2	19	7	21	...	...	36	36	14	24	9	...	15	6	13	2	6



ERECTING POPPET LEGS ON THE RUBICON GOLD MINE, DAY DAWN.
(*Murchison G.F.*)

MAP OF
PILBARRA AND WEST PILBARRA GOLDFIELDS
WESTERN AUSTRALIA

DEPARTMENT OF MINES. WESTERN AUSTRALIA

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

Scale 0 5 10 20 30 40 50 MILES

NOTE. Batteries erected & No. of Stamps employed shewn thus ®
Gov.t Wells " "
" Waterholes " "

WEST PILBARRA G. F.

PILBARRA G. F.

NULLAGINE DISTRICT

ASHBURTON G. F.

116° 117° 118° 119° 120° 121°

151

1904.

Table 25.

Mining Revenue for the Years ending 31st December, 1902 and 1903.

Goldfields and Mining Districts.	Revenue-collecting Centres.	Lease Rental under Goldfields Acts.		Other Rentals under Goldfields Acts.		Receipts from all other sources under Goldfields Acts.		Lease Rental under Mineral Lands Acts.		Other Rentals under Mineral Lands Acts.		Receipts from all other sources under Mineral Lands Acts.		Survey Fees for Leases, Areas, etc.	
		1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.
		£ 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.
Kimberley ...	... ...	19 18 0	13 0 0	22 15 0	13 0 0	0 10 0	1 10 0	...	...	...	...	...	...	...	...
Yilgarn	... ...	598 19 0	1,150 8 0	146 6 2	184 1 6	48 1 6	53 2 0	5 5 0	5 8 0	...	...	0 10 0	...	79 0 0	525 12 0
Pilbarra ...	M'ble Bar, Nullagine	525 5 0	494 10 9	248 8 9	253 17 9	77 1 0	51 18 6	17 16 3	37 7 6	52 5 0	50 7 6	...	2 2 6	142 13 0	183 11 0
Ashburton ...	... ...	30 9 0	12 19 0	10 5 0	14 17 6	0 5 0	0 5 0	60 16 6	...	2 15 0	...	1 11 0	...	16 10 0	...
Murchison	Cue, Nannine, Day Dawn, Mt. M'gnet	4,558 17 9	4,411 19 0	746 5 0	751 15 3	437 5 0	291 16 0	20 5 0	2 10 0	3 10 0	4 0 0	11 0 0	1 0 0	1,147 10 0	977 1 0
Dundas	... ...	840 13 6	854 19 6	331 1 6	327 6 11	50 9 6	71 17 6	1 13 0	1 13 0	...	...	...	...	139 3 0	281 7 0
Coolgardie ...	Coolgardie	3,446 0 0	3,240 14 9	473 4 10	398 8 0	219 7 0	223 10 0	3 0 0	4 14 0	2 5 0	0 5 0	0 5 0	...	485 0 0	694 11 0
E. Coolgardie ...	Kalgoorlie	4,194 13 0	3,591 14 9	1,394 9 6	1,165 13 9	297 10 6	317 2 6	29 12 6	42 5 6	6 10 0	10 10 0	0 10 0	4 8 0	462 15 0	485 15 0
Yalgoo	... ...	469 17 0	321 14 3	69 7 9	73 2 6	44 3 0	39 17 6	...	...	...	...	...	...	28 12 0	58 11 0
N. Coolgardie	Menzies, Ularring, Yerilla, Niagara	5,709 6 6	5,247 3 6	1,684 16 3	949 15 6	362 4 6	541 15 6	3 12 6	15 4 3	1 15 0	0 10 0	...	0 12 6	1,960 5 0	1,105 15 0
E. Murchison ...	... ...	3,253 9 6	3,017 7 9	430 7 0	652 17 3	291 11 0	148 8 0	2 1 0	1 5 0	2 15 0	4 10 0	...	2 0 0	557 15 0	848 18 0
W. Pilbarra ...	... ...	114 10 0	72 12 0	109 6 3	106 10 0	14 16 6	2 13 0	96 5 0	75 15 0	4 7 6	3 10 0	0 7 6	2 5 0	85 11 0	21 0 0
N.E. Coolgardie	Kanowna, Bulong, Kurnalpi	2,359 1 6	2,501 4 9	519 9 6	487 11 8	202 0 0	268 16 9	3 6 0	...	2 5 0	...	1 11 0	...	564 11 0	803 11 0
Broad Arrow ...	... ...	1,253 6 0	1,111 12 0	161 14 3	204 13 3	149 13 0	180 17 6	5 5 0	...	0 10 0	1 0 0	...	...	139 10 0	136 0 0
Peak Hill ...	... ...	764 8 3	766 15 0	354 18 3	239 7 0	65 12 6	42 2 6	...	16 0 0	...	...	...	...	96 0 0	66 13 0
Mt. Margaret	Laverton..., Malcolm ..., Morgans ...	3,238 4 6	2,223 12 9	446 13 4	359 15 3	207 4 0	174 10 6	7 12 6	3 0 0	3 0 0	1 10 0	1 0 0	...	552 15 0	548 4 0
		2,677 2 4	2,157 12 9	467 4 3	405 3 2	155 12 0	143 10 9	140 10 0	87 9 9	2 0 0	5 0 0	35 14 6	6 0 0	367 0 0	378 3 0
		450 7 3	723 17 6	121 17 0	182 14 9	26 7 0	19 10 6	..	1 13 0	...	...	...	...	88 0 0	154 10 0
Gascoyne ...	... ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Donnybrook * ...	... ...	192 0 0	...	...	...	...	...	14 15 0	...	0 10 0	...	...	...	...	...
Phillips River ...	... ...	455 17 3	397 19 9	161 12 3	68 5 0	77 4 10	35 5 0	158 13 6	385 11 9	17 15 0	28 12 9	32 9 0	38 15 6	164 10 0	255 10 0
Greenbushes ...	... ...	126 2 0	329 11 6	4 10 0	5 10 0	5 9 0	...	319 19 3	244 12 3	164 2 9	194 3 6	55 7 6	62 13 6	108 0 0	164 0 0
Collie	... ...	2 0 0	1 0 0	4 0 0	3 0 0	4 10 0	1 5 0	1,191 8 0	1,089 0 6	8 0 0	3 0 0	3,374 1 0	2,350 2 11	35 10 0	35 0 0
Northampton ...	... ...	...	...	...	...	...	...	32 5 0	229 8 9	2 10 0	3 10 0	0 2 6	13 7 6	9 0 0	169 10 0
Head Office, Perth	... ...	11 0 0	54 0 0	79 15 0	89 13 6	35 15 0	34 6 0	86 2 6	10 10 0	47 5 0	27 12 6	2 15 0	...	97 10 0	104 10 0
Totals ...	... ...	35,291 7 4	32,696 9 3	7,988 6 10	6,936 19 6	2,772 11 10	2,644 0 0	2,200 3 6	2,253 8 3	324 0 3	338 1 3	3,517 4 0	2,483 7 5	7,327 0 0	7,997 12 0

* Office closed 1903.

TABLE 25.—*Mining Revenue for the Years ending 31st December, 1902 and 1903*—continued.

Goldfields and Mining Districts.	Revenue collecting Centres.	Examination fees Underground Surveyors and Engine-drivers.		Exemption fees Leases, Areas, etc.		Fees under Boiler Inspection Act.		Receipts from Public Batteries.		Receipts from all other sources.		Total.		Increase or Decrease for 1903 compared with 1902.	
		1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	Increase.	Decrease.
		£ 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.
Kimberley ...	... ...	...	...	3 13 0	1 0 0	...	...	...	...	0 2 0	...	46 18 0	**28 10 0**	...	18 8 0
Yilgarn ...	... ...	11 10 0	8 15 0	60 7 0	54 8 0	...	...	...	216 2 0	3 1 3	9 5 6	952 19 11	**2,207 2 0**	1,254 2 1	...
Pilbarra	M'ble Bar, Nullagine	0 10 0	5 10 0	94 19 0	82 13 0	...	...	...	...	11 13 9	2 19 9	1,170 11 9	**1,164 18 3**	...	5 13 6
Ashburton ...	... ...	...	...	9 19 0	7 6 0	...	...	...	...	0 16 6	0 2 6	133 7 0	**35 10 0**	...	97 17 0
Murchison	Cue, Nannine, Day Dawn, Mt. M'gn't	117 13 0	34 15 0	695 18 0	543 3 0	255 5 0	347 0 0	15,846 10 2	13,092 11 6	30 4 6	16 12 9	23,870 3 5	**20,474 3 6**	...	3,395 19 11
Dundas ...	... ...	7 5 0	21 5 0	117 16 0	91 1 0	31 10 0	61 10 0	6,586 8 11	5,333 18 6	2 13 3	3 18 0	8,108 13 8	**7,048 16 5**	...	1,059 17 3
Coolgardie ...	Coolgardie	25 5 0	35 10 0	354 3 0	333 1 0	344 0 0	317 10 0	548 9 1	484 5 11	14 11 9	10 18 3	5,915 10 8	**5,743 7 11**	...	172 2 9
E. Coolgardie ...	Kalgoorlie	110 17 6	49 5 0	500 4 0	329 10 0	823 0 0	819 15 0	...	...	52 16 0	41 6 3	7,872 18 0	**6,857 5 9**	...	1,015 12 3
Yalgoo ...	... ...	...	...	126 16 0	17 16 0	...	...	...	...	1 16 6	1 7 3	740 12 3	**512 8 6**	...	228 3 9
N. Coolgardie	Menzies, Ullarring, Yerilla, Niagara	39 2 6	34 17 6	227 5 0	337 5 0	140 10 0	20 0 0	27,694 2 0	22,878 9 6	20 4 3	17 6 3	37,843 3 6	**31,148 14 6**	...	6,694 9 0
E. Murchison ...	... ...	18 0 0	18 7 6	327 6 0	205 8 0	15 10 0	5 10 0	2,078 16 0	4,755 14 9	9 9 0	9 9 3	6,986 19 6	**9,669 15 6**	2,682 16 0	...
W. Pilbarra ...	... ...	...	...	34 10 0	5 4 0	...	...	...	...	1 3 0	5 6 9	460 16 9	**294 15 9**	...	166 1 0
N.E. Coolgardie	Kanowna, Bulong, Kurnalpi	...	...	218 14 0	256 11 0	104 10 0	30 10 0	...	...	9 8 9	6 14 6	3,984 16 9	**4,354 19 8**	370 2 11	...
Broad Arrow ...	... ...	...	...	135 18 0	57 19 0	86 10 0	53 0 0	...	46 17 9	3 11 0	2 16 0	1,935 17 3	**1,794 15 6**	...	141 1 9
Peak Hill ...	... ...	16 15 0	26 0 0	94 10 0	110 19 0	...	21 10 0	564 18 9	55 19 6	3 14 3	1 13 0	1,960 17 0	**1,346 19 0**	...	613 18 0
Mt. Margaret	Laverton ...	19 2 6	10 7 6	92 12 0	178 9 0	...	...	2,033 18 6	3,713 10 4	9 6 6	5 9 6	6,611 8 10	**7,218 8 10**	607 0 0	...
	Malcolm ...	40 5 0	23 2 6	343 9 0	172 0 0	254 5 0	441 5 0	1,290 10 0	2,206 10 10	10 6 6	7 14 0	5,783 18 7	**6,033 11 9**	249 13 2	...
	Morgans ...	...	...	25 6 0	39 11 0	2 0 0	6 10 0	...	...	2 6 0	5 9 0	716 3 3	**1,133 15 9**	417 12 6	...
Gascoyne ...	... ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Donnybrook ...	... ...	...	...	16 9 0	...	...	...	...	...	0 1 0	...	223 15 0	...	...	223 15 0
Phillips River	... ...	...	19 5 0	101 12 0	34 16 0	...	...	...	...	3 2 0	3 19 6	1,172 15 10	**1,268 0 3**	95 4 5	...
Greenbushes ...	... ...	...	...	173 1 0	208 14 0	...	...	433 6 0	686 18 8	3 8 0	4 1 0	1,393 5 6	**1,900 4 5**	506 18 11	...
Collie	... ...	14 0 0	26 15 0	55 10 0	98 18 0	...	...	...	...	3 3 3	8 1 3	4,692 2 3	**3,616 2 8**	...	1,075 19 7
Northampton ...	... ...	...	...	7 17 0	9 7 0	...	...	...	...	0 4 0	1 6 2	51 18 6	**426 9 5**	374 10 11	...
Head Office, Perth	... ...	59 15 0	35 12 6	26 13 0	11 2 6	959 0 0	1,156 11 7	50 0 0	75 0 0	115 0 9	437 16 9	1,570 11 3	**2,036 15 4**	466 4 1	...
		480 0 6	349 7 6	3,844 7 0	3,186 1 6	3,016 0 0	3,280 11 7	57,126 19 5	53,545 19 3	312 3 9	603 13 2	124,200 4 5	**116,315 10 8**	7,024 5 0	14,908 18 9

The total revenue amounted to £116,315, being a decrease of £7,885 compared with the previous year; the principal decreases being receipts from Public Batteries, £3,581; lease rent under Goldfields Act, £2,595; survey fee for leases, £670, and exemption fees for leases and other areas, £658.

Part VIII.—EXISTING LEGISLATION.

The following regulations and amended regulations came into force during the year:—

(1.) Amendment of Schedule VII. of the Mining on Private Property Act, in connection with license to occupy private land and prospect thereon for gold.

(2.) Regulations for the purchase of Auriferous Copper Ores at the State Sampling Works, Phillips River.

(3.) Regulations under which stone is crushed and tailings treated at State batteries.

(4.) Amendment of Schedules 13 and 14 (monthly returns under the Goldfields Act).

(5.) Mining Act, 1904: a consolidating Act which embodies the Goldfields Act, Mineral Lands Act, and Mining on Private Property Act. One of the principal provisions of this Act is that portion relative to mining on private property, which provides for private property being thrown open to mining for minerals other than gold after certain conditions have been complied with. Another important fresh provision made is that in connection with the granting of exemptions; lessees who have spent £1,500 for every 24 acres held under Gold Mining lease and every 48 acres under Mineral lease, and fulfilled the conditions required by the Act, are entitled to six months' exemption, and twelve months if £4,000 has been spent on above-mentioned areas.

This Act, though it passed both Houses of the Legislature during 1903, does not come into force till 1st March, 1904.

PART IX.—EXAMINATIONS HELD UNDER THE "MINES REGULATION ACT" AND THE "COAL MINES REGULATION ACT."

ENGINE-DRIVERS' EXAMINATIONS.

TABLE 26.

Number of Examinations for Learners' Permits and Certificates of Competency and Service, held by the several Local Boards on the Goldfields and in Perth, with details of the several Classes of Certificates issued during 1903.

Goldfield.	Place of Examination.	Number of Examinations.	Learners' Permits.	Interim.		Competency.		Service.		Copies.
				Second Class.	First Class.	Second Class.	First Class.	Second Class.	First Class.	
Pilbarra	1. Marble Bar (Lallarookh)	1	4	...	...	3	...	...	...	...
Peak Hill	2. Peak Hill	2	5	2	1	3	4	1	...	...
East Murchison ...	3. Lawlers	1	3	...	...	2	...	...	...	...
Do.	4. Wiluna (Lake Way)	2	...	...	...	3	3	1	...	...
Murchison	5. Cue	4	6	7	8	5	1	...	3	4
Do.	6. Mt. Magnet ...	1	2	...	...	1	...	...	...	...
Mt. Margaret	7. Mt. Malcolm ...	2	...	...	...	4	5	...	...	...
Do.	8. Laverton	2	4	...	...	4	...	...	...	...
North Coolgardie ...	9. Menzies	2	6	2	1	5	2	1	3	3
East Coolgardie ...	10. Kalgoorlie	2	1	10	...	10	7	3	4	2
Coolgardie	11. Coolgardie	2	3	2	...	6	10	2	1	4
Yilgarn	12. Southern Cross ...	1	3	1	...	2	1	...	1	...
Dundas	13. Norseman	2	5	...	...	3	4	...	1	...
Phillips River	14. Ravensthorpe ...	1	...	...	...	7	2	...	2	1
	15. Collie	4	3	2	1	8	1	...	5	1
	16. Perth (Head Office)	4	3	...	1	7	...	1	1	3
	Total	33	48	26	12	73	40	9	21	18

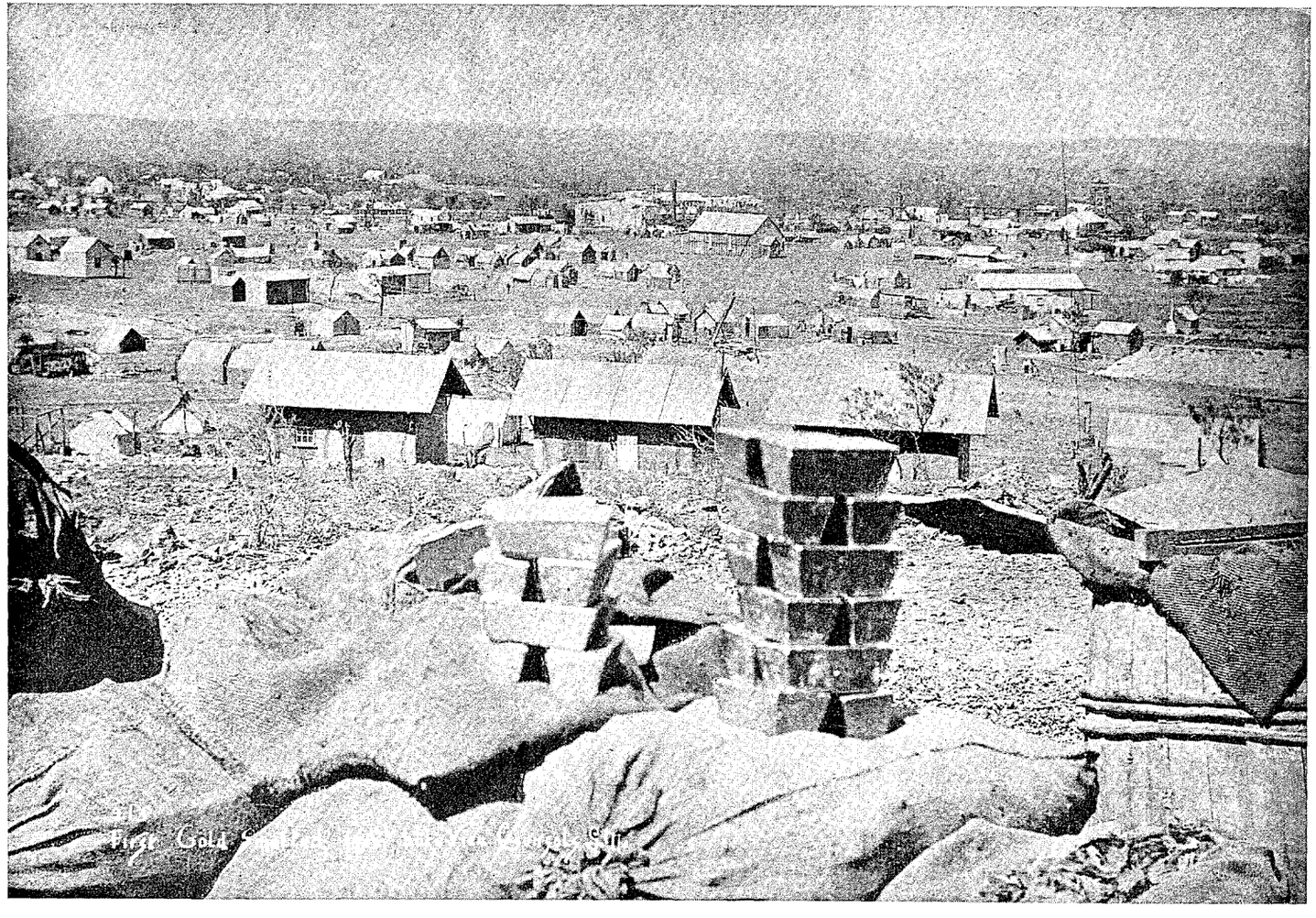
According to the report of the Chairman of the Board of Examiners, there were 33 meetings held during the year, and 336 applications were received for various certificates, of which 247 were granted, this number including 18 copies issued in lieu of those lost or destroyed.

The Inspection of Machinery Bill was introduced last session, and though passed by the Lower House, was thrown out by the Upper House. If passed, it would have enacted that all examinations would have to be conducted at one centre, thus saving considerable expense in administration, and also ensuring a uniform method of examination for all candidates. Communications have been received from the various Eastern States with regard to the expediency of adopting a method of examination by which a certificate granted in one State would be recognised in any of the others, and and it is evidently only a question of time when this will be brought about.

EXAMINATIONS OF COLLIERY MANAGERS.

Meetings of the Examining Board for Colliery Managers and under-Managers were held in Perth on March 5th, April 22nd, and October 23rd and 24th. An examination, extending over three days, for Certificates of Competency was also held at the Collie, under the supervision of the local Inspector of Mines.

Ten applications in all were dealt with during the year, and certificates were issued as follows:—Two first-class Service; two second-class Service; and one Competency Certificate, without examination.



FIRST MONTHLY OUTPUT OF 9,000 OZ. OF GOLD PRODUCED BY THE LAKE VIEW CONSOLS G.M., KALGOORLIE.

(*East Coolgardie G.F.*)

Part X.—INSPECTION UNDER STEAM BOILERS ACT.

The Chief Inspector of Boilers reports that the number of registered boilers reached the total of 2,734, or an increase in number of 126 over the previous year; and there were 2,870 inspections made during the year, compared with 2.609 for 1902, being an increase of 261; the number of certificates issued being 2,305, compared with 2,172 for 1902, an increase of 133.

Three mild explosions took place during the year, caused by negligence; but it is satisfactory to learn that no injury resulted to any person in connection with the same. It was found necessary to conduct four prosecutions under the Act—three for non-payment of fees, and one for working the boiler at a higher pressure than was authorised by the certificate, and for not exhibiting the certificate when required. Seventy boilers were temporarily condemned during the year owing to their dangerous condition, and twenty were permanently condemned, being completely worn out.

During the year two inspectors were appointed, taking the places of three Inspectors of Mines who previously carried out the duties of Boiler Inspectors in addition to their ordinary duties.

The expenditure for the year exceeds the revenue by £1,679. The Chief Inspector points out that the chief cause of the expenditure is the cost of travelling expenses incurred in travelling through such extensive districts. In any case, however, this cannot be expected to be a revenue-producing branch.

Part XI.—SCHOOL OF MINES.

From the report of the Director it would seem that the progress of the School must be considered very satisfactory; a number of students taking advantage of the means at their disposal to increase their knowledge of mining in its different branches.

Before the end of the year the Government decided that the Coolgardie School of Mines should henceforth be taken over by the Education Department, and the School conducted as a Technical School with the various subjects relating to mining to be included, and that the School of Mines be established henceforth at Kalgoorlie, the most important mining centre of the State and naturally the most fitting place for the establishment of the School of Mines.

The Government has decided to place a sum of money on the Estimates to provide for the erection of a Mineral Museum and Electrical Workshops in connection with the School, which should prove a great boon to all concerned.

For particulars with regard to results of examinations, etc., held during the year, reference must be made to the Director's report.

PART XII.—DEPARTMENTAL.

TABLE 27.

Return showing Revenue and Expenditure during the Years 1902 and 1903.

FIELD.	Revenue, 1902.	Percentage of gross Revenue, 1902.	Revenue, 1903.	Percentage of gross Revenue, 1903.	Expenditure, 1902.	Percentage of gross Expenditure, 1902.	Expenditure, 1903.	Percentage of gross Expenditure, 1903.
	£ s. d.		£ s. d.		£ s. d.		£ s. d.	
Ashburton ...	133 7 0	·2	35 10 0	·05	543 9 10	·9	309 14 6	·58
Broad Arrow ...	1,935 17 3	2·89	1,747 17 9	2·78	674 17 10	1·11	533 9 7	·96
Coolgardie ...	5,367 1 7	8·00	5,259 2 0	8·38	4,624 13 8	7·78	3,577 17 8	6·48
East Coolgardie ...	7,872 18 0	11·74	6,857 5 9	10·9	3,894 12 10	6·5	3,281 11 11	5·94
North Coolgardie	10,149 1 6	15·13	8,270 5 0	13·17	5,960 14 4	9·96	4,931 2 6	8·93
N.E. Coolgardie ...	3,984 16 9	5·94	4,354 19 8	6·9	2,908 5 6	4·86	2,321 6 4	4·2
Dundas	1,522 4 9	2·27	1,714 17 11	2·7	1,813 17 9	3·03	1,268 2 7	2·3
Gascoyne	...	...	...	...	101 0 0	·17	50 0 0	·09
Kimberley ...	46 18 0	·07	28 10 0	·04	62 5 0	·11	23 0 0	·04
Mt. Margaret ...	9,787 2 2	14·59	8,465 15 2	13·5	5,751 4 2	9·6	4,747 7 10	8·6
Murchison ...	8,023 13 3	11·96	7,381 12 0	11·76	6,010 1 9	10·04	4,979 17 0	9·02
East Murchison ...	4,908 3 6	7·32	4,914 0 9	7·9	1,965 8 7	3·28	2,112 7 4	3·82
Peak Hill	1,395 18 3	2·08	1,290 19 6	2·06	1,100 8 9	1·84	942 19 4	1·7
Pilbarra	1,170 11 9	1·71	1,164 18 3	1·9	1,771 7 0	2·96	1,743 0 2	3·15
West Pilbarra ...	460 16 9	·68	294 15 9	·47	93 15 7	·16	14 17 6	·03
Yalgoo	740 12 3	1·14	512 8 6	·81	399 17 3	·67	445 2 4	·8
Yilgarn	952 19 11	1·42	1,991 0 0	3·17	898 8 6	1·55	876 0 6	1·6
Phillips River ...	1,172 15 10	1·75	1,268 0 3	2·02	892 18 9	1·54	679 10 9	1·23
Collie	4,692 2 3	7·00	3,616 2 8	5·76	524 7 8	·88	356 13 4	·65
Northampton ...	51 18 6	·08	426 9 5	·68	121 1 11	·11	143 0 0	·26
Greenbushes ...	959 19 6	1·43	1,213 5 9	1·93	848 3 8	1·4	546 0 10	·99
Donnybrook ...	223 15 0	·33	...	...	113 11 5	·19	...	...
Head Office ...	1,520 11 3	2·27	1,961 15 4	3·12	18,769 12 10	31·36	21,334 15 11	38·63
	67,073 5 0	100	62,769 11 5	100	59,844 4 7	100	55,217 17 11	100

Revenue and Expenditure under "State Batteries" and Expenditure under "Purchase of Ore" not included in above figures.

NOTE.—The above figures include the Revenue and Expenditure under "Mining Schools" and "Steam Boilers Act," as per Summary.

	Revenue, 1902.	Revenue, 1903.	Expenditure, 1902.	Expenditure, 1903.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
"Mining Schools"	81 19 0	390 2 1	948 1 2	2,913 13 1
"Steam Boilers"	3,016 0 0	3,280 11 7	4,570 5 6	4,959 16 11

The total revenue from this table shows a decrease of £4,304, and the total expenditure shows a decrease of £4,627 on the previous year.

Mount Margaret heads the list with the largest revenue, totalling £8,466; then North Coolgardie with £8,270, then Murchison with £7,381, and East Coolgardie with £6,857.

TABLE 28.

Showing the Number of Registrars' Offices, also the Number of Officers on Goldfields and Mining Districts.

FIELD.	No. of Wardens.		No. of Registrars' Offices.		No. of Mining Registrars.		No. of Clerks.		Survey Staff.		No. of Inspectors of Mines.		No. of Clerks to Inspectors of Mines and Boilers.		No. of Inspectors of Boilers.	
	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.	1902.	1903.
Ashburton *a*	1	1	1	1	1	1	...	...	...	...	...	...	...	...	...	...
Broad Arrow	...	...	1	1	1	1	...	...	...	...	...	...	...	...	...	...
Coolgardie	1	1	1	1	2	1	...	1	*i* 3	2	1	1	1	...	...	1
East Coolgardie *b* ...	1	...	1	1	2	1	1	1	1	1	1	2	1	1	1	1
North Coolgardie ...	1	1	3	3	3	3	1	1	1	1	1	1	*j* 1	1	*j* 1	1
North-East Coolgardie *b*	1	...	2	2	2	2	1	1	1	...	1	1	1	1	...	...
Dundas	1	1	1	1	1	1	...	...	...	...	1	...	...	...	...	...
Gascoyne *a*	...	1	...	...	...	...	...	...	...	...	...	..	...	...	...	...
Kimberley *c*	1	1	1	1	1	1	...	...	...	...	...	...	...	...	...	...
Mt. Margaret	1	1	3	3	4	3	...	1	1	1	1	1	...	...	...	...
Murchison	1	1	3	3	4	3	...	1	2	1	1	1	1	1	1	1
East Murchison ...	1	1	1	1	1	1	...	...	...	...	...	...	...	...	...	...
Peak Hill	1	1	1	1	1	1	...	...	...	...	...	...	...	...	...	...
Pilbarra	1	1	2	2	2	2	...	...	1	1	...	...	...	...	...	...
West Pilbarra *d* ...	1	1	1	1	1	1	...	...	...	...	...	...	...	...	...	...
Yalgoo *e*	...	...	1	1	1	1	...	...	...	...	...	...	...	...	...	...
Yilgarn *b*	...	...	1	1	1	1	...	...	...	...	...	...	...	...	...	...
Collie	...	...	1	1	1	1	...	...	...	...	1	1	...	...	...	...
Northampton	...	...	1	1	1	1	...	...	...	...	...	...	...	...	...	...
Greenbushes *f*	...	...	1	1	2	1	1	...	...	...	...	...	...	...	...	...
Donnybrook *g*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Phillips River *h* ...	1	1	1	1	1	1	...	...	...	...	...	...	...	...	...	...
	14	13	28	28	33	28	4	6	10	7	8	8	5	4	3	4

a The Ashburton and Gascoyne Goldfields are controlled by Acting Wardens, who carry out, in addition, the duties of Registrars, their headquarters being at Onslow and Carnarvon respectively. *b* The Warden, Coolgardie, also acts as Warden of these Goldfields. *c* The Deputy Mining Registrar also acts as Acting Warden of the Kimberley Goldfield. *d* Acting Warden, in addition to his duties as Government Resident. *e* The Warden, Cue, also carries out the duties of Acting Warden of the Yalgoo Goldfield. *f* The Registrar, Greenbushes, also acts as Warden of the Greenbushes Tinfield and Donnybrook Goldfield. *g* Worked from Greenbushes. *h* The Warden also carries out the duties of Registrar. *i* Includes Inspecting and Field Surveyor. *j* The Inspection of Boilers on the Mount Margaret and North Coolgardie Goldfields is carried out by one officer, his headquarters being Mt. Malcolm. The duties of Clerk for both fields are also carried out by one officer residing at Mt. Malcolm.

The total number of officers employed in the Goldfields and Mining Districts has decreased by seven compared with the previous year. Separate Wardens for the East Coolgardie and North-East Coolgardie have been done away with, and one Warden acts for these two fields as well as for Coolgardie and Yilgarn. The Warden for the North Coolgardie field now acts as Warden for the Broad Arrow, the latter field previously being under the jurisdiction of the Warden for the North-East Coolgardie field. The position of a salaried officer as Acting Warden for the Gascoyne and Ashburton Goldfields has been abolished, and the Resident Magistrate at Carnarvon and Onslow were appointed, respectively, Acting Wardens for the above-mentioned fields.

OFFICERS EMPLOYED AT HEAD OFFICE.

TABLE 29.

Return showing number of Officers employed at Head Office.

Branch.	1902.	1903.
Clerical	Chief Clerk, 9 Clerks, and 4 Messengers ...	Chief Clerk, 9 Clerks, and 3 Messengers.
Accountant's	Chief Accountant, Assistant Accountant, 5 Clerks, and Junior Clerk	Chief Accountant, 7 Clerks, and Junior Clerk.
Drafting	Chief Draftsman, 7 Draftsmen, 1 Junior Draftsman, Plan Mounter, and Typographical Printer	Chief Draftsman, 7 Draftsmen, 1 Junior Draftsman, Plan Mounter, and Typographical Printer.
Registration	Inspecting Registrar, Registrar, Relieving Registrar, and 4 Clerks	Inspecting Registrar, Registrar, and 6 Clerks.
Statist's	Statist and 4 Clerks	Statist and 3 Clerks.
Survey	Assistant Inspecting Surveyor, Draftsman, and 2 Junior Draftsmen	Inspecting Surveyor, Draftsman, and 2 Junior Draftsmen.
State Batteries ...	Superintendent and 2 Clerks	Superintendent and 2 Clerks.
Steam Boilers	Chief Inspector, 4 Clerks, and 3 Assistant Inspectors	Chief Inspector, 4 Clerks, and 3 Assistant Inspectors.

No change was made in the total of officers employed during the year, but the taking over the control of the water supply on the different goldfields (previously administered by the Public Works Department), the administration of the Mines Development Act, and control of the Gwalia State Hotel by the Department has thrown a lot of extra work on the Department, and this has been especially felt by the Accountant's and Correspondence Branches. The increase in the erection of State Batteries, too, has led to a corresponding increase of work in the Batteries Branch, but by special efforts the branches referred to have managed to cope with their work. No invidious distinction, however, can be made, as all branches of the Department have shown commendable zeal in carrying out their duties.

TABLE 30.

Letters, Telegrams, etc., despatched during 1903.

Branch.	Letters.	Wires.	Circulars and Advices.	Statistics and Publications.	Total.
Batteries	3,600	350	23	...	3,973
Boilers	4,107	264	...	...	4,371
Chief Accountant's	4,715	83	2,781	...	7,579
Correspondence	6,676	1,251	3,278	* 10,500	11,205
Registration	5,891	297	...	...	6,188
Statistical	440	135	1,200	* 8,800	1,775
Drafting	108	6	...	...	114
Survey	679	33	...	...	712
	26,216	2,419	7,282	* 19,300	35,917

* Not included in totals.

The total number of letters, telegrams, etc., despatched from Head office reached 35,917, an increase on the previous year's amount of 4,739.

Correspondence Registered.

1902.		1903.
7,499	... ...	7,449

Though the number of correspondence registered appears slightly less than for the previous year, this is not actually the case, as the correspondence received is in reality considerably greater, but owing to an alteration in indexing a considerable saving is effected in registration.

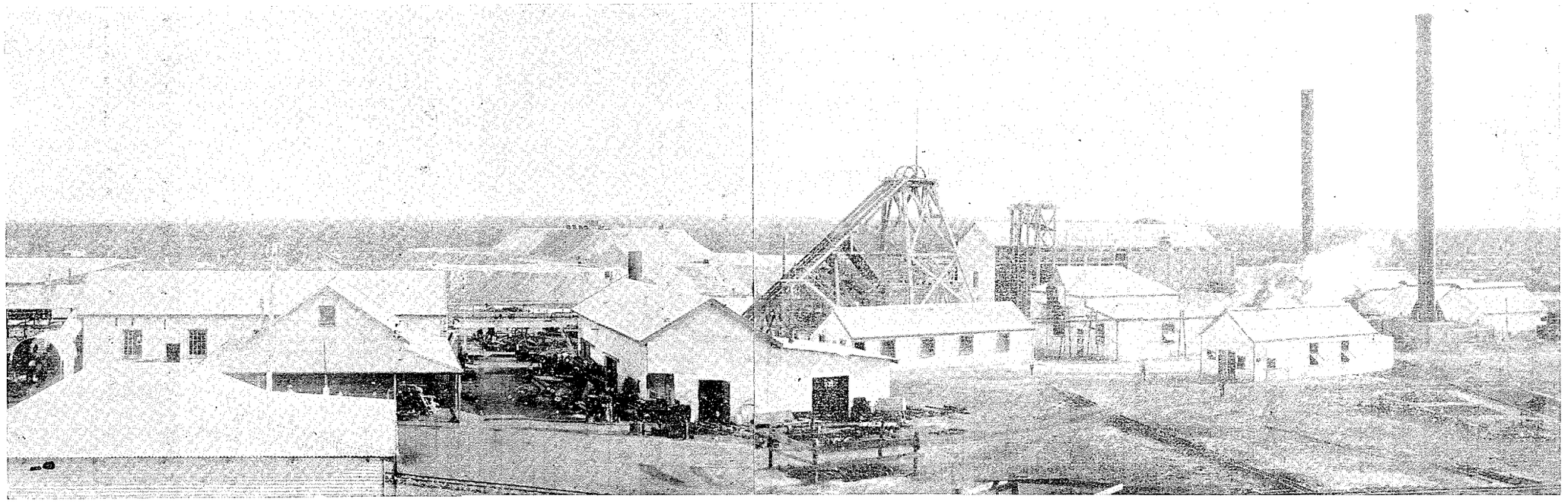
SURVEYS.—The following tables furnish a statement showing the number of surveys executed for the Mines Department during the year 1903, and compared with the year 1902:—

TABLE 31.

Total number of Surveys, compared with 1902.

	1902.		1903	
	No.	Acreage.	No.	Acreage.
Surveys on Eastern Goldfields	730	10,394	878	16,514
Surveys on Central Goldfields	286	4,344	308	3,755
Surveys on all other Fields	132	2,622	86	1,902
	1,148	17,360 acres	1,272	22,171 acres

NOTE.—The above does not include groups of Business and Residence Areas.



SONS OF GWALIA GOLD MINE, LEONORA.
(*Mt. Margaret G.F.*)

TABLE 32.

Traverses and Special Surveys.

	1902.		1903.	
	Traverses.	Cost.	Traverses.	Cost.
	M. C. L.	£ s. d.	M. C. L.	£ s. d.
Eastern Goldfields	25 47 19	77 8 5	52 47 88	175 6 2
Central Goldfields	4 63 00	15 19 2	50 52 79	168 16 10
All other Fields	6 71 86	22 19 10	5 12 22	17 3 7
	No.		No.	
Residence and Business Areas	361	376 11 10	269	294 12 0

Re Table 31. The large increase in the area is mainly accounted for by the fact of a number of 500-acre Homestead Leases being surveyed during 1903.

There has been a decrease of three officers on the Survey staff on the fields since the last report, viz., one from Coolgardie, one from North-East Coolgardie. and one from Murchison.

GENERAL.—It having been decided, at the close of the year, that extensive transfers were necessary among the officers situated on the various goldfields, owing to many of them having been located for a considerable period in the one district, the year 1904 will show that these transfers became effected.

Noticeable among the reports published during the year are the number furnished by the Geological Survey Branch, the majority of them being printed in Bulletin form, with maps included, references to which are made in the Government Geologist's Annual Report.

The appointment of the State Mining Engineer has been amply justified by results; the Mining Development Act alone necessitates such an appointment, as numerous reports are required from time to time in connection with applications for Government assistance under the provisions of the Act, and which require the services of an officer of his scientific knowledge to furnish the necessary reports alluded to.

I gratefully acknowledge the loyal support received from the various officers of the Department during the absence on leave of the Under Secretary for Mines.

I have, etc.,

L. L. CROCKETT,
Acting Under Secretary for Mines.

Department of Mines,
Perth, 16th July, 1904.

DIVISION II.

Report of the State Mining Engineer for Year 1903.

To the Secretary for Mines, Perth.

SIR,

For the information of the Hon. Minister for Mines I have the honour to submit a report of the work of my office for the year 1903.

INSPECTION OF MINES UNDER "THE MINES REGULATION ACT, 1895 (WITH AMENDMENTS)," AND "THE COAL MINES REGULATION ACT, 1902."

During the year the work of inspection of boilers under the "Steam Boilers Act, 1897," in the Coolgardie, Dundas, and Yilgarn Goldfields, was taken from the Inspectors of Mines and given in charge of a special Boiler Inspector. In consequence of this, Inspector W. M. Deeble was transferred from these fields to the Mt. Margaret Goldfield, and Mr. Crabb has now to inspect the mines formerly in charge of Mr. Deeble, in addition to those he himself had previously. The relief afforded by being freed from the boilers' inspection has enabled this arrangement to work very satisfactorily. At Mt. Margaret Mr. Deeble replaced Mr. J. O. Hudson, who was transferred to Kalgoorlie, it having been found that the work was more than could be properly attended to by the one Inspector resident there, Mr. Lightly.

On the starting of the State Sampling Works at the Phillips River Goldfield in June, Mr. John Provis, Government Ore Buyer, was appointed also Inspector of Mines, this field being quite out of reach of any of the other Inspectors.

The following abstracts are taken from the Annual Reports furnished by the Inspectors:—

COOLGARDIE, YILGARN, AND DUNDAS GOLDFIELDS.

The Inspector of Mines for these goldfields is Mr. J. Crabb, resident at Coolgardie. In the early part of the year a considerable amount of his time was taken up with boiler inspection and in acting as Chairman to the Battery Advisory Board, but since relieved of this work he has been able to devote more time to the inspection of mines. He, however, had to undertake the duties of Inspector for the Dundas Goldfield, formerly performed by Inspector Deeble, who was transferred to the Mt. Margaret Goldfield, in addition to his former work.

Four fatal accidents and eight minor ones occurred during the year 1903, and were all inquired into and reported upon by the Inspector.

Ventilation.—In nearly all of the mines natural ventilation is depended upon entirely. It is giving very good results up to the present, but unless some of the several ways by which natural ventilation may be accelerated and properly distributed are adopted, the Inspector fears much trouble will be experienced on some of the mines in ventilating to any considerable depth by this means alone. He continues:—

> "Generally, the mines are well ventilated. Rock-drilling machines furnish a large amount of pure air to the workings; the delivery at the drills is usually 80 pounds per square inch, and when this air is released it expands, becoming cooler, which has the advantage of reducing the temperature at the face.
>
> "At times when drills are not running, a small amount of air is allowed to pass through the air hose, thus furnishing the men with the necessary ventilation, and when smoke is to be removed the full head of air is turned on for a few moments. The dust resulting from drilling what are termed 'dry holes' is one of the greatest dangers the miner has to contend with.
>
> "*Explosives.*—The general rule relating to the storage of explosives has been reasonably observed; but I find very often that it is used without much judgment by the miners in their blasting operations, the holes being often overcharged, with the result—a large percentage of carbon monoxide gas is formed, miners are overcome with it, and the explosives are invariably said to be no good. As a rule miners do not appear to realise the great danger of overcharging.
>
> "*Underground Excavations.*—In the early part of the year I found it necessary to prosecute a mine manager for not providing the necessary protection for men who were working at the bottom of a shaft, and two miners for not reporting bad ground, as required by the Mines Act.
>
> "I was also compelled to cause work being suspended in one mine until such time as the workings were made safe.
>
> "*Signalling.*—The code of signals now in use is working fairly satisfactorily, and is much more appreciated than when first introduced. All of the principal mines are fitted with the necessary return signal lines, and those that have installed them are very pleased with the advantage they afford.
>
> "In most cases the ordinary knocker or gong is used, and they appear to give the best results.
>
> "The code that I have suggested to most of the mining managers, and which is now generally used, is as follows:—
>
> "Before entering cage men must knock 4 to driver and wait his
>
> 1 knock – All right, enter cage.

"Then signal level at which the cage is required to stop, followed by signals for hoisting or lowering, (1 or 2)

2 knocks – – Repeat signal.
3 knocks – – – Send cage to surface.

"It is working very satisfactorily.

"*Ropes.*—I have had to condemn eight winding ropes.

"Generally, ropes do not receive the attention that they should; the result is they are condemned long before they would have been, if properly cared for.

"*Cages.*—The cages in general use, are constructed on similar lines to Chessell's and Allen's.

"I have had to temporarily condemn five, owing to faulty construction and defective springs.

"For the further protection of life, I am of opinion provisions should be made for the following:—

"That means should be provided to prevent the dust that is caused by rock-drilling from vitiating the atmosphere underground.

"That a uniform return code of signals should be posted, under same conditions as present code.

"That ropes be recapped at least once in every four months, and a record of same be kept.

"That cages should be tested at least once a month, and a record of same kept.

"*Treatment of Ore.*—Up to the present very little trouble has been experienced in the treatment of ore, as it is principally of a free milling character.

"*Mining.*—The mining industry can be said to be steadily expanding. Very few of the old mines are idle, while new properties are being opened. There are numerous ore bodies throughout the whole of the fields that are virtually unprospected. The majority of the lodes are low grade; but the best mining fields of the world, almost without exception, are low grade districts, where profits of fabulous size are made by the treatment of large quantities of ore at a small profit per ton, rather than high-grade districts where small mines return fabulous profits per ton on small productions! And when it is seen that ore only worth 12s. per ton is being profitably dealt with at Coolgardie, and ore only worth 16s. per ton can be profitably worked at Southern Cross, where an average of 2,400 tons per month is treated, it is only reasonable to think that there is a great future for our mining industry."

To encourage the expansion of mining, Mr. Crabb is of opinion that nothing better can be done than extending the State Battery system in places that offer any encouragement.

East Coolgardie Goldfield.

Inspector Geo. Lightly reports that the inspection of the mines of this field was uninterruptedly carried out either by himself or by Inspector J. O. Hudson, who was transferred to Kalgoorlie in September from the Mt. Margaret Goldfield to assist in its performance.

Accidents.—In the course of the year 112 accidents were reported to the Head Office in Perth. The largeness of this number arose from the fuller system of reporting such occurrences that was adopted by mine managers after a prosecution of one of them for having failed to notify the Inspector of an accident at his mine. Eleven (11) accidents were attended with fatal results to 14 men—ten occurring underground and one at surface. Ten (10) of these accidents, causing the death of 12 men, happened in the large mines; the eleventh in an abandoned shaft on a forfeited lease, from which the two men who were killed were illegally removing timber. A Coroner's inquest was held in each case, and a verdict of accidental death was recorded in every instance.

Ventilation.—There were one or two cases in which managers had to be called upon to remedy defective ventilation, but generally speaking there was little to complain of. Any such defect was generally traceable to choked passes or to the rapidity with which levels were pushed forward without connections by winzes and rises. Wherever the method of ventilation was found wholly or partially ineffective the necessary steps were taken to have the defect remedied.

Sanitation.—Reasonable care was exercised underground at the mines, and nothing objectionable came under notice while going through the workings, and no complaints with regard to sanitary arrangements were made to the Inspector during the year.

General.—The greatest depth reached on the field was at the Great Boulder Proprietary Mine, when one of the shafts reached a depth of 1,800 feet from surface. At this mine, and also at the Ivanhoe, preparations (since completed) were in progress towards the latter part of the year for increasing the hauling capacity of the winding plant. This has been done by the introduction of double-decked cages, and by the erection of new and powerful engines, capable, in each case, of winding from a depth of 3,000 feet.

A steadily growing use of electricity as an actuating force for various purposes was noticeable. In some instances power was generated at the mines, and in others it was supplied to the mines by the Electric Power Company. In two cases it was applied to pumping from depths of 1,000 and 1,200 feet respectively, and in other cases it was in use for winding and for batteries. At the Associated Mine it will shortly be in use for driving a 20-head battery of 1,275lbs. stamps, and also for winding in a shaft that eventually is likely to reach a depth of 2,000 feet. This battery is to be furnished with copper

plates, three concentrating tables (one of them for slimes) to each five heads, and spitzkasten. Provision is also being made for an additional 20 head of stamps. This is another instance of the tendency that is noticeable to a return to the old system of battery work, particularly for low grade ore.

The introduction of the Merton roasting furnace, and its substitution in several cases for the Edward's furnace, were also features of the past 12 months.

Inspector J. O. Hudson reports that since taking up his duties at Kalgoorlie on 9th September, he inspected 89 mines, inquired into the causes of six (6) accidents; attended one (1) inquest; and instituted one (1) prosecution under the Mines Regulation Act.

With regard to ventilation he remarks:—

"The ventilation in stopes in the mines of this field is, as a rule, all that can be desired Usually the mines are equipped with two main shafts, and there are passes at at least every 50 feet on the blocks. In several cases the circulation of the air currents did not receive sufficient attention for the obtaining of full benefit of the air, but these have since received the necessary care. There has been a tendency on the part of some managements to carry on development work, such as main drives and leading stopes, without regard to ventilation, in some cases 400 feet below ventilating shafts. This has now been discontinued, and winzes are put down in such positions that drives are ventilated as early as practicable. In cases where it is found impracticable to sink winzes, the lower workings are ventilated by means of air pipes that are connected to one of the stacks at surface. The dust created by the boring of dry holes with machines is a source of danger to the health of the miners, in which managers are taking active interest. The Ivanhoe manager intends experimenting with Gitsham's spray, and on the Great Boulder Proprietary Mine there will shortly be six Leyner rock-drills working."

On explosives he says:—

"The explosives in general use are of good quality and of recent manufacture. In most cases the magazines on mines comply with the Regulations as regards construction, but many instances of want of care regarding proper storage came under my notice. Provision, in the shape of covered canisters or boxes, is made on all mines for the conveying of explosives from magazines to working places; but there are many men so regardless of risk that insistence on their using these boxes has to be made; they prefer carrying the explosives openly.

"The Kalgurli Mine management have been experimenting with a spray solution, which has for its object the counteracting of the ill effects on miners caused by fumes generated by use of explosives in mines.

"The systems of stoping on the various mines have been given considerable attention and in most cases a limit, as to height of backs, has been insisted on; also timber has been required to be used where considered necessary."

Mr. Hudson goes on to mention that a conference is proposed to be held between interested bodies and the Inspectors of Mines for the purpose of discussing matters in connection with signalling in mines, and recommending additions to the prescribed code in order to make it uniform. Several of the larger mines are experimenting with a view of establishing a reliable system of return signalling. So far, electrical signalling in dry mines seems to be satisfactory, but it is not reliable in wet mines.

The Regulations with regard to machinery are well observed. Ropes and cages receive careful attention. On the larger mines cages are overhauled and tested weekly; all ropes are cut and re-shod half-yearly.

The sanitary arrangements underground are generally satisfactory. Whenever fault has been found, the evil has been promptly remedied. In large mines men are specially employed to attend to this work.

Mr. Hudson also notes that the Golden Horseshoe Company is sinking a shaft on the Ivanhoe West Lease, which is not expected to cut values until a depth of 2,000 feet is attained; and that the Great Boulder Proprietary Company is also sinking a shaft, on the Great Boulder North Lease, that will have to go to 1, 00 feet before obtaining values.

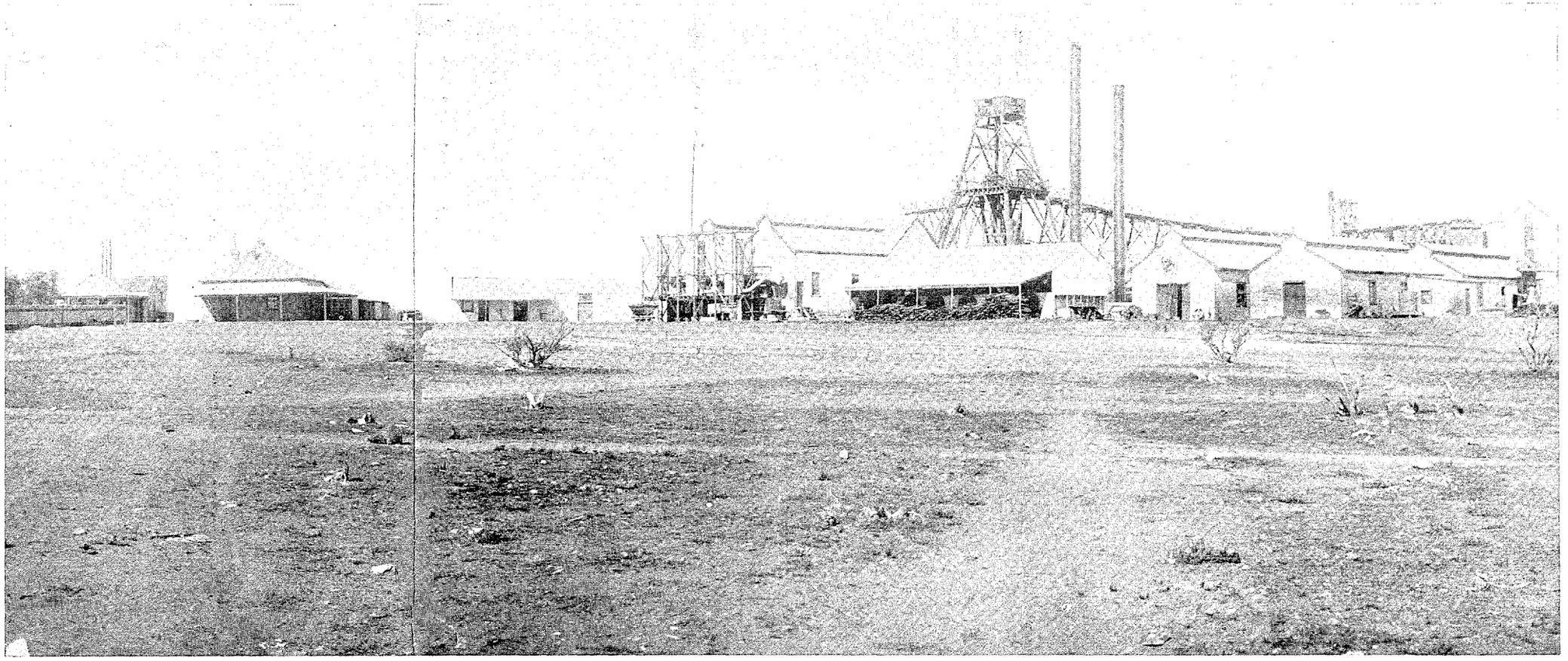
North-East Coolgardie and Broad Arrow Goldfields.

Inspector G. Jenkyn reports having made the usual inspection of mines in these fields, visiting each as a rule once in every two months, and more frequently, when possible, where shaft sinking was in progress. He goes on to say:—

"*Mining generally.*—Neither of the two fields at the conclusion of the year was looking as favourable as could be wished, as a number of important mines had closed down. On the other hand fresh finds near the Wycheproof line of reef at Bardoc and at Randell's in the Bulong District, and Mulgabbie in the Kurnalpi District, gave promise of a more prosperous future. The following figures of work done, with which I have been supplied by managers, give some idea of the development in the mines.

North-East Coolgardie Goldfield, Kanowna District.

	Sinking.	Driving, etc.
White Feather Main Reefs ...	1057	2658
Do. Reward	111	204
North White Feather	205	1252
Last Chance	470	730
Ballarat, Prince Oscar	86	186
Kanowna Consolidated	103	552
South Gippsland Leases	...	2019



EAST MURCHISON UNITED G.M., LAWLERS.

(*East Murchison G.F.*)

BROAD ARROW GOLDFIELD.

	Sinking.	Driving, etc.
New Standard Exploration ...	400 ...	350
Zoroastrian	380 ...	697
Golden Arrow	303 ...	344
Slug Hill	120 ...	737
Half Mile Reefs	100 ...	1043
Star of W.A.	120 ...	325
Wycheproof	120 ...	140
Broad Arrow Consols	50 ...	125

"*Ventilation.*—With very few exceptions the workings were well ventilated, and those exceptions again were mostly of a temporary nature where winzes were being sunk or rises put in before breaking through.

"*Timbering.*—I was particularly cautious in regard to this matter and did all I could to minimise accidents, with fairly successful results.

"*Safety Cages, Hooks, and Ropes.*—I specially inspected these on each occasion on which I visited the mines, and advised the keeping clean and oiling of the hooks.

"*Explosives.*—There were no accidents in this branch, as careful attention was paid to the storage of these articles.

"*Machinery.*—Throughout, the machinery was kept in good order and was well protected, and I had very little trouble concerning it.

"*Accidents.*—There were 15 accidents in all, nine in North-East Coolgardie and six in Broad Arrow field. Of the former none were fatal, and of the latter four were so.

"*Prosecutions.*—I had occasion to conduct three prosecutions for breaches of the Act, one relating to cages and two to driving without a certificate. The defendants were convicted and fined in each instance.

"In conclusion, I am pleased to state that I consider that the provisions of the Acts were fairly well observed, and that my instructions, where necessary, were promptly complied with, and every assistance and information were courteously rendered by owners and managers."

NORTH COOLGARDIE GOLDFIELD.

The Inspector of Mines, Mr. W. F. Greenard, reports for the year 1903:—

"The mines working on the North Coolgardie Goldfield have been continuously inspected by me, both above and below ground, during the year under review. Three mine managers were proceeded against in the Court for non-compliance with the Act.

"Two shift bosses were also proceeded against in the Court for non-attendance to their duties and the requirements of the Act.

"Two miners were summoned for non-compliance with the Act, which non-compliance caused direct injury to other miners working with them. One owner was proceeded against for neglecting to keep the shafts on his lease securely covered or fenced. In all these cases a conviction was recorded, and fines and costs inflicted, ranging from £10 to a 'caution.' These proceedings have had a salutary effect.

"*Accidents.*—Four fatal, and 15 of a serious nature. All accidents arising during the year have been immediately inquired into—no matter how trivial—and reported to Head Office, showing cause and extent of injury. Special attention has been given to trivial accidents, as they often disclose conditions leading up to larger accidents, which, by timely consideration, can be avoided The one accident calling for special mention is the 'Queensland Menzies' to Stokes and Keating. In the evidence at the inquiry the 'Platman' says 'he warned Stokes and Keating not to fire, as the air might be cut off.' After doing this, one would think he would have taken some precautions to insure safety, but, on the other hand, he omitted to signal the surface engine-driver. This omission, and the chaos that arose when danger was near, caused one of the most deplorable accidents that has occurred in the North Coolgardie Goldfield.

"Mining generally is in a sound condition, and developments throughout the goldfield are most promising. The Cosmopolitan Proprietary's shaft is now down 1,300 feet."

MT. MARGARET GOLDFIELD AND EAST MURCHISON GOLDFIELD.

Inspector J. O. Hudson reports that he was in charge of this district up to September, when he was transferred to Kalgoorlie, and succeeded by Inspector W. M. Deeble.

Inspector Hudson inspected 73 mines and 11 leases in the Mt. Margaret Goldfield, attended one Warden's Inquiry and 15 Preliminary Inquiries, and instituted proceedings under the Mines Regulation Act against three persons, travelling 1,302 miles in the execution of these duties. In the East Murchison Goldfield he inspected 52 mines and 13 leases, and attended one Warden's Inquiry and three Preliminary Inquiries, which necessitated travelling 901 miles.

In the Mt. Margaret Goldfield a rush occurred during the year on account of an alluvial discovery at Duketon by Messrs. Fosser and Baker. There is every likelihood that by thorough testing this locality will develop into a permanent mining district. It is now receiving considerable attention. Webster's Find G.M. started active operations after a lengthy term of inactivity. The Millionaire G.M. at Morgans was equipped with a five-head battery of 1,750lbs. stamps, which gave every satisfaction.

In the East Murchison Field a rush occurred at Black Range, and was the initiative of remarkably successful prospecting work over a large area of the locality. With this exception no new developments took place on the field.

On both fields, during the eight months of Mr. Hudson's term of office, there were 16 men seriously injured by mining accidents, and two men killed. One of the fatal accidents occurred in a shaft that was used for water only.

Inspector W. M. Deeble, who succeeded Mr. Hudson, reports that since taking up his duties on 11th September, 1903, he has been continually travelling, the mines being scattered over a large area. The distance travelled amounted to 2,825 miles, and he has not been able to visit the mines more than once, except in the case of the principal ones, which were seen more frequently.

In the Mt. Margaret Goldfield there have been for the whole year 25 accidents, wherein four men were killed and 22 injured. One accident whereby one man was killed and another injured occurred through the careless use of explosives, and was on an abandoned lease where no mining operations were being carried on. Five (5) accidents happened on the surface, and twenty (20) underground.

In the portion of the East Murchison Goldfield in Mr. Deeble's charge there were six accidents, three of them fatal, involving eight persons.

With regard to ventilation, Mr. Deeble reports that the air is very fair in most of the mines, but considers that where rock drills are in use in stopes, rises, drives, etc., and the boring is done without water, the air is always charged with fine dust, which soon gives miners working in it what is known as "Miner's Complaint" or "Miner's Lung." He thinks that the use of sprays of water should be compulsory, and that it should be considered a serious offence to drill a dry hole. The spray would not only allay the dust, but also take up a certain amount of any noxious fumes present from the explosives.

Regarding the progress of mining in his district, this Inspector says:—

"*Mount Margaret Goldfield.*—In the Northern part of this goldfield some new shows have been opening up well during the last few months. About ten miles South of the Erlistoun Creek there are several promising reefs being developed.

"*Duketon.*—At this place, which is 83 miles North of Laverton, several good shows are being worked with an average result of over one ounce per ton. The main reef being worked is more continuous than is usually seen on these fields, and can be traced for miles on the surface. The difficulty of working at the time of my visit was to cope with the water, which was met with ten feet from the surface.

"*Laverton.*– Mining in this district has been very quiet lately, but in the mines working the prospects are very encouraging.

"*Burtville.*—In this district the reefs are small, but the results obtained are good, and as the country rock is soft, most of the mining is being done by private parties.

"*Mount Morgans.*—The Mount Morgans G.M. is the chief feature of this district. The width of reef in one of the stopes is over 100 feet wide, and great care is necessary to work this safely. In this district there is practically no mining timber. The best of the Mulga growing is only fit for logging up passes or firewood. Within a radius of seven miles there are 10 small mines, and some of these have good prospects, but at the time of my visit were not being worked in a very energetic manner.

"*Murrin Murrin.*—There are a large number of small shows working within a radius of 10 miles, and in the majority of cases the reefs are small and good. The chief mine in this district was the Murrin Copper Mine; but this has lately been shut down. The lode is a large ironstone formation, carrying a percentage of copper, which has been treated by smelting, on the mine.

"*Malcolm.*—Mining in this district has been very quiet during the latter part of the year. At the Pig Well a number of small claims are worked with good results. The leaders are small, but the country rock is very soft. The main mine in this centre is erecting a 10-head battery, and when complete I understand five head will be used for crushing for the public. If the rates are reasonable, this will remove a great handicap under which the holders of small shows are at present working.

"*Mertondale.*—The chief mine in this centre has only been carrying on development work so far. Outside claims are now doing very little.

"About ten miles East of Mertondale are several mines from which good stone is being obtained. The Anglo-Saxon Syndicate have lately erected a five-head mill and put through their first crushing of 58 tons for an average of 18dwts. per ton. The Randwick, lately taken up by Castledine and Sons is turning out well. They have had several good crushings and one specimen of 53lbs. dollied 56 ounces of gold. A ten-head battery is now being erected on this mine. The East Lynne Gold Mine, worked by a local syndicate, crushed 24 tons for a return of 69ozs., and while breaking this stone 60ozs. were dollied, giving a total of 129ozs. from 24 tons.

"*Leonora.*—The mines are within a radius of six miles of Leonora, and taken on the whole are very promising at present.

"The Sons of Gwalia is the only regular producer at present; but there are others, if vigorously worked, I am satisfied would soon bring this district to the fore. Twenty miles north is the King of the Hills G.M., which is at present shut down. This mine crushed 12,154¾ tons of stone for 8,437·55ozs. to end of 1902, and 1,421 tons for 966ozs. during first six months of 1903.

EAST MURCHISON GOLDFIELD.—About 42 miles north of Leonora are the Lorna's Luck and Great Western Gold Mines. The former is at present developing the mine. The Great Western is erecting a ten-head battery and winding engine. The reef in the latter mine is large, and low grade ore which should be made to pay.

"*Darlôt.*—There are a large number of small mines around Darlôt, and the results obtained are very satisfactory. The average of all the stone crushed at the State battery in this district for 1903 is 2·82ozs. per ton. It is pleasing to note what State batteries are doing for places like this, where there are no other means of treating the products of the mines.

"*Lawlers.*—The mines in this district are generally improving, and I am of the opinion will show up better during the coming year. About seven miles in a South-West direction from Lawlers some promising shows have been pegged out, but very little can be said yet as to the value, as no crushings have been put through the battery.

"*Sir Samuel.*—There is only one mine and a few small shows in this place. The reefs are a fair size and of medium quality; but I was informed by the holders they were not in a position to open them up properly.

"*Kathleen Valley.*—There are two mines and a number of prospectors at this place, but unfortunately during the latter part of the year the two mines had to shut down on account of not having a sufficient supply of water for crushing purposes. At the time of my visit they were sinking to get a supply."

CENTRAL GOLDFIELDS.

Inspector F. J. Lander reports that managers and miners throughout his district have invariably carried out the provisions of the Mines Regulation Act in a satisfactory manner, and have given him all possible aid in fulfilling his duties. He considers that the Murchison is undoubtedly a working man's field, but thinks that in many cases it has been handicapped in obtaining the assistance of capital, by excessive values placed upon their properties by proprietors.

His district is a very large one, extending from Yuin, in the Yalgoo Goldfield, to Peak Hill, and from Cue, 250 miles eastward, to Lake Way. Peak Hill was visited three times during the year; Lake Way, Yuin, and Yalgoo twice; and Fields Find once. The mines in and around Cue, Nannine, Day Dawn, the Island, Lennonville, and Mt. Magnet were frequently visited.

Accidents.—There were 17 accidents recorded during the year; 13 on the Murchison Goldfield, 3 at Peak Hill, and 1 on the East Murchison field. There were others of minor importance which were not sufficiently severe to be considered cases of "serious injury to any person." In every case but one there was no blame attributable to the management of the mines; but in a number of instances the men injured showed much negligence. Five accidents resulted fatally; two on surface, one in a winze, one in machinery, and one as the result of an explosion while the deceased was recharging a hole that had just been fired. One of the surface accidents was a very unusual one, and happened on the East Murchison field. The man was sleeping in his tent, 245 feet away from an open cut where blasting was being carried on, and was killed by a stone thrown from the cut striking him on the head.

Sunday Labour in Mines.—Nine permits were issued for work found necessary on Sundays. "The Act with regard to Sunday labour works very smoothly here."

Testing of Cages and Safety Hooks.—Where winding engines are used the cages have been tested and the catches found to be working satisfactorily. No accidents occurred through failure of winding ropes. Several ropes were condemned and replaced by new ones.

Explosives.—A number of explosions have taken place at the Great Fingall breaker, and on one occasion a man was seriously injured. Shortly afterwards there was another explosion, which did no damage. A thorough investigation was made as to how the dynamite got into the breaker, and it was discovered that there had been a good deal of carelessness on the part of some of the underground officials, and eventually two of them were dismissed. In one case the Inspector found in the stopes that nine holes had been bored when only four were necessary. The custom was to fill every hole with dynamite and try to explode them, with the result in many cases that several holes were cut out, and the dynamite left lying among the loose ore, with which later on it passed to the breaker, to be a source of danger to men and machinery. It was a common thing at this time to hear explosions at the breaker; but after the Inspector's investigation there was no more trouble in that way, and a great saving of explosives resulted as well.

Inspector Lander favours the view that all mine managers should be required to hold certificates from the State, regarding it as necessary in the interests of the State that men in charge of mines should be qualified to work them in a scientific manner, and maintaining that any system of work that is adopted by a manager which will lead in the end to abandonment of ore means a dead loss to the State as a whole.

Mr. Lander speaks very highly of the system of working the stopes now adopted in the East Fingall Consolidated Mine at Day Dawn. He says of this:—

"The old pass system is being abandoned as speedily as possible, and the principle of working upon the broken ore is being introduced, the main features of which are as follows:—The first heading (about 6 x 8 feet) of the drive is driven some four to six feet above the final level of the level. Following this about 10 to 20 feet back from the face of the drive other machines rigged on bars, placed in the drive, take out the leading stope from some six to eight feet or more, and take up the bottom to the desired level, and cut back to the foot-wall or hanging-wall (preferably the foot-wall.) It will be observed that this way of driving avoids the necessity of rigging staging with its attendant drawbacks and dangers, for the boring of the

leading stopes. Again, the bars are firmer, the men are able to move around easily and freely, and consequently can come close up to their work. The rigging is quickly done, is less dangerous, and the work is effective and economical. By this method of working the drive is prepared for stoping and the timber work is brought along some 20 to 30 feet behind the machines. The timbers are covered and stoping in the new way may be commenced and carried forward. The work of driving, taking out the leading stopes, and the bottom to the desired grade (and level) four to six feet, and cutting back to the foot-wall, timbering and stoping are carried on simultaneously. There is a connection from the stope to the level above, and although the timber work and stoping follow so closely, the development work (*i.e.* the drive) a means of ventilation for the drive is provided.

The system of stoping is as follows :—

The levels are securely timbered, and breaking of ore is begun. No passes of any kind are used and no timber is used in the stopes except for absolutely necessary and exceptional cases. The ore is broken down over the level timbers and is allowed to remain there, only a sufficient quantity being drawn off so that top of the broken ore may be from four to eight feet from the back of the stope ; ample room is only allowed for the men to get around and work. The bars are rigged on the broken ore, and against the back of the stope, thereby giving a good solid bar. The stope is carried forward and up in the breasts and backs of from seven to ten feet. In one set up a machine will bore the face of the stope (with water holes) and the back of the stope will also be bored from this same bar. The stopes are taken off either side of the rise or winze existent between the two levels. The rise or winze also provides a means of ventilation. From this it will be seen that, when all the ore has been mined in the stope and work completed, the stope will be full of broken ore representing from 60 to 70 per cent. of the total quantity of ore broken ; it being necessary to draw about one-third as the work progresses, in order that room may be had along the back of the stope for the men to carry on their duties. For the drawing off of broken ore, shoots of large and ample size are provided in the level about 12 feet apart, depending upon the width of the lode. The following advantages are claimed for the system mentioned :—

"(1.) The method is the safest, inasmuch as there is little hanging-wall exposed (only six to eight feet) between the broken ore and that unbroken, and the men are enabled to easily reach the back of the stope to work down any loose rocks, and at all times they can sound the wall and the back of the stope. Even if any rock were to fall it would do but little harm, as the fall is a short one ; therefore accidents from falling rocks are reduced to a minimum.

"(2.) The system provides the best means of ventilating the faces and back of the stopes, as the air is compelled to travel along the back and faces of the stopes, and it is here the men are working, so that they are in the full current and circulation of the air. Any dust and smoke are rapidly carried away, and cases have been noted where the circulation has been so great as to make it impossible to keep a naked light.

"(3.) The great advantage is that the men are able to carry on their work and move about freely and safely. Faulty and dangerous staging is done away with and the bars are as firmly rigged, and as solidly, as in a drive. Further, the machines may be easily handled and moved as already demonstrated by the fact that the men are not harassed in their movements. A great saving of time takes place in the rigging of the machines so that more effective work is done. In the Fingall the method has been long enough in vogue to prove that the machines break more ore than under the old style.

"(4.) Filling is not necessary while the work is in progress in the stopes, so that if there should be large exposures of hanging wall during the drawing off of the remaining 60 (about) per cent. of broken ore in the stope, very little danger or damage can be done for the reason that there is no one working in the stope at this time, so that filling may take place at the most advantageous and opportune time. In drawing off the remaining 60 per cent. of broken ore, work is commenced at one end of the stope and carried forward, the necessary filling following closely behind.

"(5.) With dangerous walls and heavy ground the broken ore acts as a filling, and is the best kind of support, obviating the use of timber, etc.

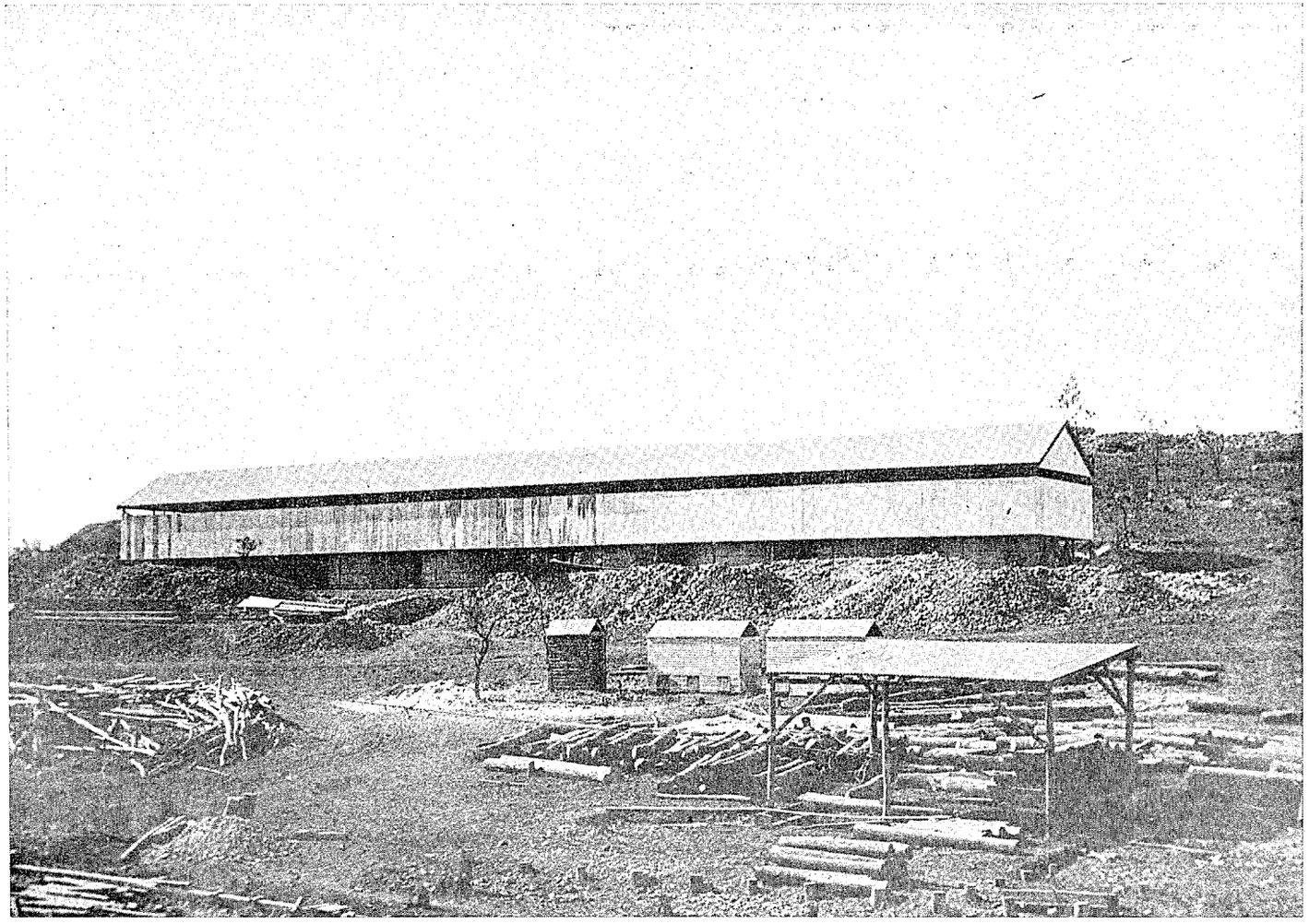
"(6.) Another advantage is that only one connection is necessary between one level and the other for the carrying on of stoping. All other connections are stoped and carried up from the lower level to the level above, on either one or both ends of the stope.

"(7.) Should a "horse" of mullock be met with in the stope, the necessary quantity of ore can be drawn off, and a "stull" put in, and "stilling" run up on each of the "stull" and the mullock used for filling. This "horse" in no way nullifies the beneficial effects of the excellent system of working, which must be seen to be appreciated.

"Moreover, if the horse of mullock is a large one, it can be left solid, and the ore worked out all around."

Phillips River Goldfield.

In this district the manager of the State Sampling Works also acts as Inspector of Mines. He reports that his duties commenced on June 1st, 1903, and that no accidents have occurred beyond the slight burning of two men owing to an explosion of some molten metal while lining a bearing on a battery engine. The work on the whole has been satisfactory, and miners seem fully alive to the importance of making their workings secure.



THE FIRST CYANIDE PLANT ERECTED IN KALGOORLIE. LAKE VIEW CONSOLS G.M.
(*East Coolgardie G.F.*)

Some progress has been made in the development of the copper mines, but necessarily slow on account of the absence of capital. There is still, however, a great inclination to sink unnecessary surface shafts instead of pushing out lateral drives. Thirty-one mines have sent ore of payable value to the State Sampling works. The deepest of these mines is the Elverdton, which is down to 140 feet deep, and no machinery for winding except whip and windlass is used on any of them. They have sent 3,095 tons of ore to the Sampling Works, and there are another 3,000 tons in sight in them.

The gold mines are looking fairly well, and offer good promise for the next year. A 5-stamp battery has been erected at the Plantagenet mine, and the lode in the bottom level of the Maori Queen is looking better than for some time past.

Collie Coalfield and Donnybrook Goldfield.

Inspector T. D. Briggs reports as follows:—

"*Collie Coalfield.*—The output of coal for the year was 133,253 tons, being a decrease of several thousand tons on the previous year. The decrease in the output can be accounted for, to some extent, by the stoppage of the Proprietary Colliery for the period of three weeks in the month of May, owing to a labour dispute.

"Of the total output the Government Railway Department purchased about 77 per cent.

"During the year one fatal accident occurred, resulting in the death of one person.

"Of the non-fatal accidents there were seven which appear to come within the meaning of "serious accident," and which caused serious personal injury to seven persons.

"In addition there were 65 accidents reported for the purposes of the Accident Relief Fund. Of these 34 caused the disablement of the same number of persons for a period of a fortnight or over. The remaining 31 were minor accidents, causing the disablement of 31 persons for a period of less than a fortnight.

"There was considerable delay in the establishment of special rules under the Act, but they are now in force at the Proprietary, Cardiff, Boulder, and Moira Collieries.

"The following are particulars of prosecutions under the Coal Mines Regulation Act, 1902:—

Name of Mine.	Description of Offender.	Contravention.	Result of Trial.	Penalty.	Costs.
				£ s. d.	s. d.
Collie-Boulder ...	Owner ...	Failure to transmit Special Rules	Not proceeded with		
Collie-Proprietary ...	Miner ...	General Rule 12—Keeping explosives in excess	Conviction ...	1 0 0	3 9
Do. ...	do. ...	General Rule 12—Keeping explosives in excess	do. ...	1 0 0	3 9
Do. ...	Engine-driver	Section 36—Taking charge of machinery without certificate	do. ...	0 10 0	4 6
Do. ...	Manager ...	Section 36—Allowing person to take charge of machinery without certificate	do. ...	2 0 0	4 6
Collie-Boulder ...	do. ...	General Rule 26—Not providing manholes in underground plane	do. ...	5 0 0	9 6
Do. ...	Owner ...	Section 53—Failure to transmit Special Rules	do. ...	2 0 0	5 0
Do. ...	do. ...	Section 72—Preventing examination of books by Trustees of Accident Fund	do. ...	1 0 0	12 6
Do. ...	Manager ...	Section 59—Not enforcing observance of General Rules	Dismissed for want of corroborative evidence. This case had to be adjourned owing to a Bench not being available, and when it was heard one of the principal witnesses who had to give corroborative evidence had left the district.		

"During the year trials were made at two collieries with coal-cutting machines, but so far they have not come into regular use.

"*Donnybrook Goldfield.*—In the early part of the year about 100 men were employed on this field, all of whom were employed by the Donnybrook Goldfields Company. Owing to the operations not turning out remunerative, work during the latter part of the year has been restricted to boring operations.

"No accidents occurred on this field, and there were no prosecutions for contravention of the Mines Regulation Act, 1895."

Mining Accidents.

The mining accidents for the year ended 31st December, 1903, are tabulated in Tables 21, 22, and 23, attached to the Annual Report of the department by the Secretary for Mines, in comparison with the figures for the preceding year (*see* pages 22-3). Table 21 shows 43 persons killed in 1903 as against

39 in 1902, and 179 persons injured as against 132, being an increase of four fatal and 47 non-fatal cases. The table also shows the number of accidents which occurred in each goldfield or mining district, as the case might be. The great apparent increase in the number of non-fatal accidents is largely due to the more exact system that has been adopted during the year of recording these. Under the Mines Regulation Act, 1895, all accidents which are "attended with serious injury to any person" have to be reported to the Inspector of Mines, but no definition is given of what injuries are to be considered "serious." It has been decided not to record accidents as being "attended with serious injury" unless the injuries are such as to disable the person for a period of at least two weeks from following his ordinary employment, thus keeping in line with "The Workers' Compensation Act, 1902." A large number of accidents of essentially trivial nature are found to incapacitate men for more than a fortnight, and these are now recorded where formerly they were not.

Under "The Coal Mines Regulation Act, 1902," Sec. 47, the manager must report to the Inspector "any serious accident in or upon any mine attended with or without serious injury to any person"; but in recording the accidents it has been thought best to follow the same practice as in the case of the metalliferous mines, and not to record such as do not incapacitate the worker for more than two weeks. There is much difference of opinion as to whether trivial accidents should be reported to the Inspector, it being urged with much force that a trivial injury often results from a cause that might just as well have brought about a very serious or fatal accident, but it has generally been considered to be the best practice to confine the *records* of accidents—apart altogether from any question of Inspector's inquiries—to such as have actually had serious results to persons. This follows the same reasoning which induces statisticians to take into account, as a rule, fatal accidents only, in estimating the relative amount of danger of the miner's occupation in different countries, discarding the records of non-fatal accidents on account of the want of uniformity in the methods of arriving at them.

Table 23 above referred to gives the number of persons killed in coal, gold, and other mines during 1902 and 1903, with the death rate per 1,000 persons employed, and Table 24 shows the various districts in which the accidents occurred. From Table 23 it is seen that the death rate from accidents per 1,000 men employed was ·83 for persons employed above ground, which is lower than the rate, 1·03, for 1902, and 3·77 for underground workers, which is higher than the figure, 3·06, obtained in 1902. On the whole, the rate is slightly higher in 1903 than in 1902, being 2·36, as against 2·10.

Seven (7) of the fatal accidents were caused by explosions, five (5) underground and two (2) on surface. One of the underground accidents was due to boring into a missed hole, another to recharging a blown-out hole while it was still very hot, and a third occurred while charging a hole, but no one knows what was done to cause the explosion. The remaining two deaths underground from explosions were due to a very unfortunate accident in the Queensland Menzies Mine, whereby two men who were sinking the main shaft could not be drawn up to the level above them through the supply of air to the air-winch used for raising them having been cut off at surface. The braceman had forgotten to signal to surface that the men were about to fire. They were raised about 20 feet before the air failed, and signalled to be lowered again, when they tried to pull out the fuses, but before they could do so the charges exploded and both men were killed. The fatal accidents from explosives on surface were due, one to a flying stone from a blast in an open-cut working striking a man on the head as he lay asleep in his tent, and the other to ignition of a bag of blasting powder that was being very carelessly handled.

As usual, falls of rock were responsible for a large number of accidents, 13 men being killed by these, 12 under ground and one in an open cut, during the year. Nearly all occurred to men engaged stoping.

Nine (9) men were killed in shafts, one by the falling of some old stopes from the side of the shaft breaking away and smothering a man, three while taking timber out of old shafts, two by being struck at plats by moving cages and tanks, one by falling down an old shaft near his camp, one by falling down a shaft owing to breakage of a ladder, and one by falling down a shaft owing to a breakage of a rope.

Nine men also lost their lives underground through miscellaneous accidents, three by falling down winzes and mullock passes, four by being smothered by runs of dirt in stopes and mullock passes, and two by being suffocated by gases suddenly let free from a large body of water that had been standing stagnant in a winze up to which they were rising. A shot broke through from the rise to the winze unexpectedly, and a great volume of bad gas was at once liberated and killed the men.

On surface, five men lost their lives from accidents of a miscellaneaus description, two by being caught by moving belts, another by being crushed by the fly-wheel of an engine, a fourth by falling over an elevated tramway with a truck, and the last by a grinding pan being overturned upon him owing to an accident with the driving belt.

The accidents which were recorded as attended with serious injury to persons but did not result fatally have been grouped as follows:—

(*a.*) Due to explosives	20	men injured
(*b.*) Due to falls of ground	35	,, ,,
(*c.*) Occurring in shafts	25	,, ,,
(*d.*) From miscellaneous causes underground	46	,, ,,
(*e.*) Occurring on surface	53	,, ,,
Total	179	men injured

There were also 75 accidents, involving 78 men, reported to the Inspectors of Mines which proved not serious enough to prevent the injured men from resuming work within a fortnight, 43 of the men being hurt in gold mines, one in a tin mine, and 34 in coal mines. These have been grouped thus:—

(*a.*) Due to explosives	6	men injured
(*b.*) Due to falls of ground	3	„ „
(*c.*) Occurring in shafts	3	„ „
(*d.*) From miscellaneous causes underground	44	„ „
(*e.*) Occurring on surface	22	„ „
Total	78	men injured

Careful inquiries have been made by the Inspectors of Mines into all cases of accidents to men, and while there have been a good many instances where a great deal of carelessness has been displayed, it is satisfactory to note that the majority were due to occurrences which could not reasonably be foreseen and guarded against, and which must be regarded as dangers incidental to the miner's calling.

The fatal and serious accidents are shown in tabulated form in Table XXIII. of the Statistics appended to the Annual Report of the Secretary for Mines.

Sunday Labour in Mines.

"The Sunday Labour in Mines Act, 1899," has been carefully attended to by the Inspectors of Mines so far as the powers given them enable them to go, but they are not specially authorised to initiate and conduct prosecutions for breaches of this Act, and a Departmental ruling by the late Minister for Mines, Mr. Lefroy, threw this duty upon the police. It would be much preferable to have this work entrusted to the Inspectors of Mines, and the Act would be the better of amendment to make this clear. I would also recommend that Section 5 of this Act be amended to enable the Inspectors to allow shaft sinking in wet ground to be carried on continuously when, in their opinion, such continuous work is advisable in the interests of all concerned, both employers and employed. At present such work can hardly be said to be "necessary to avoid the risk of injury to a mine or its operations," which must be the case before permission can be granted for employment of men on Sunday, unless the word "injury" is held to include financial loss. But if this construction is allowed to be put upon it all sorts of claims would be made for Sunday work, on the ground that stoppage of work on that day involved financial loss to the mine owner, and the Act would become a dead letter. Such an interpretation of the word "injury" is clearly opposed to the whole spirit of the Act.

Signalling in Mines.

There has been much discussion during the year on the subject of the best method of signalling in mines, and especially as to the practicability of return signals. The subject is receiving close consideration from the managers of the larger mines, and several systems are under trial. Since the close of the year a conference has been held on the subject at Kalgoorlie, between the Inspectors of Mines and representatives of the Chamber of Mines, the Mining Managers' Association, the Engine-drivers' Association, the Amalgamated Miners' Association, and the Amalgamated Workers' Association, at which the amended code suggested by the Chamber of Mines and Mining Managers' Association was approved, and further consideration of the question of return signals was deferred pending inquiries as to systems in use in other parts of the world.

Safety Catches for Underlay Shafts.

Extended inquiries in the other States of Australasia, South Africa, the United States, and Europe having failed to find any thoroughly satisfactory appliance suitable for use as a safety-catch on skips and man trucks used in the inclined and underlay shafts so common in this State, His Excellency the Governor in Council was pleased to amend General Rule No. 30 of Section 23 of "The Mines Regulation Act, 1895," and Section II. of "The Mines Regulation Act Amendment Act, 1899," by allowing such skips to be used without safety catches when, in the opinion of the Inspector of Mines, it is not reasonably practicable to apply the same; but in all such cases special precautions are prescribed as to testing the ropes, chains, and other appliances used. Though this matter is for the present in abeyance, it is one which should not be overlooked, and in which there is an excellent opportunity for inventors to exercise their ingenuity. As soon as a practical safety cage or skip has been proved thoroughly successful, its use should be insisted on in all underlay shafts.

Filling Abandoned Shafts.

The question of whose duty it is to fill up and make safe the numerous abandoned shafts all over the Goldfields has from time to time excited much attention. There have been several accidents in these shafts in recent years, and the danger due to them is easily appreciated by anyone acquainted with the fields. Owners of mines are required by the Mines Regulation Act to fill up or securely cover all such shafts when they abandon them; but in many cases, especially prospecting shafts and alluvial diggings, this is quite neglected. In many other cases the shafts are securely covered, but the coverings are removed by thoughtless and unprincipled persons who want the timber for some purpose of their own, and give no attention to the public danger created by their action. Even public bodies, who should know better, have been known to remove the dumps round old shafts for road-making purposes, leaving them quite unprotected. In some places the danger to life on account of unprotected shafts is very great, but there appears to be no recognised authority whose business it is to see that they are at once made secure. It seems to me that stringent measures should be taken to ensure that shafts are protected before being abandoned, and that the coverings and fences are not interfered with; but, besides this, the responsibility of filling up shafts which have become dangerous, and which now belong to no one, should be clearly laid either upon the shoulders of local bodies or undertaken by the general Government.

The Coal Mines Regulation Act, 1902.

SPECIAL RULES.

After a great deal of discussion between the Inspector of Mines, the managers of the mines at Collie, the representatives of the labour organisations at Collie, and the Department, a set of Special Rules under Sections 52 to 60 of the Act has been agreed to, and adopted by all the mines working at Collie.

EXAMINATIONS FOR MINE MANAGERS' CERTIFICATES.

Meetings of the Board of Examiners for Colliery Managers' and Under Managers' Certificates, were held during 1903, on March 5 and April 22, and on October 23 and 24. A written examination, extending over three days, arranged by the Board, was held in October at Collie, under the supervision of the Inspector of Mines, at which two candidates sat, but both failed, one altogether and one partially. Altogether, ten applications for Certificates were dealt with by the Board during the year, and five were granted, namely :—

Certificate of Competency (without examination)	1
Certificate of Competency (after examination)	0
1st Class Service Certificates	2
2nd Class Service Certificates	2

The examination papers used at the October Examination are appended to this report. (Appendix III).

There has been no change in the *personnel* of the Board of Examiners during the year, but it was found necessary to appoint Mr. E. S. Simpson (Acting Government Geologist) a member temporarily for the October meeting, owing to the unavoidable absence of the Government Geologist (Mr. A. Gibb Maitland).

NOTES ON FIELDS VISITED.

During the course of the year I made short visits to several of the principal goldfields, mainly to become acquainted in a general way with the position of the Mining Industry in them and conversant with their requirements, so as to be able to advise intelligently upon questions coming before the Department in which they were concerned. In some cases, where special matters relating to particular mines had been referred to me to look into, closer examinations were made of the mines; but, as a rule, all that time would permit was a rapid and cursory glance over some of the main workings, and obtaining information from people on the spot as to what had been done. Obviously on such a flying inspection it is impossible to arrive at any really reliable opinion as to the value and prospects of the mines, no precise information being obtained at first hand as to extent of chutes of ore and assay values of stone in sight, and consequently any report on them can only give the general impressions received, and cannot be expected to go into minute details of work done in each mine, or to speak with any authority upon the value of the properties from a commercial point of view. Nevertheless, one is enabled thereby to form fairly definite conclusions as to the value of the mining districts as a whole, having in view the work already done in them, and the records of gold produced, and as to what are the possibilities of improving the conditions under which work is carried on, so as to bring about a greater development of the industry.

The following notes upon the various fields visited are of a general character, and the views expressed would perhaps be much modified in many cases after more minute investigation; but they are presented for what they may be worth, bearing in mind the above explanation.

Southern Cross.

A very hurried visit to this field was made on 9th February, in connection with the request for the erection of a State battery. The country round Southern Cross is mostly greenstone and greenstone schist, much seamed with very numerous quartz reefs and veins, many of which have been proved auriferous by actual crushings. The reefs are mostly whitish quartz, carrying a little pyrites; but there are also some reefs of black jaspery quartz, in one of which gold was stated to have been obtained. The district has all the appearance of a highly mineralised patch of country, very similar in structure to the Coolgardie and Norseman fields.

In a flat gully running down to Lake Polaris from near Fraser's mine there has been a large amount of dryblowing done, and at the time of my visit it was proposed to try to sluice this ground with water pumped up from from the lake. The proposition seemed a feasible one, and assistance was a little later given to Mr. H. M. Dickson, who had brought forward the scheme, to enable him to thoroughly test the ground. Particulars of this are given later on in describing the various attempts that have been made to work old dry-blown areas by sluicing.

A short visit was made to Messrs. Lang and Hatt's new find, a small reef running about parallel with Fraser's line of reef. The stone being raised was of very good quality, showing gold freely. The Homeward Bound (or Golden Pig), Golden Pig North, Eureka and Eureka South mines were also glanced at, but at that time work was at a standstill. In these properties there are large reefs which have had a good deal of work done on them, and from which a considerable quantity of stone has been crushed, but the returns have been rather too low for profitable working under the conditions then existing. Whether they can now be made to pay is a question only to be settled by actual trial, but many of the local people who know them best expressed themselves satisfied that they could be worked to give the owners a fair living if there was a State battery available. The Comet and Transvaal mines are somewhat similar propositions to the above, from which also considerable quantities of ore have been crushed. The Lord Roberts mine is on a somewhat flatly underlaying reef of fair size, but which has been opened only to a very shallow depth. According to the returns obtained from the crushings taken out, it appears to be of considerable promise and worth serious attention. The Greenmount reef is a fine

strong body of quartz, in which gold could be seen pretty freely, and has been opened up above water level for a very considerable distance. The reef is very well defined, and seemed to me to be a very promising proposition. According to the values stated to have been obtained in trial tests it should be a payable mine.

A short visit was made to Fraser's, the main mine of Southern Cross, which is well opened up, and equipped with winding machinery, electrical pumping plant, and a fair battery and cyanide plant. The reef in the lower levels is a strong, good-looking body of quartz, and, though of low grade, appears to have a chance of being worked with some profit if a little more development work were done. With the expenditure of a considerable amount of capital in getting development work put well ahead of the stoping, and in improving the machinery for handling and crushing the ore, there seemed to me, according to the information received on the mine, a very good prospect that this mine would become a very steady producer of gold, with a fair likelihood of paying dividends. At the time of my visit a fine new cyanide plant had been erected to treat the accumulated tailings from the batteries, with a slimes plant arranged to treat the slimes by the decantation process; but owing to trouble with the centrifugal pumps used to elevate the tailings, it was not then at work. The operation of this Decantation Treatment Slimes Plant is worthy of attention from metallurgists throughout the fields, as it is by no means certainly established that this method is not superior to filter press treatment in many important respects.

According to a statement submitted by the management of the Fraser's mine, there were crushed for the public at Fraser's South Mill from the beginning of June, 1899, to the end of January, 1903, 4,025½ tons of ore from 10 mines, for a total return of gold by amalgamation of 1,314ozs. 11dwts. 6grs., or at the rate of 6dwts. 12·7grs. per ton. The tailings were not assayed at first, but since December, 1901, 3,430 tons of ore treated gave tailings of average assay 4dwt. per ton. It would seem, therefore, that 10dwt. to the ton is about the average assay value of stone in these prospecting mines, and from the statements of residents in the district, and my own observation of the method by which the reefs had been worked, I came to the conclusion that a great deal more of the same class of ore is readily obtainable, and that the mines were abandoned not so much through having worked out the chutes of ore readily accessible, as because the average value was not payable under the conditions of working. With improvement of the conditions, there is every probability that payable results can be obtained, so, though the field is on the whole a low-grade one, so far as yet known, there is much likelihood of steady progress being made. There are a very large number of reefs in the district in which a little gold has been got, which are practically untried, and there is every reason to think that resolute prospecting will develope many new productive mines.

A State ten-head battery and cyanide plant have been erected at Southern Cross, in consequence of the very urgent representations from the local people that such was necessary in order to enable the prospectors to have their ore treated. The results of the present year's working will afford an excellent index as to the probability of the low-grade ores being made to pay.

A geological map of the Southern Cross field, showing general topography and the position and trend of the various reefs, besides defining the areas occupied by the different country rocks, would be of very great service both to the prospectors and investors.

Norseman.

This field was visited in the middle of February, six days being spent there, which was only sufficient time to enable very short visits to be made to the principal points of interest. The field is an extensive one, the distance between the extreme points visited by me—the Princess Royal group of mines to the North, and the Break-o'-Day group to the South of the town of Norseman—being about 13 miles. Further North there are reefs on which some work has been done, at the "Four Jolly Smiths" group of leases, about three and a-half miles, and again at the "Peninsula" group, about 12 miles North of Princess Royal, and going South from the "Break-o'-Day" leases have been taken up for about eight miles down to the townsite of Dundas. From Dundas, at the one end of the field, to the Peninsula, at the other, is about 32 miles. There are several distinguishable groups of lodes in the field, the most extensive being that lying East of the town of Norseman (Norseman group).

The country is somewhat hilly in the neighbourhood of Norseman, but roads with good grades are obtainable to almost any part of it, the hills not being so steep and broken as to make it at all difficult ground to traverse. Several of the hills rise to a height of over 400 feet above Lake Cowan, which is itself stated to be about 800 feet above sea level. The prevailing country rock is greenstone, sometimes schistose, sometimes massive, of the type prevailing throughout the Eastern goldfield, a very variable rock, sometimes best called an amphibolite, but often passing into diorite and diabase. Some of the massive portions seemed to me as if they might be intruded through the schistose parts; for example, the dense crystalline rock seen immediately North of the No. 1 North Norseman workings, which appears to cut off the Norseman line of reef, but the relations are not at all clear.

Numerous thin dykes of quartz porphyry, and felsite cut through the greenstone in various parts of the field, and may possibly stand in close relation to the auriferous reefs, but in what way they affect the latter I was not able to make out in the course of such a flying trip over the mines. It is noteworthy that similar dykes appear in several of our goldfields; for example, Phillips River, Siberia, Kalgoorlie, Kanowna, Mulwarrie, and Black Range pointing to a period of acid eruptive activity subsequent to the formation of the greenstone. The relations of these dykes throughout the country to the auriferous reefs are a question requiring close study.

There is another intrusive rock of later origin than the greenstones, forming a huge dyke running for miles across the district in an East and West direction, which is well seen at Trig. Hill, between Norseman and Princess Royal. This rock has been variously named and requires scientific determination of its rock species.

The schistose greenstones in the superficial, weathered, portions of the country, have much the appearance of ordinary aluminous schists, but in depth they pass into hard dark greenish rock in which the fissile structure is not always easily distinguishable. The lamination, so far as I observed it, has approximately a North and South strike, and a somewhat flat dip to the East, corresponding with the strike and dip of the quartz reefs of the Norseman group. These lie mostly on the West slope of the range of hills immediately east of the town of Norseman. Crossing the range, however, we come upon a belt of laminated quartzites and jaspers, containing veins and reefs of quartz conformably bedded with them, which also have an approximately North and South strike, but dip to the West, that is towards the reefs on the other side of the range. On account of this feature, it has been proposed locally to bore a line of holes with a diamond drill right across the hill to determine if the lodes by any chance form a syncline, or junction in depth, and in the latter case which branch continues downwards as the main lode. The question is an important one for the field, as the intersection of the two sets of holes seems likely to take place well within the limits of depth to which they may be followed, and a great deal might depend upon the effect of the intersection, or junction as the case might be. The relative age of the two sets of veins seems to be the principal point to be determined, for if they are of the same age, there is hope that they will junction in depth, but if they are of different times of formation, the probability is that one set will cut through and most likely fault the other, possibly very strongly.

The belt of quartzites and jaspers is of considerable width, and runs very straight across the country on a course a little East of North, forming the "Ironstone hills." It is very similar to the belt which runs parallel to the lodes at Edjudina, mentioned later on in this report. The quartzites are very distinctly laminated, and vary very much in colour according as they are more or less strongly charged with oxide of iron, passing from jaspers to silicious hematites. They are often much fractured, and traversed by numerous veins of white quartz and brown oxide of iron, there being so much of the latter constituent in some parts of the outcrop as to make it quite fairly termable a silicious "gossan." The main veins of quartz seem usually to be parallel to the laminations of the quartzite, but the smaller ones are very irregular, and run in all directions through it. The quartz and brown oxide of iron carry some gold, and a good deal of work has been done in consequence, some of it with rather hopeful results. At first sight the impression is that the quartzites and jaspers are a belt of metamorphic rocks of originally sedimentary origin, and it may be that this is correct; but after examination of the very similar occurrences of jasper reefs at Boorara, Kalgoorlie, Edjudina, Erlistoun, and Black Range, I am of opinion that they are much more probably altered portions of the greenstone country in which laminated structure has been produced by intense pressure and shearing stress along a line or zone of faulting movement, and that the change of the rock to quartzite and jasper has been effected by hydrothermal and pneumatolytic action (*i.e.*, by the action of intensely heated aqueous vapour) removing soluble constituents from the rocks, and charging them highly in return with silica and oxide of iron. Whichever explanation is correct, whether the rock is a metamorphic sedimentary, or greenstone country rendered lamellar along a shear zone and which has suffered great metasomatic changes, it is clear that this zone has been subject to strong movement subsequently, causing fracture along the old line of weakness, and has been strongly charged with silica, oxide of iron, and pyrites, so as to make it now partake largely of the character of a lode.

The lines of strike of the Norseman group of lodes and of the quartzites appear to come together going southward, the latter having a course a little more to the East of North than the former. It seemed to me probable that a close study of the relations of the two sets of lodes could be made in the vicinity of the Lady Mary mine, where both are seen in very close proximity, and that information could probably be so obtained that would make boring as above mentioned unnecessary.

The geological survey of the field now in progress will doubtless throw a great deal of light on these questions, and will bring together data that are at present wanting to enable conclusions to be arrived at. A scientific investigation is very desirable, on account of the light it would throw upon purely mining and economic problems, and is thoroughly justified from the point of view of its bearing upon the future development of the national estate. The mapping of the positions of the various lines of reef, of the dykes of felsite and porphyry, and the quartzites, and the determination of their mutual relations, will be of very great service indeed in opening up the field in the most intelligent manner.

Another very interesting feature of the district upon which much light may be expected to be thrown by the geological survey is presented by the "Deep Leads" which are found in more places than one in the district. A considerable amount of gold has been obtained from one passing through the town of Princess Royal, and which may yet be traced into Lake Cowan. Another was being worked at the time of my visit in a gully running down from the Lady Mary Mine towards Lake Dundas. In this several shafts had been sunk to depths of from 70 to 90 feet, and undoubted alluvial material was obtained, containing well waterworn stones, though mostly of a clayey character, and yielding encouraging prospects of gold. One fairly large nugget that had been obtained was shown to me, and was remarkably free from any sign of attrition by being transported by running water, showing several sharp crystalline points. A lot of the fine gold was also crystalline, and deposited on the faces of small crevices in clayey material and along minute rootlets of trees which had penetrated down from the surface. The occurrence was quite similar to that of the gold in the well-known "pug" at Kanowna, to which some of the more clayey material bears a very strong resemblance. Some of the gold, however, was of the ordindary "waterworn" alluvial character. It seems probable that the lead was formed in the usual way by running water at a period when the climate of the district was quite different from that now prevailing, and that alluvial gold was deposited in the ordinary way, but that, during the long period that has elapsed since the leads were formed, there has been a great deal of redistribution of the gold by its being dissolved and reprecipitated, probably over and over again, as a result of the varying chemical reactions from time to time occurring in the permeable alluvial material, which has doubtless continued to be a channel for the superficial drainage of the district.

It is probable that at present it will not be possible to map the deep leads of this field at all closely, as they disappear under wide alluvial flats along the margins of the lakes, where they could only

be traced by boring or actual mining. So far as yet worked they have not been very profitable, mainly on account of the cost of recovering the gold from the dirt brought to the surface. This has usually to be carted a considerable distance, and then treated in an ordinary battery, and only material of high value will give a remunerative return. The stuff really requires a combination of puddling and battery treatment, only the headings from the puddlers going through the battery, but want of a good water supply on the spot is severely felt. Considerable outlay is necessary in providing water, puddling and crushing plant, and tramways down the leads, before there is much prospect of being able to handle the alluvial material with profit, and this outfit is quite beyond the means of the prospectors upon whom it generally falls to develop such propositions.

With the exception of those in the quartzite belt, which are largely country rock infiltrated and partly substituted by silica, with ramifying quartz veins, the reefs of this district are composed of fairly clean white quartz, with a small percentage of pyrites. In places however, the greenstone country rock itself has been highly charged with silica, and the values are in dark silicious material similar to that so common in the lodes of Kalgoorlie. The walls of the reefs have usually well-defined, smoothed, and striated surfaces, showing them to have been fissures on which movement of the country took place. They have every appearance of being permanent to any depth to which mining is likely to follow them. The angle of underlay varies very much in the field, some reefs lying rather flat and others fairly steep. The reefs with a considerable amount of underlay seemed to me to be the most plentiful.

The following notes on the mines visited take them more or less in order from the South going Northwards:—

Break-o'-Day.—This reef has yielded some thousands of tons of stone of payable grade, and a good deal of work has been done upon it. The reef is about three feet wide, but gets very small at both North and South ends. It runs North and South, and has a very flat underlay to the East, occasionally lying nearly flat. The main shaft is down below water level, and is about 310 feet in depth, on the underlay. In the bottom of the shaft, which was full of water, the reef is said to be going down strongly, and much steeper than above. There was good gold in the upper levels, but values fell off lower down, and expenses rose at the same time through the country becoming harder. This mine possesses a ten-stamp mill and a cyanide plant, and when I visited it was crushing for the public at 15s. a ton. Work in the mine was practically at a standstill, the available ore having been mostly taken out, and the reef requiring further opening below the water level with better machinery than it now possesses.

Little Wonder.—A little work has been done in this mine on a line of reef lying parallel to the Break-o'-Day, and with a similar flat underlay to the East. There has been fair gold got about the surface.

Lady Mary.—The reef in this mine runs about North and South, with underlay to the East of about three feet in two feet. The main shaft is on the underlay, and was down to 355 feet vertical depth at the time of my visit, and still being sunk. The country is pretty hard, and the stone has been uneven in value. A very considerable amount of stone has been crushed, and there is said to be still in the mine a good deal of low-grade ore that will barely pay expenses of mining and milling. A better chute of ore was stated to be going underfoot in the North end, and the drive from the bottom of the shaft was expected to open this and provide new and better stoping ground. The mine has had a hard struggle to keep going, but appears to have a fair chance of being successful if it can get some capital for development. There is a fair steam winding equipment, and a 20-head battery and cyanide works. In the latter the tailings and slimes accumulated at the battery were being treated, and good extractions were said to be made by drying the slimes very thoroughly in the sun, breaking the lumps by running a large roller over them by horse power, and feeding the dry powder into the cyanide vats in thin alternate layers with the sands. This was said to have given better results than when the sands and slimes were mixed promiscuously. The thorough sun-drying of the slimes was evidently the key to the successful treatment.

Alickizander.—The quartzite and jasper belt passes through the country to the West of the Lady Mary reef, the outcrop of which is on the contact of the amphibolite country with the jaspers. These then continue to the South, passing about half-a-mile to the West of the Break-o'-Day. A little gold has been got all along them, and sometimes fairly good ore. In the Alickizander Mine, to the North of the Lady Mary, a shaft has been sunk about 90 feet in this "formation," which is running North and South, and underlying rather flatly to the West, and some driving has been done. The "formation" is quite 30 feet wide, and is made up of jasper, quartz, oxide of iron, clayey matter, and brown opal-jasper. Eighty tons crushed at the State battery gave a return of 29ozs. 17dwts. 4grs., or at the rate of 7dwts. 11grs. per ton, and the tailings assayed 4dwts. 20grs. per ton, showing the necessity for cyanide treatment to save the fine gold. I was told that some hundreds of tons had been crushed for a return averaging about 6dwts. to the ton, with tailings of nearly the same value, and that after picking out the best looking white quartz and crushing it by itself, a mill test of the rejected residue gave nearly as good a return as the stuff picked out of it. If this information is correct the mine is well worth attention, for the ore body is a very large one, and very easily broken, and a large tonnage could be cheaply obtained by open-cut workings and a shallow tunnel. This mine is interesting as being one of the few on which a good deal of work has been done on the "Ironstone Hills" line, or quartzite and jasper belt.

Cumberland and Mt. Benson Mines.— The main shaft of the Cumberland mine is down vertically 227 feet, and there are three other shafts down to the 145 feet level. Strike of reef North 50° East, dip North-West 75°. The reef is small and somewhat irregular, but has good well-defined walls, sometimes as much as six feet apart. A feature of this mine is the occurrence of four or five short cross reefs running North-Westerly and dipping South-East about 45°. These run only a short distance into the walls, but have been found very persistent and regular in depth, and the stoping has been greatly upon their intersections with the reef. The output of the mine was given to me by the manager as 2,931 tons of quartz crushed for a return of 3,931ozs. of gold, worth £3 16s. an ounce.

There is another reef lying to the East of this one, which is known as No. 1, but it was not being worked. The Mt. Benson reef is on the same line as the Cumberland, but further to the North, but as it underlays to the South-East it is probably a branch. Time did not permit me to examine these workings. These mines have a 10-head battery and cyanide plant at the side of Lake Cowan, two and a-half miles away.

Kirkpatrick.—This mine lies East of the Cumberland, and has produced some fair stone, but I had not time to visit it.

Bonanza.—In this mine the reef runs East and West, with flattish underlay to the South, and has yielded some good ore, but was not working when I saw it. To the West of the principal workings a small North and South lode was being opened, which seemed to be very much on the line of the Valkyrie reef, and some nice gold was showing in the stone. There was a good deal of quartz porphyry in this vicinity.

The *Ophir* and *Sovereign* are small mines lying North of the Bonanza, and worked to a shallow depth for some six or seven chains in length, on an East and West line of reef underlaying South. Some fair stone is said to have been taken out of them, but no work had been done lately when I saw them.

Valkyrie (formerly St. Agnes).—This was formerly held by an English company, who are stated to have got £2,000 worth of gold from one small pocket of ore in the reef. They crushed with a 10-head battery and oil engine for a return said to have averaged about 16dwt. per ton. In later days the tailings from this battery are stated to have yielded about 5dwt. per ton when cyanided. The reef runs North and South, and dips about 50° to the East, but is sometimes nearly vertical and sometimes almost flat. The main shaft is down 340 feet on the underlay, in hard greenstone country full of pyrites, but in which the reef remains strong and well defined, with slickensided walls. This line of reef lies to the East of the Mildura reef, on which are the main workings of the Norseman Gold Mines, Limited, and may, perhaps, be the same reef that is worked further North in the *St. Agnes Blocks* and *Lady Jean* mines. At the time of my visit the owners of the Valkyrie mine had lately had two highly-payable crushings, and gold was readily visible in their workings. The quartz ran about two feet in thickness on an average.

Norseman Gold Mines, Ltd.— Thirteen leases are comprised in this company's property, which has been worked on an extensive scale, but eventually became too low in grade to be worked with profit. I was informed that expenses were brought down to as low as 24s. 6d. a ton, inclusive of all costs in this State, which is a remarkably good figure for such hard ground, and for a place where all stores and machinery are so expensive as at Norseman. At the time of my visit the company had stopped working, and only parties of tributers were employed underground, so most of the lower levels were full of water, and very little could be seen, except the stoped out ground in the upper levels, and the "dead ends" where work had been stopped. The mines had been very systematically worked, but the values fell off in depth to below the payable point.

On the *Viking* lease, which is furthest South, the shaft is down some 510 feet on the underlay, and the water was standing at about 340 feet. Levels are open at 100, 200, and 300 feet. The country was fairly soft to the 200-feet level, but below that became very hard. The reef runs North and South, with underlay to the East of about one and a-half to one, and has been a strong body of quartz, probably averaging from two to three feet in width throughout, though often four to six feet wide. In the hard country the reef has smooth hard walls, but contains frequent "horses" of wall rock, and small enclosed angular fragments of the same. I was informed that the tributors had raised about 1,000 tons of ore for an average return of 16dwt. per ton in the battery, the tailings assaying four to six dwts. In the lower parts of the tributors' workings I saw some very fair gold, and their returns were stated to be payable for them even in the hard ground. There did not seem to be any reason for the falling-off in the gold value of the lode going downwards, and I am inclined to believe that it will yet be found that the impoverishment is only local, and that good ore chutes are to be found by opening up in depth.

The *Mildura* shaft is the main shaft of these mines, and in it the reef is very similar to where seen in the Viking. There is still a lot of stone in sight, but too poor to be worth taking out. Above the 200 feet level the reef is nearly all stoped out.

In the *Hardy Norseman* tunnel, further North, tributors were starting work, at the time of my visit, on a big reef of rather poor looking stone, which had evidently not been thought fit to send to the mill. They had, however, found a place where the stone was a little richer, and were hopeful of success.

The company have a well-arranged 20-stamp mill with rock breakers, automatic feeders, etc., a ball mill, some grinding pans, and a very nice cyanide plant, together with a good mining outfit of winding plant and rock-drilling machinery. When I was on the mine the manager told me that he had cyanided roundly 50,000 tons of tailings for about 6,000ozs. of gold.

The falling off in the value of the reef in this company's mines in depth has had a very depressing effect on the whole district, as it was the principal producer of gold, and had the most extensive workings. I do not, however, think that the case for renewed trial of it is altogether hopeless, believing that there is a very good chance that the gold will make again at still lower levels. Every effort should be made to continue sinking the main shaft three or four hundred feet deeper, and then to drive again along the lode to test it thoroughly.

Mararoa.—The Mararoa reef is a parallel one to that worked by the Norseman Gold Mines, and lies about quarter of a mile West of it. It strikes North and South, and underlays East at about one in one. The country is schistose greenstone, with laminations parallel to the reef, which nevertheless is a true fissure lode, showing smoothed and striated walls. The main shaft is on the underlay, and 150 feet deep. It was sunk a good many years ago by former owners of the mine, who also did a good deal of development by driving at various levels, but at the time they were operating mining and milling expenses were enormous, and the ore was not good enough to pay. The present owners, Messrs. Crabb and party, had been in possession about four years when I visited the mine, and had been able to make

a living and purchase Bevilaqua's old battery. They had crushed at the State battery 1,923½ tons of ore from the shallow levels for 1,207ozs. 16dwts. 12grs. of gold, or at the rate of 12dwts. 13grs. per ton, and the average of the tailings assays was 7dwts. 14grs. to the ton. A block of about 4,000 tons of what was supposed to be similar ore was open for stoping, and the party seemed in a fair way to be highly successful. They have of course reaped a great advantage from having the mine developed for them by the prior owners, and should make the most of it by putting their profits into machinery, and sinking and opening up fresh ground, so that new blocks will be ready by the time the old ones are stoped out. The reef has been traced South through the *Mararoa South*, and North to the *All Nations* at the State battery. It is strong reef right along, and crushings taken from it at various points have given battery returns of from 7 to 14dwts. to the ton. This reef seems to deserve attention from a company able to equip it with machinery and to develop it extensively.

The battery bought by the Mararoa owners was an old one situated near the edge of Lake Cowan at which a good deal of public crushing had been done by Mr. Bevilaqua. It has been put into going order, and fitted with a small cyanide plant, with which Messrs. Crabb have cyanided the old tailings heap. The lower portion of this was very slimy and wet, and spread out two to three feet deep over a considerable area of ground. The method adopted for working this slimy material was a little like that above mentioned as being employed at the Lady Mary battery, but was even more thoroughly carried out. The tailings were opened by a long cut stretching right across the paddock, and to thoroughly mix the layers of sands and slimes the face was pared down with spades in very thin slices from top to bottom. The men paring followed one another in succession, leaving the pared down material to dry for a few hours, when it was shovelled into carts and taken to a drying ground near the battery, where it was allowed to become thoroughly sundried, and from time to time broken up by trampling with horses. After thorough drying the dusty material was trucked to the vats, and has been found to treat very well, in spite of the large percentage of slime. This method involves a considerable handling and consequent cost of preparation of the stuff for leaching; but it is one that might often be adopted with advantage in small batteries where it does not pay to have a slimes plant.

Lady Jean.—This is another reef also parallel to the Norseman one, but on the Eastern side of the range. The workings are close to the Southern boundary of the lease, and have been continued across it some 200 feet into the *St. Agnes Blocks*. The reef is small, from 3in. to 30in. in thickness, only averaging about one foot, but has been of very good value. It strikes North and South, and underlays about one in one to the East. The shaft is 50 feet deep vertically, and then goes off on the underlay for a further 85 feet. The owners had crushed 870 tons at the State battery for 1,484ozs. 11dwts. 15grs., or at the rate of 1oz. 14dwts. 3grs. per ton, the tailings assaying 4dwts. 12grs. per ton. This has been a very nice little reef for the working party owning it, but it is doubtful if they will be able to continue far into the hard country with so narrow an ore body.

St. Albans West.—Going North-Easterly from the Lady Jean, we pass some abandoned workings in soft whitish country, which may, perhaps, be a decomposed porphyry. The reef runs North and South, but underlays somewhat flatly to the West, being the most Westerly of the group of West-underlaying reefs belonging to the Ironstone Hills zone. The quartz is white, and is stated to have given battery returns of 6 to 7dwts. per ton.

Bandit King, Lord Hopetoun, and *Vale.*—These three prospecting mines are on an outcrop of the laminated quartzites and jaspers of the Ironstone Hills, very like that above described at the Alickizander, which is on the same line. The main veins of quartz lie in the laminations of the quartzite, and the whole group dip West about one in one. There is gold in both the quartz and the brown hematite of this "formation," and several crushings have been taken out, At the time of my visit the Bandit King had crushed at the State battery 204½ tons of quartz for 153ozs. 15dwts. 9grs. of gold, or at the rate of 15dwts. 1gr. per ton, and the tailings assayed 4dwts. 5grs. per ton. The Lord Hopetoun had crushed 186 tons for 113ozs. 17dwts. 2grs., equal to 12dwts. 6grs. per ton, with tailings assaying 1dwt. 14grs.; and the Vale 130 tons for 192ozs. 16dwts. 11grs., or 1oz., 9dwts. 16grs. per ton., with tailings 3dwts. 16grs. per ton. These figures show this jaspery formation is not to be despised as a gold producer. All these mines have done a good deal of work, and one shaft is down 180 feet. The owners, however, have only followed the veins of quartz, while, judging from the Alickizander experience, it is quite possible that there is payable gold in the jaspery "formation" itself, and the whole of the shattered and mineralised zone requires frequent crosscutting and careful assaying.

No. 1 North Norseman.—This mine is on the northern extremity of the Norseman line of reefs, which does not seem to have been got in the next lease to the North, where there is a shaft some 200 feet in depth revealing hard crystalline amphibolite rock, which may cut the reef off. The main shaft has been put down to a depth of about 310 feet on the underlay, which is very flat, being about two in one. Near the surface the reef leans over, forming a saddle, which is, however, probably only the result of a surface movement of the outcrop down hill from the influence of gravity and the swelling of the rock due to weathering. The reef runs about three feet thick, and has given 574½ tons of quartz crushed in the State battery for 362ozs. 9dwt. 13grs. of gold, equal to 12dwt. 16grs. per ton, the tailings assaying 2dwts. 17grs. A large amount of stone left in sight in the mine is said to be worth 6 to 8dwts. per ton in the battery. The reef, as usual, strikes North and South and underlays Eastward. This mine seems to deserve more extensive opening up. As in other cases on the field, the most of the development work was done in the early days of the field, when nothing under about 30dwts. to the ton was any use to the owners.

Scandinavian and Northern Star Mines.—After crossing the amphibolite belt lying across the line of lode to the North of the last-mentioned mine, a reef is found again in the Scandinavian and North Star leases, which may perhaps be the Norseman lode faulted somewhat to the Westward of its original line. The Scandinavian mine was not working at the time of my visit; it had not lately crushed more than a few tons of ore of value about 7dwt. per ton, and there was said to be some copper pyrites in the stone. The Northern Star has a shaft down some 210 feet on the underlay of a lode very like that in

the No. 1 North Norseman, striking North and South, and underlaying about two in one to the East. The stone is from three to six feet wide, between smooth walls, and in the workings of the holders, Messrs. Fox and Cox, gold was showing freely in from three to six inches of the quartz on the footwall side. A large amount of stone is in sight in this mine, and the owners estimated that it would yield in bulk about 8dwts. to the ton. Cartage to the State battery costs two shillings a ton; ore breaking, eight shillings. To the North of the main shaft, there are two more shafts still showing a strong reef. A crushing of 10 tons from old dumps here is said to have given a return of 10dwts. per ton of bullion, valued at £3 per oz., containing a good deal of silver. This property, according to the quantity of stone exposed, and the information given to me as to the values proved by test parcels, should be well worth careful sampling, and further testing by sinking and driving, as it seems such a proposition as could be made to pay well with a battery on the spot.

Sudden Norseman.—This mine lies North of the Northern Star, but was not working. From the outcrops and the amount of stone in the dumps, the reef appears to be a large body of quartz. There is a pretty deep vertical shaft and several underlay shafts. The dumps are said to give 3 to 4dwts. to the ton when crushed. 138 tons crushed at the State Battery have given 57ozs. 13dwts. of gold, or at the rate of 8dwts. 8grs. per ton. This proposition would best be handled in conjunction with the Northern Star.

St. Patrick.—In this lease, which lies West of the Northern Star, there is a cross reef running about East and West, and underlaying about 2 in 1 to the South. The lode is well defined, and up to three feet in width. There is an old shaft down about 200 feet, but Messrs. Vincent and party, the present owners, were working at about 60-feet level when I saw them. The returns have been very payable, 353½ tons yielding 600ozs. 8dwts. 15grs. at the State Battery, equal to 1oz. 13dwts. 23grs. per ton, with tailings assaying 4dwts. 19grs.

Lily.—The workings of the Lily Mine lie to the West of the St. Patrick, but no one had been in them for some time, and the lease was forfeited. I am not clear whether the Lily reef is the St. Patrick one or a parallel line.

Moloney's.—On this, also, no one was at work. A lot of surface work has been done on four reefs, some of them running North and South and others East and West; and there is a main shaft said to be 128 feet deep. A lot of stone has been raised, but it is regarded as a little too low grade to be worth sending to the battery.

Kyneton.—North of Moloney's workings there is some little amount of surface work done on a mine known by this name, from which some fair ore is said to have been got. No work was in progress.

Desirable.—This is another of the old mines which were opened up a good many years ago, and which has now fallen into the hands of local working parties. The old owners are reported to have crushed some 4,000 tons of ore for about 4,000ozs. of gold, but I have not been able to verify this. The reef is very crooked, its strike being in one part East and West and in another North and South, and the dip, which is very flat, is in consequence anything from South to East in different places. The average width of the stone is about two feet, and the present owners say that the most of what is in sight will yield about 10dwts. to the ton. There is a little water in the bottom of the mine, and the owners are working just above it, and have a large amount of stone in sight. If their valuation of the quartz is anything like correct, this is a very promising property, and would be worth putting a battery upon.

Another shaft, known as No. 1, appears to be on a different line of reef from the main shaft, but may be the same faulted or bent over. The stone in this is stated to be of somewhat better quality than in the other part of the workings.

To the South of this mine some work was in progress on the *Desirable Proprietary* on a cross reef stated to contain some fair stone. To the North, also, there is some work done on the Desirable reef in the *Missfire* mine, with a fair prospect of gold.

Three Colonies.—This old mine was situated very close to Lake Cowan, and the workings are under water. The present owners were getting good gold from a small block of ground left near surface above the water-level. The mine was formerly equipped with a very fine lot of machinery for winding and crushing, and pumping, but most of it has been removed. The old main shaft was some considerable depth, but I obtained no particulars. There appear to be a considerable number of gold-bearing reefs in the vicinity of the Desirable and Three Colonies mines, but at present very little can be done with them, cartage to the State battery at Norseman costing 11s. a ton. These mines are not far from Princess Royal, but there is no public crushing plant there available.

Princess Royal.—This fine mine is so well known that it is not advisable to attempt description of it, unless one is prepared to do so fully, which my very short visit does not justify me in attempting. The mine is provided with a full outfit of necessary machinery, and is a regular and successful gold-producer. In the stopes in the bottom level the reef was eight to 10 feet wide, of good ore when I saw the mine, and looked very well indeed. The development was a little behind-hand, however, and required to be vigorously pushed ahead.

I was not able to get time to look through either the Princess Royal North or the Princess Royal South mines, so can express no opinion on their much-discussed chances of getting the Princess Royal ore chute in depth.

Besides the abovementioned mines there are a great many others in the Norseman district on which a good deal of work has been done, and more or less gold has been obtained. The official statistics for the Dundas Goldfield show the returns of which there is any record, with the names and numbers of the leases from which they have been obtained; but many of the older ones are now combined under the title of "voided leases."

The following figures, supplied by the manager of the State Battery at Norseman from his books, give the returns from crushings from 1st December, 1898, to 16th February, 1903, with the assay value

of the tailings sands, so far as these had been assayed. The slimes had not been assayed separately, but were reported by him to give an average of about 7dwts. per ton :—

Return of Stone crushed at State Battery, Norseman, from 1st December, 1898, to 16th February, 1903.

Name of Mines.	Number of tons crushed.	Yield.			Average.			Assay value of sands.	
		ozs.	dwts.	grs.	ozs.	dwts.	grs.	dwts.	grs.
Mararoa Syndicate	1,923½	1,207	16	12	0	12	13	7	14
Mt. Barker North	55⅕	5	17	0	0	2	3	1	12
St. Patrick	353¼	600	8	15	1	13	23	4	19
Mt. Benson North	15½	8	4	16	0	10	15	2	9
Virginia	8	3	18	21	0	9	17	No record.	
Record	23	32	13	10	0	18	10	3	3
Norseman Reward	349½	222	14	21	0	12	11	1	13
Bon Accord	⅕	7	9	12	74	10	20	No record.	
Tiara, Q.C.	6	5	0	8	0	16	17	No record.	
Oriental	9½	3	6	0	0	6	18	5	4
Block 14 Proprietary	16	19	9	0	1	4	3	No record.	
Morning Star	693½	578	19	13	0	16	17	3	3
St. Agnes Blocks	57	24	12	0	0	8	15	3	22
Lady Jean Syndicate	870	1,484	11	15	1	14	3	4	12
New Find	5	0	7	0	0	1	9	No record.	
Q. Claim No. 38	13	7	15	0	0	11	22	No record.	
Eden Park	64	58	17	0	0	18	9	2	0
Scandinavian	34	11	12	6	0	6	20	2	4
Q. Claim No. 39	6	1	6	0	0	4	8	No record.	
G. G. Q. Claim	10	5	15	0	0	11	12	No record.	
Kyneton	6	1	9	0	0	4	20	No record.	
Welcome	54	43	14	0	0	16	4	No record.	
Q. Claims Nos. 40 and 41	10	2	0	0	0	4	0	No record.	
Sudden Norseman	138	57	13	0	0	8	8	1	19
Lease No. 712	38	14	5	0	0	7	12	No record.	
Q. Claim No. 27	17	8	12	0	0	10	3	No record.	
Canton	12	5	5	20	0	8	20	3	22
Three Kingdoms	10	2	11	0	0	5	2	No record.	
Valkyrie (late St. Agnes)	257	405	8	14	1	11	13	4	5
New Chum	6	1	14	0	0	5	15	1	22
Belmont	24½	120	16	0	4	18	19	8	11
Trump Card	24	16	16	0	14	0	0	1	17
Sovereign	138	140	4	0	1	0	7	4	14
Priscilla	333	183	14	17	0	11	1	2	17
Midas	69	38	18	15	0	11	7	5	20
Alickizander	80	29	17	4	0	7	11	4	20
Royal Dane	120	62	16	15	0	10	11	2	14
Viking	878	732	5	22	0	16	16	4	3
Day Dawn North	7	8	16	0	1	5	3	3	6
Union	52	44	9	12	0	17	2	6	12
All Nations	153	58	5	20	0	7	15	2	20
Moloney	116	141	17	11	1	4	11	3	22
Narracoorte	23	6	13	0	0	5	18	2	17
Bangowangie	5	3	14	6	0	14	20	1	15
Kirkpatrick	173	210	7	12	1	4	8	4	14
Federation	98	176	12	8	1	16	1	7	20
Lord Hopetoun	186	113	17	2	0	12	6	1	14
Lily	61	26	4	18	0	8	14	2	9
Royal Lead Alluvial	580¼	501	17	3	0	17	7	3	9
Comet	40	30	5	8	0	15	3	3	6
No. 1 North Norseman	574½	362	9	13	0	12	16	2	17
Erl King	4	2	0	0	0	10	0	3	22
Desirable	166	115	6	14	0	13	21	1	0
Wheel	28	16	8	23	0	11	18	1	12
Long and Short	7	3	11	0	0	10	3	1	0
Buldania	65	95	3	13	1	9	7	7	7
Valkyrie South	13	6	4	8	0	9	13	0	12
Vale	130	192	16	11	1	9	16	3	16
Happy-go-Lucky	6½	9	14	10	1	10	0	No record.	
Bandit King	204½	153	15	9	0	15	1	4	5
Bonanza	15	4	10	20	0	6	13	1	13
Horseshoe	41	17	14	10	0	8	15	3	3
Bulletin	14	6	2	18	0	8	18	2	5
Primrose	37	14	8	0	0	7	19	1	0
Ophir	8	10	9	0	1	6	3	8	19
Cachuca	56	28	0	0	0	10	0	2	8
Wheel North	5	1	7	14	0	5	12	0	12
Hardy Norseman	314	280	14	13	0	17	21	4	21
Mildura	266½	112	6	12	0	8	10	2	0
Sydney Norseman	83	58	0	8	0	13	23	2	20
Braeside	36	22	19	3	0	12	18	3	0
Q. Claim No. 100	18	12	1	3	0	13	9	2	13
Mt. Barker No. 1	140	87	10	17	0	12	12	4	20
Mt. Barker	22	9	12	18	0	8	18	1	6
Lucky Hit	30	14	2	10	0	9	10	2	0
Three Colonies	42½	70	12	12	1	13	2	5	17
Eureka	10	2	10	18	0	5	2	1	11
Lady Jean South	20	14	12	22	0	14	16	1	13
Scotchman's Dump	16	3	9	10	0	4	8	1	13
Mt. Barker No. 4	11½	4	3	6	0	7	5	3	8
Middleton	7	1	7	0	0	3	20	No record.	

The State Battery at Norseman was an old one, in a rather bad state of repair, and is now being replaced by a more modern plant of ten heads of stamps with cyanide vats arranged for a double treatment. It has been a great benefit to the district, and has been fairly well supported, even though there were several batteries on the field.

The Norseman field appears on the whole to be a low-grade one, but there are a great number of gold-producing veins, and some of them have carried very good chutes of ore. There seems every reason to be sanguine about the district maintaining its output and developing a number of payable mines, particularly when connected with the railway system of the State. This would make a very great difference in the cost of mining supplies of all sorts and machinery, and in the cost of living in the district, and would enable a number of mines that are now just a little too poor to pay to obtain a small margin of profit. From the returns already obtained it seems that there are several mines in the field that would be profitable, if opened up with the aid of a little working capital to begin with, and provided with their own batteries.

Widgiemooltha.

In travelling from Coolgardie to Norseman this field is passed through; but time did not permit me to give it any examination. There is a fine concrete dam or water-tank on it, and a State Battery, but the latter has not been kept going, except very occasionally. There are a good many gold-bearing lodes in the district, but mostly low grade so far as yet opened up. This district would probably receive further development if opened up by the proposed railway from Coolgardie to Norseman.

Coolgardie.

During the year I made several short visits to Coolgardie, but never with time to devote to a systematic inspection of the mines. The principal working mines were only visited casually, without any intention of making a public report on them, and too briefly to make any remarks upon them have any value. The only workings visited for closer inspection were those relied upon to furnish support to the Coolgardie State Battery. A few brief notes on these are now presented:—

Rita Nita (Lease 3977).—Opened down to 160-feet level, where the lode becomes heavily charged with sulphides. Near surface there is a big mullocky body of low-grade ore, which could be taken out by an open-cut. 200 tons crushed yielded about 5dwts. per ton, with tailings assaying 3dwts. Big lode up to 16 and even 30 feet wide, but ore-body somewhat short so far as visible. There seems just a possibility that this low-grade material can be handled with profit, so far as the oxidised ore near surface is concerned, being easily broken out and milled.

Gleeson's Success (Lease 3790).—A tribute party were working in the upper levels of this mine, and were going to pump the water out from the lower levels. They have a lode six inches to six feet wide, average about two feet, which has yielded from 6dwts. to 2ozs. to the ton.

Newmarket (Lease 3975).—This is a very interesting prospect, some shallow workings having been made on flat, irregular veins of quartz running through hard greenstone country, which is nevertheless so much jointed as to be fairly easily broken out. The quartz veins carry fair gold, but the whole of the material has to be crushed *en masse*. It is doubtful if this deposit could be worked to any great depth, but there may be a chance of working it as an open cut at a profit. Crushings are stated to have yielded nearly 7dwts. to the ton from a considerable bulk treated. It seems possible that the veins scattered through the greenstone may unite lower down into a more defined lode; but at present the deposit is more of a stockwork than an ordinary lode. The hard greenstone country appears to have been greatly shattered, and the crevices partly filled with auriferous quartz.

King Ned (Lease 4023).—This is South-East of the Newmarket, and on the same sort of deposit. A ten-head battery was in process of erection upon it, to test it in bulk, the preliminary trials having given what were considered payable returns. I understand that the results of crushings have as yet been very disappointing, however. The auriferous greenstone is said to be some 300 feet in width. Both in this case and the Newmarket it would be advisable to test the ground very thoroughly by sinking small shafts in various places over the area proposed to be worked by open-cut, and crushing the whole of the material raised by them, so as to get a trial of the bulk value of the whole mass before going in for expensive plant. The working facilities are so good that there seems a chance to make a very low-grade proposition pay, provided it is handled on a large scale; but before going to the outlay necessary for such treatment, it is clear that both quantity and quality of the ground to be worked should be proved by working trials on considerable parcels of stone. The battery now on the King Ned offers an excellent opportunity for such trials, provided the owners are willing to face a very probable excess of costs over returns while engaged in the testing work.

Union Jack (Lease 1385).—A little work has been done on this lease on a quartz lode two to six feet wide, said to be about a 7-dwt. proposition. Crushings of 9dwts. and 18dwts. per ton are reported to have been obtained. There is a lot of stone in sight and easily got at if the grade proves payable.

Richmond Consolidated Co.'s Lease "Joe" (3639).—Tributers had started working on this lease, and have had crushings up to 3ozs. per ton, with tailings said to assay 12½dwts. They are only making a small output at present—about 30 tons a month.

Brilliant (Lease 3972).—A fair amount of work has been done on a North-and-South reef, with steep underlay to the east, cutting through fairly hard greenstone country, with smooth, well-defined walls; reef, six inches to two feet six inches and three feet thick, averaging about two feet; length of proved ore chute, about 170 feet. Some good ore has been obtained here, crushings having gone up to 3 and 4ozs. to the ton, with tailings assaying as high as 7½dwts. This is a very nice permanent-looking little reef, of good grade, and is worked in a small way by the owners.

Williams and party's Quartz Claim (on old Lease 808).—Work was going on here on a big soft weathered greenstone "formation," full of quartz veins, said to give a bulk return of about 4dwts. per

ton. A large amount of excavation has been done along the cap of this soft lode, which is north of Lindsay's mine, and near the old Eldorado workings. So long as it is soft and easily mined, a very low return should pay working costs; but unless there is a great improvement lower down the prospects are doubtful when the lode-stuff becomes harder and the mining more costly.

Duke of York (Lease 4014, formerly Great Western, 3953).—There is a large lode in this property up to 30 feet in width, showing a well-defined hanging wall, and a good deal of superficial work has been done on it; but nothing to any depth. Some very rich ore is stated to have been got at first in this mine, but on the whole it was poor and patchy. Some 400 tons are reported to have been crushed for an average of 18dwts. per ton, not inclusive of a good deal of gold got by dollying; and the last crushing is said to have given 16dwts. per ton. It is stated that a lot of the ore left in sight is worth 4dwts. per ton. A shaft has been sunk to the 110-feet level, at which depth the lode-stuff appears to be in part a mass of pyrites and hornblende in thin parallel laminæ. The country is fairly hard greenstone. The hornblendic lode-stuff is interesting from a genetic point of view, but does not seem to be of much value in gold. No work was is progress at the time of my visit.

Garfield (Lease 3827).—This mine has done very well lately, yielding ore of a very fair grade. The last crushings previous to my visit gave 389ozs. from 125 tons. The country is pretty hard greenstone, but the lode cuts through it very distinctly, with smooth, well-defined walls. The lode-stuff is largely crushed rock and dolomite, and I saw gold in the dolomite in one place. The shaft is about 120 feet deep, and there is a level at 60 feet which is about the bottom of the zone of superficial weathering of the country, though there is very little water, even at the bottom of the shaft. Parts of the lode-stuff in the bottom are composed of fibrous actinolite crystals, matted together, some of which material carries gold. The ore streak is only four to six inches wide, as a rule.

Mystery (Lease 3882).—This abandoned lease is some little distance to the North from the Garfield, and is said to have given 39ozs. from 20 tons crushed, the last time it was worked. Carting and crushing cost 25s. a ton. While the mine was worked, I was informed, it yielded about 8dwts. to the ton on an average. Probably it would be reopened if cheaper crushing were available.

Square and Compass (late Lease 1153).—There is a fine main shaft sunk on this mine by former owners, but I do not know the depth. The ground was not being worked at the time of my visit, but I was informed that it would probably be taken up when the State battery started.

Canterbury (formerly the Herbert), 3892, and *Dundalk West*, 3962.—Leases were being prospected. A good deal of work has been done in former days, and there used to be a battery on the Herbert. The ore is of somewhat low grade, but is reputed to be sufficiently promising to justify giving the reefs another trial, now that mining and milling costs are so much less than when these mines were formerly worked.

Ada and *Ada United*, Leases 4044 and 4085 (formerly Westward Ho, Lease 2393).—On this there is a shaft about 50 feet deep in hard dark greenstone. The reef is well defined, and about three to six feet wide, and in the bottom of the workings is very hard and full of pyrites, requiring concentration and treatment of the sulphides to get a good extraction of the gold. Some of it is stated to assay 22dwts. per ton. About two chains South there is a parallel lode, the outcrop of which has been opened for some distance. The quartz is hard and dense, and in depth probably will contain much pyrites. One crushing was reported to have yielded 25dwts. to the ton.

Griggs' Quartz Claim.—This was a prospecting "show" on which some small veins carrying gold had been discovered in hard greenstone country, but nothing of importance.

On the *Daisy* (3961) a good deal of work had been done on a small vein, and crushings are reported to have given from from 8 to 16dwts. per ton. There are two lodes, and a shaft about 50 feet deep.

Phœnix (Lease 3880).—This mine has been worked to a depth of about 100 feet, and given crushings of from 10 to 16dwts. to the ton. A good deal of work has been done on this property. The lode is said to have become pinched in the lower workings.

Big Blow (4091, lately 3590).—This is on part of the Flagstaff Company's ground, and has been worked by tributors as a big open-cut, and also underground, with returns of about 8dwts. per ton. The lode-stuff is pretty soft mullocky material, with quartz veins. The workings are down to about 120 feet, where there is ore heavily charged with pyrites. The workings are stated to have been supplying about 300 tons of crushing stuff a month for about four years past.

After glancing at the above and several other mines in the Coolgardie District on which some work has been done, one is much impressed with the multitude of reefs in the district that have proved more or less auriferous, and which still have a considerable amount of promise, and may yet develop into fair mines. It is very clear that most of them are very low grade, but it is also apparent, after even a slight examination, that the amount of work which has been done on most of them is by no means sufficient to condemn them upon as utterly worthless. Most of them have had a very insufficient trial. Further, in a great many cases the trials were made in the early days of the Coolgardie field, when crushing charges were very heavy and mining costs very high, making returns which would now-a-days pay handsomely utterly unprofitable to the owners. I had heard a great deal about the "wild cats" of the earlier days of Coolgardie, and was surprised to find how many of them had really had a genuine basis in the possession of gold-bearing reefs, though absolutely useless to anyone at that time. The evil reputation acquired in those days is, however, still a factor in preventing them being reworked, and it is only by the efforts of working parties of prospectors getting out series of crushings that outside attention can be directed to them again. The great number and easy accessibility of the reefs give a great opportunity to parties of men to make a living by working the shallower portions of the reefs on their own account; and this will doubtless lead in time to the opening up of several larger mines.

There are several batteries in various parts of the Coolgardie district which crush for the public and for some time past one or other of these has been taken on lease by the Government as a State battery. After much consideration of the strong representations of the prospectors of the district, the erection of a State Battery and cyanide plant was at last decided upon, and since the close of the year this has been erected in a central position near the town. The establishment of this battery will now give prospectors confidence to go on working, knowing that crushing facilities will be available when they have a parcel taken out. Hitherto there has usually been a good deal of uncertainty on this point, as the privately-owned mills crushed for the outside public or not, just as it suited them.

Kanowna.

Several short visits were made to the field during the year, but no systematic examination was made of it. It is an exceedingly interesting district, presenting several problems of great economic importance. Among the most important of these are:—

(1.) The question of the treatment of auriferous "pug" and ironstone deposits of the "Deep Leads."

(2.) That of the value, extent, and treatment of the auriferous "lode formations" and other impregnated bed-rocks underlying the alluvial ground.

(3.) That of determining the continuations of the "Deep Lead" system into the flat, low-lying country to the North of Kanowna, and proving if gold continues in it in workable quantities, and if so, the further question of drainage so as to make the deposits accessible.

The maps and reports published by the Geological Survey in their Annual Progress Reports for 1899 and 1900 give a great deal of information as to the course of the gutters, and the general formation of the country, also as to the borings which have been carried out to trace the leads. When it is remembered that the latter have a recorded output of 230,104·23 ounces of gold to end of 1903, it is clear that their further development is a matter deserving the closest attention from this Department, and worthy of considerable expenditure, if necessary, from the State. The leads have been worked downwards from shallower into deeper and deeper ground, finally becoming so deep and wet as to be difficult for working parties to follow. This is on the edge of an extensive stretch of low-lying ground on which are the claypans known as the Kanowna Lake. In the deepest workings the gutters are, however, still well defined, and there seems no reason why they should not continue to carry gold into still deeper ground, and when the various branch leads come together, there seems to be a likelihood of good deposits of gold in the main gutter. That there is such a main gutter lying under the low ground is not, however, demonstrated; and in speculating upon the probability of its existence we have to form some theory as to the geological history of the formation of the leads and their relations to the salt lakes. Unfortunately, there is little, if any, evidence obtained as to the age of the leads, so that we are debarred from feeling any confidence in correlating them with any given period in the history of changes of altitude of the country which have taken place since early Tertiary times (perhaps even a little earlier), and which must have greatly affected both the climate and the topography of the goldfields generally. This history is, doubtless, applicable also in explaining the other "deep leads," such as these above mentioned at Norseman, those that lie on each side of the Boulder Hill at Kalgoorlie, and those at Bulong, Paddington, Black Flag, and many other places throughout the fields. These show a very general similarity in their characteristics, and have probably been formed about the same time and under much the same conditions. They all show, by the water-worn and water-sorted condition of much of the alluvial material contained in them, especially in the "gutters," and by the shape of the "gutters," that they have been formed in the first instance by the action of running streams of water. These streams do not appear to have been of any great magnitude, and clean gravels are not, therefore, so commonly found as mixtures of gravel with clayey materials, and much of the gravel is not greatly waterworn.

Still, that it has been concentrated in its present position by the action of moving water admits of no question. This fact gives us the inference that the climate of the region was at that time considerably different from what we have at the present day, a consideration which has to be borne in mind constantly while discussing the question. We must regard it as established that, at the period we are speaking of, there was sufficient rainfall to form streams which ran pretty frequently, if not constantly, and which eroded for themselves fairly deep channels in the bed rock, on which became concentrated the gold set free from the portions of the surface soil of the district sluiced away in course of time by rains and running water, all in the ordinary well-known fashion of formation of alluvial deposits.

The key to the changes of climate required to explain such streams in a region which is now arid and streamless, is, I think, to be found in the great movements of subsidence and elevation which can be shown to have affected the whole of the South-West portion of this State, if not also the Southern portion of the Australian continent generally. It has been pointed out in my report on the supposed oil-bearing country at the Warren River that there is proof all along our West and South coast that at the time the coastal sandstone formation began to be laid down the general level of the country must have been close on 2,000 feet higher than at present, as we find estuarine and other shallow marine deposits below Perth to nearly that depth. The deep deposits of the Warren River and of the Eucla limestone country recently bored through in looking for artesian water on the line of the proposed Transcontinental Railway, are quite in line with those under Perth, and point to a widespread movement of subsidence, not merely a local one. When the bedrock on which the coastal sandstones were laid down was near the tide level, therefore the whole of the interior country probably stood at some 2,000 feet altitude above its present level, or, say, over 3,000 feet above sea level, a condition quite sufficient of itself to explain a difference in climate then and now.

The high limestone deposits inland from Eucla, the fossil shells recently discovered by the Geological Survey on the shores of Lake Cowan, at an altitude of some 800 feet above sea level, the

limestone hills of the Warren River district also reaching to 800 feet in altitude, and the elevated limestones along the coast from the Leeuwin to Cape Naturaliste, all agree in showing that there was a long continued slow subsidence of the country until it was quite 800 feet, and probably more, below its present general level, which would bring the sea far inland from the South coast along the low-lying country now occupied by Lakes Cowan, Dundas, and Lefroy. Very possibly the whole of the Eastern Goldfields were thus submerged. The presence of an inland gulf or sea would again have a great influence on the climate of the country in rendering it much wetter. The subsidence has been followed by another movement of elevation which has raised the limestones to their present position, and it was probably during this elevation that parts of the inland sea became severed, remaining to form the salt lakes.

There would thus be two periods at which the climate of the goldfields would probably be much wetter than now; one when the general altitude of the country was very considerably greater than at present, the other when it was considerably lower, but when a shallow sea extended a long way inland from the South coast. There would be a considerable difference in the behaviour of the leads according as they were formed at the former or the latter period. In the first case the leads we now see would be mere tributaries of a much larger old river system into which they would unite, and as the most likely outlet seems to be to the South, it is probable that there was an extensive valley running Southward. When the movement of subsidence set in, it would be along this valley that the sea would advance inland, sometimes cutting into and destroying the alluvial deposits, at other times, perhaps, covering them deep under marine sediments. Any remains of the old main leads would then be expected to be most likely found under the deepest parts of the salt lakes, which probably represent, approximately, the position of the old valley. It does not necessarily follow, however, from this theory of the formation of the salt lakes, that they occupy the exact site of the old river valleys, as these might be so filled up during the advance of the sea as not to be the deepest parts of it, and, consequently, when an elevation took place again, the portions cut off and left to form our salt lakes might be in shallow basins of the bed rock to one side or other of the older buried valley. Still, the sites of the salt lakes seem, on the whole, most likely to contain the buried valleys, and it would only be after proving them to be shallow ground that there would be much inducement to try outside of them for the buried leads. The important inference to be drawn from this theory of the circumstances of formation of the leads would be that they would persist underneath and through the lake basins, which would then be composed of more modern sediments which have accumulated to fill the old river valleys. Traces of the old main lead might then be picked up anywhere along the line of the low country. Taking into account, however, the probability of the deposits being destroyed by marine erosion during the advance of the sea, instead of being merely covered up, and also that there has been much faulting during these extensive earth movements, I am not at all sanguine that any continuous main lead is now to be expected, even if the above theory is entirely correct. The curious patch of deep alluvial ground at Coolgardie, near Colreavy's dam, described in the Geological Survey Annual Progress Report for 1900, which goes to a depth of some 400 feet, yet is entirely surrounded by granitic and other ancient bedrocks, is most probably due to the faulting just mentioned, and doubtless there have been many similar instances both of the alluvial deposits being thrown down by faults and so preserved, or on the contrary, thrown up, and so exposed to erosion and destruction. We might, however, expect to find fragments of an old main lead at intervals along the course of the old valley.

If, on the other hand, the leads were formed at a much later date, when the sea had advanced far inland, and so given a more insular climate to the country between it and the West coast, the state of the case would be entirely different, the leads then representing comparatively short streams finding their way independently down into the adjacent sea and there terminating, without ever coming together to form a main lead. In that case the gutters would be found to flatten out, and their contents to become scattered and widespread littoral deposits. The Salt Lakes probably representing old portions of the sea, the leads would then most likely terminate in them, and there would be little hope of tracing them through the lake beds. With the facts at present at our disposal, I cannot come to any conclusion as to which theory is the more probable one, and it will only be by tracing some of the leads well into the lake basins by systematic series of bores that the question can be set at rest. Should the first theory prove correct and the leads be found to persist under the lakes, there would be very strong inducement to follow them and try to locate the main leads into which they must then have combined.

The Kanowna leads are perhaps the best case that could be tested, on account of their proved value, the fact that there are several gutters likely to unite lower down in the flat, and that already the bottom of the lead is known to lie far below the present bottom of the lake. From this last consideration it is clear that an old valley existed under part, at any rate, of the lake, and that if the streams ran into the sea the level of the latter must at that time have been well below the deepest proved parts of the lead. But if so, there seems a fair chance that the gutters would be found to extend a long distance into the flats.

The "pug" and "ironstone" so characteristic of the Kanowna leads represent effects of lacustrine conditions that would result from a continuation of the subsidence of the country, the streams filling up their valleys with alluvial material instead of eroding them deeper, and the low lands becoming lagoons and swamps. The "pug" is a thick deposit of clay of a very tenacious nature found more or less all along the leads covering the more sandy and more gravelly portions, and is itself usually overlaid by another thick layer of brown iron ore of somewhat concretionary character. The clay was probably laid down as fine mud under water, and the iron ore deposited later in a swamp or marsh as "bog iron ore."

During the long period that has elapsed since the leads were filled, there has evidently been very considerable chemical action going on in them, resulting in formation of beds of ferruginous cemented sands and gravels, conglomerates cemented by carbonates of lime and magnesia, and veins of iron oxide and carbonate of lime running irregularly through the deposits. The most important result from an industrial point of view was, however, the deposition

of fine crystalline gold in parts of the "pug," ironstone, and conglomerate, and also in the softer portions of the bed rock. In the "pug" the fine, crystalline gold is usually found, as it were, painted on the faces of the fine joints and crevices traversing it at all angles to the horizon. The only possible explanation is that gold has been introduced in solution, and has been precipitated in favourable places. The "pug," containing a little organic matter, appears to have been favourable for precipitation, and consequently is sometimes quite rich in gold. The gold also is frequently found round the minute rootlets of trees, which have penetrated down often as much as 70 feet from the surface. It seems probable that there was some gold scattered right through the alluvial formation, and that it has been concentrated to some extent by being leached out and reprecipitated in favourable positions. As the whole deposit is saturated with salt and both pyrites and oxide of manganese are common in it, it is possible that chlorine, produced by the reaction upon one another of these substances, may have been the active agent in dissolving the gold. Be this as it may, it is evident that solutions containing gold did traverse the mass of alluvial sediments, and gold is in consequence found irregularly through them. The ironstone often contains some, especially in veins running down into the "pug," but the latter appears to have been the principal recipient of the precipitation. As might be expected, the distribution of the gold in it is very irregular, and the "pug" is therefore very variable in value. Much of it is very poor, but there are also many patches which have been proved payable to work. For example, Mr. Sims has been working stuff of very good grade from his claim, raising the "pug" to surface, drying it in the sun to render it friable, treating it by puddling, and crushing with stamps the residual ironstone gravel left in the puddler. At the time of my visit to his mine he was working at about 60 feet below the surface, taking out from four to six feet in thickness of the lowest part of the "pug"; but I am told he has since been taking it eight to ten feet in thickness. Below the "pug" there was a considerable depth of gravelly ironstone, lying above the gutter, which happened to be poor in this claim. Another "pug" claim visited was the "Kitchener," in which four to eight feet in thickness of "pug" and ironstone veins were being mined. This stuff had yielded about 9dwts. to the ton by battery treatment. There are many other "pug" mines on the North Lead which have given payable returns, in most cases by treatment in batteries with light stamps, and there is every indication that there is still a large amount of valuable material to be extracted. Auriferous "pug" is also obtained on the "Moonlight Lead."

The successful extraction of the gold from the Kanowna "pug" is a problem that has excited a great deal of attention, and has been attempted in a great many different ways. The two processes that have survived are ordinary battery treatment, with a plentiful supply of water, and combined puddling and battery treatment, but in both cases the slime escaping often carries fair values in gold. This slime has been repeatedly tried in filter presses, with the general result that only thin cakes can be obtained, and no one has thought it worth while to put up a permanent plant. Mr. Duncan, who has lately erected a decantation cyanide treatment plant, has had very fair results; but has been much hampered for want of a reliable supply of fresh water. He has tried with some success both slimes from the puddlers and "pug" direct from the mines, drying the stuff as much as possible before treatment, and then churning it again into sludge with cyanide solution. The fineness of the "pug" gold is shown by the fact that it almost entirely dissolves in the cyanide solution without depositing heavier gold in the bottom of the agitating apparatus. This experiment should be watched with a great deal of interest, as the process can be worked very cheaply and without much expensive machinery. In some cases where there is a good deal of ironstone through the "pug" it is probable that crushing of the residues in the agitator will have to be resorted to. The early completion of the extension of the Coolgardie Water Supply to Kanowna will remove the difficulty which Mr. Duncan has hitherto met with, so there is every likelihood that the present year will see his method of treatment demonstrated either a success or a failure. For my own part, I am somewhat sanguine as to its being successful, though more complete washing will be necessary to obtain the maximum of extraction. There is probably a great field for a cheap and simple process of treating the "pug," as there are immense quantities of the material readily accessible. Doubtless a great deal of this is very poor, probably too poor to pay for mining and treatment; but the work that has already been done has shown that there are very frequent patches of richer stuff of considerable extent, which would yield a large amount of ore for treatment. Systematic sampling of the "pug" by boring is quite feasible, and would rapidly determine the position and extent of the richer patches.

The gold found in parts of the bed rock under the North Lead is probably due to the same process of solution and redeposition of the metal which has charged the "pug" with it, and is similarly likely to be local and patchy. In Mackman and party's claim near the North end of the North Lead, the soft quartz porphyry bed rock was found to carry good gold values, and a quantity was mined and milled in spite of considerable difficulties experienced with water. In Blair's claim, higher up the lead, the gold was found to descend a good distance into the bed rock, which here was apparently a weathered greenstone, but the values were found to be mainly confined to a sort of vein running north and south, and from two to four feet wide, which at times showed smoothed walls, but was otherwise almost indistinguishable from the surrounding country except that perhaps it was a little more sandy and somewhat harder. Very probably this is a fissure on which some faulting has taken place, and this opening has allowed the descent of auriferous solutions along the fracture. Should this be the case it is not likely that the gold would live very far down; but there is always a possibility that this explanation of the occurrence is not correct, and that it will prove to be of the true lode character as it is followed downwards. In Eaton's claim there is an occurrence very similar to that in Blair's, but on a larger scale, there being some 16 feet of softish "lode" matter charged with more or less gold. In this case, too, I think the lode is probably a fault fissure in the bed rock, filled with crushed country, and impregnated with gold from the solutions traversing the lead above it. A shaft has been sunk 110 feet, through the alluvial stuff into the weathered greenstone bottom, all of which latter seems to carry some gold. The crosscut from the shaft to the "lode" was stated to me to have yielded 6dwts. per ton, and much better crushings have been got from the lode stuff. It seems probable that there is a very large amount of 6dwt. to 8dwt. ore here, but very careful sampling would be required before a positive opinion could be given. A considerable quantity of stuff has been crushed with fair results. This seems to me a

proposition worth looking into very carefully, and testing by boring. The soft auriferous rock could be very cheaply worked. These occurrences render it likely that many other portions of the soft bed rock under the leads will be found to contain enough gold to be worth working. These deposits would probably be quite superficial, but their lateral extent would make them considerable producers of ore, even if they lasted only a short distance downwards.

At the North end of the North Lead, near its junction with the Q.E.D. lead, the gutters are below water level, and pumping is consequently required, which limits the operations of working parties. During 1902 a pumping plant was erected on Rollo's shaft on Lease 918X, in the hope that, as this shaft was 193 feet deep, by keeping it pumped out the water would be drained from the adjacent claims, especially those further up the lead. After pumping for some time, however, there was found to be no perceptible difference in the water in these claims, and it became necessary to take further steps. There was considerable question, however, as to what was best to be done, for there was much difference of opinion as to whether the shaft had gone through the alluvial ground or not, some persons holding that bedrock had been sunk into at 105 feet, and others that the bottom of the alluvial had not yet been reached. The following section of the shaft, and a bore put down by him in the bottom of it, was given to me by Mr. Rollo :—

	Thickness.	Total depth.
Red soil	10 feet	10 feet
Cemented ironstone	10 „	20 „
Ferruginous clay	20 „	40 „
Ironstone	10 „	50 „
"Pug" (with colours of gold)	18 „	68 „
Calcite	3 „	71 „
Kaolin	30 „	101 „
Kaolin and Quartz	4 „	105 „
(This was supposed to be the bottom of the alluvial by some.)		
Kaolin	55 feet	160 „
(Water came in here heavily.)		
White limestone	2 „	162 „
Kaolin	10 „	172 „
Yellow clay	16 „	188 „
Soft rock	5 „	193 „
Bore (Bottom of shaft).		
Clay and Gravel	6½ „	199½ „
Clay	9½ „	209 „
Coarse reddish wash	1 „	210 „
Grit	17 „	227 „
Clay and Gravel	13 „	240 „
(Bottom of bore.)		

The bore then fell in at about 210 feet and had to be abandoned.

A second shaft, about 100 feet to the North, was sunk through quite similar strata to the above down to 120 feet, and a bore was then put down to 187 feet without reaching the bed rock, but cutting coarse wash stated to carry gold. These sections seemed fairly conclusive as to the bed rock not having been reached, and it was accordingly decided to continue sinking the pumping shaft, in the hope that when the bed rock was arrived at the water from the leads would come in along with it, and the claims higher up would be drained. Unfortunately, the sinking was one succession of mishaps; first the pump breaking down through the bursting of the bucket chamber, and then the steam pump used to temporarily replace it rapidly becoming worn by the constant work in sharp, gritty sand. At 205 feet, after passing through some ironstone wash containing fairish prospects of gold, soft weathered greenstone was obtained carrying quartz veins, which was assumed to be the bed rock, after sinking in it to 225 feet. On examination, however, I came to the conclusion that these were only soft boulders of the bed rock, greatly decomposed, and not true bottom. In the meantime, however, an attempt had been made to open out on the supposed bottom at 205 feet, but no sooner was this done than a run of dirt took place from under the old timbers of the shaft, and the latter became so bulged and bent that there was imminent danger of its complete collapse. All that could be done was to strengthen the bulged portion so as to preserve the shaft for a water shaft, but further sinking was impossible without enlarging and re-timbering the whole shaft from the surface downwards. Before doing this it was thought best to put a line of bores down across the course of the lead, to cut, if possible, both the North Lead and the Q.E.D. Lead, so as to ascertain the best possible position for a drainage shaft, if another one had to be sunk. These borings are now in progress and will come into the record of the present year's work; but it is as well to say here that the first bore in the bottom of the pumping shaft went down to 271 feet before it struck the hard bed rock, passing through clearly alluvial material all the way, and a second bore 100 feet to the North-East now in progress has confirmed this so far as it has gone (246 feet). The line of bores is being continued, and in the course of a short time should demonstrate the shape of the cross-section of the old channel.

A curious fact in connection with this deep alluvial ground is that the nearest workings known to be on the North Lead are not much more than 100 yards away from the bores, yet are only from 95 to 100 feet deep, and the wash in them does not correspond with anything cut in the shaft and bores. Either there is fault between the two sets of workings, or the North Lead runs on to a "false bottom" composed of still older alluvial material. From evidence supplied by Messrs. Blake and party, working to the East of the pumping shaft, I am inclined to think that the "North Lead" as followed by the diggers, passes considerably East of the pumping shaft. Mr. Rollo tells me that the water in the Q.E.D. Lead was lowered to some extent by the pumping, though that in the North Lead was not affected; so it may be that the very deep gravels belong to the former, and that the latter is of more recent date and runs over the older ones on a "false bottom." Until the boring is completed it is best to suspend judgment. It is abundantly evident that a large amount of systematic boring is quite necessary in this deep ground as a preliminary to successful opening of the gutters by shafts.

The question of pumping to drain the lower parts of the leads is complicated by the fact that there is no lower ground into which the water may be run off when raised; it must go down to the lake, where it will soak into the ground and so again back into the deep gravels. The problem is, therefore, similar to that of draining a shaft situated on a sea beach. All that can be done is to pump out the water faster than it can filter back again through the strata overlying the gutters.

There are a considerable number of important quartz mines in the Kanowna district, but my visits have been too short to admit of making any report on them. The country is mostly greenstone, quartz porphyry, and felsite. Doyle and Finney's mine, on the Red Hill, which has produced some remarkably rich ore, is on a flat-lying fissure vein in hard quartz-porphyry. In the Golconda mine (Lease 1058x), at the head of the Fitzroy lead, there is a very interesting conglomerate formation of considerable width, apparently forming one of the main beds of the country, which has been opened to a depth of 210 feet by a shaft. There is a certain amount of lamination of the schistose material forming the matrix of the boulders, which shows a strike of about N. 30° W., and underlay to south-west of about one in two. This schistose material is very like the ordinary greenstone schist, but the enclosed boulders are thoroughly rounded, and consist of dense felsitic rock and granite, both of different varieties from any I have yet seen *in situ* in the State. The stratum is one which will require special study in any geological examination of the district. Quartz veins pass through it in places, sometimes cutting right across the boulders. There is a good deal of pyrites, and some gold, which has led to mining work being done, but I do not think the chances of there being a payable mine are at all promising.

Bulong.

Only a very cursory examination was made of this field, and in consequence only a very general account of it can be given. There are several lines of reef of considerable importance and a good deal of alluvial workings. The latter are on three principal leads running in a southerly direction and getting deeper as they go, which unite together about two miles South of the Kalgoorlie to Bulong Road. The most westerly is known as the Margaret lead, and runs to the West of the Queen Margaret mine, then turns to the South-East through old lease 711y, uniting with the Great Oversight lead some little distance to the East of old Lease 639y. The Great Oversight lead begins close to the town of Bulong and runs in a South-South-Westerly direction. The middle branch, known as the Slug Hill lead begins in Lease 681y, and runs roughly parallel to the Margaret lead, joining the Great Oversight lead about quarter of a mile South-West from old lease 643y. At the junction of the Slug Hill and Great Oversight leads the ground is 90 to 100 feet deep, and at the junction of the Margaret with the Oversight it is about 140 feet deep. The leads have been worked out pretty completely, the gutters being somewhat narrow—up to 15 feet in width. Much of the stuff is so cemented as to require treatment by crushing, and often contains very hard bands of dolomitic travertine. A good deal of the wash is fairly well waterworn, but much clayey matter is mixed through it. The alluvial matter on top of the gutters is mostly sandy clay and ironstone, very similar to the covering of the Kanowna leads. At the time of my visit it was proposed to run a line of bores to prove the lead further South than the last workings upon it, and this work was afterwards undertaken, but after boring for a time a very hard bar of dolomite was encountered which the drills could not penetrate, and the local syndicate who had the work in hand thereupon abandoned the idea of any more boring. There can be little doubt that the lead could be traced to the South by a few well placed prospecting shafts. It appears to run towards Lake Yindarlgooda, but the wide alluvial flat into which it disappears affords no indication of the position of the "lead" beneath.

On the North side of the Kalgoorlie to Bulong road there have been a good many alluvial workings, but none of any considerable depth, and most of the work has been done by dry-blowing. Some of the ferruginous dry-blown areas are fairly extensive, and may yet be found possible to work by sluicing.

The principal rock formation at Bulong is greenstone and greenstone schist; but there are also considerable dykes of quartz-porphyry penetrating the greenstone. Some of the layers of schist are very slaty in appearance, and others are very greasy and talc-like. The quartz reefs often penetrate the porphyries, which, therefore, appear to have existed prior to the formation of these.

The principal lines of reef run more or less North and South, but differ a good deal in both direction and amount of their dip. The Green Harp line is the nearest to the town of Bulong; not much work has been done on it, and on the whole it has been rather small and poor. It dips somewhat flatly to the West. The shaft of the Bulong Public Mill Syndicate on Lease 835y is down 306 feet deep, and a cross-cut East of it at the 200 feet level passes through a small reef which may be the Green Harp line, but is more likely a parallel vein. In a shallower shaft further South there were said to be 300 tons of ore broken in the stopes and about 100 tons at grass. Still further South, in the old Great Eastern Mine, there were said to be some 600 tons of ore in the dumps at surface, estimated to yield 6 to 7dwts. to the ton. The Great Eastern shaft is said to be 200 feet deep, without water, and the lode is stated to be some 20 feet in width and dipping West. The stuff raised is very white, kaolinic, lode-matter, containing very fine gold, and may prove to be weathered porphyry or felsite. The mine is considered locally to be a fair low grade proposition, but at the time of my visit no work had been done on it for a very long time. It may be the same lode as the Green Harp, judging from the positions of the two on the map, but I am not aware of the connection having been traced through. West of the Great Northern shaft the country is very hard greenstone.

The Great Oversight line of lode lies some 400 to 500 feet West of the Green Harp line, and has been very productive. It is nearly all taken up in small registered quartz claims, instead of the more usual leases, and the workings of the various parties mining upon it are therefore very close together. On the North side of the Kalgoorlie to Bulong road *Kennedy* and *Woodhall* were working on the "Golden Hope" reef on about the Great Oversight line, but as it dips to the West, while the dip of the Great Oversight lode further South is to the East, I am not at all certain that they are identical. Their

shaft was 108 feet deep, with cross-cuts to the lode at 75 feet and 50 feet levels. The vein was small, but with very smooth slickensided walls, and had some very fair ore, seven tons yielding 1oz. 17dwts. per ton, and 10 tons 2½oz. per ton. The country is brown weathered greenstone. In places the width of the "formation" between the walls is five or six feet, but the ore seems to be in a vein from 2in. to 12in. thick of ironstained granular quartz.

Coen and *party* have the most northerly claim on the Great Oversight lode property. They have two shafts, 100 feet and 80 feet in depth. At 80 feet 30 tons of ore were got, yielding 3ozs. 3dwts. to the ton, but there the lode became very poor, and at 100 feet level it was also poor. Most of the good ore came from above the 37-feet level, 374 tons having been crushed for 1,744ozs. 8dwts. of gold. The lode "formation" underlays to the East and consists of clayey and ferruginous material without much quartz, though there is usually quartz with the good ore. Numerous smooth and striated walls are seen in the "formation" dipping variously.

The *Welcome* claim lies next South of Coen's, and has a shaft down 150 feet, but only got "colours" of gold at that level. The workings are similar to Coen's, and connected with them at the 37ft. level.

Quigley and *Lynch's* claim comes next, and also has a shaft 150 feet deep. The best gold in this was got above the 40-feet level, some very rich stuff being crushed.

Menzies and *McNally's claim*, next South of Quigley's, has also good returns from the surface stuff, as also did *Fortune* and *Brown* in the adjoining "Butterfly" claim. Continuing South we come in succession to *McQueen's*, *McGregor's*, *Grigo's* and *Lee* and *Connell's* claims, and to *Day* and *Harty's* lease, several of which have had more or less gold in the surface workings. The following returns were given to me as having been obtained within the last two years from the Great Oversight lode:—

	Tons crushed.	Gold obtained. ozs.	dwts.	grs.
Coen and Party	374 ...	1,744	8	0
Quigley and Lynch	106 ...	2,000	0	0
Menzies and McNally	297 ...	2,533	4	13
McGregor	193 ...	511	0	0
O'Brien...	356 ...	1,825	7	2
Lee and Connell	43 ...	175	1	0
	1,369	8,789	0	15

The list is by no means complete, but gives some idea of the value of this lode.

From Day and Harty's workings the lode is not found to the southward, unless a reef worked in Kane and O'Grady's lease, 913r, is the same. Very little had been done in this when I saw it, but some fair gold had been got in prospecting.

The Great Oversight lode is a wide and rather badly defined soft clayey "formation," probably a fault fissure, and has been rich down to about 40 feet in depth, but poor below that level. Its proximity to an old "deep lead," and the likeness of the "formation" to those of Blair's and Eaton's mines at Kanowna suggest that the gold may possibly have been introduced in solution from the surface, but as there are many points of similarity also to the adjacent Queen Margaret line of lode, which has carried gold very much deeper, I would not be inclined to attach very much importance to this suggestion until a great deal more work at deeper levels has been done. Should such work fail to find gold the explanation might be held to apply. In order to test the lode at greater depth it has been proposed to bore with a diamond drill, but in such a patchy reef as this, boring would be liable to do more harm than good, the chance of striking good ore with the drill being so small. The best thing to be done now seems to me that several of the small claim holders should combine to form a company and throw their ground together, reserving, if they like, the portion above, say, 80 feet as a tribute for the present owners to continue to work out, and sink one of the deeper shafts to 200 or 300 feet, and then thoroughly prospect the lode at that level by driving along it.

Queen Margaret Lode.—This line of lode dips at 51½ degrees to the West, but has about the same North and South strike as the Green Harp and Great Oversight mines. Several mines have been opened upon it, and a great deal of gold obtained, some as unusually large and heavy pieces of solid metal. On the whole, however, the reef has been not quite payable, and at the time of my visit only the Queen Margaret mine was working at all extensively, and it principally with tributers in the upper levels. The main shaft of the Queen Margaret mine is 600 feet deep, but there is a winze down below the 600 feet level to 700 feet. There are levels from the shaft at 100, 200, 300, 400, 500 and 600 feet. At the 600 feet level a long cross-cut was driven 1,324 feet to the East, to cut another line of reef seen on surface, and known as the Slug Hill lode, but this was poor where cut. So also were two other somewhat badly defined quartz lodes passed through. The country in this cross-cut is mostly talcose schist and dark slate (which is probably laminated greenstone in reality) with belts of crystalline greenstone, but on the hanging wall of the lode there is a belt of graphitic greasy slate, and on the footwall a large belt of felsite. In the upper levels the felsite is weathered to white kaolin. The walls of the lode are very even and smooth, but the vein itself is quite small and bunchy. The gold has been found mostly where veins of iron oxide come from the kaolin against the graphitic slate. In the stopes above the 350 feet level an unusual mineral occurrence was encountered, about 10 pounds weight of mineral coke being found, heavily impregnated with gold. Analysis showed only 9·3 per cent. of ash in this natural coke. There is probably some connection between the carbon occurring in this form and that in the layer of graphitic slaty matter forming the hanging wall of the lode. Since my visit the tributers have been very successful in finding gold, and the company are said to have resumed working the mine on their own account.

The Queen Margaret Company have a fair battery and cyanide plant, and a pumping plant which raises about 72,000 gallons of salt water daily. The mine thus provides an ample supply of water for battery purposes. The company have done a good deal of crushing for the public.

Robilliard and *Peach's* mine (the *Stawell*, 5 acres, Lease No. 873Y) and *Speedy* and *party's* workings lie about a mile to the North of the Queen Margaret, and on about the same line. The former have a shaft 56 feet deep, and the latter one 100 feet deep. Both show big kaolin bodies, probably felsite in depth, with plentiful iron oxide and quartz-veins, from which a good deal of gold has been got. The quartz-veins lie somewhat flat, and do not appear to form a regular lode. They run North and South and underlay West. It appeared to me that the best policy would be to try to define the "formation" by driving along the principal vein and running several cross-cuts from it. The gold got offers encouragement to persevere with prospecting. There has been a great deal of "dry-blowing" of the surface soil done in the vicinity of these mines.

Ballagundi.

The Ballagundi field lies between Kalgoorlie and Bulong, on high country running Southward to the Golden Ridge or Boorara. At the time of my visit only a few men were working at Ballagundi, the place being kept very much back by the want of a supply of water for local crushing. There are a large number of reefs, many of which have given crushings that would be payable with a battery on the ground, but until water is found it is no use putting up a battery. A considerable amount of boring has been done by the Water Supply Department without getting any sufficient supply of water, and schemes are now under consideration for bringing water from Mt. Charlotte or from Kanowna. Under present circumstances it is difficult to say whether the provision of a water supply will be a remunerative undertaking or not, as the reefs are too little developed to guarantee that they will be profitable, even with local crushing; but it is clear that until there is a water supply no progress is possible, and there seems to be sufficient promise in the field to make it worth risking the outlay necessary to provide water.

Gift No. 1 North or *Ballagundi Syndicate* (late Lease 754Y).—This party were doing some work on the Paris Gift line of reef, which is a strong lode with prominent outcrop traceable a considerable distance to the South-East from their workings. Their main shaft is about eight feet by four feet, and is sunk 226 feet vertically. Levels have been opened at about 60 feet, 160 feet, and the bottom of the shaft. At the bottom level there is a cross-cut 42 feet North-East to the reef, which has been driven on for 10 to 12 feet each way. A winze has been sunk 24 feet, and appears to have touched the water level.

At the No. 2 level the lode has been driven upon about 30 feet each way from the cross-cut, and at No. 1 level it has been followed about 140 feet to the South-East, but not at all to the North-West. The country is weathered greenstone schist, getting pretty hard at about 160 feet. The lode is of pretty clean quartz, 3 to 10 feet thick, with smooth, well-defined walls, and strikes about North 40° West, with underlay to North-East of one in five. Between the walls there is often a good deal of schist, besides the quartz, which also contains gold. I was shown assays of up to 21dwts., and averaging about 10 to 12dwts. to the ton, which were said to have come from various parts of the mine, and the representative of the owners considered that the ore in sight would return about 10dwts. by milling and cyaniding. Without sampling I cannot express an opinion on the value, but I saw gold in some of the stone, and much of the quartz had a "kindly" appearance. This mine could turn out a large amount of quartz very easily if there were local means of crushing; but the stone is altogether too poor to be carted to Bulong or Kalgoorlie for treatment. The main shaft is situated in low-lying ground and would have the best chance of any in the district of soon getting a supply of salt water by sinking. Another 100 feet of sinking would probably show if a battery supply was there obtainable.

About 500 feet South-East of this shaft on the same line of reef there is an old shaft about 100 feet deep, at which some four or five tons of ore have been bagged, and about 200 feet further on there is a hole on the outcrop perhaps 20 feet in depth. In these shafts the lode is seen to be a big strong body of quartz about 10 feet wide, rather hard looking, and stained a good deal with brown oxide of iron. These workings are on the old Paris Gift lease. The old main shaft of the Paris Gift mine is about 200 feet further to the South-East, and is said to be sunk about 200 feet deep. It is about 10 feet x 4 feet. I was informed that the lode had been driven on at the 100 feet level for a long distance, but not cut through at the bottom of the shaft. There is a large heap of quartz lying at surface, in some of which I saw specks of gold, and parcels picked out and sent to the Boulder North Battery at Kalgoorlie are said to have returned 17½ and 21dwts. to the ton.

From a cutting on the outcrop about 1½ chains South-East from the main shaft a parcel of 21 or 25 tons is stated to have yielded 7dwts. to the ton. About five chains from the main shaft another old shaft about 100 feet deep seems to be on about the South end of the Paris Gift line. This reef is apparently rather poor on the whole, but would probably be worked if there were a local battery. It could turn out a large amount of stone if the average grade proves to be payable. It has evidently given sufficient encouragement to prospectors to cause it to be tried over and over again by successive owners, and the want of local crushing facilities appears to be the main reason why they did not continue to work it.

Bonanza (799Y).—There are a lot of workings some six or seven chains South-East of the last-mentioned shaft, which belonged to the Bonanza mine, and may be on the Paris Gift line of lode; but if so, it has turned more to the Eastward. There seem also to be several branches of stone, as if the reef had split up.

A big outcrop of quartz, jasper, and iron oxide runs South 50° East through the old Bonanza ground, and crosses the head of Long Gully just above where a good deal of heavy gold has been found. This lode has many of the characteristics of the jasper lodes described at Norseman and Edjudina, and may contain some gold in parts.

Ironbound (Lease 890Y).—In this lease there is a small reef running North-East and South-West and dipping 50° to the South-East. There are about 18 inches of lodestuff between the walls, of which three inches to six inches are quartz, from which fair prospects have been obtained. A shaft has been sunk 78 feet on the underlay, and the reef has been traced for some chains by shallow shafts. The walls are smooth and regular. The country is yellow weathered greenstone.

Ballagundi Horseshoe (Lease 888Y).—On this lease there is a North-West and South-East lode running about parallel with the Paris Gift line, but some distance West of it. A shaft has been sunk but I was unable to go down it, no one being at work, and windlass and ladders having been removed. Some gold is stated to have been got.

Not far to the North of this there is a shaft about 80 feet deep, sunk to cut a lode of ironstained quartz running North-North-West and South-South-East, with underlay to the West, which is said to have given some gold. Four or five chains further North-West there are some small workings on ironstone and quartz leaders said to have yielded some gold. There is a considerable area of ground which has been worked by dry-blowing to the West of these workings. Not far from these is a quartz claim worked by Messrs. Warrell and Keller on a leader running North-East and South-West and dipping flat to the North-West, which showed some nice gold.

Homeward Bound (Lease 868Y).—A considerable amount of work has been done on this lease and some fair returns have been obtained. There are eight shafts altogether, the deepest of which is down 100 feet, and the owners were stoping at 50 feet when I visited the mine. The lode is small, and strikes North to West with underlay to the West about one in six, and shows smooth well marked walls. A crushing of eight tons has recently yielded eight ounces to the ton. The average obtained by the original owners of the mine is said to have been about 16dwts. to the ton. The country is weathered greenstone. Cartage of ore to Kalgoorlie costs 12s. a ton, and crushing 20s. a ton, and there is no allowance made for the tailings, which are said to assay about 3dwts. to the ton. This reef has been traced a considerable distance to the South, into Lease 811Y, but very little work has been done upon it in this portion. On the top of the ridge in 811Y there are a shaft and a surface cutting on the lode, which appears in them to be a fairly strong "formation" with strings of quartz and ironstone, there being no well defined vein of quartz. Further South-East the *Scotch Golden Hole* is much on the same line, but no connection has been definitely traced between this lode and that seen there. Between the two on the South fall of the ridge there is an ironstone lode about three feet thick seen running North-West and South-East and underlaying South-West, and there is a shaft close to it in whitish country; but I got no information about what had been the result of the work.

At the head of the Long Gully alluvial workings the jasper and ironstone lode above mentioned as passing through the Bonanza Lease is again seen cropping out as a lode of very solid brown hæmatite with strings of quartz. Its course here is North-West and South-East, and it stands nearly vertical. A little further South it is composed of very dense cherty quartz. Probably this lode contains much pyrites in depth, cubes of limonite pseudomorphous after pyrite being commonly seen in it. Another ironstone lode is cut in the Long Gully in a shaft about 40 feet deep, some 8 chains North-North-East from the Mt. Bellew shafts. This shaft was sunk on a leader running East and West with underlay about 1 in 1 to the North, which yielded a good deal of gold. The lode material appears to have been mostly soft and clayey. There is also another small rubbly quartz lode about three chains further North running more or less East and West. To the West of this again solid dense ironstone is seen, and a fairly deep shaft has been sunk, which is said to have cut leaders in the brown weathered greenstone country. All the country about the head of the Long Gully seems to be very full of leaders and veins, which are likely to be the source of a good deal of the alluvial gold. The latter, however, was found right over the saddle at the head of Long Gully and down into the Malvern Hills gully, where also there has been a great deal of dry-blowing.

About six chains East of the Mt. Bellew shafts three old shafts have been sunk on a lode running North-North-West and South-South-East in white kaolin-like country. There were two nearly vertical quartz veins in these from which gold was got near the surface by the alluvial dry-blowers, and some stuff sent to Adelaide is said to have yielded 3½ozs. to the ton. The white rock may prove to be felsite or quartz porphyry in depth.

Ballagundi King (late Mystery Lease 804Y).—Two ironstone lodes are seen traversing this lease, one running North-North-West and South-South-East, the other West-North-West by East-South-East, the latter running into the former and being traceable East-South-East through to the old Bank of Ireland mine. Both are composed of dense brown iron ore with numerous quartz veins. On the West side of the first mentioned lode there is a long belt of strongly laminated grey slate country, which, I suspect, however, is a variety of the schistose greenstone. The whole of the country in this vicinity seems much mineralised. The Mystery main shaft was sunk 170 feet, and cut a lode at near that depth. Some driving was done, the lode proving to be a soft "formation," four to six feet wide, running a little to the West of North, and containing some nice looking iron-stained quartz. The prospectors are stated to have expected 10 to 14dwts. to the ton from a crushing sent to the Queen Margaret battery at Bulong, but only 4dwts. per ton were realised.

Freedom (Lease 807Y).—On this there is a large ironstone ridge, which, where cut through by trenches, shows soft fawn coloured to purplish country under the gossany capping. On the West side of the capping a shaft has been sunk to a depth of probably quite a hundred feet, which seems to have passed through buff and fawn coloured soft country with veins of oxide of iron and quartz, which appear to underlay West and to strike towards the Homeward Bound Mine. This country appears to me to have undergone chemical alteration in this vicinity from more than mere surface weathering, and I suspect that there is a large soft "lode formation" or belt of country which has suffered alteration through lode-forming agencies. About four chains further West there is another deep old shaft with a lot of quartz stored beside it, and in a costeen on the East side of it a wide lode of quartz and iron oxide

is seen, striking North-North-West toward the Homeward Bound Mine, and underlaying about 45° to the West. From the amount of quartz raised there must have been a good deal of driving done down below. Some of the quartz gives fair prospects by panning. West again from this, about three chains, is a main shaft about 9 feet x 4 feet, said to be about 200 feet deep, but not yet down to the water level, which appears to have passed through greenstone schist, mostly weathered considerably. It is not apparent from the dump whether the lode has been intersected in this shaft or drives from it. The quartz lode is known as the Scotch Golden Hole, and is said to be worth working if there was a local battery. There are probably quite 150 tons of quartz on the dump.

Lanark, late Bank of Ireland (Lease 789Y).—A strong outcrop of quartz is traceable through several old leases, on a course running North-North-West and South-South-East, and a good deal of work has been done upon it. At the most Northerly shaft the reef is 10 feet wide, of white quartz. It has been trenched along the outcrop for some distance to the South, and the reef seems to separate into two branches. The old main shaft is said to be 200 feet deep, but partly filled up again by subsequent work at the 130 feet level. A cross-cut was put in to the West, which cut a lode which had been already cut in the shaft at 30 feet, and some driving was done, the stone being said to have been of fair value, expected to average 12dwts. per ton. The other parallel lode is seen in another shaft about two and a-half chains further East, which is about 100 feet deep. From this a crosscut had to be made some 40 or 50 feet to cut the lode, and a winze was sunk on it for 20 feet, showing it to underlay to the West about one in three. The main shaft is evidently not deep enough yet to cut this lode. There is a lot of quartz at the East shaft, stated to be worth 10 to 12dwts. to the ton. I was not able to enter either of these shafts, so the above particulars are all from information received from Mr. P. Diskon, who was good enough to show me over the field. If the values are correctly estimated, there is every reason to think that a good mine could be opened on these reefs, the quantity of stone easily available being large. The stone is, however, too poor for anything but local treatment.

Bank of Ireland Consols (Lease 524Y).—On this old lease there is a deep shaft sunk on the crown of the hill, which does not appear to have cut a reef. About two chains North-West from it there is a strong quartz vein seen running towards the South-East shaft of the Bank of Ireland, and the surface soil has evidently all been worked by dry-blowing, though very much cemented and requiring a great deal of labour. Some good slugs of gold are said to have been got. There is another shaft some five chains to the South-West on a vein of quartz and iron oxide, some of the latter in stalactitic and mammillary form.

Crown and Sceptre (old Lease 468Y).—On this old lease there is a main shaft, about 10 feet by four feet, which is probably quite 200 feet deep, but appears not to have reached water level. There is also a second fairly deep shaft further East. Some rather good looking quartz is lying about the dump, but there is nothing to show the size or direction of the reefs. The country appears to be greyish weathered greenstone.

A quartz reef with ironstone on its West side is seen about 10 chains to the North-West from these shafts striking North 55 degrees West into the Mystery ground, and a little further along its line some work has been done on it, showing several quartz veins on the wall of a soft "formation" about 12 feet wide.

Mt. Bellew (Lease 748Y).—On this lease a good deal of mining has been done on a reef running East-North-East and West-South-West and dipping 32° to the North-West. The vein is from 10 inches to three feet in width, with smooth well-defined walls. Two shafts have been sunk, one to 200 feet, but which was working only from the 100 feet level at the time of my visit, and another 170 feet deep; but from the latter level a winze has been sunk on the underlay another 130 feet. There is a lot of ground now open for stoping, though the shoot does not seem to be a long one. The owners estimate that the stuff will average 10 to 12dwts. to the ton, but have been making their living out of very rich bunches of ore, which have been fairly frequent. The country is soft whitish clayey material, possibly a decomposed felsite, and brown laminated weathered greenstone schist. Another lode of rubbly quartz, carrying a very little gold, running between North and North-West, and conforming with the laminations of the country, faults the Mt. Bellew lode somewhat, and the latter becomes thin in the ends of the workings. In its being a cross lode to the larger reefs of the district there is a strong similarity between the Mt. Bellew lode and the lode of the Golden Ridge mine at Boorara, which is likewise a very flat lode. There is a little arsenical pyrites in the lowest workings of the Mt. Bellew, and in this also it resembles the Golden Ridge lode. The flat lying veins in the Hannan's Reward and Mt. Charlotte mine at Kalgoorlie and in the Gladys mine at Mulline are also comparable, and may be due to a similar method of formation, the flat fissures being possibly formed during strong compression of a block of ground lying between two North and South lode fissures. In each of the cases mentioned such North and South lodes exist in close connection with the East and West flat veins. If this theory is correct, it is probable that there are in each case a series of more or less parallel flat veins, as is notably the case in the Hannan's Reward and Mt. Charlotte mine, and a sharp look out should be kept for any signs of such existing.

The Mt. Bellew and Homeward Bound mines have been the richest in the district, producing ore of value sufficient to pay for sending to Kalgoorlie for crushing, but in both cases the lodes are somewhat small, and unlikely to produce a large tonnage of ore. The main reefs of the field are the Paris Gift and the Bank of Ireland, and perhaps the Scotch Golden Hole. In these there are considerable visible supplies of crushing material, but it is of low grade. Whether they can be relied on to pay their way or not can only be determined by very careful and extended sampling of the reefs, and by actually crushing the ore at grass.

A great deal of alluvial gold has been got in the vicinity of Ballagundi, and it will be seen from the above description that there are several lines of strong reefs and a great many smaller veins carrying gold, and that the field has been only scratched as yet. Even if none of the already discovered reefs

prove payable, there seems a fair amount of likelihood that better lodes will yet be found, but the provision of a water supply for the district is necessary to ensure any continuance of prospecting. It seems to me that there should be a very fair chance of getting a supply of salt water by sinking the Ballagundi Syndicate's shaft on the Paris Gift line another 100 feet, and I would recommend State assistance in the work before undertaking such a serious expense as is involved in bringing water from Mt. Charlotte or Kanowna.

Boorara.

The Boorara field lies about six miles East of the Lakeside Railway Station, at the South end of the Boulder Belt, and is on fairly high ground. The principal workings are those of the Golden Ridge Proprietary Company, who are working on the *Golden Ridge Leases* (Nos. 2310E, 2312E, 2314E) and on the *Waterfall Leases* (Nos. 3908E, 3910E, 3912E) some three and a-half miles away from the former, the two mines being connected by a light tramway. In the Golden Ridge Mine there are two lode "formations," running North-Westerly, with a cross lode underlaying about one in one running between them. The more Westerly lode shows on surface as a big outcrop of somewhat laminated jasper and ironstone, and the Eastern lode is a large badly-defined body of soft whitish kaolin traversed by quartz veins. In a prospecting shaft 40 feet deep on this a quantity of the lode matter has been extracted, 100 tons being said to have returned 10dwts. to the ton when crushed at Kalgoorlie, and 40 tons 5 dwts. to the ton when treated at Boorara. This soft lode is considered to be a low-grade ore body which might be treated if there were plenty of water available. On account of its clayey character it requires a large amount of water when being crushed. At the 100 feet level from the main shaft this lode is still a soft decomposed clayey ore body of low grade, and the Western lode is here also a big soft clayey body, unlike the ironstone forming its cap at surface. At the 200 feet level the principal workings are on the cross vein, which is a quartz lode one to three feet thick underlaying to the South-East about one in one. This has yielded very payable stone which has enabled the owners to put up a battery and still further open the mine. The water level is at 250 feet in the main shaft, but there was not much water in the mine when I visited it, about 5,000 gallons a day, or barely enough for the battery of 10 heads of stamps. At the 300 feet level the cross lode continued to give good stone and contained a great deal of arsenical pyrites. The main shaft is sunk vertically to 400 feet, but when I visited the mine the lowest level was at 360 feet, where a crosscut was being driven out to intersect the lode. On account of its flat underlay the lode is getting rapidly further and further away from the shaft as the latter is sunk, and an inclined shaft will probably have to be considered before very long. The cross lode seems to terminate against the mullocky lodes lying East and West of it, but may possibly be faulted by these. I am, however, inclined to think that it is a result of side pressure fracturing the block of ground between these two, as has been above put forward in the case of the Mt. Bellew Mine at Ballagundi. The country in depth is seen to be greenstone schist, but near surface this is much weathered and softened.

In the Waterfall leases there are several lodes close to one another and requiring a map to show their relations to one another clearly. A large amount of stone was in sight and I saw a good deal of gold. The deepest shaft at the time I visited the place was 150 feet and passed through what is regarded as the main lode which underlays East about one in one at 70 feet. There is a jaspery lode parallel to this, and another further West, and between these there is a cross lode. All these lodes carry gold, the crushings have assayed over an ounce to the ton, and run from two feet to six feet in thickness. No water has been reached at 150 feet, and the country was all much weathered greenstone. This seemed to me a very promising prospect, likely to develop into a good mine.

There has been a good deal of difficulty at Boorara in getting enough salt water for milling, and in procuring fresh water for the boiler supply, the latter being carted from Kalgoorlie. The Company has, however, made two fairly large dams which will conserve, it is estimated, about 350,000 gallons of rain water. There is a good catchment, and by deepening the dams it is probable that a fairly reliable store of water could be obtained. The present dams are too shallow to allow for the great evaporation in the hot weather. Since my visit, a pipe connection has been made with the Goldfields Water Supply mains at Lakeside, and a constant supply of fresh water thus ensured. Probably enough salt water for the battery will be got in the mine, as the workings below 400 feet become more extensive.

The Golden Ridge mine is almost entirely owned by residents of Kalgoorlie and Boulder, and the success it has achieved is the more gratifying on account of its being a locally-owned concern. Since the arsenical pyrites have come in at the lower levels, the battery has had to concentrate these after crushing, the concentrates being shipped to Dapto for treatment.

Broad Arrow and Paddington.

The very short time I spent in this district did not allow me to do more than drive round some of the mines, without devoting any serious attention to them. The impression carried away was that in this district, as in others above described, there are a great many reefs known to exist and proved to carry some gold, which have not been seriously worked upon, but many of which might at any time prove to be valuable.

At the "Fag End" alluvial diggings, near Mt. Pleasant, a proposition had been made to bore for a "deep lead," and examination showed that there was reason to believe that there was a wide lead lying in the valley between Mt. Pleasant and Black Flag, and running down to Black Flag lake. Borings were subsequently carried out which showed that deep alluvial ground existed beyond doubt; but, so far as they went, the indications of gold were not sufficient to induce the party to continue boring. A previous attempt to sink a shaft had shown that the deeper parts of the "lead" were very wet, so that fairly good pumps would be required to master the water. A great deal of alluvial work had been done on a "deep lead" running from close to the Broad Arrow dam to Paddington, and a large amount of gold has been obtained from time to time. The ground gets deeper going Southward, being 70 to 90 feet deep at Paddington. The wash is pretty well water-worn, but often cemented, and some of the cement shows gold

of secondary deposition as at Kanowna. The lead is capped with a brown oxide of iron deposit. The layer of payable wash is rather thin, but often of very good quality, and numerous parcels have been taken out and sent to Kalgoorlie for treatment by crushing. It is evident from inspection of the lead that there must still be a great deal of ground untouched that is likely to be just as good as the parts that have been already worked. In response to a very strong local demand for a State puddler to allow of these gravels being cheaply treated, one was erected at Paddington; but after a very short trial the diggers came to the conclusion that they could not get enough pay dirt in their claims to warrant them in continuing work, and the puddler had to cease operations for lack of support. I am not at all satisfied that a fair trial was given to either the lead or the treatment by puddling, and I am of opinion that the lead is well worth the attention of good working parties of alluvial miners.

Siberia.

The mines in this district are in the vicinity of the townsite of Waverley, but are a good deal scattered. There are quite a considerable number of reefs known to carry some gold, and a large amount of alluvial gold has been obtained by dry-blowing; but, owing to want of crushing facilities and absence of good water supply for battery purposes, very little progress has been made.

The country is greenstone and greenstone schist, with a good many dykes of quartz-porphyry and felsite traversing it. A little further North granite country comes in and continues to the Siberia soak.

Waverley Mine (known also as Christie's Reward, Lease No. 124s).—There are two big quartz reefs in this mine, lying parallel and close together, giving up to 14 feet in width of stone. Strike North-East and South-West. A shaft is sunk 120 feet, and a winze from the bottom level goes 25 feet deeper, and appears to have reached the water level. The reefs have been patchy, but phenomenally rich at times. They have not been worked in a systematic manner, and it is impossible to say what is their average value; but with local crushing there seems a good prospect of payable returns. The owners have a Tremain mill at a Government well about two miles away to the North, but did not appear to be well satisfied with its performance either in regard of capacity or cost.

A little to the South of the Waverley Mine is the old "Bonnie Doon" shaft, 160 feet deep, in hard greenstone country. Near the bottom a quartz-porphyry dyke was cut. A drive is said to have been made about 35 feet to the East at the bottom. There is a little water in this shaft, but it only makes about 30 gallons a day. The country became somewhat softer in the end of the drive. The shaft is 6 feet by 3 feet, timbered right down, and in good preservation, and is very centrally situated in the field. The ground falls from it to the Eastward, and would be very suitable for a battery site if a good supply of water were obtained by sinking the shaft or extending the Eastern drive. To the East of this shaft there is a large soft schist "formation," which runs North-East and South-West through the field for a long distance and carries a little gold in many places. It is up to 60 feet in width, and probably constitutes a water channel, so a shaft sunk in it would be likely to obtain a battery supply. Continuing the drive East from the Bonnie Doon shaft would also intersect this "formation," but the distance to be driven would be considerable, and it might be cheaper to sink a new shaft than to make the crosscut.

Mystery (formerly Marquis of Lorne, Lease 628s).—This piece of ground seems full of reefs and veins of quartz, three or four lines being recognisable, all carrying some gold. The principal reef is a strong body of quartz two feet to eight feet wide running North-Westerly. I was informed that 30 tons crushed at the Pole battery had returned 10dwts. to the ton, with tailings assaying 6dwts. and concentrates 2ozs. per ton. The cost of crushing was 20s. a ton for parcels over 20 tons, and 25s. for those under 20 tons, and the cost of carting to the battery, about $7\frac{1}{2}$ miles, was 10s. 6d. a ton. Another crushing of 32 tons returned 13dwts. per ton. The leaseholders have from 200 to 250 tons of stone at grass, of rather low grade, but worth putting through a local battery, and they could rapidly turn out a much larger tonnage. There has been a lot of gold got by dry-blowing about the surface of this lease.

The Admiral Dewey (Lease No. 529s) lies to the South-East from the Mystery, and has two shafts, 130 feet and 110 feet deep, on a small reef 10 to 12 inches thick. A crushing of 35 tons is stated to have returned 28dwts. to the ton, and several smaller ones, amounting to about 40 tons, to have averaged 22dwts. per ton.

On old lease 544s, to the North-East from this, another small lode 10 to 12 inches thick, is reported to have given 22dwts. and 10dwts. per ton from two parcels of about 22 tons.

Invincible (Lease 519s, formerly Camperdown).—A crushing from this lease of 15 tons is stated to have given about 10ozs. to the ton, and was obtained from a small reef running more or less North and South, from one to four feet wide. The lode material appears to be a mixture of country rock and quartz veins rather than clean quartz. The shaft on this is 60 feet deep. There is also a large lode, up to 20 feet in width, of soft schistose material, with quartz veins, much resembling some of the Kalgoorlie lode outcrops, running North-North-Easterly through this lease, from which fair returns have been got; 100 tons crushed at the Pole battery are reported to have yielded 30dwts. per ton by crushing and cyaniding, and another 15tons 27dwts. by amalgamation alone. This lode seems decidedly well worth further testing.

Silksworth (Lease 655s).—The Invincible lode continues Northward in this lease, and has been worked upon by open cutting; 39 tons crushed shortly before my visit at the Pole battery were stated to have yielded only 7dwts. per ton by amalgamation, but the 15 tons of sands saved for cyaniding assayed 2ozs. per ton. About 44 tons sent to Hannan's Reward battery gave 8dwts. to the ton by amalgamation and 1oz. 19dwts. per ton in the tailings assays. One hundred tons of seconds, from which the 39 tons parcel had been picked, are said to have assayed 23dwts. per ton. These results are as given to me on the ground by the owners, and I had no means of verifying them, but accepting them in good faith it would seem that this is a valuable lode, well worth further development. The oxidised part of the lode for eight feet wide is said to have assayed 16dwts. per ton over and over again.

Three or four chains East of this lode there is a quantity of quartzitic stone outcropping, which appears to be felsite or quartz-porphyry much hardened by infiltration of silica, and this dyke is seen running South-Westerly across the country at intervals for six or seven miles.

Victory (Lease 685s).—This lease lies on the South-West end of the Invincible, and has a shaft 90 feet deep, in which is seen a lode eight or nine feet wide of bluish altered country and quartz, with a good deal of iron pyrites and copper pyrites. Ten tons of this ore are said to have returned 27dwts. per ton at Kalgoorlie, mostly in the concentrates. A little water was making in the bottom of the shaft at the time of my visit.

Majestic (Lease 703s).—A large amount of work has been done on this ground on an ironstained quartz lode running a little East of due North. Probably quite 1,000 tons of quartz have been raised, but it is said to be very poor. I was told, however, that 20 tons picked from the heaps had gone 2ozs. 6dwts. per ton at the Pole battery. I saw a little gold in some of the iron oxide that accompanies the quartz. Five shafts have been sunk to test this line of lode, but after a trial it was abandoned. The reef is a strong one and may yet prove worth working if there were a battery on the ground.

Stanhope.—Here there is a shaft about 60 feet deep with a good sized quartz reef. A crushing of under 20 tons is said to have given 15dwts. per ton in the Tremain Mill.

Merriwee King (538s).—On this lease there are three shafts sunk, one being about 120 feet deep, partly on the underlay of the reef, which is somewhat flat to the Eastward. Strike North 10° East. About a foot of quartz is showing, much ironstained. The gold seems to be very fine and rather scaly, and the stone shows a little indigo copper at times, betokening copper pyrites in depth. I saw gold pretty freely in 8 to 10 tons of stone paddocked at the middle shaft. Crushings of 60 and 40 tons at the Pole battery are stated to have given returns of 2ozs. to the ton, and one of 42 tons gave 5ozs. 1dwt. per ton. This lode is on the West side of the schist "formation," which passes to the East of the Bonnie Doon shaft, and which is traceable nearly to the Majestic. It seems a very greasy talcose schist with much contorted foliation with general dip of the laminæ to the Eastward, and is stated to carry a little gold right along its course. A short distance to the South-West of the Merriwee King shafts there is a big open cut on this schist "lode," where a quantity was taken out for crushing. The surface here was worked by dry-blowers, with good results. In this cutting is seen a dyke of bluish porphyry, the course of which is not clearly visible.

The *Horseshoe* (Lease No. 653s) is on the same schist "formation," which here contains a good deal of quartz. A shaft has been sunk 30 feet vertically and 40 feet on the underlay, and a drive has been made 50 feet to the East without getting through the "formation." Some of the stuff is very rich, two lots of 79 and 73ozs. of gold being reported to be got by dollying. Some 30 tons at grass were expected to return 6 to 7 ozs. per ton, and gave very good dish prospects. The porphyry dyke is seen a little to the West of these workings. Further South about 10 chains on the same lease there is another shaft down 60 or 70 feet on the underlay, which is somewhat flat, and some very good ore has been got from a vein of quartz and soft lode stuff, which twists irregularly about through the schist "formation." About 20 tons of very good ore and 20 tons of seconds were on the dump at the time of my visit.

This schist "formation" seems to me to deserve careful prospecting, and to be of the nature of a large soft lode. It runs right through the fields and most of the best mines are in its close vicinity.

Pole (299s).—Very little work appears to have been done on the Pole mine, but as no one was on the ground at the time of my visit I could not get much information at first hand. The shaft is said to be about 140 feet deep, but has not a very large supply of water. On surface there is a five-head battery and a cyanide plant, which have done a good deal of work for the field. Unfortunately it is at the extreme South-West end of the field, about 4½ miles from the townsite of Waverley, and is, therefore, inconvenient as a public battery. It is in somewhat low-lying ground, and probably could get a better water supply by sinking the shaft deeper.

Golden and Lochiel (Leases 674s and 673s).—In these leases there are three parallel lodes running about North-North-West and dipping somewhat flatly to the East, composed of laminated dark cherty material with much iron and manganese oxides, and cut through by East and West veins of quartz. In one of these quartz veins I observed some silvery mica and a little felspar, showing an approximation to the structure of the quartz-porphyry dykes—a fact of considerable genetic interest. A good deal of gold has been got, especially at the intersections of the quartz veins with the lodes, and the owners of the leases are said to be able to make a living by dollying. They could raise a good deal of stuff worth crushing pretty easily if a State battery were erected in the district.

Nevertire (Lease 545s).—A reef 12 inches to 18 inches wide in this lease is said to have given two crushings of 1oz. 18dwts. and 2oz. 2dwts. per ton from parcels of about 40 tons each, and there are some 40 to 50 tons at grass, estimated to be worth 10dwts. to 12dwts. per ton.

Mexico Extended (Lease 151s).—In this lease a reef is seen running West-North-West and East-South-East, with flattish underlay to South-South-West. The quartz vein appears to have been 12 inches to 18 inches wide, with well defined smooth walls. The stone lying about the old dumps and in the paddock (about 15 tons) shows some copper pyrites. Three small shafts have been sunk, one of them a whip shaft. About 200 tons are said to have been crushed at the Mexico battery, for a return of about 12dwts. per ton of gold, of poor standard (£2 15s. per ounce.)

Mexico (106s), and *Mexico West* (518s).—A large amount of work has been done on this property on two small very flat-lying veins which have been of very good value, yielding over 5,000ozs. of gold from a little over 3,000 tons crushed. The stone is from three inches to 24 inches in thickness, but averages about six inches, and is practically worked out down to the 70-feet level. The country is weathered greenstone. There is a water shaft sunk 205 feet, and with 150 feet of driving done from it, and as it was situated in low-lying ground a supply of water might have been expected, but only about 400 gallons

per day were obtained. The water was not very salt, but contained a good deal of magnesia salts. There was a five-head battery and cyanide plant at the shaft, but on account of the want of water it was removed to the Fair Adelaide lease, which belongs to the same company.

Lady Harris (Lease 170s).—Very little work has been done on this mine, which has a small, flat quartz reef, from which four tons were crushed for 8dwts. per ton. This is close to the contact of the greenstone country with the granite, the latter appearing in the hills which form a sort of amphitheatre round the South side of the Mexico Flat. There is an outcrop of porphyry close to the Lady Harris workings which seems to be intruded through the greenstone country.

Christmas (309s).—There are very large outcrops of quartz in this neighbourhood, and a large amount of money was spent in developing them, but the best crushings only returned 3dwts. to 4dwts. per ton. A water shaft was sunk 170 feet, and obtained about 200 gallons of water per day. A good deal of heavy gold has been picked up on the surface in this vicinity, but the source of it does not appear to have been yet discovered.

Fair Adelaide (479s).—There is a reef in this lease, but it was very poor, and was not worked for any length of time. The shaft was sunk 160 or 170 feet as a water shaft, and gives about 4,000 gallons a day of salt water, said to contain $1\frac{1}{2}$ per cent. of solids, mostly sodium chloride. The mill on this lease is one of five stamps, of very old and light pattern, and in very bad repair. At the time of my visit a nice new cyanide plant had been erected for treatment of the Mexico slimes by decantation, but owing to charcoal having been ground up with them, through addition of wood ashes while amalgamating, the extraction was unsuccessful. This water supply would be valuable for a public battery, but it is too far away from the principal mines, being about four miles South-South-East from the Waverley townsite.

The Siberia district stands greatly in want of a good central battery at which crushings could be made, and furnished with cyanide plant for saving the fine gold. None of the three batteries on the field are centrally situated, nor was any one of them in good order and suitable for public crushing when I saw them. Though the field seemed almost deserted, there were 32 men engaged upon it, and all the residents appeared to have great faith in it, and agreed in saying that many others would return to it if a State battery were provided. It has yielded a large amount of alluvial gold, and the quartz veins are numerous, and many of them have been proved gold-bearing. It seems to me a case where a State battery can be recommended as being the best means of putting fresh life into the district and allowing it to be properly tested. It might, however, very possibly have to be run at a loss at first. Before erecting a battery it would be necessary to obtain a good water supply, and this could most probably be got by sinking to cut the soft schist "formation" in the flat to the East of the Bonnie Doon shaft. This would also have the effect of testing what may possibly prove to be an important gold-bearing lode.

Callion.

My visit to this district was in order to look into the application of the lessee of the *President Loubet* mine for assistance under the Mining Development Act; and time did not permit me to look over the field generally. It was stated to be almost deserted, the principal work going on being cyaniding of the tailings lying at the Callion battery. This battery has 20 stamps, and gets its water from the North Callion shaft, which is down 270 feet, but has only a small supply of water. There are three dams in the district to conserve surface water, but the Callion dam is the only one which holds at all well, the other two leaking badly and losing their water rapidly. A good deal of work has been done at one time and another in the district, but the quartz appears to be generally rather low in value.

On the *President Loubet* lease (611u) Mr. R. Berteaux has made a very determined effort to open up a lode running about North-North-West and dipping East 51°, having sunk several shafts upon it and done a good deal of driving. The new main shaft, 6ft. 6in. x 3ft. 6in., had been sunk 105 feet at the time of my visit, but was not expected to cut the reef until sunk to between 250 and 300 feet. The deepest shaft on the reef was 115 feet vertical, and then went down on the underlay to 170 feet, at which depth a little water made its appearance. The reef is from two feet to four feet wide as a rule, with smooth, well-marked walls, and consists of ironstained quartz containing fine gold. Since my visit a crushing of 25 tons at the Mulwarrie battery returned gold at the rate of 9dwts. 16grs. per ton, the tailings assaying 4dwts. 4grs. per ton. This is not too promising, but the reef seems to me to deserve trial at greater depth. Mr. Berteaux's object is to sink the main shaft to try and get a water supply, and at the same time test his reef; and he seems to have a fair chance of success.

The same reef is seen again further south on the old Welcome Stranger mine, on which a good deal of work has been done some years ago. The crushings are said to have yielded about 7dwts. per ton, but there was also a patch from which some 200ozs. are reported to have been got by dollying. The reef seems to be a strong body of quartz, and more or less gold-bearing all along, and may yet be opened up to become a productive mine. It would, however, require a battery on the ground and a local water supply to have any chance of being payable on the grade of ore as yet found. There is good mining timber in this locality, and on the President Loubet mine there is a very convenient battery site. Mr. Berteaux's venture is very commendable, as any success in his mine would react favourably on the district. There is so little work done on the Callion field, as a whole, that it can by no means be condemned as hopeless, though in little favour at present.

Davyhurst.

This district also was visited for the special purpose of looking into an application for assistance under the Mining Development Act; and there was not time to look at more than a few of the mines in it. The reefs have been laid down on a geological map of the district recently issued by the Geological Survey (Bulletin No. 12, on "The Geological Features and Mineral Resources of Mulline, Ularring, Mulwarrie, and Davyhurst," by Mr. C. E. Gibson, B.E.), which shows also the general structure of the country very clearly. At the time of my visit the greatest interest centred in the *Golden Pole* mine, on which a 10-head battery and cyanide plant had just been erected. The main shaft was down to

300 feet, and it was proposed to sink another 100 feet. At the 100 and 200-feet levels the reef was seen to be a strong, good-looking body of quartz, and the returns obtained proved it to be of excellent quality. There seemed every reason to be sanguine about this becoming a valuable mine. Want of water supply has, however, kept it back very much. The adjoining *Waihi* mine is also equipped with steam winding machinery and rock-drill plant, and has a main shaft down 275 feet, which appears to be just on the water-level. There is also a level open at 110 feet. In these workings the lode stuff was found to change very suddenly from white quartz into mineralised and altered country rock, green talc schist, chlorite, dense dark quartz, and iron pyrites with a little copper pyrites, and the chutes of workable stone appeared to be very short and bunchy. A very similar feature to this is seen in some of the principal mines at Menzies. On surface it is seen that there are four parallel lodes running about North-North-West and with slight underlay to the West, and several crushings from these have given fair returns. It seemed to me that from the disjointed nature of the blocks of quartz in these lodes it would be necessary to drive extensively along the course of each, and to do a great deal of exploratory and development work, in order to be able to preserve a steady output of ore. The country is hard greenstone, with occasional porphyry dykes.

The *Great Ophir* mine (613U) was the one whose application for assistance by way of loan from the State took me to the district. The lessees wished to sink to a depth of 180 feet, and to make necessary drives at that level to obtain a supply of water that would enable them to crush their ore on the spot. They claim that they have a large amount of ore on hand that would be payable if crushed on this lease, but which is not rich enough to pay for cartage and crushing charges elsewhere. The ore is of a very clayey nature and the gold is very fine and often flaky, so more water and more careful treatment are required than in the case of ordinary quartz. The mode of occurrence of the ore presents some features which are not altogether usual, and which, I think, have led the lessees to believe that the "formation" is a larger one than it will probably prove when opened out at a short depth below the surface. There is a good deal of gold about the surface, along the line of the "formation," impregnating the schist country. The country is greenstone schist, very much weathered at surface, and often largely altered to ironstone schist by infiltration and substitution of brown iron oxide. Portions are also often similarly altered to quartz, still retaining the schistose structure of the original rock. The gold occurs in these ironstones and silicified schists, and also in less altered schist, principally between the folia, but also embedded in these, and is of a crystalline character, some of it fairly heavy, but mostly very fine and flaky, floating in the prospecting dish with the greatest readiness. It is very pure gold, being stated to have brought as much as £4 2s. 1d. per ounce at the Mint. From its purity and occurrence in the ironstone schist I am of opinion that this gold is of secondary origin, having been deposited as a consequence of the varied reactions which take place during the superficial alteration of lodes and country by the chemical processes which result from the action of the atmosphere and surface waters upon the rocks lying above the permanent water-level. These processes often result in a concentration of values in the oxidised parts of the lodes, and exploration at deeper levels is required before there can be any confidence as to the values being maintained below the weathered zone.

The general strike of the schists in this district seems to be about North-North-West, as is usual in our Eastern Goldfields, but at first sight in this mine it appears to be almost at right angles to this, being East-North-East. In some surface workings, about four chains West of the main workings, it is, however, seen to have the normal strike of North-North-West, and also in some other workings about 12 chains to the South. The East-and-West lamination of the country suggests that there is a strong disturbance of the strata at this point, but further examination of the district convinced me that there was another explanation, and that the anomaly was only apparent, not real. At the 100-feet level of the Golden Pole mine the country in the crosscut from the shaft to the reef is seen to be laminated by the occurrence in it of a large number of parallel joint planes or cleavages, lying very close together. These cause a foliation of the rock across its strike, quite similar to the true "slaty cleavage" exhibited by roofing slate—which splits into plates across its original bedding—though not carried to the same completeness of lamination. Such cleavage is usually attributed to compressive stresses in a direction more or less perpendicular to the planes of cleavage. It is noteworthy that this laminated rock in the hard greenstones of the Golden Pole lies almost on the exact line of strike of the Great Ophir lode, the direction of the laminæ being East-North-East by West-South-West, and the dip in both cases is as nearly as possible the same—about 30 degrees to the North. It seems probable, therefore, that the "formation" of the Great Ophir lode, with its accompanying foliated country parallel to the veins, and of the laminated rock in the harder country of the Golden Pole, are due to the same line of compression and jointing. In the softer country of the Ophir there was probably faulting movement along the joints, resulting in the formation of the lode or lodes. These show smooth striated walls with clayey selvages, indicative of rubbing motion. The lode matter is largely weathered clayey greenstone, kaolin, oxide of iron, and quartz, and often shows streaks of white kaolin and brown iron oxide parallel to the walls. In the Golden Pole mine the joint planes in the laminated rock are similarly often clearly marked by white kaolin deposited along them. It seems fairly plain that the Great Ophir lodes have been formed by lode solutions travelling along the fracture in the country afforded by a group of close-lying parallel joints and impregnating and altering the rock between them. In the lowest workings I noticed radiating and felted bundles of actinolite crystals in parts of the lode, confirming this interpretation of its origin. Below the water-level the lode-matter will probably be quartz, actinolite, chlorite, and pyrites, with any gold that may be present mainly in the quartz and pyrites. The main fissure appears to be a plane on which perceptible movement of the country has taken place, consequently may be expected to be persistent in depth.

At least two parallel veins are cut in the workings; and it is probable that there are others. In a fissured zone, such as has been above described, it is to be expected that deposition of minerals will have gone on along several of the parallel planes of lamination, and accordingly the country is worth testing by crosscuts from side to side of the foliated belt. Owing to the flat dip of the veins this crosscutting can be done even more effectively by sinking than by driving.

The workings on the vein on which most work has been done begin with a shaft about 18 feet deep near the outcrop, sunk vertically to the vein, from which an underlay working has been carried down about 140 feet. Another shaft, called the main shaft, has been sunk vertically 70 feet, and cuts the lode at 65 feet, connecting with the underlay workings. Another shaft, known as the West shaft, is sunk a little further to the West to a vertical depth of 100 feet. At about 80 feet a large and rather irregular body of quartz was passed through, which is probably connected with the lode, as this ought to pass through the shaft at this depth. Some of this quartz contains a little gold. From the bottom of the shaft a rise has been put up to connect with the underlay workings, and as this comes up under the lode it is clear that the shaft must have passed through it. In the main shaft a parallel vein is being worked at the 30-feet level, the ore being schistose brown ironstone mostly; but this does not appear to have been cut in the 100-feet shaft. The ironstone often gives place to quartz, and at times to very clayey soft "pug," some of which carries very good gold values. This vein is being stoped out about 18 to 24 inches in width; but a greater width of it is auriferous, and could be worked with a mill on the ground.

About four chains to the West of these shafts there is a hole excavated on the same line of lode, from which some good schistose brown ironstone, carrying gold, has been taken. It is also traceable along the surface to the shafts. About 12 chains to the South of the shafts some mining has also been done on a vein of blueish quartz, striking North 20° West, and underlaying steeply to the West. This is small, rarely more than six inches thick, but carries some excellent ore showing coarse gold very freely. It strikes almost straight for the shafts, and along the line between the shafts there is a good deal of quartz about the surface. This line of quartz should be prospected, and an attempt made to find its junction with the East-and-West lodes.

There have been four crushings from this lease from the workings at the shafts, and at the time of my visit another parcel was being taken to the Mulwarrie State battery to be treated. There has been at times some difficulty in getting this stuff put through at the battery on account of the large amount of water required from its very clayey nature. The crushing of one parcel of the very "puggy" stuff from the main shaft could not be completed for this reason, the water supply becoming exhausted before the crushing could be finished. The following are the returns that had been recorded by the Statist of the Department:—

Year.	Tons crushed.	Gold obtained.	Rate per ton.
		ozs.	dwts. grs.
1901	23	18·70	16 6
1902	15	8·30	11 0
1902	19	13·60	14 8
1902	42	31·70	15 2
Total	99	72·30	14 14

The tailings from the first crushing, I was informed, assayed 6dwts. to the ton; those from the second—the "puggy" stuff above referred to—11dwts., and the slimes 26dwts.; those from the third, 8dwts. 9grs. per ton.; and from the fourth, between 8 and 9 dwts. per ton. These results show that the ore has a very fair total value, but that it requires cyanide treatment to get anything approaching a satisfactory extraction. The cost of cartage to the Mulwarrie battery is 8s. a ton.

There seems a good deal of likelihood that the main shaft would get a supply of water, if sunk, as the mine is in low-lying ground.

At the time of my visit to Davyhurst the pressing need of the district was a reliable water supply, both of salt water for crushing, and of fresh water for boilers and domestic use. The supply at the State battery at Mulwarrie was insufficient, and no other considerable supply had been found. The Government dam—since finished—for catchment and storage of rain water, was only being begun; and in none of the mines was there any influx of water capable of keeping a battery in work. I think, however, that before long salt water for crushing will be got in several mines which lie in the valleys to the South side of the field by deepening the shafts, and the Government dam will provide for fresh water supply; so the troubles as to water will probably lessen very much in the course of a year or two. The records of the State battery at Mulwarrie show that there are a considerable number of gold-producing reefs round Davyhurst and Mulwarrie, and the field seemed to me, from the little I saw of it, to be in a very healthy condition.

Mulline.

In passing through from Davyhurst to Menzies I made short visits to a few of the mines in the Mulline district, on which the following notes are offered:—

Red Leap Mine (Lease 89u).—A good deal of work has been done in this mine on a small reef some 6 inches to 12 inches thick running about North 10° West and dipping Easterly about 60°. A dyke of quartz porphyry lies near the lode, which is in greenstone country, getting rather hard below the 100-feet level. Several shafts have been sunk along the line of the lode, which appears to have carried gold for a fairly long distance. Work was mostly confined to the softer country above the water-level (about 100 feet). The mine is reported to have produced a considerable amount of gold.

Shamrock (Lease 1u).—This lease was the first one taken up in the district, and has been worked on a small scale for a long time. The reef strikes North 10° West with dip about 56° to the East. The main shaft is down 145 feet on the underlay, to the water-level. Two other shafts are 130 feet and 60 feet deep, also on the reef. The lode has distinct smooth walls, three to five feet apart, and seemed rather bigger in the harder country at the lowest level than in the softer ground near surface. The quartz

would average from 12 inches to 18 inches, and the ore chute is about 200 feet in length. Over 1,000 tons of stone had been crushed from this mine for an average return of 32dwts. per ton, and at the time of my visit the bottom of the mine seemed still to be in good ore. A good deal of galena is found with the gold, also iron pyrites. This seemed to me a very promising mine, well worth being opened below water-level with a good equipment of machinery.

Lady Gladys (139U, 235U, 555U).—This has been a valuable mine, about 6,000 tons of ore crushed having yielded over 14,000 ounces of gold. The reefs are small, the veins of quartz being usually only 12 inches to 18 inches wide, and very flat, dipping about 1 in 5. Two veins, close one above the other, are worked in the principal workings, and tributers were at work on other flat veins that seemed to lie higher than the main ones. The reefs bend about a good deal, and seem to terminate at each end of the levels against crosscourses, into which, however, part of the quartz often appears to run. It seems possible, as mentioned previously, in the cases of the Mt. Bellew lode at Ballagundi, and the Golden Ridge at Boorara, that the flat reef results from compression of the block of ground between the two crosscourses. There seem to be several more or less parallel flat veins, so boring and sinking vertical shafts seem likely to be the best ways of prospecting the ground. The workings are down to about 120 feet vertically, and in the bottom levels the reef contains a great deal of pyrites, often in large crystals. There are also some copper pyrites, blende, and galena. In the bottom levels the reef is in hard greenstone country.

MENZIES.—A few hours were spent visiting the Lady Shenton, Queensland Menzies, and Menzies Consolidated mines, but it was not possible to devote enough time to them to make a report upon them. The disjointed character of the quartz in the reefs, and the shortness of the ore chutes, seemed worthy of note. The country is hard greenstone, but granite is seen in one of the crosscuts of the Lady Shenton, and plentifully in the neighbourhood.

KOOKYNIE and GWALIA.—Similarly as at Menzies, though short visits were made to the Cosmopolitan, Cumberland, and Sons of Gwalia properties, the time spent in these large mines did not justify me in attempting anything in the nature of a report upon them. All three mines have considerable underlay, and are worked by inclined shafts following the dip of the reefs.

YERILLA.—A little work was going on at Yerilla, on the Melba Consols and Queen of the Earth mines, and a good deal of dry-blowing on surface appeared to have been done recently. There are numerous outcrops of quartz in this district; and it seems possible that some of the reefs that were unpayable in former days when the field was first opened may now be workable with profit. The Melba Consols has lately erected a battery, which will serve to test the district.

YARRI AND EDJUDINA DISTRICTS.

A short visit was paid to the Yarri and Edjudina districts on 5th to 8th August, 1903. The inspection being necessarily a very hurried one, it was not possible to see all the mines that were working, and only a very short time could be given to those that were seen. It is possible that closer examination and sampling of the mines would greatly modify the opinion formed by me of the district, but I do not think that the main conclusion—that we have two valuable and very promising fields at Yarri and Edjudina—would be seriously affected.

The recent publication of the Geological Survey Bulletin No. 11 ("Notes on the Country between Edjudina and Yundamindera"), by the Government Geologist, Mr. A. Gibb Maitland, renders it unnecessary for me to give a detailed report on the workings on the various leases, as these are fully described, and the reefs marked on the map, in his report, which also describes the geological structure of the district. In some cases, however, a good deal of work had been done between the times of his visit (early in the year) and my own, and a few remarks on these, to supplement the Government Geologist's report, will not be out of place.

At Yarri the lodes occur close to a contact of greenstone and granite running North-Westerly, and are partly in the former and partly in the latter rock. In some the immediate wall-rock is a sericitic schist, which appears to be pretty certainly a product of alteration of the wall-rock along a shear zone. The quartz often seems to be a metasomatic replacement of this schist, having a fibrous fissile structure, conformable with the lamination of the schist. The relative age of the greenstone and granite formations requires a good deal of elucidation. Mr. Maitland describes the granite as penetrating the greenstone, but suggests that the greenstone schists of the district may be much older than the massive greenstones, and also suggests that there may be granites of two totally distinct geological ages. In the spoil heap at the Government well at Yarri I noticed a block of greenstone inclosing a large angular fragment of granite, which would show that some of the greenstone dykes are younger than certain of the granites of this locality.

At Edjudina the country is mostly greenstone schist, not altogether similar to the massive greenstone (diabase) of Yarri, and the lodes form a remarkably well-defined belt in the schist, running for about eight miles in one line in a North-Westerly direction. There are several lines of lode in the group, and they seem to thin out and take up again on about the same line of strike further on. No one of these lodes seems to run for any considerable length, but the group as a whole appears to be very persistent, and is stated to be traceable as far South as Pinjin, or over a total distance of quite 25 miles. Mr. Maitland's map shows very clearly the characteristic occurrence of the separate lodes in this group or "run." It also shows the relation between the group of lodes and certain parallel belts of hematitic jaspers, which lie on each side of the run of lodes. These are often very evenly laminated, but at times are much contorted in structure, and often have strings of quartz running irregularly through them. At times the quartz carries pyrites. Portions of these jasper bars are of distinctly lode type of structure, and I agree with Mr. Maitland in regarding them as the result of mineralising action along zones of shearing of the country rock. In the "Broken Hills," to the North of Edjudina, there is a large development of these jaspers, and they are associated with several quartz lodes carrying gold.

The auriferous reefs at Edjudina are notable for the peculiarity that the quartz usually occurs in lenticular masses, locally known as "kidneys," of very various shapes and sizes. The lenses may contain several tons or only a few pounds, and are generally disconnected from one another as they lie in the reef, the edges being separated by thicker or thinner layers of schist. The occurrence is locally compared as resembling that of strings of beads or strings of sausages, and gives a considerable amount of uncertainty to any estimates of quantities of quartz available in any block of stoping ground. The reefs are mostly rather small, and a large tonnage output of quartz could not be maintained without working out a very large amount of ground. Most of them are therefore better suited for the operations of small owners than of large companies. The average values as determined by the crushings that have been made are very satisfactory, however, and there seems every reason to believe that they will be maintained in depth, the gold being well distributed through the solid stone. The stone contains a fair amount of pyrites at the lower levels, and has a very kindly appearance.

The quartz in the Yarri reefs varies a good deal in appearance, some of it having a semi-translucent, ice-like character, some being vitreous, with an amber tinge, and some of the more ordinary dull opaque ironstained variety. The best gold I saw was in the latter, but good prospects were also got from some of the very white ice-like stone. This last seems mostly to be a replacement of the schist, and merges into the latter very suddenly; in some cases big bodies of quartz changing in a few feet into schist. The apparent "petering out" of some of the veins, due to this, has been against the field, but I do not think that a great deal of importance should be ascribed to it, as most probably the quartz will come in again below just as suddenly as it went out. The formation of the quartz does not seem to me to be at all likely to be a merely superficial phenomenon. This feature seems to be characteristic of the lodes in the granite, rather than of those in the greenstone in the Northern and South-Eastern portions of the field. In these the quartz is of the ordinary type, much stained with iron near surface, and carrying a good deal of pyrites lower down.

At the time of my visit there were 20 men engaged on the Yarri field, working on eight leases. Several leases had no one working on them. In the *Queen's Birthday* lease (585R) some very fine ore was being got in two shallow shafts, from a reef about three feet wide. The show looked a very good one when I saw it, but was very little opened up. Crushings going 15dwts. and 18dwts. to the ton were reported to have been got from two leases further south which I did not see. In the *Wild Dog* lease (582R) three gold-bearing reefs were seen lying parallel to each other within a width of 250 feet, from which crushings yielding 5dwts. to 18dwts. to the ton had been got. The same three reefs extend northward into the *Wallaby* lease (581R), on which a good deal of work has been done by shafts and trenches. One shaft is 70 feet deep, and two others 55 feet. The surface quartz was of very fair value, good prospects being obtainable all along the outcrops of the reefs, which show very strongly at surface. At the bottom of the shafts, however, the bodies of quartz became smaller and broken up, and the values are said to have fallen to very little. I do not think, nevertheless, that nearly enough work has been done to properly test this property. On the *Wallaby Central* lease (580R) a strong reef runs right through the holding, with one or two parallel ones not so distinctly seen. On this lease an underlay shaft has been sunk 106 feet, reaching fresh water at 103 feet, and a vertical shaft is down 60 feet. Some good crushings have been got from this lease, and there is a large amount of very easily mined surface stone that would probably pay with a battery on the ground. The same lines of reef continue into the *Wallaby North* lease (579R), which has a shaft down 55 feet, and has had good crushings. I saw some nice gold in the workings here.

Between these leases and the next worked to the North there is an interval of a mile and a-half, where we come into greenstone schist country which appears to contain a large number of reefs, many more than have yet been opened up. In the *Mia Mia* lease (666R) there is a shaft about 70 feet deep on a reef two to three feet wide, but no one was on the mine when I visited it, so I was not able to get any information as to crushings. Still further North, on the *Aerie* lease (655R), a good deal of shallow work had been done, and some nice stone raised. There was a very large amount of quartz about this lease, which would require much trouble and skill in prospecting in order to locate the payable chutes. Work has also been done on the *Return* lease (680R), and on the *Puzzle* (690R) and *Puzzle Extended* (707R).

With regard to the question of a public battery for the Yarri field, it is soon seen, on going over the ground, that there is no lack of quartz carrying some gold, but a good deal of actual crushing must be done before it can be regarded as demonstrated that there is any large quantity of payable ore. Much that would be payable with a battery close by is of no use when all stone has to be carted to Edjudina. The charges for carting and treatment of ore from the Wallaby Central for example were:—

Cartage to Edjudina	... ...	12s. a ton
Treatment in battery	... ...	16s. ,,
Removal of tailings	... ...	2s. ,,
Total	... ...	30s. a ton

This is equal to the value of 8dwts. of gold per ton for cartage and treatment only. To treat quartz of, say, 10dwts. value, a local battery must be obtained. It should have cyanide vats attached to it, as much of the gold is very fine, and escapes amalgamation. While there can be no certainty on proof at present available that a State battery at Yarri would pay its way, I think that the prospect of doing so is quite good enough to warrant risking the putting of one there. As things are at present, unless a State battery is established, there is every expectation that this very promising field will be abandoned.

The location of a State battery to serve the district to best advantage requires a good deal of consideration. The principal leases working at Edjudina are seven and a-half miles in a direct line East of the Wallaby group of leases, so it at once suggests itself that a battery half-way between the two would serve both places. This is quite true, but it would serve neither place well, as every one would have to

cart quartz quite four miles, at a cost of probably 8s. per ton. Two batteries would be far preferable, one at each place; and as Edjudina has three batteries already in existence, it seems to me best to put one at Yarri without any reference to Edjudina. Then, in order to serve both ends of the Yarri field, it would be advisable to put the battery somewhere about equally distant from both north and south groups of mines. The question, however, turns on water supply for the battery, and until this has been found it is useless to decide as to a site. The Government well is 109 feet deep, and gives a supply of fresh water, but only 900 gallons a day. About a mile North-North-West of this well there is an old shaft about 100 feet deep in which fresh water was struck, but the flow is not known. If found to be considerable this would not be a bad site for a battery. To the North the ground rises, and there is little probability of getting a water supply easily. The best known water supply in the district is about two and a-half miles South-South-West from the Wallaby leases, at Alderson's well. This is stated by Mr. Alderson to have yielded 6,000 gallons a day, when first opened, of good potable water, and has never been emptied since. The water was got at 40 feet and the well sunk to a total depth of 55 feet. As the general fall of the country is toward this well, it is probable that the best supply will be found in that direction, but it is, unfortunately, away to one end of the field. Probably water could be got also to the South-East of the Yarri leases, as the ground falls that way also, but this too would be a good way from the mines, especially from those at the North end. I am inclined to think that the safest course would be to arrange for sinking the Wallaby North shaft to a depth of 200 feet, and crosscut therefrom across the line of lodes, where it would be reasonable to expect a fair supply of water.

At Edjudina the *Neta* lease (361E) is equipped with a 5-head battery, and a rather primitive cyanide plant, and has a steam winch employed in winding from the main shaft. This is opened to the 100 feet level, and when I visited the mine, was in process of being sunk to the 200 feet level. The water level is only a few feet below the 100 feet level. The water is pretty salt, but is used in the mine boilers without condensing. There is sufficient to supply the wants of the battery, and probably as the 200-feet level becomes opened up there will be enough for a larger mill. There are three lodes cut in the workings, and the quartz varies in thickness from nothing up to about four feet, and runs in chutes that appear to be somewhat short. The quartz occurs in the form of lenses or "kidneys" as above described. This mine, I understand, has paid its way from the start, and the machinery has been obtained out of gold produced.

The *Senate* (539R) and *Representative* (557R) leases are worked conjointly, and a good deal of driving and stoping has been done. The width of stone runs from about nine inches to one foot as a rule, and it has the "kidney" character. The mine has been opened to the 100-feet level, which is just above the water level, and sinking will soon be necessary. Some very good ore was seen by me in the bottom of the mine, with every appearance of permanency, and the record of crushings is very fair indeed.

The next lease going South is the *Gawler* (365E on the map), which also has been opened at 100 feet, just above water level. A very considerable amount of driving and stoping has been done, with payable results. The reef only averages nine inches to one foot of stone, and sinking below water level will therefore soon become imperative in order to get ore. There is, however, a second reef to the West of the one now being worked.

The *Neta Extended* (366E on the map) lies next to the Gawler, and was formerly known as the Great Fingall. I did not see the underground workings of this mine, but understand that the main shaft is 100 feet deep, and that two other shafts are down to water level at about 93 to 94 feet. The reef was small, as in the above-mentioned leases, but carried some very fair stone. This mine was opened a good many years ago, in the early days of the Edjudina field, and a battery is said to have been erected and pulled down again without crushing the stone at grass. In later days this is stated to have realised 26dwts. to the ton when crushed.

Five men were working at the time of my visit on the *Scott's Belle* (367E) and *Welshman* (368E) leases, and were down to water level in two shafts. In the next lease to the South, known as the *Bulger* (369E), there were six men at work. There are said to be seven lines of reef in this lease, and one shaft is down 100 feet to water level. Fair stone is being obtained.

Continuing down the line of lodes several parties were at work on the the *Golden Girl* lease (370E), and several other leases and quartz claims which I have not been able to locate with certainty on the map. The parties were, in order going South, Findtner and party, Murray and Coglan, Williamson and party (383E), Gordon and party, Barrow, Silva and party, Gibson Bros., Petros and party, Christianson and party (near 640R). In all these workings fair stone was being raised from reefs of rather small size, rarely going up to three feet in width, all showing the characteristic lenticular quartz bodies. The water level gets gradually shallower going South. Petros and party and Gibson Bros. are working on the same shoot of stone, which is 500 to 600 feet in length. Mr. Gibson informed me that there were eight lines of reef in this part of the field.

The next party at work were on the old *Triumph* ground (322E), and have two shafts down on similar ore to that already described. Between their workings and those of Petros and party there is a considerable interval, but the lodes continue, and crushings taken from them are stated to have run from $7\frac{1}{2}$ to 13dwts. to the ton. The Triumph mine was worked in the early days of the field on a considerable scale, the main shaft being sunk some 175 feet and a good deal of driving done. The mine has steam-winding machinery, a pumping engine, and a battery, and is stated to have crushed some 4,000 to 5,000 tons of quartz for a return of 27dwts. to 28dwts. per ton. The official record, however, only shows 2,262 tons crushed for 2,213·3 ounces of gold. The tailings are stated also to have been cyanided for a return of 8dwts. to the ton, but there are no official returns to support this statement. The carelessness of mine owners in sending in their returns for record, in this case, as in many others, reacts unfavourably on the field.

The last lease worked on the line was the *Glengarry* (502R), which had just been fitted with very nice winding plant, a steam pump, and a ten-head battery and cyanide plant. The surface outfit of this

mine was very creditable indeed to those erecting it, but I am sorry to say that the underground developments appeared to me to be quite insufficient to warrant such a plant at the present stage. Very little stone was in sight and the reef was very small. The shaft is down to the 200 feet level, at which a little driving has been done. The reef here was very small when I saw it, about three inches to six inches only, but carried gold. In the 100 feet level it might average 12 inches of stone. The amount of stoping ground opened up was quite insufficient to keep the battery supplied. The shaft was stated to be making about 40,000 gallons of water a day, the water being salt, and required condensation to fit it for use in the boilers. The water level is at 61 feet. This battery was willing to crush for the public, but its position at the extreme end of the line of workings was against it.

At the North end of the field, but on another line lying quite a mile and-a-half to the East of the line of the above lodes, are three leases known as the *Broken Hill* (610R), *Broken Hill North* (611R), and *Lyon Glen* (677R). These are situated on some stony hills, composed largely of jasper and quartzite, which are shown on Mr. Maitland's map to be a continuation of the big Eastern jasper belt which runs parallel to the Edjudina line of lodes, and is well seen at the old Triumph battery site at Yabboo Hill. Not very much work has been done as yet, but enough to reveal several very promising lodes. A crushing of the outcrop stone on Lease 611 is said to have given 6dwts. to 7dwts. to the ton in the battery. The stone in these reefs will contain a good deal of pyrites in depth, the surface stone showing numerous spots of brown iron oxide resulting from the decomposition of pyrites. These reefs require and deserve systematic prospecting, but the distance from a battery makes them expensive to work. A good deal of work could be done by tunnelling from the East side, the hills being steep and high enough to admit of this method.

Besides the Neta and Glengarry batteries, both of which take public crushing when not engaged with their own stone, there is another battery, that of Messrs. Pauley and McCoy, which is situated on Machine Area 3R, near the centre of the Edjudina line. This has 10 stamps, of 950lbs. each. When I saw it there was no cyanide plant, but the owners proposed to obtain some vats and a tailings wheel. The charges were 16s. a ton for parcels over 20 tons, and the proprietors received an additional subsidy of 1s. 6d. a ton from the Government. The tailings belonged to the parties bringing in the stone provided they removed them at their own cost. In most cases the owners paid the battery 2s. a ton for removing the tailings to stacks a little distance away from the stamps, where they are accumulating for subsequent cyanide treatment. When the tailings wheel is erected the handling of the tailings should be much cheapened. This battery appears to be able to meet all reasonable demands for public crushing facilities at Edjudina at present. The water supply is obtained from a shaft about 100 feet deep, and is quite sufficient. It is salt, but water for the boilers is obtained from a Government dam at a cost of 3s. per hundred gallons for carting. Wood costs 20s. a cord.

A well appointed State battery could, I think, crush in this district at the ordinary Government rates without loss, and the demand for one is really mainly in order to get cheaper crushing, and not because facilities do not already exist. Messrs. Pauley and McCoy's battery would require very considerable alteration and improvement before much difference could be made in their crushing rates, and as they have their living to get from the battery, and must recover the capital sunk in its purchase and erection, it is impossible for them to come down to the Government scale, which is based on mere working expenses. The need of the district is urgent for cheap crushing rates, and if these can be given there seems little question that it is a field most admirably suited to small co-operative working parties, and which would carry a thriving population. It seems to me, therefore, that a State battery ought to be granted as soon as either the Pauley and McCoy battery is fully occupied with stone from a mine of their own, or a satisfactory arrangement can be arrived at with them for the sale or removal of their battery.

The fine plant at the Glengarry mine would be well adapted for public crushing and cyaniding if there were better means of getting to it. The mines all lying in a dead straight line on level country could be most admirably served by a light tramway, on which the carriage of ore to the Glengarry mill could be done far more cheaply than by cartage to the present more central plant, from almost all the leases requiring crushing facilities.

The official records to the end of 1903 show the returns from the Yarri and Edjudina fields to total as follows:—

	Tons crushed.	Gold obtained.
		ozs.
Yarri	1,332·25	2,072·19
Edjudina	14,071·25	18,426·10
Total	15,403·50	20,498·29

Details of the yield of each mine are given to June 30th, 1903, in Mr. Maitland's report, and to end of 1903 in the Annual Statistics of the Department. At the time of my visit the number of men employed on the Edjudina mines was 141.

Blackboy Hill.

About 25 miles North of Newcastle, in the high country near the head of the Toodyay Brook, a little gold has been known to exist for some years past. The district was examined and reported upon by the Government Geologist, Mr. A. G. Maitland, F.G.S., in March, 1898, and again by Mr. H. P. Woodward, F.G.S., in June of the same year. In 1903 some of the old leases were taken up again and prospecting resumed, and in consequence I visited the locality. There is very little, however,

to add to the former reports. The country is mostly mica schist, with occasional dykes of diabase penetrating it, and often carrying large veins of quartz. The lodes appear to lie in the laminations of the schist or very nearly so. The principal workings are on the Eureka Extended, Eureka, and Toodyay Wonder leases, but very little has been done on any of them.

Eureka Extended (8PP).—On this there was a shaft sunk 100 feet vertically, and opened out from at water level, 80 feet. At this depth a big body of micaceous and amphibolitic schist, with a good deal of vitreous quartz, has been cut through, which appears to be of the nature of a lode, and presents in places a fairly smooth hanging wall. Some gold is stated to have been got in this, but it did not seem very promising material. A sample sent to the Geological Survey Laboratory assayed 4dwts. 12grs. of gold per ton.

Eureka (6PP).—The workings are close to the North boundary of the lease, and consist of an underlay shaft sunk to meet a vertical shaft 85 feet deep. There is a considerable body of quartz in these workings, rusty and vitreous, in which a little gold is to be seen. The quartz is full of vughs of ochreous oxide of iron, indicating pyrites below the water level. Some tons of ore had been bagged, and a sample taken by me from the bags assayed 11dwts. 23grs. per ton. Another sample taken at the 60 feet level only gave 4dwts. 22grs. per ton. The reef appears to be rather irregular in shape, but is little opened out. Some of the quartz contains hornblende. There is a good deal of quartz available at this point, and the assays show that some of it approaches a payable value, so further prospecting is much to be recommended.

Eureka North (11PP).—A very little work has been done on this on what is probably the Eureka reef.

Commonwealth (19PP).—Some trenching was in progress on this lease, without much result, when I saw it, and a hole had been put down on a "formation" of iron-stained schistose quartz said to carry a little gold.

Toodyay Wonder (7PP).—A shaft has been sunk vertically about 50 feet, and some cross-cutting and driving done from it. Close to this are two other old shafts. No very definite lodes appeared to me to have been cut. On surface there is a trench on the outcrop of a vein running North five degrees West, and dipping flatly to the East, but of small size, and in this a little gold can be got by panning. A sample taken by me, however, only yielded 15grs. per ton when assayed at the Geological Survey Laboratory. About two chains West from these workings there is another lode, about 18 inches thick, on which a shaft is down 20 feet. The lode runs North and South, and dips to the East, but seems to be lost in the bottom of the shaft, probably through making a sudden twist into the hanging wall conformably with the mica schist country enclosing it, which is seen to make such a bend. A little stoping has been done here, and a sample taken along the back of the stope by me gave 12dwts. 6grs. of gold per ton when assayed. The quartz is very glassy in appearance, with vughs filled with oxide of iron, and on the edges shows scales of silvery mica.

There is no question that some gold has been found in this locality, but the reefs as yet discovered, are, in my opinion, too irregular in their occurrence and too small to be likely to prove of much importance. The association of glassy quartz, mica, hornblende, and chlorite, in the lodestuff is very interesting, and quite unlike the gold-bearing material of the other goldfields of the State. The occurrence of these lodes in the mica-schist country is also unlike that of the reefs of most of the well-known fields. There seems to be very good reason for continuing prospecting in the locality, as a more defined and larger reef may thereby be found, but there does not appear to be much hope of successful mining on the veins as yet opened up. A small battery has lately been erected on the ground, which will enable the veins to be tested practically. The water supply is, however, very poor.

GREENBUSHES.

A brief visit was made to the Greenbushes Tin Field in connection with applications for advances under the Mining Development Act by the "South Cornwall" and "Battler's Hope" lessees, during which the opportunity was taken of making a very cursory inspection of the field generally. It has been mapped and its geological structure described in the Government Geologist's Annual Progress Report of the Geological Survey for the year 1899, to which I can add but little. The bedrock is very poorly exposed, but there appear to be some three or four more or less parallel belts of stanniferous granite running through the field on a course between north and south and north-west and South-East. As far as I could see they were not definite lodes, but rather of the nature of stockworks, that is, belts of the granite much altered by pneumatolytic agencies, and impregnated with tin ore and tourmaline. The altered granite is very micaceous, with large scales of white to greenish mica, but sometimes is also altered to a granular quartz rock, almost free from mica. Much tourmaline is present, often in large crystals. The stockwork granite also contains small quartz veins, which occasionally seem of sufficient importance to be called small lodes. Much kaolin and talcose and sericitic matter is present, the rock being very variable in its composition. It is very similar, in its essential characteristics, to the tin-bearing rock of the well-known stockworks of the Blue Tier in Tasmania, with which I am familiar, and which are regarded as portions of the granite country much altered by pneumatolytic action, that is, by the action of super-heated steam and hot gases while buried deep below the surface of the ground. This action is akin to that by which most probably regular tin lodes have been formed, but has affected a considerable mass of rock, instead of being confined to a lode fissure.

The general experience of stockworks is that they are of low grade on the whole, though containing numerous rich bunches and strings of ore, and containing, in the aggregate, often enormous quantities of tin. Where they have been worn away at surface they set free large amounts of alluvial ore, which readily becomes concentrated, by natural agencies, to form important deposits. The distribution of the tin in stockworks is usually very irregular, being sometimes right through and through the rock, but

more frequently in small veins and strings ramifying irregularly through it. As a rule these veins are too irregular to be capable of being followed by mining, and the proposition, from a mining point of view, narrows itself down to whether the tin-bearing rock will pay to handle in bulk.

South Cornwall.—At the time of my visit to the "South Cornwall" the shafts on the property were full of water, and only the dumps could be examined. Portions of these gave good prospects of tin ore on washing. The tin-bearing formation, or stockwork, is said by Mr. Johnston to be some 100 feet in width, but not yet to have been properly cut through. The East wall is dark micaceous schist. The tin-bearing rock has quite the stockwork characteristics above described, and I have little hesitation in grouping it in this class of ore deposits. The deepest shaft is stated to be 65 feet in depth, and some excellent ore was obtained from it. Mr. Johnston informs me that altogether about 600 cubic yards of material have been washed, for a return of 10 tons of black tin, or dressed tin oxide. This is, approximately, 1 per cent. tin ore per ton of rock, which might be payable under favourable conditions of mining and dressing. Less than one half per cent. of tin ore has been made to return a profit, under favourable conditions, at the Anchor mine in Tasmania.

Mr. Johnston tells me that the water level in summer in his shafts is at about 65 feet, and that down to that depth the rock is soft and easily sunk through. In winter the shafts become filled to the surface, but the influx of water is not so great as to present much difficulty in working. The idea in the district heretofore appears to have always been to sink deeper, in the hope of defined lodes being met with, but the behaviour of stockworks hardly warrants this course. The probabilities are in favour of there being little change in the character of the rock, except that it will naturally get harder below the surface zone of weathering. It does not seem to me that there is any better chance of getting good ore in depth than near the surface, and the shallow ground is much less costly to work. Consequently I would advocate a thorough trial being made of the superficial parts of the deposit, before going in for deep sinking. If the shallow ground cannot be worked profitably, there does not seem to me much hope for the deeper parts.

In order to test the "formation" thoroughly, I would recommend in the first instance sinking a number of shafts, about 50 feet in depth, along its course, and crosscutting therefrom, crushing and testing all rock extracted, so as to arrive at the general average value, and to ascertain if this was high enough to give a profit when worked in the cheapest possible manner. It might happen that a certain width of the deposit would pay to work, even if the whole would not. Without a systematic test of this sort, there is no likelihood of being able to make anything permanent of the mine, though a few richer bunches of ore might be rooted out in a desultory manner.

A less satisfactory method of testing would be to bore a large number of holes to a depth of, say, 100 feet each, with a diamond drill, crushing and testing all the core as it was extracted. To be effective this method would require a very large number of holes, and very careful sampling of the core.

The testing of these stanniferous "formations" or stockworks is of great importance to the district. At present I am not at all sanguine that they are rich enough to pay for working, but think that the matter ought to be tested thoroughly, and that there is a fair claim for State assistance. I have recommended, therefore, that the lessees' application for an advance should be acceded to.

The work should not be very costly, and probably shaft sinking and crosscutting together would not average more than £1 per foot. At this rate a subsidy of £500 would enable 1,000 feet of sinking and crosscutting to be done, which would go far to thoroughly test the ground.

The *South Cornwall* ground appears to have had the richest ore as yet discovered in the field in the matrix, and is therefore the best place that can be selected at present for such an extended trial as is required. The results of Mr. Maitland's tests of the adjoining "Cornwall" mine show that it also carries an appreciable amount of tin in similar stockwork material, pointing to it likewise being well worth testing. Present appearances indicate that the "Cornwall" and "South Cornwall" "formations" are more likely to prove to be separate parallel bodies than one and the same.

The fact that the stanniferous deposits appear to belong to the stockwork type instead of the true lode type should be borne constantly in mind in prospecting for tin in the matrix in the Greenbushes field. There may be true lodes as well, but so far as I could learn none have yet been discovered. A good deal of the prospecting already done has been misdirected through want of appreciation of the stockwork character, all efforts having been directed to looking for regular lodes instead of proving the value of the stockworks.

The *Westralian Stannaries, Ltd.*, are also working a "soft lode" near the head of "Dumpling Gully," which seems to me rather of the stockwork type of ore deposit, and are stated to have extracted some very fair ore, but I had not time to go underground and examine the occurrence fully.

In the lower part of "Bunbury Gully," in the *Amanda* workings, there are veins carrying crystalline tin ore traversing the soft weathered granitic bed rock. These do not appear to me to be large enough to be called lodes, but are apparently fissure deposits rather than impregnations of a mass of country, and come therefore nearer to the lode type than to that of stockworks. Some of these veins contain nice bunches of tin ore, but none have been large enough for systematic work, and they have only been followed downwards a few feet into the weathered bed rock.

The principal source of the tin ore raised at Greenbushes has been the shallow alluvial deposits which are fairly widely spread, having been worked in several somewhat flat gullies that traverse the field. The principal one is "Spring Gully," from which, with its branches, a large amount of tin ore has been taken from very shallow workings. Much of the tin ore, however, is in cemented oxide of iron gravel, and requires battery treatment to set free the tin. In other portions the "wash" is clayey and soft, and puddling is sufficient to extract the clean ore. Occasionally the "wash" is buried under 10 to 15 feet of iron oxide gravel, as in Mr. Rattray's mine. At the head of "Dumpling Gully" there is also some fairly deep alluvial "wash" requiring underground mining, and some of the claims in this deep and wet ground

have been considerable producers of tin ore. This "wash" is mostly treated without difficulty, by puddling without crushing. The "Lady Esther" lease is at the head of the Dumpling Gully, and on it there is a deep hole, filled with water at the time of my visit, from which a considerable amount of tin ore has been extracted, until the influx of water became so great that it was not possible to continue with the plant then available. The ground is still deep going to the South-East, and it seems possible that there may be a run of deep ground going through to the head of Salt Water Gully. Boring would be the quickest and easiest way of testing this deep ground. The "Bunbury Gully" has been shallow ground all the way down, and has been pretty well worked out; but at the lower end there is a deposit of deep alluvial ground, through the "Hard Graft" and adjoining claims, which appears to belong to an entirely older set of alluvial deposits, and to be part of a "deep lead." In this the "wash" is composed of large well-rounded boulders, and the tin ore is much rounded and waterworn. Some of it is cemented with oxide of iron and requires crushing. I had not time to more than look over the dumps of a few of the claims in this part of the field, but the evidence of a "deep lead" was very obvious. It seemed to run across the course of the present valley, towards the "Battler's Hope," and prospecting along this line seems very desirable.

Battler's Hope (Leases 313 and 314).—Owing to an accident which occurred early in October last, resulting in the collapse of the North level close to the bottom of the shaft, the workings had been abandoned and the water allowed to rise until the shaft was quite full at the time of my visit. I had therefore to content myself with an examination of the material thrown out on the dump, and the description by the lessee, Mr. Johnston, of what had been done. It is anticipated that when the water rose the bottom of the shaft would collapse, so before more work is done it is most probable that a new shaft will be required; the present one, being only six feet by two feet four inches inside the timber, is rather too small, and it has proved that it is not situated in the best position for prospecting the lead, so the loss of the shaft is not so serious as it might be thought, inasmuch as a new one is required in any case.

The shaft is situated almost on the boundary line between Leases 313 and 314, and is 113 feet deep from surface of the ground to bottom of well. The alluvial matter was bottomed at 93 feet, below which the shaft is in soft dark-coloured micaceous material, probably much weathered micaceous schist. At 103 feet a level was opened, and drives made to the South-West 100 feet, and to the North-East 20 feet. In the South-West drive the alluvial matter appeared in the roof at 55 feet from the shaft and the level gradually rose into it, the bottom all the time dipping flatly to the North-West. The North-East drive was only driven 20 feet when the level collapsed as above mentioned.

The "wash" on the bottom was about 15 inches in thickness, and was composed of alluvial material, comprising numerous large, well waterworn, rounded boulders of quartz, quartzite, greisen, and micaschist, with softer, much decomposed rounded boulders of clayey ironstained rock, all much intermixed with clayey and sandy material.

From the appearance of the larger boulders at surface it is evident that a true "wash," or river-worn bouldery gravel, was encountered, pointing to the existence in past times of running streams of considerable carrying power, and to different climatic conditions from those now prevailing.

A little tin ore was obtained by Mr. Johnston while working the "wash," but it was altogether too poor to be payable. The presence of the ore, nevertheless, gives ground for thinking that the "gutter" of the lead, when found, is likely to carry payable deposits. Above the "wash" there was in the shaft about four feet of dark clayey matter, covered by two feet six inches of fine drift, from which a good deal of water made into the shaft. On top of this drift there was a thin hard band or layer of oxide of iron cement, then 50 to 60 feet of brown mullocky material, with iron oxide concentrations and angular pieces of quartz. Mr. Johnston tells me that this has been repeatedly mistaken in the district for the true bedrock. Near surface the ground is hard white and brown cemented grit and sand. The succession of strata is as described by Mr Johnston; the shaft being full of water I could not further verify them.

The "wash" and boulders at this shaft were very similar to those at the "Hard Graft" and adjacent shafts above mentioned, and I think there is much likelihood of their being all on the same deep lead.

This deep lead has evidently nothing to do with the present shape of the surface, its course being quite independent of the modern watercourses, and the latter are no guide as to where it might be expected to be met with. To the Westward of the "Battler's Hope" it may be entirely removed by the modern erosion of the country, in which case some trace of it should be found where the old channel emerges on the more recent surface, or it may possibly continue as a buried lead, in that case probably going out somewhere towards the junction of Cowan's and Norilup Brooks. At Johnston's shaft the belt of deep ground is some 15 chains in width with shallow ground to North and South, and as the bedrock in the levels was dipping to the North-West it is evident that the shaft must be on the South side of the "gutter," though fairly well in the centre of the belt of deep ground. The next shaft should therefore be sunk further to the North.

In a district which has produced such a quantity of tin ore from the shallow ground it is probable that any deep leads will be found to contain important concentrations of ore also, and the tracing of such deep leads therefore becomes a matter of much consequence to the whole district. It is probable that in the "gutter" the lead will be pretty wet, and will require fairly good pumps for its drainage.

The Greenbushes field, though it has been a very payable one on the whole, is still very little developed, and as the shallow alluvial deposits are becoming more or less worked out, will have to depend more and more as time goes on on the opening up of the deeper alluvials and the stockworks. The possibility of working the latter at a very low content in tin ore seems to be the most important problem to be solved, and on it will greatly depend the future of the district. There is a certain small amount of

data to go upon that indicates that there is a chance of handling these stockwork deposits at a profit, but a great deal of systematic prospecting has yet to be done before sufficient proof would be forthcoming to warrant the erection of the extensive plant that would be necessary to treat ore of very low grade successfully.

There are a State battery in the Greenbushes district, two or three private crushing plants, and several puddlers. Two smelting companies have also been operating, but lately one of them has retired from competition. Part of the ore is smelted locally, and some shipped as tin oxide to smelters outside the State.

A large scheme for supply of water by pumping from the Blackwood River was nearly completed at the time of my visit, but time did not permit of my going over it sufficiently to express any opinion upon its prospects of commercial success.

Warren River District.

A special report was made on this district in connection with the Westralian Mining and Oil Corporation's application for assistance in boring for oil, and a copy of same is now appended to this report. (Appendix I.)

ADVANCES UNDER THE MINING DEVELOPMENT ACT, 1902.

A great deal of my time has been taken up with consideration of applications for assistance under "The Mining Development Act, 1902," and as the past year is the first one in which the Act has been in operation, it may be of advantage to give a few notes upon some of the more important cases. These are embodied in Appendix II. to this Report.

The applications have been of a very varied nature, and many of them difficult to bring within the scope of the Act, and have drawn attention to several points in it which seem to me capable of amendment. In Part II. great objection has been made to Section 9, which requires that "before receiving any instalment of an advance, the borrower shall execute, at his own cost and to the satisfaction of the Minister, a first mortgage of the whole of the mine, and, in the case of a company, its other property and assets (except uncalled capital) to secure the repayment of the advance and interest, and the due performance of the terms of such agreement and the provisions of this Act." In several instances persons applying for assistance have found themselves quite unable to comply with this requirement, having already encumbrances on their property of one sort and another, which prevent a first mortgage being given. In the case of large mines which have come to the end of their capital, and are struggling to carry on from hand to mouth, it is unusual to find one which is able to take advantage of the assistance offered by the Act, because of obligations incurred to debenture holders and other creditors, yet it is in carrying out special development and exploratory works in these mines that the greatest benefit would be likely to result from the Act. It therefore deserves reconsideration by the Legislature whether more discretion should not be allowed in Section 9 as to the nature of the security upon which the Minister must insist before he can make an advance by way of loan. In Part III. of the Act prospecting for water might with advantge be added to the purposes for which assistance may be given, as it is often necessary to find a water supply as a preliminary to opening up a mine. The procuring of a water supply for battery or other purposes might similarly be added with advantage to the purposes specified in Part IV., Section 19, and Part VI., Section 27, and in Part V. it seems desirable to include sinking for water under the same regulations as boring for it.

The administration of the Act is rendered difficult by the fact that no principles are laid down as to the sort of applications which should be considered worthy of State assistance. There are innumerable cases of most deserving parties of men struggling month after month to prospect places and open mines where there is some chance of success, and where a good discovery might be of great importance to the State, but it does not appear practicable to give State assistance in all such instances, and the question at once arises on what grounds should advances be made to one party and not to another. The central principles kept in view when framing the Act appear to have been that advances should only be made when, in the opinion of a responsible Government officer, there was reasonable probability of the operations proving successful, and that all loans should be repayable with interest. If these are rigidly adhered to, it is not likely that much advantage will be taken of the Act, for if the prospects are so good that a Government officer can recommend a loan with confidence that it will be repaid from produce of the mines, it is more than probable that the investing public will be quite ready to give the mine owner all the assistance he desires without any necessity for him to go to the Government; while if repayment is insisted on whether the venture proves successful or the contrary, such tangible security must be taken by the State as would satisfy a private lender, with whom the applicant could deal directly without the delays inseparable from obtaining Departmental assistance. The proposition which most commonly appears for consideration is quite a different one, being that of a venture which has a chance of success, but nothing approaching certainty of it, and which can only repay the money advanced in the event of proving successful. The State is, in fact, asked to participate in a more or less promising, but nevertheless doubtful venture.

There appear to me to be two classes into which most of these applications could be divided, and which should be treated differently; first, those that are cases in which the benefit of success would fall almost entirely to the owners of the mine, and would only indirectly be of advantage to the State, in the way that any successful industrial concern is an advantage to it; and secondly, those in which a valuable discovery would affect a whole district beneficially and be of direct advantage to the State by causing several other mines to be opened up. The case of a mine in a well-known and a well-proved field getting assistance to sink to a deeper level would come into the first class, for if the work were successful

it would not necessarily react favourably to any considerable extent on the surrounding district as a whole, though very beneficial to that particular mine; and that of a party sinking to try an unproved "Deep Lead" would be in the second category, because a good discovery would at once give an immense impetus to a whole district, and lead to many mines being taken up.

In dealing with cases of the first sort, it seems to me that the State might very well advance money on first-class security, other than the chances of the mine, at the lowest rate of interest compatible with safe business, and probably at a little lower rate than most private lenders would care to advance it; but payment of interest and repayment of the capital amount would then have to be insisted upon just as much as if the State were a private bank or other financial institution, and quite irrespective of the success or failure of the venture.

In the second class of cases it seems fair that the State should participate in the risk, and only insist on repayment in the event of the mine proving payable. Security should then be taken over the mine alone, as such would be quite sufficient to enforce repayment, if necessary, when it became valuable; but if the venture did not turn out well, the State money would be lost, the same as that of the mine owner.

In the majority of the cases, therefore, which present themselves for consideration, the principle that should, in my opinion, be insisted upon in making advances of money under the Mining Development Act is that the venture should be such as, if successful, would benefit more than the immediate borrower by proving some fact of value to a whole district, and leading to the opening up of other mines. In such instances the State might very well risk a good deal of money, as one success would compensate for many failures; but unless general public benefit is clearly discernible, it seems to me that advances should be made in all other cases only on strictly tangible and reliable security, as a matter of facilitating the endeavours of the applicants to obtain financial accommodation on the most reasonable possible terms.

Part IV. of the Act, which provides for the erection of State batteries and other ore-treatment plant, and the subsidising of private reduction works treating ore for the public, is a very important division of it, and the conditions prescribed by the Act have to be carefully borne in mind in considering every application for State assistance in this respect. They are three in number, viz., that the Minister is satisfied that

(*a.*) Large deposits of metalliferous ores exist; and

(*b.*) The plant and appliances for testing or treating such deposits in bulk at reasonable rates are not available; and

(*c.*) The establishment of such plant is necessary for the development of mining.

The limitations imposed by these conditions, especially by (*b*), are not generally realised on the fields when an agitation is in progress for the erection of a State battery, and in many cases where a private battery already exists and crushes for the public, it is a difficult matter to determine when the needs of the district demand that a State battery should also be erected. One of the most commonly occurring positions is that there are batteries existing on a field which will crush for the public at certain times when it suits them to do so, but may at any moment become fully occupied with quartz from their owners' own mines or from those of one or more others who may contract to monopolise the crushing facilities. It may then prove that either a State battery is required to give the mine owners of the district a certainty of being able to get crushing done when required, or a subsidy may be given to ensure that the private battery will be open to receive ore from all comers on fair terms for a reasonable proportion of its crushing time. Certainty that crushing will be available when wanted is one of the necessities of the small mine owner, in order to enable him to open out his mine with any degree of confidence. Another very common case is that the charges of the private batteries are a little higher than the general grade of the ores of the district will allow, to leave any profit to the mine owners, and a reduction is necessary in the interests of the community. But the lower rate is often not sufficient to pay fair interest and redemption of capital upon the cost of erection of the batteries in addition to working charges, and a privately-owned concern cannot therefore afford, as a matter of business, to reduce its crushing rates. In such circumstances it might be possible to work a State battery so as to pay working expenses or a little more, and the other revenue accruing from the consequent settlement of the field might be held to repay the first cost and interest thereon, but it would be very much the same thing to the State to give a subsidy to the private mill equal to the amount required to pay interest on the cost of erecting it and the redemption of capital outlay, on condition of having the crushing charges lowered to the minimum over purely working expenses. In practice both methods have been adopted according to whichever seemed best to meet the needs of the case.

SLUICING DRY-BLOWN ALLUVIAL GROUND.

A good deal of attention has been given during the year to various proposals that have been brought forward for treatment of alluvial areas that have been worked over by dry-blowers, in a more systematic way by sluicing. There are very considerable deposits of this sort in various parts of the State, and now that water is commonly much more easily obtainable than in former times, the possibility of re-treating them by some form of sluicing has led to several schemes being put forward. Where sufficient water is cheaply obtainable, it seems to me that there is a good deal of likelihood of success, provided the mechanical arrangements are such as to permit of handling large quantities of material very cheaply. The following particulars, collected from reports from time to time received as to the working of various trials, will serve to bring out some of the more prominent facts in connection with the problem, which may prove useful to other persons who may be experimenting in the same direction.

One of the first to bring forward this matter was Mr. H. M. Dickson, who submitted a scheme for working an area at Southern Cross, between Fraser's mine and Lake Polaris, which has been worked over a good many times by dry-blowers, and was practically abandoned as worked out. Mr. Dickson proposed to pump water from a well at the lake side to a tank which would command the ground to be worked, and then to treat the stuff by shovelling it into boxes to be sluiced. In order to try the value of the ground, and to assist him in his scheme, he was employed by the Department to thoroughly sample the area by digging lines of holes across it, and washing the material excavated. The data so obtained showed that there were some 22,000 cubic yards of material, yielding, on an average, 14 grains of gold to the yard, or, say, 2s. worth of gold per yard, or 1s. 4d. per ton. Mr. Dickson then pegged out an extended alluvial claim and erected some apparatus, but abandoned the ground for some reason without giving his scheme a trial.

A somewhat similar method of working was adopted at the Newmarket lease, near Coolgardie, the ground being sluiced in boxes. 300 tons of dirt treated yielded 11ozs. of gold, or at the rate of 17·6 grains per ton, worth about 2s. 9d. per ton. 80,000 gallons of water were used in the test, being a consumption of 267 gallons per ton, or the cost of water being 4s. 6d. per 1,000 gallons, an expense of 1s. 2½d. a ton. The labour cost was 2s. a ton, so the test resulted in a loss.

At Bayley's mine, Coolgardie, an extensive test was made of alluvial ground which had been run over by dry-blowers, but not systematically worked. In this case the stuff was shovelled into carts, and taken to a puddling machine for treatment. 4371 tons so handled yielded 796ozs. 1dwt. of gold, equal to 3dwt. 15grs. per ton, valued at £3,014 2s. 6d., the gold being worth £3 15s. 9d. an ounce. The cost of treatment was given as 7s. 4d. a ton, or exclusive of water and management, 4s. 6d. a ton. This is an important test as showing the good value of some portions of the alluvial areas.

An attempt to solve the problem was also made at Lindsay's mine, Coolgardie, on a fairly large scale, with a plant which appears to me to come nearest to a practical method of working such ground rapidly and cheaply of any that have yet been tried. The apparatus consisted of a portable barge carrying a centrifugal pump elevator which raised the material to a set of overhead sluice boxes and grizzlies, whereby the coarser gravels were dumped in a heap to one side of the machine and the sands and sludge were separated from the surplus water by spitzkasten, the water returning to the sump to be again used, and the thick stuff from the bottom of the spitzkasten running to a paddock to be drained as dry as possible. The barge, with its superstructure, could be hauled about from place to place as required. The gravels were sluiced to the elevator by a stream of water thrown from a small centrifugal pump. The machine was only a trial one and worked under many disadvantages, but I understand that a larger and better arranged plant on the same lines is likely to be tried before long. Mr. Joseph Bennetts, whose arrangement of plant it was, has supplied me with the following particulars of the trial, which I give in his own words:—

"*Statement of Sluicing by a 4in. Centrifugal Pump on Lindsay's Alluvial Flat, Coolgardie.*

Quantity of alluvial treated	1,600 tons
Number of actual days sluicing	20 days
Gold obtained	38ozs. 5dwts. 14grs.
Value per ton	11½grs.

Quantity of water found necessary and used per ton of alluvial, 200 gallons.

Water lost in sluicing by using a Spitzkasten for separating the residues from the water and returning same direct to nozzle pump, 50 gallons.

Thus representing a loss in the proportion of 25 per cent., or for 1,600 tons, 80,000 gallons as replenishing water. Cost of treatment cannot be considered, as the pump and plant were completely out of proportion to the class of material, and were only intended to demonstrate the practicability of sluicing on the Goldfields.

"What was demonstrated was:—

(1.) The complete saving of the fine gold.
(2.) A disintegration of all clay balls.
(3.) A satisfactory system of husbanding and returning of the water for re-use.

"The small quantity this pump treated per day was due to a variety of causes—chiefly the installation, which comprised a dynamo run by Lindsay's battery engine, and was constantly stopping with every mishap connected with the battery; moreover, the dynamo was only 18 B.H.P., and I was calling up 22 H.P., causing trouble, therefore my pump was working inefficiently. The stones as an average were far too large for the pump, and compelled my keeping a grizzly in front of the suction pipe; in a word, it could not be accepted as a sluicing proposition by suction pump, and could only be viewed as setting out the principle."

I understand that nine men were employed in this test work, and that water cost only 1s. per 1,000.

Another attempt at the sluicing proposition was made by the Coolgardie Puddling and Sluicing Company, with Mr. Marshall's rotary puddler, also in the vicinity of Lindsay's mine at Coolgardie, with water from Campbell's dam. The lease comprises 24 acres, and the alluvial material on it is from five to eight feet in depth, and was mostly worked out years ago by sinking holes and driving out about 18 inches of the bottom dirt between them, which was then treated by dry-blowing. The puddler is described as follows by Mr. F. B. Allen, M.A., Director of the School of Mines of W.A., who reported upon its performance in a trial run.

"The puddler consists of a cast-iron drum, 6ft. in diameter and 16in. wide, revolving in a casing made of ⅜in. boiler iron, with a removable cover of 3-16in. boiler iron. This casing in the

lower half is lined with 1in. cast-iron liners on the sides and 1½in. liners on the bottom. The drum is provided with 32 beaters of 45lbs. railway iron secured by a single nut and projecting 18in. beyond the rim of the drum, with a clearance of ¼in. from the bottom liners of the casing. Between the side liners measures 18in., and the discharge opening is 20in. above the bottom of the trough formed by the liners, and is covered by a heavy swinging door, so that the forward action of the revolving drum and beaters does not discharge the alluvial fed into the machine before everything is properly disintegrated. It is expected that the stones in the alluvial will assist the beaters in breaking up the earthy lumps and liberating the gold, and that even large stones will be able to pass past the beaters as they are placed alternately in the drum, without requiring breaking by the machine, but at present only comparatively small stones are being encountered. At the bottom of the trough in which the drum revolves is a grid 17in. wide and 19in. long, provided for the purpose of saving nuggets or smaller particles of gold before they are thrown out by the action of the beaters. This opening is kept clear by an upward jet of water delivered by a 1¼in. pipe, while the removal of a 2ft. door in the side of the casing enables the well underneath the grid to be periodically cleaned, and repairs to be effected to the interior of the machine. The casing weighs 4½ tons, and the drum with its beaters another 3¼tons, but these moving parts are supported independent of the casing. The whole machine is rigid, requires inexpensive foundations, and is capable of easy removal."

The machine is driven at 60 to 70 revolutions per minute, and is fed from a hopper, to which the dirt is raised by a belt elevator, the whole of the machinery being driven by a portable engine. It is estimated to be capable of handling 150 tons of dirt in the eight-hours day. The stuff when passed through the machine is thrown out on to sluice boxes provided with grizzlies and perforated false bottoms, and the water is rapidly separated and returned by a pump to the machine. Mr. Allen reported as follows as to the test witnessed by him:—

"I have to state that as the machine has been running only 10 days from August 17th to 27th, and then only intermittently while the machinery was being adjusted, no results can be fairly recorded as final. In all probability better results will be obtainable during the more extended run which is now about to be commenced. During the 10 shifts of eight hours that the machine was working upon the alluvial the following quantity of material was treated:—

August 17th	...	...	54	truckloads during	2½	hours
„ 18th	...	...	37	„ „	1½	„
„ 19th	...	...	16	„ „	2	„
„ 20th	...	...	72	„ „	4¾	„
„ 21st	...	...	34	„ „	3½	„
„ 22nd	...	...	60	„ „	4½	„
„ 24th	...	...	60	„ „	5½	„
„ 25th	...	...	67	„ „	5	„
„ 26th	...	...	82	„ „	5¾	„
„ 27th	...	...	100	„ „	6½	„
Total	...	...	582 = 727½ tons in		41½	hours

(With horse trams)

"It will thus be seen that the machine was running only half time, and actually treated 72¾ tons per shift during the 10 days. This went through at the rate of 17½ tons per hour, showing that when working continuously without stoppages the machine can puddle 140 tons or more in eight hours. Including the manager and engine-driver, 10 men were employed during the trial, and working costs were as follows:—

	£	s.	d.
Wages 10 men 10 days	65	2	8
Firewood for 14 days	10	0	0
Water for 14 days	10	0	0
Oil, waste, sundries	2	7	4
Office expenses, say	2	10	0
727½ tons treated for	90	0	0

Costs per ton of Alluvial Treated.

	s.	d.	
Wages	1	9·5	per ton
Firewood	0	3·3	„
Water	0	3·3	„
Sundries	0	0·8	„
Office expenses	0	0·8	„
Total per ton	2	5·7	

Costs = Practically 2s. 6d. per ton.

"The amount of gold won during the 10 days was 7ozs. 11dwts., which at £4 per oz. = £30 4s., equal to a saving of practically 10d. per ton. Most of the gold was recovered in the well underneath the machine, the largest speck being 5dwts; scarcely any of the coarse gold was driven out into the sluice boxes, which saved black sand and fine gold, while the stones separated by the grating of grid on top of the sluice boxes were discarded as worthless. In the alluvial of these fields, however, there is always the probability of obtaining quartz specimens carrying rich gold, and during future runs this stone dump will require supervision. The company has the use of a dam holding 2½ million gallons, for which a rental of £250 per year

is paid. This is equivalent to a cost of 2s. per 1,000 gallons, but during the trial run the machine did not treat sufficient material to obtain the full benefit of this cheap water supply, and the water used actually cost at the rate of 4s. 3½d. per 1,000 gallons, so that practically the amount of alluvial treated could be more than doubled without any additional expense being incurred for water. According to measurements I took in the supply tanks, and which I checked by measurements in the sump, the actual amount of water used during 4⅔ hours on August 26th, while treating 82 tons of alluvial, was 4,000 gallons per hour, and as far as it was possible by careful measurements to gauge the amount of water lost during the same time I found that 800 gallons per hour, or 20 per cent. of the water used, was going to waste. An extended run, however, is required to finally decide these questions.

"A number of the details of working hours, wages, etc., including the gold yield, have been supplied to me by Mr. George Marshall, and he believes that the ground now being taken out to make room for the tailings pit is really the poorest in the claim, so that it may be anticipated that somewhat better gold yields will be obtained in the future, and that the working costs will be reduced. On the supposition that the machine will work efficiently for the full eight hours instead of only half-time as in the late trial during which various alterations were being made, the output should be more than doubled, so that it is reasonable to place the cost of extraction in the future at 1s. 9d. per ton.

"*Summary of Results of Marshall's Puddler, doing 10 days' preliminary trial from 17th to 27th August, 1903* :—

Actual time of working	41½ hours
Alluvial treated	727½ tons
Total cost	£90
Gold saved—7ozs. 11dwts.	Value, £30 4s.
Alluvial treated	72¾ tons per shift
(Actually)	17½ tons per hour
Actual cost per ton	2s. 6d.
Value of gold saved per ton (alluvial)	10d.
Water used per ton of alluvial treated	228·5 gallons
Water lost per ton of alluvial treated	45·7 gallons.

"These numbers are subject to modification, as a much longer run is necessary before they can be determined with any degree of certainty."

The dirt was broken by pick and shovel, and dragged to the machine in trucks on a tramway worked by horses. It seems quite possible that by this method ground could be worked at 1s. 9d. per ton, as anticipated by Mr. Allen; but it is evident that the breaking and tramming of the dirt are likely to be much more costly than if it were broken down by a nozzle and at once elevated by machinery without much manual labour. From one cause and another, the trials of this machine have not been continued at Coolgardie, but another one has recently (1904) been erected at Kalgoorlie, and will shortly be at work, when further particulars of performance may be hoped to be obtained.

Towards the end of 1903 another sluicing trial with primitive apparatus was made at Kalgoorlie, at the "King of the Hills" lease, using water from the Coolgardie Water Supply. Six men worked 15 days for a return of 3ozs. 3dwts. of gold, worth £3 12s. 6d. an ounce. The average amount of ground worked per day was stated at 50 tons, or a total of 750 altogether, so the value recovered was only 3½d. a ton. The costs for wages were £45, and for water £20, the water being supplied for this purpose at 5s. per thousand gallons, by special arrangement. The consumption of water was 106⅔ gallons per ton.

Messrs. O'Brien and Crichton have recently (1904) been working on their lease near Coolgardie, sluicing in boxes; and Mr. Crabb, Inspector of Mines, reports that the value of the ground is from 1dwt. to 1½dwt. per ton (say, 3s. 9d. to 5s. 7d.), the cost of labour is about 11s. 6d. a ton, and the consumption of water about 100 gallons per ton. Evidently, unless there is a great reduction in costs of working or very rich ground found, this venture will be quite unpayable; but the value of the dirt and the consumption of water are both highly favourable for profitable working with machinery of Bennett's or Marshall's type.

Comparing the above results, we find that the values of the alluvial ground have proved to be as follows :—

		s.	d.	
Southern Cross	By Sampling	1	4	per ton.
Newmarket	Sluicing	2	9	„
Bayley's	Puddling	13	9½	„
Lindsay's	Sluicing	1	8	„
Marshall's	„	0	10	„
King of the Hills	„	0	3½	„
O'Brien & Crichton's	„	3s. 9d. to 5	7	„

These figures show that although there are some parts of the alluvial areas that are of fair value, the bulk of the dirt must be expected to run pretty low in gold, and the only possibility of general success will lie in substituting mechanical handling in large quantities for manual labour on a small scale. As the ground is generally quite shallow, it is evident that any machinery used must be very readily moved as the ground is worked out, in order to minimise handling. In many places steam shovels would be very effective for lifting the dirt, and by trucking from them on portable tracks of light rails it would be possible to work cheaply at a central treatment machine such as Marshall's, or even a good steam puddler of the more ordinary sort. A better arrangement would be to have the disintegrating

apparatus also portable and following the steam shovel, or even on the same bed. For simplicity, lightness, and effectiveness it would, I think, however, be difficult to find a better principle than that adopted by Mr. Bennetts, especially with use of electro-motors for driving the machines, enabling the power to be generated at the most convenient fixed point in the vicinity. The weight of machinery to be dragged about the working area is thereby reduced to a minimum and great flexibility is obtained. The method of breaking down the ground with a jet of water under high pressure, whether obtained by a centrifugal pump or any high pressure pump furnished with a large air chamber, also admits of great flexibility in bringing the dirt to the elevator, and would often enable the elevating to be dispensed with to a large extent when the fall of the ground would admit of separating the heavier gravels by means of grizzlies and undercurrents. With machinery of this type, there seems to be hope of emulating the remarkable cheap working costs obtained by the dredging process elsewhere.

One of the greatest difficulties in the way of cheap working is the cost of water. Water is consumed (I.) in wetting the gravel and earth sluiced, which even when most thoroughly drained may contain from 20 to 50 per cent. of its weight of water; (II.) by evaporation, and (III.) by sinking into the ground. The quantity left wetting the tailings will depend on their nature, clean hard gravels retaining much less than clayey stuff. The evaporation depends on the season of year and on the surface of water exposed, and the loss by absorption into the ground on the character of the bottom, the area of ground over which the water is allowed to run, and the time the water is in contact with the absorbing surface. Evaporation and absorption losses are to be avoided by confining the sluicing as much as possible to water-tight boxes and tanks, and minimising the area of ground over which the water is allowed to run. The trials above noted give figures which enable an approximation to be made to the consumption of water per ton of dirt treated :—

At the Newmarket the consumption was 267 gals. per ton.						
„	Bayley's	„	„	„	„	not recorded.
„	Lindsay's	„	„	„	„	50 gals. per ton.
„	Marshall's	„	„	„	„	46 „ „
„	King of the Hills	„	„	„	„	$106\frac{2}{3}$ „
„	O'Brien & Crichton's	„	„	„	„	100 „

From these results it would appear that the least consumption was in the cases where there were the best arrangements for rapidly circulating the water and confining it in sluice boxes and supply tanks and dams. The low consumption at Lindsay's and Marshall's was also due greatly to the favourable character of the ironstone gravel treated, which drained very readily, and contained comparatively little slime. Their average of 48 gallons per ton gives only 17·6% of moisture in the drained material, without allowance for evaporation and absorption, which is so very low as to make me doubt that the figure is entirely correct, but it would probably be safe to reckon on a loss of not more than 75 gallons per ton of dirt treated in well-arranged plant, when the material was ironstone gravel of the sort usually met with in the dry-blown areas. The cost of water consumed would then work out thus :—

With supply at 1/-	per	1000	gall.,	75	gall.	would cost : 0·9	pence
Do.	do. 2/-	do.	do.	do.	do.	: 1·8	„
Do.	do. 3/-	do.	do.	do.	do.	: 2·7	„
Do.	do. 3/6	do.	do.	do.	do.	: 3·15	„
Do.	do. 4/-	do.	do.	do.	do.	: 3·6	„

Since the end of the year an arrangement has been made between the Mines Department and the Goldfields Water Supply, whereby while there is a plentiful supply of water available to the latter, it will be sold for sluicing purposes only at a cost to the alluvial workers of 3s. 6d. per 1,000 gallons. At this rate, therefore, the cost of water may be expected to be at least 3d. a ton, even in the most favourable cases worked by the Coolgardie Water Scheme Supply, and there are not many instances where a cheaper salt water supply is available. This minimum cost for water is more than the total cost per ton by dredging in many more favoured localities in other parts of the world. With water at this rate, however, it seems to me that good appliances and skilful handling will make it possible to treat dirt containing not more than 9d. worth of gold per ton at a profit, and 6d. seems possible to be made to cover all actual working expenses, without allowing for cost of plant and owners' profit. The values above quoted, obtained in trial runs in various mines, seem, therefore, to be sufficiently good to allow of profitable work being expected. It will, however, only be worth while putting expensive plant on some of the larger alluvial areas, where there is a quantity of dirt sufficient to keep the machines going for some considerable time.

SMELTING *VERSUS* MILLING AND CYANIDING.

In the course of inquiries made during the past year as to the possibility of encouraging the smelting industry of the State, a very interesting question arose, which seems of sufficient importance to have public attention drawn to it in order that further investigations should be made, and any doubt existing on the matter replaced by certainty as to the facts. It has been the custom of some of the large mines at Kalgoorlie to ship their richest telluride ore either to the Fremantle Smelting Works for treatment or to smelters outside the State, while others contend that a better financial result is secured by roasting the ore locally and treating it by amalgamation and cyaniding after roasting. The advocates of smelting hold that the higher extraction of the precious metals more than makes up for the greater cost of treatment, while the mill men claim that they can extract so much of the metal contents of the ore at a low cost that they can afford to lose the values contained in the tailings and yet show a better financial result in the shape of net profit than if they had sent the ore to the smelters. As the supply of this rich ore to the smelters is at present their mainstay—the quantity coming forward from other sources being small—it was evident that their whole existence depended on their being able to compete successfully with the local mill treatment, and my inquiries were, therefore, directed to ascertaining what were the respective costs and profits resulting from treatment of the ore by the rival methods. Let it be once established that the local treatment gives the better financial result, and the supply of ore to the

smelters must inevitably cease. To my surprise and disappointment, I was unable to get from any one of several managers, to whom I went for information, really conclusive figures showing a complete comparison between the two methods, on an ore of equal value: no one seemed ever to have divided a large parcel and treated one half of it by the one process and the other half by the other, to obtain an absolute comparison. The advocates of local roasting and cyaniding treatment appeared to have relied all along on comparative figures showing the costs of the one process as against the other, which would be quite correct if all the costs were taken into account. But when I came to make inquiries I could not find that any one had determined the very important point as to whether there was any appreciable loss of gold by volatilisation in the roasting process, which is liable to be quite heavy under certain conditions when salt is present in the roasting charge, as it is in the Kalgoorlie material. In Rose's "Metallurgy of Gold," pages 244 and 245, reference is made to the losses which are liable to take place in roasting, cases of 20 per cent., 8 per cent., 42·8 to 93 per cent., 68 to 85 per cent., and 50 per cent. losses being quoted. Fuller particulars are contained in a paper, referred to by Rose, by Prof. S. B. Christy, in the "Transactions of the American Institute of Mining Engineers for 1888," which quite bear out the opinion that it is most necessary to exercise extreme caution in subjecting gold ores to roasting treatment in presence of salt. In the *Engineering and Mining Journal* (New York) of September 5th, 1903, Mr. J. T. Marriner, late manager of the Great Boulder Main Reef mine, in a paper on "Roasting and Filter-press Treatment," at Kalgoorlie, remarks that he had found "in experimenting that it was inadvisable to crush with the salt water of the district and subsequently roast the tailings, on account of the volatilisation of the gold, due to the presence of the chlorides of magnesium and sodium, and other chlorides left over from the evaporated water." Later on in the paper he remarks that "This loss of gold can be made in some cases, under special conditions, as high as 70 per cent. of the total gold contents of the ore." As all the ore raised from the Boulder mines is moistened with the extremely salt water found in them, it is evident that the presence of salt is usual even when the ore is crushed dry and submitted to furnace treatment. In a valuable paper on the "Volatilisation of Metals as Chlorides," in the *Engineering and Mining Journal* (New York) of 29th August, 1903, Mr. Stuart Croasdale gives results of a number of experiments, many on a working scale, showing heavy losses of gold, quoting, for example, losses of 93·6 per cent., 90 per cent., and 90·9 per cent. from lots of a ton or more treated in a reverberatory or White-Howell furnace. Among other tests he mentions an instructive case met with when making experiments in a small furnace with 200lb. charges. He had had occasion to make some chloridising roasting trials with silver ores, and on completing these and resuming roasting of gold ores, "the furnace was carefully scraped out and a charge of Cripple Creek ore put in. After roasting, it was found to have lost over 50 per cent. of the gold. The next charge lost over 25 per cent. of the gold. This was accomplished by the salt remaining in the hearth of the furnace, or perhaps not more than a quarter of a pound for the 200 pounds of ore. When the furnace was relined there was no loss of gold on roasting subsequent charges of ore." In some laboratory experiments of my own, as long ago as 1888, I found that as much as 62 per cent. of the gold contents could easily be driven off by roasting with salt, and it was thereby strongly impressed upon me that there was danger in this process, and necessity for the most rigorous control of the work by assays before and after treatment, to determine positively if losses from this cause were taking place. Should losses be proved, the condensing of the fumes would be a matter of prime importance, and special appliances would have to be used for the purpose. So far as I could learn, very little attention has been paid at Kalgoorlie to this possible and probable loss, it having been generally assumed that the volatilisation losses, if any, were so slight as to be negligible. One gentleman regarded this as proved by the fact that the assays of his flue dust were not sensibly higher than those of the ore treated; but this is not by any means conclusive, as exceeding difficulty has been found in satisfactorily condensing these fumes without special filtering appliances. In many cases I found that no systematic assays of the ore were made before it went into the roasting furnaces, and that the extractions reported were based on the assays of the roasted ore, and I did not meet with any person on the field who was able to tell me positively from actual trials whether the loss by volatilisation was great or small. It could be easily ascertained by systematically assaying the pulverised ore *before* roasting, the most perfect sampling being obtainable from this finely-ground product, and again assaying the roasted material, making due allowance for the difference in weight due to the roasting. I regard it as a severe reproach to the Kalgoorlie metallurgists that any doubt should be possible on an important point such as this, and have deliberately drawn attention to it in this report in order that steps may be at once taken to have the question thoroughly gone into and conclusively set at rest. While I admit freely that laboratory tests on a small scale are not conclusive in such a matter, it is nevertheless clear that if they show a loss there is a strong presumption that a similar result will be got on the working scale, and demonstration to the contrary is imperative before the presumed loss can be neglected. That there is a loss in roasting Kalgoorlie telluride ores on the small scale is proved by the following experiments kindly supplied to me by Mr. J. W. Sutherland:—

	Gold present according to assay.		Loss.	Loss.
	Raw ore oz. per ton.	Roasted ore oz. per ton of raw ore.	oz.	per cent.
Fine Concentrates	5·15	5·00	0·15	2·91
Coarse Concentrates	4·15	4·00	0·15	3·61
Sulphide Ore	4·25	4·15	0·10	2·35
Average	4·52	4·38	0·13	2·95

A loss of 2·95 per cent. is equal to 2s. 7·357d. per fine ounce, taking the net value per fine ounce at £4 4s. 7d., which is about what Kalgoorlie gold comes out at, after deducting mintage, escort, freight,

and insurance charges, from the field to the Perth Mint. On ore of 8oz. grade, such as is often shipped to the smelters, this loss would amount to £1 0s. 11d. per ton of ore. If the actual working process produces a similar loss by volatilisation, the amount of gold escaping through the roasting furnace stacks at Boulder must be worth a very large sum of money annually.

Returning to the relative costs of smelting and milling, Mr. G. M. Roberts, of the Great Boulder mine, was good enough to let me have the following figures of the cost of shipping ore to smelters at Fremantle and Dapto, on the basis of stone containing 8ozs. of gold to the ton :—

	Fremantle.			Dapto.		
	£	s.	d.	£	s.	d.
Bagging	...		...	0	15	0
Cartage to Station	0	1	3	0	1	3
Railage	0	16	4	1	6	0
Wharfage	...			0	2	9
Fremantle Agency and Charges	...			0	1	6
Marine Freight...	...			0	10	0
Marine Insurance	...			0	1	9
Dapto Charges	...			0	1	0
Smelting Charges	2	15	0	2	7	0
Sydney Wharfage and Agency	...			0	1	0
Percentage of Assay Value retained by Smelters	1	5	7	...		
	4	18	2	5	7	3
Loss of Gold Values, Fine Gold paid for at £4 an ounce only, 8oz. at 4s. 7d.	1	16	8	1	16	8
Total	6	14	10	7	3	11

(In the figures, as supplied by Mr. Roberts, the last item of shortage of value in fine gold is taken at the full value per ounce fine, which would be correct if in the mill figures to be quoted presently for comparison the expenses of realisation of the bullion at the Mint are included. As I am in some doubt as to this, I have taken the value per fine ounce at £4 4s. 7d., as being the net value per ounce fine at Kalgoorlie. The difference of 3s. per ton so involved does not seriously affect the comparison of costs.)

We may summarise the above charges thus :—

	£	s.	d.	£	s.	d.
Transport Charges	0	17	7	3	0	3
Smelting Charges	5	17	3	4	3	8
Total	6	14	10	7	3	11

These being the deductions to be made from the absolute assay value of the ore, that is, for 8oz. stuff, from £33 16s. 8d., taking net Kalgoorlie value of fine gold.

The treatment costs per ton at the Great Boulder Proprietary Mill for the month of June, 1903, are given by Mr. Roberts, for comparison, as follows :—

Sulphide Mill.

	s.	d.	s.	d.
Crushing and delivery of material	4	7·28		
Roasting	3	9·83		
Amalgamating	1	6·88		
Supervision (including salaries)	0	3·81		
Assaying, electric light, clerical, etc.	0	4·51		
			10	8·31

Cyanide Mill.

Mixing, agitating, and filter-pressing	4	6·56		
Disposal of residues	0	11·41		
Precipitating	0	2·92		
Supervision (including salaries)	0	2·23		
Assaying, electric light, clerical, etc.	0	4·01		
			6	3·13
Total			16	11·44

To compare these with the smelting costs, we have next to consider the values left in the residues, and this presents some difficulty, for the high-grade ores that are sent to the smelters are not sorted out and treated by themselves in the mills, but are mixed with the general produce of the mines. When ores much above the ordinary average of richness are being treated, I understand that it is the general experience that the tailings values also increase, and it is argued from this by the advocates of smelting that if the ores of high grade were sorted out and specially milled by themselves, the tailings would be of high value also. I think this conclusion is a just one, and that the tailings from such high-grade ore would require at least a second treatment, and possibly a third, before they could be safely run to waste. It

is reasonable to suppose that this is the case also, even when the richer ores are mixed with so much poorer material that the average grade is reduced to that of the ordinary run of the mine, and the tailings from a single treatment are no richer than usual. A numerical example will make this clearer. A mine produces, say, 4,000 tons a month of ore worth £3 a ton, and 200 tons of picked ore worth £33 a ton. The average value of the 4,200 tons would then be £4 8s. 7d. a ton. If the poor ore were treated separately, the residues would probably average about 6s. a ton, but if the whole lot was treated together, 8s. a ton in the residues would not cause any alarm—but what would it mean?

Total value in tailings	4,200 tons @ 8s.	=	£1,680
Do. do.	4,000 do. @ 6s.	=	£1,200
Difference due to richer ore	200 do.	=	£480

or at the rate of £2 8s. a ton. It would obviously be far better practice to treat the rich ore separately by itself, with repeated re-treatments of the tailings, than to mix the lot together. This principle is so well understood in the dressing of tin, copper, and lead ores that it is difficult to understand why it should be ignored in the case of gold ores.

The loss in the residues after amalgamation and cyanide treatment at the Boulder mines varies a good deal in different mills and from day to day, and the advocates of smelting express scepticism as to the totals being always correctly confessed; but taking the figures as advanced by the various offices we shall not be above the average result of the practice on the fields if we call the loss 6s a ton on the ordinary milling grades of ore. On the richer grades, however, similar to the ore sent to the smelters, this result would be impossible without at least one re-treatment of the tailings, which would cost probably quite 8s. a ton. Supposing there to be a loss by volatilisation to the extent shown by Mr. Sutherland's experiments above quoted of £1 0s. 11d. a ton, the total cost of milling the rich ore would be:—

First treatment as per Mr. Roberts' figures	£0	16	11·44
Re-treatment of tailings (say)	0	8	0
Values left in tailings	0	6	0
Roasting loss	1	0	11
Total	£2	11	10·44

as compared with £6 14s. 10d. a ton, costs for smelting at Fremantle.

On these figures it would seem that there is no hope for smelting even the richer ores in competition with local roasting and milling treatment, and it would appear that to send them to Fremantle Smelting Works is an absolute throwing away of over £4 10s. a ton. The items roasting loss, values left in tailings, and cost of re-treatment of tailings, are, however, all more or less doubtful, and until a careful actual trial has been made by roasting, milling, and cyaniding on a thoroughly sampled large parcel of ore of the same high grade as is sent to the smelters, there will always be doubt as to the relative advantages of the two methods. It was a complete surprise to me to find that at this stage in the history of the field there could still exist any doubt on such an important matter. The inferences to be drawn from the figures are unpalatable whichever side is right, for if the milling advocates are correct, an enormous sum has been wasted in unnecessary smelting, and if the smelters are correct, the loss by volatilisation, and in the residues, and the cost of treatment, must be vastly greater than are admitted. It rests with each of the managers employing the rival methods to demonstrate by incontestable facts and figures that the method he has adopted is the superior one for the ore with which he has to deal.

Smelting Charges.

It will be of interest to many mine owners who possess refractory or copper-bearing ores to note the following particulars of sales of ore to the Wallaroo Smelting Works, as affording an indication of the results obtainable elsewhere in comparison with what they can themselves effect by local treatment. The first instance is that of a shipment of copper ore containing gold and auriferous concentrates, sent from the Mulline District:—

	Net dry weight. T.	cwt.	qrs.	lbs.	Assay.
Parcel 1—Copper ore ...	4	3	0	14	Copper, 12·9 per cent. Gold, 0·4 oz. per ton.
„ 2—Concentrates ...	1	11	0	14	*Nil.* „ 30·1 „
Total	5	14	1	0	
	T.	cwt.	qrs.	lbs.	
Gross weight	6	6	0	0	

Deductions from Assay.—

Parcel 1—2·5 per cent. Copper = ·1039 tons Copper.			
10·39 units at 11s. 3·3d.	=	£5	17 2
·01oz. of Gold = ·41563ozs. Gold at £4	=	1	13 3
Parcel 2—5 per cent. of Gold Assay = 2·342ozs. of Gold at £4	=	9	7 4
Total	£16	17	9

Equal to £2 19s. 3d. per ton on 5·7 tons.

SMELTING CHARGES.—

Smelting No. 1 Parcel, 4·15 at £2 11s. per ton	£10 12 0
„ No. 2 „ 1·55 at £2 2s. „	3 5 4
Freight and charges, Mulline to Fremantle, on 6·3 tons	17 12 7
Freights, Fremantle to Wallaroo, on 6·3 tons	4 14 6
Wharfage, Wallaroo, at 2s. per ton	0 12 7
Weighing and Sampling No. 2 Parcel (under 3 tons)	2 2 0
Cost of reference assay, No. 1 Parcel, for Copper	1 1 0
Agency charges, South Australia	3 14 6
	£43 14 6

Equal to £7 13s. 5d. on 5·7 tons.

PAYMENTS.—

No. 1 Parcel—43·22 units Copper at 11s. 3·3d. per unit	£24 7 4
1·246ozs. Gold at £4	4 19 8
No. 2 Parcel—44·501ozs. „	178 0 1
	207 7 1
Less charges as above	43 14 6
Net return	= £163 12 7

Equal to £28 14s. 2d. per ton on 5·7 tons.

The price of copper was £56 8s. at the time of the transaction. The price of gold taken at £4 an ounce may be considered fairly correct when all realisation charges are taken into account. It will be seen that though the net return was £28 14s. 2d. per ton, the smelting deductions and charges and expenses of shipment amounted to no less than £10 12s. 8d. per ton chargeable against the total value as shown by the assays.

A second instance is a parcel of copper ore shipped from Bremer Bay to Wallaroo, of which the particulars are given by the following smelter's statement:—

EX "WAREATEA," S.S., AT WALLAROO, 26TH MARCH, 1904.—

N. C. M. Roughs—
Wet Assay ... 16·15% Cu.
Less ... 2·50.

April 5th, 1904—
No. of Bags, 258.
No. of Pile, 193.

	T.	cwts.	qrs.	lbs.
Gross weight,	9	7	0	0

Moisture, Grains per lb., 629.

	cwts.	qrs.	lbs.
Total allowance for Moistures,	16	3	7

	T.	cwts.	qrs.	lbs.
Net weight,	8	10	0	21

Produce, per cent.—13·65.
Copper units—116·14.

Copper 116·14 Units at 11s. 7·8d. per unit	£67 13 0		
Less smelting charges at £1 18s. 6d. per ton, 8 T. 10 cwts. 0 qrs. 21 lbs.	16 7 7		
		£51 5 5	
Charges—			
Through freight on ore from Bremer Bay to Wallaroo, 9 tons 11cwts., at 25s. per ton	11 18 9		
Wharfage, etc., at Wallaroo, 9 tons 11cwts, at 2s. per ton	0 19 1		
Wharfage, etc., on returned empty ore bags	0 1 3		
		12 19 1	
		£38 6 4	
Thomas Davies & Co's. agency charges per voucher		0 18 0	
		£37 8 4	

The total charges against the absolute assay value of the parcel in this case are—

Deductions from assay 21·275 units at 11s. 7·8d.	= £12 7 10
Charges as per statement	30 4 8
Total	£42 12 6

equal to £5 0s. 2d. per ton on 8·51 tons.

In this case the cost of bringing the ore from the mine to Bremer Bay is not shown.

STATE PURCHASE OF ORE—PHILLIPS RIVER.

In accordance with the scheme laid down in my Report on the Phillips River District of 28th February, 1903, it was decided that the Government should purchase copper ores for a time on that field in order to enable the mines to be opened up and a test made as to whether the district would be able to support a smelting works. An assay office was built and equipped, and a sampling floor laid down, and the ore as received was weighed and sampled by hand and then placed in ore beds on a site convenient for subsequent erection of a smelter. While the experiment was on its trial it was thought inadvisable

to go to the expense of erecting machinery for sampling, though it was well recognised that the cost of the sampling would in consequence necessarily be greater. Purchase of ore was begun in June, and in about three months it was found to be coming forward so freely that it became necessary to restrict the purchases to ore broken in the course of development work in the mines only, as otherwise the vote provided for the buying would soon have been exceeded. On 23rd January, 1904, it became necessary to discontinue purchasing ore in order not to exceed the vote and still to have money in hand for erection of a smelter. As this stoppage forms a natural break in the continuity of the ore purchase scheme, the following statement shows the output of the various mines up to the date of it instead of to 31st December, 1903:—

OUTPUT OF COPPER MINES AT PHILLIPS RIVER.

From 15th June, 1903, to stoppage of Works, 23rd January, 1904.

Mine.	Gross Weight of Ore.				Net dry weight.				Amount of Vouchers.		
	tons.	cwts.	qrs.	lbs.	tons.	cwts.	qrs.	lbs.	£	s.	d.
Elverdton	1,062	7	1	1	984	10	1	1	2,942	6	5
Mary	532	19	2	0	505	14	0	14	1,855	13	0
Last Chance	393	18	0	10	376	14	0	19	1,795	15	5
Marion Martin	243	17	3	12	229	12	1	7	1,067	5	9
Sunset	174	11	0	9	165	7	0	25	650	4	6
Mt. Benson	143	3	2	15	132	15	2	1	728	11	6
Mt. Pleasant	2	0	1	5	1	19	0	10	8	19	4
Mt. Stennett	111	10	3	3	101	18	1	2	518	9	4
Emily Hale	54	12	1	8	50	18	1	21	208	6	6
Mt. Cattlin	46	18	3	11	44	17	3	25	204	14	1
Mt. Desmond	43	7	1	5	40	13	2	9	175	14	6
Kilmore	33	16	2	22	31	18	2	5	174	13	11
Surprise	26	17	2	17	24	11	3	10	57	17	6
Zealandia	25	9	3	1	23	19	2	8	48	6	2
Great Oversight	22	12	1	3	20	12	3	8	97	11	10
South Elverdton	21	11	0	15	18	9	2	19	63	12	0
Mosaic	20	19	2	9	20	5	2	13	124	15	8
Last Chance Proprietary	20	2	0	4	19	7	1	15	55	1	10
Red, White, and Blue	19	11	3	24	18	13	2	18	123	11	9
Welcome Stranger	19	6	2	16	18	1	2	2	78	11	4
Australia	12	9	2	14	11	19	3	0	89	9	11
Omaha	9	8	2	18	9	3	0	0	60	18	6
British Flag	8	14	3	8	8	6	0	9	68	5	2
Harbour View	7	3	2	26	6	13	2	19	73	15	9
Rio Tinto	6	19	3	6	6	10	0	2	39	0	1
Blue Ribbon	6	14	0	18	6	6	0	12	34	18	3
Mt. McMahon	5	4	2	4	5	0	1	12	22	11	7
Grimsby	4	13	2	20	4	9	0	0	4	9	0
Nil Desperandum	4	9	3	5	4	5	1	6	4	5	4
P.P.A. No. 12	3	10	0	7	3	6	2	7	19	19	4
Duke of York	1	17	3	7	1	16	1	6	0	19	1
	3,091	1	1	15	2,898	17	2	25	£11,398	4	4

The average assay of the ore heap is 16·5 per cent. of Copper. The return is not quite complete, as further small payments for gold in the ore were yet to be made in several instances when it was compiled. The average net return to the sellers is seen to be nearly £4 per ton.

Since the beginning of the present year a smelting plant has been purchased, and is expected to be in work in August.

SCHOOL OF MINES, WESTERN AUSTRALIA.

As Chairman of the Advisory Board of the School of Mines of Western Australia, I have to report that the Board was appointed on 16th July, 1903, to advise on matters relating to the management and working of the School. Meetings were held at Kalgoorlie on 20th August and at Perth on 9th December, 1903, at which numerous matters relating to the Examinations, Regulations, and appointment of Staff were considered and recommendations made upon them.

I have, etc.,

A. MONTGOMERY, M.A., F.G.S.,
State Mining Engineer.

27th June, 1904.

APPENDIX I.

REPORT ON THE PROSPECTS OF DISCOVERING PETROLEUM BY BORING IN THE WARREN RIVER DISTRICT.

The Secretary for Mines, Perth.

Department of Mines, Perth,
30th April, 1903.

SIR,

In accordance with instructions to visit the Warren River District and report on the probability of finding petroleum there, I went to Bridgetown on 23rd March, and arrived at Messrs. Brockman's station at the Warren River on 25th March. Thence I went to the scene of the Westralian Mining and Oil Corporation's borings near the mouth of the Warren River, and next day to Malamup, near Black Head, returning on the following day by an inland route direct from Malamup to Messrs. Brockman's station. On 30th March I went down the Fly Brook to its Junction with the Donnelly River, and on to Messrs. Gibletts' hut at Quinelup Spring, thence next day to the mouth of the Donnelly River and across country to Black point, continuing next day to the Lower Blackwood River. On 2nd April I went to Cape Leeuwin, and next day to Karridale, returning to Perth on 4th instant. I therefore traversed the supposed oil-bearing area from end to end, and was able to obtain a good knowledge of its geological features. Mr. W. L. Brockman, who knows the district very intimately, was kind enough to act as my guide, and I was also accompanied by Mr. E. J. Nankivell, the representative of the Westralian Mining and Oil Corporation, who was able to give me information as to the bores put down by his company, and as to the various evidences that had been relied upon by them as showing that there was a likelihood of obtaining petroleum in the district.

The district has been previously reported upon by the Government Geologist, Mr. A. Gibb Maitland, in a report dated 26th March, 1902, and two private reports have also been published, one in the *West Australian* of 27th March, 1902, by Mr. H. P. Woodward, F.G.S., and another in a pamphlet issued by the Westralian Mining and Oil Corporation, by Mr. S. Goeczel. All are agreed in regarding the low-lying country between the mouth of the Blackwood River and Point D'Entrecasteaux as composed of recent to older Tertiary, and perhaps Mesozoic, sedimentary strata, deposited in a basin of the Archæan metamorphic formation. The explanatory sections given by Messrs. Maitland and Goeczel differ, however, materially, in that while the former regards the sediments as deposited on a gently shelving shore of the older rocks, and lying roughly horizontal in their bedding, Mr. Goeczel shows a "zone of dislocation," or large fault, between the sedimentary series and Archæan rocks, and also that the more recent strata have been folded to form an anticline. The difference is of consequence from an oil-finder's point of view, as Mr. Goeczel's section shows a much greater probable depth of strata that might be oil-bearing, and also a bending of them in a manner which has been recognised as a favourable condition for the existence of the underground reservoirs in which oil accumulates. A very interesting question is also raised in Mr. Woodward's report, as he considers the Fly Brook series, in which the Fly Brook coal occurs, as being of Mesozoic age, and consequently older than the Tertiary coastal sandstones and limestones. The extent of these Fly Brook beds is not determined, but there is a likelihood that they may extend under the whole of the recent series, in which case we would have to consider the probabilities of finding oil in rocks of Mesozoic age instead of only in Tertiary strata.

Going down the Warren River from the bridge on the Busselton to Albany Road the country rock in the bed of the river is mica schist, striking from North 5° East to North 15° East, to about seven miles inland from the sea, when the stream gets into low-lying swampy ground, and the bed rock is rarely visible in the banks. In this low-lying ground we appear to come almost at once into the area occupied by Tertiary and recent deposits. Going Southwards the Archæan schists make their appearance on the beach at Malamup, about two miles North of Black Head, and then are seen for some distance along the coast to the South. Going Northwards they are not again seen on the beach till the mouth of the Blackwood River is reached, when they are seen on the West side of the river, and along the beach to Cape Leeuwin. The Cape itself is gneiss, striking nearly North and South. The gneiss and schist are seen outcropping at intervals along the railway from Augusta to Karridale, and from Karridale for most of the way along the road to Busselton until the flats at the Vasse are reached, when Tertiary strata are again entered upon. Not having followed the contact between the Archæan rocks and the Tertiary series between Fly Brook and the Blackwood, I cannot say what is the greatest width of the area occupied by the more recent formation, but Mr. Goeczel, who I understand took an inland route, shows it as running over 30 miles inland, the widest portion lying to the North and North-North-East from Black Point. From Fly Brook to Black Head the width of the Tertiary formation is from ten to three miles. The whole of the ground in the Tertiary area is flat and swampy, and therefore difficult to examine geologically, except for the coastal hills, which form a series of small pointed peaks, up to 800 feet in height, in a belt two to three miles wide, lying alongside the beach, from Black Head to Augusta. These hills are very like sandhills in general appearance, and are much covered with sand dunes of very recent formation. The hills are composed of sandstones and limestones usually showing very distinct stratification. The limestones are composed of fragments of shells, comminuted to form a shell sand and then cemented together into a hard rock. They show a laminated structure exactly similar to the sandstones. The limestones appear generally to overlie the sandstones, forming the tops of the higher hills. All along the range of hills on the inland side the beds of both sandstones and limestones appear to have a strong easterly dip, of about 20 to 30 degrees, and though this varies a good deal in direction within short distances, it seems to me, on the whole, to be much too regular to be the result of formation by wind. The lamination is also, in my opinion, too minute and too regular to be

due to æolian action, and in my opinion these strata have been laid down in shallow water originally. The apparent dip to the East is probably what induced Mr. Goeczel to consider that there was a distinct anticlinal fold in the strata, and I was myself disposed to agree with him on that point until I had examined the larger sections presented at the mouths of the Meerup Brooks, Warren River, and more especially the Donnelly River. In all these large sections it is clearly seen that the main beds of the strata are lying, approximately, horizontally, but that individual beds often present splendid examples of "False" or "Current" bedding, with the false bedding dipping usually to the Eastward. In these main sections also the appearances seem to be inconsistent with an æolian origin, as the main beds are too regular for this. Fairly heavy shells are at times enclosed in the sandstones also, which would be unlikely in wind-formed deposits. The general easterly dip of the false beds suggests that at the time of their formation there was water between them and the mainland, where the low swampy ground now is, and it seems to me not improbable that the Tertiary area was a large lagoon, cut off from the ocean by an intervening range of sand hills, as is often seen along the coast at the present time. I would emphasise the distinction that the existing sandstone and limestone hills were not the old sand hills hardened into rock, but sediments laid down in the lagoon, and on the ocean beach, which have hardened into stone and have since been raised and carved into their present shapes by erosion.

A strong confirmation of this theory of the subaqueous formation of these rocks as opposed to their æolian (wind-blown) origin was obtained at Malamup, close to the junction of the sandstones with the Archæan rocks. Here I found a strong bed of coarse conglomerate, containing fairly large pebbles of an older dense crystalline limestone, far too heavy to have been moved by wind. The character of the limestone suggests that it is of Paleozoic age, but no definite conclusion can be formed on this point except that it is much older than the strata in which the pebbles are now found, seeing that the rock must have existed in the neighbourhood when the sandstones were being formed. No such rock is now known to exist in the district, having been entirely removed by erosion, but these pebbles prove that it has existed, and it is possible that remains of it still lie buried under the more recent deposits. The Government Geologist, Mr. Maitland, has informed me that an older limestone has been recorded as existing in the neighbourhood of Busselton.

There may be some connection between these older limestones and the beds in which the Fly Brook coal occurs. At the time of my visit the old workings along the Fly Brook had all fallen in, and only very poor sections were obtainable in the banks of the creek, which show soft micaceous sandy and clayey beds, with carbonaceous markings, which have a very recent appearance, and were taken by me to belong to the Tertiary series. The late Government Geologist, Mr. Woodward, however, appears to have examined the locality when work was in progress, in 1888, when better exposures of the strata were obtainable, and in his report of March 27th last he refers them to the Mesozoic Coal Measures. In his Mining Handbook, 1895, pages 143 and 144, Mr. Woodward gives an account of the Fly Brook coal occurrence, which is also quoted in the "Mineral Wealth of Western Australia," Geological Survey Bulletin No. 4, by the present Government Geologist, Mr. Maitland, on pages 120 and 121. The analysis of the coal agree fairly well with those from the Collie coalfield, quoted in the "Handbook" by Mr. Woodward. In "The Mineral Wealth of Western Australia," pages 118 to 120, records are also quoted of borings near the Vasse River, which show several small seams of coal. Mr. Maitland says:—"So far as may be judged from the bore journals, the strata consist largely of sand—in all probability an incoherent sandstone—shales, with pyrites nodules, and dark and yellow clays. They in all probability represent the Northward continuation of the Fly Brook beds." It would therefore seem likely that the coal-bearing formation in this part of the State is fairly extensive. The only pieces of coal that I saw about the old Fly Brook workings were distinctly lignitic, with the woody structure very plainly visible.

In considering the geological history of this district, which it is necessary to do in investigating the probabilities of its containing petroleum, it is necessary to take a wider view than that of the immediate locality merely, and to look into the Post-Palæozoic deposits of the West and South coasts generally. A synopsis of the available information as to these is given in chapters I., IX., and XI., of Mr. Maitland's "Mineral Wealth of Western Australia." The records of a large number of borings are there given, which show that the Tertiary deposits are of great depth, the South Perth bore for example having reached a depth of 1,860 feet 6 inches without reaching the underlying older rocks. A calyx drill bore on the Dardanup Estate is shown (page 117) to have gone down over 1,016 feet, in strata which are probably of the same age as the Fly Brook series, and may therefore be Mesozoic or older instead of Tertiary. The No. 3 Bore of the Westralian Mining and Oil Corporation, now in progress at the Warren River, is down 917 feet without having reached the bottom of the strata, and a bore in progress at Eucla is now over 1,000 feet in depth. The strata passed through in these bores are of lacustrine and estuarine type, such as are deposited in shallow water, and have evidently been deposited during a long period of gradual subsidence of the coast. As the sea level is a constant all the world over, it is clear that at the beginning of this subsidence the land must have stood some 1,800 or more feet higher than at present, and gradually sunk, with accumulation of sandy deposits along the shores. As the sandstone and limestone hills between the Blackwood River and Black Head are often 600 to 800 feet in height above the present sea level and high Tertiary sandstones and limestones are found all round the West and South Coasts, it is further evident that the subsidence went on until the level of the land was in all probability at least 1,000 feet lower than at present, since which time there has been a movement of elevation resulting in present conditions. A similar subsidence and elevation can be demonstrated to have occurred in Victoria and Tasmania in Tertiary times, making it probable that the movement was one affecting the whole Southern portion of the Australian Continent. In Victoria and Tasmania the period of subsidence culminated in extensive outflows of basalt, after which the movement of elevation seems to have set in, and it is therefore very interesting to find that basalts of middle to later Tertiary age are also found in the South-West of this State. The basalt is seen at Bunbury, also in the Blackwood River, at Black Point on the South Coast, near Silver Mount between the Warren and Donnelly Rivers, and was cut in Nos. 1 and 3 bores of the

Westralian Mining and Oil Corporation on the Warren River. A black dyke coming through the crystalline rocks between Cape Leeuwin and Augusta was also pointed out to me as basalt, but I had not time to go to examine it. The outcrop of the basalt at Black Point is a very fine one, with well marked columnar jointing. It is seen forming black reefs down to and below low water mark, and is covered with sandstone strata, much of the sandstone being of dark brown colour in contact with it. Though I looked specially for fragments of the basalt in the overlying sandstone I could not find any, and the brown colour of the sandstone seemed to be due to a ferruginous cement rather than to basalt sand. The next rocky point to the West of Black Point shows at sea level brown sandstones with a very considerable amount of brown oxide of iron in them, and with very twisted and crumpled stratification. On these lie calcareous sandstones, often showing false bedding, of the usual character of the district. The crumpled brown sandstones are probably due to the intrusion of a sheet of basalt between the bedding planes of already existing sandstones, and the brown cementing material is probably derived from ferruginous solutions due to the basalt. In the Oil Company's No. 1 bore, however, the basalt is of a somewhat scoriaceous nature, full of cavities, and was probably poured out on the surface as a lava flow, instead of being thrust between the strata in an intrusive sheet as at Black Point. The occurrence of these volcanic rocks is of considerable importance in consideration of the possibilities of finding oil.

Three bores have been put down on the banks of the Warren River by the Goldfields Diamond Drilling Company under contract from the Westralian Mining and Oil Corporation. The No. 1 Bore is about six miles up the river from its mouth. According to a letter from Mr. W. J. L. Sinclair, dated January 9, 1903, "The drill penetrated to a depth of 81 feet, the first 49 feet being through sand and black mud, when basalt was struck. When 32 feet of the basalt was traversed the hole was abandoned, in consequence of the site being unsafe from danger of floods." Of No. 2 Bore, which was put down about a half a mile further down the river, he says:—"No. 2 Bore traversed 504 feet of sand." I understand that it was abandoned because the site of No. 3 Bore, chosen by Mr. Goeczel, was thought to have a better chance of success. The sand in this bore seemed to have had very little coherence, and no basalt was met with. The No. 3 Bore was about two miles up from the mouth of the river, just inside the sandstone hills. For 80 feet incoherent sand was passed through, then to 100 feet black clay, with seams of sand, after which came a layer of quartz, pebbles, and incoherent sand to 150 feet. From 150 to 180 feet basalt was passed through, partly decomposed, then a succession of shales, sand, and sandstones, with coaly particles to 440 feet. With the exception of about 10 feet of clays and shales from 503 to 513 feet, the rest of the bore to 917 feet is mostly sand, usually rather incoherent. Artesian fresh water was obtained at 720 feet, and at 810 feet there were traces of shells and lignite. Coaly particles were found more or less throughout the whole of the bore. The bore is still in progress, and I understand it is the intention of the Company, if possible, to carry it down to the Archæan rock.

The reason that has induced prospecting for oil in this neighbourhood lies in the frequent occurrence on the beach between the Lower Blackwood and Point D'Entrecasteaux of pieces of bitumen and asphaltum, of very good quality, and as is well known, this substance is very commonly found at surface where oil springs burst out of the ground, being formed from petroleum partly by the evaporation of the lighter oils, and partly by "inspissation," a molecular change due to absorption of oxygen and sometimes to the action of light. This bitumen or asphaltum is commonly thrown up on the beach, sometimes in quite large pieces, one being described as being as big as a piano-case, and local residents have often made use of it for mending boats. When first thrown up it is stated to be usually quite soft, and smelling strongly of kerosene, but after exposure to the air for a time it becomes hard and brittle. While travelling along the beach from the mouth of the Warren River to Malamup, we found three pieces of it on the sand at about high-water mark, between Meerup Brook and Malamup, and Mr. Brockman informed me that this was the part of the coast where, according to his experience, it was most commonly found. I could get no authentic information as to its ever having been found inland, though there was a rumor that it had been obtained also up the Blackwood River many years ago. If it can be established that the source of this bitumen is in the district, there would be every reason for persevering prospecting for oil by boring. Being cast up on the ocean beach, however, there is no certainty as to where it has come from. The same substance has been sent to the Geological Survey Laboratory from Starvation Harbour, over 200 miles East of Albany, and something very similar was found at Kangaroo Island, near Adelaide, and led to bores being put down for oil without result. The fact which tells most strongly in favour of the Warren District being probably the source of it is that it is found there pretty constantly, and not only once in a while. The continual reappearance of the mineral at about the same place is fairly strong evidence that the source is not far distant. It is pretty certainly submarine, however, and may lie some distance out from the coast. But once let it be conceded that this is the case, the only geological formation possible for it to be found in known to exist in the vicinity is the Tertiary or perhaps Mesozoic one described above, and the search for oil in this becomes a venture that has possibilities of success.

Certain other evidences of the presence of petroleum have been brought forward, namely, alleged oil scums on the rivers at times, shales yielding oil on distillation, and scums on the ocean. I only saw one very slight iridescent scum on the Warren River. and it was just such as is common on any swampy stream, and the scums on the ocean which were pointed out to me as similar to those which had been thought to prove the existence of oil had neither oily feel nor smell when thrown upon the beach, but were made up of dead marine organic matter. Mr. Maitland's analysis of the supposed petroliferous shales gave a negative result, but even if a little oil or tarry matter had been produced by distillation, it would have been no proof of oil deposits, as almost any peaty material will give off oily matters when subjected to destructive distillation. Many shales also yield a little oil when distilled without there being any free oil in them to begin with. The search for oil in this district therefore turns entirely upon the opinion that is held as to the most probable source of the bitumen.

The geological structure of the district is neither particularly favourable for the occurrence of oil, nor conclusively unfavourable, oil having been found elsewhere in similar strata of similar age, while

other such strata have been penetrated over and over again without getting a trace of it. The numerous bores, of which details are given in Chapters IX. and XI. of Mr. Maitland's "Mineral Wealth of Western Australia," have in most cases had just as much chance of getting oil, so far as the formations in which they are located are concerned, as those at the Warren River, yet in none of them has there been any trace of oil. So, too, with the bores near Eucla, and along the Tertiary deposits of the South Coast of South Australia. The one point in the structure of the Warren district that might make it more likely to carry oil than the others mentioned is the occurrence of basalt in large flows and sometimes in intrusive sheets. Mr. A. S. Cooper, State Mineralogist of California, and a high authority in petroleum, in his paper on oil in "California Mines and Minerals, 1899," makes out a strong case for the derivation of petroleum from vegetable remains enclosed in shales and other sedimentary strata through a process of natural distillation caused by heat, engendered by chemical action in some cases, and in others by crushing of the strata during earth movements. If this theory is correct, the injection of considerable masses of molten basalt into a formation rich in vegetable remains might be expected to have the same effect, and the hydrothermal action which so frequently accompanies volcanic outbursts would work in the same direction. The sedimentary strata are full of the necessary vegetable remains, as shown by the coal seams, so that there is, on Mr. Cooper's theory, a chance for the formation of oil. Other authorities, however, ascribe an animal rather than a vegetable origin to oil, regarding it as a product from marine animal organisms buried in the sediments.

The sections obtained in the Warren River bores do not as yet show the impervious shaly strata separating the sandbeds that are considered favourable for the retention of oil in underground reservoirs, and to that extent the nature of the country is unfavourable. I am also unable to agree with Mr. Goeczel as to the existence of an anticlinal fold in the strata, another condition favourable for the collection of oil underground, the rather meagre evidence available seeming to me to go to show general horizontality of the strata. If Mr. Goeczel's view proves to be correct, the existence of the anticlinal structure he figures would be of great importance, both as affording storage for oil, and from a genetic point of view, as folding of the strata is a probable source of the heat required by Mr. Cooper's theory of petroleum formation.

With regard to the large fault shown by Mr. Goeczel, I did not see any evidence of such in the parts of the district traversed by me. There seems to be a fault, probably small, where the sandstones abut against the schists at Malamup, and it is possible also that the mouth of the Blackwood River follows a line of faulting. In both cases the recent formation seems to abut against the older one too suddenly to be merely an original contact, but it does not seem to me that there is conclusive evidence of any extensive fault. The line of a fault would be an especially likely place for an outbreak of oil springs if petroleum were present in the district, and it is possible that the bitumen found comes out under the sea along such a line.

The Oil Company have now applied for Government assistance to continue boring. It will be seen from the above that the formation is not unfavourable for oil, and that there is the positive fact in its favour that bitumen, a product of oil, has been repeatedly and continually found in the district for many years past. On the contrary, the bores at the Vasse, where the formation is equally likely to contain oil, did not give any sign of it, the source of the bitumen is doubtful, and even if there is oil in the formation, the history of oil boring shows that a great many bores may be put down in an oil field before one is fortunate enough to strike petroleum. The chances appear to me, therefore, to be greatly against success being likely, and I am not able to certify, under Part V. of the Mining Development Act that there is a "reasonable prospect of success." Nevertheless, it seems to me that this is a case where it would be advisable to assist any person willing to undertake the cost of boring, for there is a possibility of success, and the reward of success in finding oil would be an enormous one. It is also advisable, now that the drill is on the ground, that the question should be set at rest once for all. I would therefore recommend you to subsidise the boring to the extent of £ for £ until the No. 3 Bore has bottomed on the Archæan Strata, after which further boring could be considered with the additional light conferred by the results of this bore.

I have, etc.,

A. MONTGOMERY, M.A., F.G.S.,
State Mining Engineer.

Appendix II.

ASSISTANCE TO MINING GRANTED DURING 1903, UNDER "THE MINING DEVELOPMENT ACT, 1902."

Sluicing at Southern Cross.

The scheme for which assistance was applied for by Mr. H. M. Dickson has been already referred to in my annual report when dealing with the projects for sluicing dry-blown areas of alluvial material. Amount authorised, £50; expended, £18 15s. 2d., under Part VI. of Mining Development Act.

Boring with Diamond Drill in Hannan's Reward and Mount Charlotte Mine.

Application having been made by the Company owning this mine for assistance in boring to test the continuation of their auriferous veins in depth, an examination of the workings was made, and a loan up to £500 granted. The auriferous bodies in this mine consist of a large number of parallel quartz veins running N.E. and S.W., and lying crosswise between two lode "formations" which run more or less North and South. The cross veins dip somewhat flatly to the N.W., and the North and South lodes fairly steeply to the West. In the upper levels a number of these cross veins have been successfully worked, especially at their junction with the Western lode; but in the harder country, in the lower levels, they become small. The object of boring was mainly to ascertain if the two principal cross veins, which have been the largest producers of ore, persisted in depth. Two bores were made, one horizontally Southward from near the end of the 400 feet level, the bore being laid off to run parallel with the Western lode, and about 20 feet in from its footwall, in order to intersect the cross veins; and the other diagonally downwards at an angle of 60°, keeping also just under the Western lode, with the object of cutting the cross veins just before they run into the lode, and of striking the principal cross ore vein at about 1,000 feet from surface. The first bore was put in 355 feet, and the second 650 feet. Both bores cut a large number of small veins of quartz carrying a little gold, but none of sufficient size to work. The values ran from traces up to 24dwts. per ton in the horizontal bore, and from traces up to 17dwts. per ton in the inclined bore. The work proves that the cross veins, though small, are very persistent in depth, and more or less gold-bearing to the deepest point reached. It was thought by the management at the time of boring that both bores were sufficiently advanced to cut all the known ore bodies if they maintained their dip as in the upper levels, but on subsequently laying them down on a plan it was found that the horizontal bore ought to be extended 50 feet further, and the inclined bore 150 feet further, in order to make sure of having cut the principal cross vein. As only £364 6s. 3d. of the £500 authorised had been expended, the Company was informed that the balance was still available for further boring if they thought fit to resume it, but up to the present they have not taken advantage of the offer.

The advance was made under Part V. of the Act, at the rate of £1 for £1 on the expenditure in boring, which was carried out by contract at a price of 14s. 6d. per foot.

The Company gave a lien upon their leases as security for repayment of the advance from the first gold obtained from any lodes proved by the boring.

Water Supply for Public Battery, Mosquito Creek, Nullagine.

An application from the Bell Gold Mining and Exploration Company, Mosquito Creek, Nullagine, for assistance in sinking to get a water supply for battery purposes, was referred to the Engineer of Mines Water Supply, and reported on by him. The Minister approved an advance up to £500 to be made to the Company, on condition that they would expend, if necessary, at least £500 in obtaining water by sinking a new shaft 150 feet or more on Lease 109L, no subsidy to be payable until a supply of water had been obtained, and that they would at once crush for the public with their existing battery and water supply at least five days (of eight hours) a week at the following rates:—

5 ton parcels	...	...	...	...	...	40s.	a ton
10 „ „	...	...	...	...	...	35s.	„
10 to 50 „ „	...	...	...	...	...	30s.	„
over 50 „ „	...	...	...	...	...	25s.	„

Tailings to be property of Battery Company if not removed by owner within seven days of completion of crushing.

Also, that when the new water supply has been obtained the Company will crush for the public 10 days in each month, at the rate of 30s. a ton for parcels under 50 tons, and 25s. a ton for parcels over 50 tons; tailings to be the property of Battery Company if not removed by owners within seven days. When a satisfactory water supply has been obtained, the Minister is to pay £1 for £1 on the cost of obtaining it up to a maximum of £500, repayable at any time after three months' notice that he is not satisfied that the conditions are being fulfilled, for which a lien over Lease No. 95L is taken as security. This lien is to be cancelled after two years if the Minister is satisfied that the conditions have been properly carried out. The work of sinking was hardly commenced during 1903. Amount of authority, £520; amount expended in 1903, £6 15s.

Boring for Coal in the Irwin River Basin.

The Irwin River Coal Prospecting and Development Syndicate, Ltd., boring for Coal at Mingenew, applied under Sections 22 and 23 of the Mining Development Act for assistance at the rate of £1 for £1 on their expenditure. The matter having been reported upon by the Government Geologist, an advance was granted at the rate of £1 for £1 on the cost of boring from 631 feet (the depth at that time) to 1,000 feet, provided the total cost did not exceed 25s. a foot. The Company undertook, in the event of coal being discovered, to start development within six months, and to repay the amount advanced, with interest at five per cent., before any bonus or dividend should be paid to shareholders.

Later on the Minister approved continuing the bore to a depth of 1,500 feet on the same terms. On 11th May the Company's manager reported having cut at 905 feet 10 inches a "hard and strong coal seam" six feet two inches thick, which on analysis proved to be of good quality and very similar to the coals of the Southern Coalfields of New South Wales. Government officers were then sent to the bore to check the depth and, if possible, to obtain confirmatory samples of the coal. The bore was at this time reported to be 994 feet in depth, but on remeasurement it proved to be only 964 feet, making the exact position of the coal seam doubtful, but most probably about 877 feet. It was also found that the lower part of the bore had been reamed out, that the casing was broken in at least two places, and that there was great difficulty in keeping the bore free from silt and sand. Strong suspicion was thrown on the alleged discovery of coal, and the Government officers were unable to find any confirmation of it, but owing to the bad state of the bore, and the uncertainty as to the position of the seam, they could not arrive at positive proof.

After some delay it was decided to put down a second bore close to the first, and a contract to do so was let to the Goldfields Diamond Drilling Company, who have been boring up to the end of 1903 without striking any coal. The work is still in progress. The expenditure for 1903 was £362, out of £500 authorised.

Sinking Shaft on M.L. 12, the "Money Mia," at Arrino.

The application of the lessee of this property for assistance to enable him to sink a shaft to prospect his copper ore deposits was complied with by granting advances at the rate of £1 per foot down to 50 feet depth, and 30s. a foot from 50 feet to 100 feet. The lessee sank 60 feet, and then discontinued working. Expenditure authorised, £125; spent, £65.

Sinking Shaft on President Loubet Lease, 611u, at Callion.

Mr. R. Bertaux made application for assistance to the extent of £1,000 under Part II. of the Act, to enable him to sink a main shaft for the double purpose of opening and prospecting his reef and obtaining a water supply for Battery purposes. After examination of the mine it was considered desirable to have a bulk test of the quartz already in sight before coming to any conclusion as to an advance, and an arrangement was come to whereby 100 tons of stone were to be sent to the Callion Battery to be crushed, the Minister granting a subsidy of 10s. per ton towards the costs of carting and crushing. When the stone had been delivered at the Battery it was found that there was no water, and crushing could not proceed. This was the position at the end of 1903. Expenditure authorised, £50; paid, £50.

Sluicing Alluvial Ground at "Lady Mary" Lease, G.M.L. 3993, Coolgardie.

This was a scheme for testing the possibility of working dry-blown alluvial areas by sluicing, which took several different shapes before being settled. The first application was for plant to value of £40, and cheap water from the Coolgardie Water Supply. The Minister, in reply, offered to lay pipes on to the ground from either the Coolgardie Main or Gleeson's water shaft, leaving the party to make their own arrangements as to purchase of water. The salt water supply from Gleeson's shaft was at that time available at 3s. 6d. per 1,000 gallons. The sluicing party, however, then found that they could get water at 4s. 6d. per 1,000 gallons delivered on the ground under high pressure from Mr. Graham Price, and asked for a subsidy on the cost of the water instead of the loan of the pipes. The Minister thereupon agreed to pay for half the cost of the water for three months up to a total of £150, to be repaid if the ground proved payable. Difficulties next arose as to sufficient consumption of water being guaranteed to warrant Mr. Price in laying the pipes, and eventually the negotiations with him were broken off. A fresh arrangement was next made by the party with Messrs. Silverthorne and Adair for a supply from Gleeson's shaft, but nothing further was done in the matter before the end of 1903. Authority issued, £150; expended, *nil.*

Prospecting Deep Alluvial Lead at Kalgoorlie.

An application from Messrs. R. Foran and party for assistance to prospect a deep lead—probably a continuation of the "Town Lead"—at Kalgoorlie, was acceded to. An advance at the rate of £1 for £1 up to £100 being granted, repayable out of the first gold won. Considerable delay was entailed by it being necessary to obtain the consent of the owners of property in the locality to mining being done under their allotments, but eventually work was begun in September, 1903, by sinking on Lot No. 424, in the block enclosed by Egan, Wilson, MacDonald, and Lane Streets. The shaft was sunk 114 feet, reaching bottom at 109 feet. Considerable driving was done on the lead, revealing likely looking ground, with a little gold, but not payable. The advance was expended at the end of 1903, but work still being continued by the prospectors. Authority, £100; paid, £100.

Prospecting Deep Alluvial Lead near Trafalgar, on Extended Alluvial Claim No. 209E.

Messrs. Waite and Blamire having made application for assistance to prospect some deep alluvial ground on the East side of the Boulder Hill, the matter was reported upon by the Inspector of Mines, and an advance of £1 for £1 up to £100 authorised, repayable from the gold won. At 86 feet "wash" was struck, said to be four feet thick and to prospect at the rate of 5½ dwts. to the ton; and at 118 feet another layer six feet thick was obtained, from which seven tons were crushed for a yield of 2oz. 10dwts. of gold, or at the rate of 7dwts. 3grs. per ton. The work was still in progress at the end of 1903. Authority, £100; expended, £55 0s. 2d.

Prospecting Deep Alluvial Lead at Smithfield.

An advance of £1 for £1 up to £50 was granted to Messrs. C. A. Jameson and party to assist them in sinking a shaft on their Prospecting Area 275w, near Paddington. The shaft was sunk 86 feet, and work still in progress at end of 1903. Authority, £50; expended, *nil.*

Boring for a Deep Lead near Black Flag.

Messrs. F. C. Thompson and party applied for assistance to test an alluvial lead near Mt. Pleasant, on the road from Broad Arrow to Black Flag, by boring, their previous efforts to prove it with a shaft having failed on account of the large amount of water in the ground. An expenditure up to £150 was thereupon authorised by the Minister, the Government providing the Drilling Plant and a Foreman, and the party the other men required for the work. Eleven bores were put down, the total depth bored being 1,123 feet; deepest bore, 124½ feet. Cost to Department, £138 12s. 1d.; cost to Boring Syndicate, £145 4s. The work revealed deep alluvial ground, but was not successful in locating valuable "wash."

Boring for a Deep Lead near Bulong.

A local syndicate having applied for State assistance in boring for the continuation of the Great Oversight Deep Lead at Bulong, authority was issued up to £150 on the same terms as to Thompson and party above mentioned. Only one bore was put down, but it struck a hard travertine bar, and was unable to break through it, whereupon the syndicate abandoned the venture. Expended, £49 5s. 11d.

Boring for a Deep Lead near Lake Darlôt.

Assistance in the same way as above was given to a local syndicate who wished to bore some deep ground near Lake Darlôt, an authority being issued for £200 for the purpose. Three lines of bores, 31 in number, were put down, the total depth bored being 1,574 feet. Some promising-looking ground was passed through, but no payable "wash," though a little gold was got in some of the bores. The expenditure by the local syndicate was £93 6s. 8d., and by the Department £192 0s. 9d.

Diamond Drill Boring at South Fingall, Cue.

Assistance to the extent of £1,000 was authorised by the Minister, after examination of the locality by the Government Geologist, in favour of the South Fingall, Ltd., for boring with a diamond drill at Cue, on a site approved by the Geologist, the Company undertaking to pay the amount, with five per cent. interest out of the first gold won, prior to any bonus or dividend being paid to shareholders. The boring was carried out on contract by the Goldfields Diamond Drilling Co., cores being sent to the Government Geologist. At 760 feet gold-bearing quartz 15 inches thick was cut, a crushed sample from which assayed 5ozs. 18dwts 16grs. gold per ton. Other samples, however, of the solid cores averaged 7dwts. 2grs. per ton. The first bore hole went to a depth of 1,000 feet. A second was then put down to 549 feet without cutting anything of much value, though at 457½ to 458½ feet core was obtained which assayed, according to a report by the Company's manager, 5dwts. 5grs. per ton, but as only a crushed sample was forwarded to the Government Geologist, no check assay was made. A third bore hole went to a depth of 762 feet 8 inches, but did not cut any reef of value, though passing through quartz veins between 509 and 518 feet, which yielded only traces of gold on assay. Since completing this work the Company have decided not to go on with mining on these leases. The total expenditure is stated by the Company to have been £2,661 12s., excluding management, general, and travelling expenses.

Drainage of Kanowna North Lead.

The work done in sinking the pumping shaft on lease 918x, Kanowna, for the purpose of draining the North end of the North Lead, has been explained in my Annual Report above. Total expenditure on machinery and wages, £1,208 8s. 8d.

Subsidies to Crushing Plants.

A total amount of £502 17s. 7d. has been expended, during the year 1903, in subsidising various batteries to induce them to crush for the Public at reasonable rates.

Puddler at Paddington.

The expenditure on machinery and erection of this puddling plant, which was erected at Paddington as above described in my Annual Report, was £1,219 19s. 9d.

Expenditure on Camels, Horses, and Equipment for Prospecting and Exploring Parties.

The outlay for 1903 on this head amounted to £2,356 5s. 5d.

A. MONTGOMERY, M.A., F.G.S.,
State Mining Engineer.

APPENDIX III.

"Coal Mines Regulation Act, 1902."

QUESTIONS TO BE USED FOR FIRST-CLASS CERTIFICATES.

THURSDAY, 1ST OCTOBER, 1903.

12 noon to 1 p.m.

(The candidates will not be allowed any books other than logarithm tables during the time they are sitting for examination. All calculations must be shown in detail.)

SUBJECT No. 1.—ARITHMETIC.

1. Multiply 4/5 x 5/9 x 7/13, and from the product substract 1/5.

2. Find the square roots of 784996 and ·3, and the cube roots of 303464·448 and 12·3.

Give answer to three places of decimals where necessary.

3. How much coal is contained in an acre of a seam 5 feet 6 inches in thickness, the specific gravity of the coal being 1·3.

4. A rectangular cistern is 13 3/5 feet in length and 5 feet in breadth, and contains 290½ cubic feet of water. What is the depth of the cistern, and what is the weight of the water?

5. Express 8cwt. 3qrs. as the decimal of a ton.

6. Divide 1·1214 by 5·34.

7. A colliery produces and sells 6,000 tons of coal per week. Eight per cent. of this quantity is sent out of the colliery as "small coal," and the remainder as "large." At the pit bank a further 15 per cent. of the total quantity is screened from the large coal and added to the small. The selling price of the "large" is 7s. a ton, and that of the "small" is 4s. a ton. What is the average selling price of the whole 6,000 tons?

8. A certain amount of work has to be done in 16 days; 12 men do two-thirds of the work in 15 days. How many additional men will have to be employed to finish the work in the time specified?

9. How many cubic yards of walling are there in a shaft 500 yards deep and 20 feet diameter outside brickwork, the walling being 18 inches in thickness?

THURSDAY, 1ST OCTOBER.

10 a.m. to 12 noon.

(The candidates will not be allowed any books other than logarithm tables during the time they are sitting for examination. All calculations must be shown in detail.)

SUBJECT No. 2.—SURVEYING.

1. Describe the method of conducting: (*a.*) The surface survey of a mining property; (*b.*) The underground survey; and (*c.*) The methods of connecting it.

2. Describe the Theodolite, the processes for using it underground, and enumerate any precautions which may be required to ensure accuracy.

3. Give an imaginary page from a level book, showing twelve readings taken with four settings of the instrument over undulating ground. Work out and plot the section.

4. Describe the method of making mining plans.

If a plan is drawn to the scale of four chains per inch, what is the proportion between the actual area surveyed and the area as shown on the plan?

5. How many tons of coal will there be on a property comprising 326 acres, containing two seams of coal 6 feet 2 inches and 3 feet 8 inches thick respectively, and dipping at 9 degrees, allowing 20 per cent. deduction for faults, etc.

THURSDAY, 1ST OCTOBER, 1903.

2 p.m. to 4 p.m.

SUBJECT NO. 3.—GEOLOGY.

1. Define the terms: Shale, sandstone, dolerite, granite, dolomite, denudation, overlap, washout, and unconformity.

2. Discuss the origin of coal, and describe the different classes of coals.

3. Give an account of the geological features of any coalfield with which you are acquainted.

4. Describe the different kinds of faults, their effect upon coal seams, and the methods adopted for dealing with them when met underground.

5. Define true dip and apparent dip.

How would you determine the true dip of a coal seam from observations made on its apparent dip? Give an example.

SATURDAY, 3RD OCTOBER, 1903.

10 a.m. to 1 p.m.

(The candidates will not be allowed any books, other than logarithm tables, during the time they are sitting for examination. All calculations must be shown in detail.)

SUBJECT No. 4.—MACHINERY.

1. Water has risen 80 yards up a shaft of 16 feet diameter, and the feeder is equal to 300 gallons a minute. How long will an 18 inch plunger of 10 feet stroke, making 7 strokes per minute, be in pumping out the water.

2. Describe, with diagrams, the workings of a simple type of (*a*) Suction Pump, (*b*) Force Pump, and point out the principal differences in their action.

3. Discuss the relative advantages and disadvantages of direct-acting pumps driven by compressed air, direct-acting steam pumps, and electrically actuated pumps in dip workings distant from the main entrance to a mine.

4. Make sketches, with figured dimensions, showing the setting of a Lancashire boiler 7 feet in diameter and 28 feet long.

5. If a weighted lever safety valve on a boiler is $4\frac{3}{4}$ inches diameter, and the lever is 42 inches in length from centre of valve to centre of weight, and $4\frac{1}{4}$ inches from centre of valve to fixed point, and the weight is 87lbs., what is the blow off pressure?

6. What is meant by "Unit of Work" and "Unit of Heat?"

7. What is understood by the terms "Volt," "Ampere" "Watt," and "Ohm?"

8. Enumerate various applications of electricity to colliery work and discuss the sources of danger in its use.

9. What rules should be observed in the care and management of wire ropes? Describe how you would ascertain the breaking strain of a large wire rope.

10. A winding engine is required to raise 1,000 tons of coal in 11 hours from a depth of 536 yards. What description of engines and size of ropes would you use for the work, and what horse power would be required, assuming the engine to yield 50 per cent. of effective work.

11. Describe a safety detaching hook.

12. Show how you arrive at the actual load upon an endless rope hauling engine, when you know the weight of the rope, the number of skips, empty and full, and the weight of coal on the rope at one time, the average gradient being 1 in 10, allowing 1/28 as the coefficient of friction.

FRIDAY, 2ND OCTOBER, 1903.

2 p.m. to 5 p.m.

SUBJECT NOS. 5 AND 6.—VENTILATION: DANGEROUS CASES.

1. How many cubic feet of air per minute will pass through an airway 5 feet by 7 feet when the current is travelling 20 yards in 15 seconds?

2. Describe a water-gauge, and how it is fixed in a mine. What is the meaning of the term "Motive column," as applied to ventilation?

A water-gauge reads 2·7 inches. What are the weight and height of the theoretical motive column, assuming that a cubic foot of air weighs ·0807lbs?

3. What is the weight of a cubic foot of air when the barometer stands at 30 inches and the thermometer at 56deg. F.?

4. The reading of a water-gauge is 0·7 inches. If the length of the airway is trebled and the velocity is increased from 8 to 10 feet per second, what will be the height of the water-gauge?

5. Two airways, A and B, are of the following dimensions:—A, 2,000 yards long, 5 feet high, and 8 feet wide; B, 4,000 yards long, 6 feet high, and 6 feet wide. If 50,000 cubic feet of air per minute are split into these two airways, what quantity will pass through each?

6. If a ventilating fan is running at 40 revolutions per minute with 1·5 inches of water-gauge, and it be altered so that the water-gauge reads 2·6, what would be the speed of the fan?

7. The effective horse-power of a fan is 14; the water-gauge reads 0·7 inches. What is the volume of air travelling per minute?

8. Describe fully the gases met with in coal mines.

9. Explain the principle of the safety lamp, and describe a good modern type of safety lamp.

10. How can you tell, roughly, by means of a safety lamp the percentage of fire damp present?

What percentage is required to form an explosive mixture, and what to form the most explosive mixture?

11. An explosive mixture of air and fire damp at the highest explosive condition passes along an airway 5 feet by 8 feet at a velocity of 500 feet a minute. What quantity of pure air must be added to dilute the mixture so that the gas cannot be detected on the flame of an ordinary safety lamp?

FRIDAY, 2ND OCTOBER, 1903.

10 a.m. to 10 p.m.

(The candidates will not be allowed any books other than logarithm tables during the time they are sitting for examination. All calculations must be shown in detail.)

SUBJECT NO. 7:—MINING OF COAL.

1. A head of 854 feet of water acts against a dam in a mine. The inside face of the dam has an area of 13 square feet. Work out the total pressure against the dam, and give the answer in tons.
Describe the construction of such a dam.

2. Describe the retrograde system of long-wall working, and state what are its advantages and disadvantages compared with long-wall working outwards.

3. Under what circumstances would you adopt board and pillar working in preference to long-wall and *vice versa* ? Discuss the advantages and disadvantages of each method.

4. Describe, with sketches, a wooden curb or crib as used in sinking operations.

5. Describe how you would prevent the oscillation of a kibble used in sinking a shaft.

6. What precautions would you take in working a dry and dusty mine to prevent possible explosions due to coal dust?

7. Describe the means you would adopt to secure wire guides or conductors to the head gear, and your arrangements for keeping the guides sufficiently rigid.

8. Make a sketch of some method of coal working with which you are familiar, showing a main heading and at least six working places. Show the drawing roads, packs, timbering, and mode of ventilation.

9. Show by sketch the method of timbering you would adopt for a roadway through a worked-out and filled portion of a seam dipping 1 in 3.

10. Knowing a mine to be liable to spontaneous combustion, what precautions would you take to minimise the danger thereof ?

11. Discuss the relative advantages of circular and rectangular shafts.

12. Show, with aid of sketch and figured dimensions, how you would fit up a shaft 14 feet in diameter for winding with two cages and wire rope conductors.

THURSDAY, 1ST OCTOBER, 1903.

4 p.m to 5 p.m.

SUBJECT No. 8:—THE COAL MINES REGULATION ACT, 1902.

1. What does the Act require regarding—
   (1.) Signalling and manholes in planes worked by machinery;
   (2.) Withdrawal of workmen in case of danger;
   (3.) The ventilation of mines.
2. What is meant in the Act by "ventilating district"?
3. What are the requirements of the Act with regard to keeping plans of mines?
4. What is the necessary procedure to establish Special Rules?
5. What precautions are required to be taken when approaching a place likely to contain a dangerous accumulation of water?
6. What are the general rules as to fencing machinery?

School of Mines of Western Australia.

DIRECTOR'S REPORT FOR THE YEAR 1903.

To the Secretary for Mines, Perth.

SIR,—

I have the honour to submit the following report on the work done at the School of Mines during 1903 :—

COOLGARDIE SCHOOL OF MINES.

The work of the School has been systematically carried on throughout 1903, and it is gratifying to the staff that as the result of their efforts a fair average attendance has been maintained, notwithstanding the constant departure of students to other districts in search of employment.

The fact, however, that the students have not been able to attend regularly through the whole year has militated against the best results being shown. Those students who were able to attend regularly, and sit for the final examination, have acquitted themselves creditably; and the School of Mines at Coolgardie has established a satisfactory record for its single year of existence.

But the examination results are not the only test of the good work accomplished by a School of Mines, nor do the best students always pass the best examinations. The real value of a School of Mines becomes evident year by year in the work done by the students after they have finished their school course; and the last twelve months' work at the Coolgardie School has started a number of students on the fair way to become better workmen, and has taught them to take an intelligent interest in their work.

During the early part of 1903 the services of Mr. F. H. Neville, electrician at the Lake View Consols, were secured for conducting classes in the practical applications of electricity. The classes were well attended, the subject being recognised as one of special importance on these goldfields. At the end of the first term Mr. Neville was obliged to discontinue his journeys to Coolgardie owing to private business in Kalgoorlie, and Mr. J. Kingston, M.I.E.E., manager of the Electric Supply Company, Coolgardie, conducted the classes successfully up to the end of the year, making a special feature of practical work in connection with motors, dynamos, electric lighting, and wiring, which was carried on in the large hall attached to the School.

Classes in applied mechanics and drawing were conducted throughout the year by Mr. C. E. Lewis, draughtsman for Messrs. Bewick, Moreing, & Co.; but the classes were not as well attended as the importance of the subjects demanded.

Mr. J. F. Lynch, holder of a mining manager's certificate from the Ballarat School of Mines, conducted the classes in surveying, and gave his students a large amount of practice in the field and underground; Mr. Gourley, manager of the Lady Loch, kindly placing his mine at the disposal of the students for this purpose. The class, although small, did a considerable amount of good work.

Mr. Lynch also assisted me in one of the divisions of the mathematics class, which was divided into separate sections to meet the requirements of the students.

To all the instructors credit is due for the conscientious manner in which their duties were discharged. The students were orderly throughout, and displayed keen interest in their work. During the year the School was taken advantage of by practical mining men, but in several of the classes the attendance was small, owing to the general depression in mining around Coolgardie, and it became a question whether certain of the classes should be continued during 1904.

Though busy with the initial work of the Kalgoorlie school, I devoted full attention to maintaining a fair average attendance at the Coolgardie school, and considering the difficulties during 1903 it is gratifying that the number of individual students never fell below 40, even though only a limited number of subjects out of the full School of Mines course were taught at the School.

PRACTICAL CLASSES.

As far as possible, prominence was given to practical work in connection with the School classes. The laboratories for chemistry and assaying were well equipped, and the students have been able to gain a good practical knowledge of the work in these subjects.

A workshop for electricity was fitted up in the large hall attached to the School, and much useful work was accomplished in connection with dynamos, electric lighting, etc.

The geology class, besides having a fair collection of geological samples to work from, made a number of excursions, both on foot and on bicycles, and thus were able to gain a fuller understanding of the classwork, and an intimate knowledge of the geology of the district around Coolgardie.

Such practical work, supplementary to the lectures, is of the utmost importance both to the teacher and to the students, and properly equipped rooms for practical work are a necessity in every School of Mines.

Examinations.

The examinations held annually in connection with the Diplomas and Certificates issued by the Mines Department were conducted by the Minister for Mines, and the Examiners selected chiefly from outside the staff of the School. This method of examination tends to raise the standard of work done at the School, and prevents the classwork from running in a groove.

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.

W.A. SCHOOL OF MINES, COOLGARDIE.

Examiners.

The following examiners were appointed by the Minister for Mines to conduct the annual examinations in November, 1903, in connection with the diplomas and certificates issued by the Mines Department :—

Subject.	Examiners.
Mathematics	J. Parr, B.Sc., and F. B. Allen, M.A., B.Sc.
Assaying and Metallurgy ...	G. C. Klug, and F. B. Allen, M.A., B.Sc.
Chemistry, Mineralogy, and Petrology	E. S. Simpson, B.E., F.C.S., and A. Purdie, M.A.
Geology	A. Montgomery, M.A., F.G.S., and F. B. Allen, M.A., B.Sc.
Physics	C. F. Jackson, B.E., and J. B. Allen, B.Sc.

The following examiners conducted class examinations :—

Subject.	Examiners.
Drawing and Applied Mechanics	P. E. Lewis
Surveying	J. F. Lynch
Electricity	J. Kingston, M.I.E.E.

Examination Results.

The following are the results of the annual examinations held at Coolgardie in November, 1903.

For the Associateship Courses outside examiners are appointed, and a high standard is demanded before students are allowed to pass.

ASSOCIATESHIP COURSES.

Mathematics — Preparatory.

D. S. Freeman, W. Main	equal	First Class (Prize)
C. F. Zabel...	... ...	First ,,
T. A. Vance	... ...	First ,,
C. Parsons ...	... ...	Third ,,

Geology.

D. S. Freeman	... ...	Third Class
A. H. Cook	... ...	Third ,,
C. F. Zabel	... ...	Third ,,

Chemistry—First Course.

C. F. Zabel	... ...	Third Class
P. Finey ...	... ...	Third ,,

Assaying—First Course.

D. S. Freeman	... ...	First Class (Prize)
E. F. Gleeson	... ...	Second ,,
T. A. Vance	... ...	Third ,,
W. Denholm	... ...	Third ,,
C. F. Zabel	... ...	Third ,,

The following passed a part examination in Chemistry—First Course :—

D. Freeman	F. Stokes	H. Taylor
S. Halliday	W. Denholm	T. Vance

The following passed a part examination in Assaying—First Course :—

S. Halliday	P. Finey	F. Stokes

Students are required to pass in both the practical and theoretical portions of chemistry and assaying before obtaining a class certificate.

CLASS EXAMINATIONS.

Surveying.

W. Jowitt ...	First Class
C. F. Zabel	First ,,
W. Gourley	Second ,,

Applied Mechanics.

S. Cleland ...	Second Class

Arithmetic.

H. Stokes ...	Third Class
A. H. Cook ...	Third ,,
S. Cleland ...	Third ,,
F. Taylor ...	Third ,,

Algebra.

R. Tindal ...	First Class
F. Taylor ...	Second ,,
H. Stokes ...	Third ,,
A. H. Cook	Third ,,
W. Denholm	Third ,,
S. Cleland ...	Third ,,

Mechanical Drawing.

R. Tindal ...	Second Class
S. Cleland ...	Third ,,
W. Walker ...	Third ,,

Electricity.

H. Taylor ...	First Class
T. Peake ...	First ,,
D. S. Freeman	First ,,
L. Dunstan ...	First ,,
J. Whitfield	Second ,,
C. F. Zabel ...	Third ,,
C. Sutcliffe ...	Third ,,

REGISTERED STUDENTS FOR THE ASSOCIATESHIP COURSES.

No student can be enrolled as having entered for either Associateship Course unless and until he has passed the examination in preparatory mathematics, and it is at the discretion of the Minister for Mines whether passes obtained prior to passing the Entrance Examination will afterwards be accepted as part of the Associateship Course.

D. S. Freeman and C. F. Zabel were the first to be enrolled as registered students for an Associateship Course of the School of Mines of Western Australia, their enrolment, in consequence of examination, dating from 1st March, 1903.

T. A. Vance commenced classes for the Assayer's Certificate in March, 1903, and having passed the examination in preparatory mathematics at the end of the year has been enrolled as a registered student, dating from 1st March, 1903.

E. F. Gleeson, having obtained exemption from the Entrance Examination, has been enrolled as a registered student, dating from 1st March, 1903.

W. Main and C. Parsons, having passed the Entrance Examination, have been enrolled as Associateship students, dating from 1st January, 1904.

These six constitute the whole number of students who have up to the present been duly enrolled in the Register of the School of Mines as having entered upon the Associateship Courses.

The following table shows the attendance at the School of Mines, Coolgardie, during 1903:—

	First Term.	Second Term.	Third Term.
Mathematics	33	28	17
Chemistry (Theory)	25	21	14
Chemistry (Practice)	25	21	16
Assaying	22	17	13
Geology	8	7	6
Surveying	5	3	3
Drawing	4	5	3
Mechanics	3	4	2
Electricity	22	17	12
Total attendance at Classes	147	123	86
Individual Students	61	50	42

The following table shows the passes obtained by students of the School of Mines, Coolgardie, at the annual examinations, held in November, 1903 :—

Class Examinations.

Subject.	First Class.	Second Class.	Third Class.	Total.
Surveying ...	2	1	...	3
Mechanics ...	...	1	...	1
Arithmetic...	...	...	4	4
Algebra ...	1	1	4	6
Drawing ...	...	1	2	3
Chemistry (part exam.) ...	...	...	...	6
Assaying (part exam.) ...	...	...	...	3
Electricity ...	4	1	2	7
Associateship Courses.				
Chemistry ...	...	...	2	2
Assaying ...	1	2	3	6
Geology ...	...	...	3	3
Mathematics ...	4	...	1	5
Totals ...	12	7	21	49

Four students at Coolgardie and two at Kalgoorlie have become registered Associateship students by examination.

It has now been decided to close the School of Mines at Coolgardie, to allow of the establishment of a Technical School in its stead.

KALGOORLIE SCHOOL OF MINES.

Up to March, 1903, I was busily engaged in making sketch plans and preparing details necessary for the preparation of the working drawings and specifications of the Kalgoorlie School of Mines. These having been completed by the Public Works Department, a contract for the building was let in March, 1903.

While the building was still unfinished, lecture work was commenced in the completed wing of the school in November, 1903, and for the following six weeks classes were regularly carried on in mathematics, mining, applied mechanics, geology, mineralogy, and surveying.

The attendance at classes during the opening term at the end of 1903 was as follows :—

Mathematics, first section ...	52
Mathematics, second section	19
Mining	8
Mechanics	4
Surveying	7
Geology	20
Mineralogy	14
Total attendance at Classes	124
Individual students	82

The School of Mines at Kalgoorlie is situated on the large block of ground between Egan, Cassidy, and Macdonald Streets, and is a commodious building of one storey, covering an area of 104 feet by 140 feet. It is suitably fitted up and equipped for its work, and by its position in the centre of the most remarkable goldfield of the world offers exceptional opportunities to students to become acquainted with the most modern methods of mining and ore treatment.

The peculiarities of the occurrence of gold at Kalgoorlie, the many different and successful metallurgical plants for its recovery, and the extraordinary richness of the field are object-lessons of great value, offering especial attractions to School of Mines students.

The managers of the mines and mills at Kalgoorlie, many of them School of Mines men, have, as far as they have been approached, expressed a willingness to assist students in gaining the practical knowledge which is the necessary accompaniment of a course of lectures at a school of mines. This is in itself a great and valuable concession to the students of the Kalgoorlie school.

Museum.—Apart from the typical collections acquired by purchase, the School has already received donations of minerals and geological samples. I have personally collected a number of others, and the managers and other officials of the mines in Kalgoorlie have promised to assist with further donations of mineral samples as soon as a suitable museum, in which to display them, has been erected.

The opportunity now exists to make a thoroughly good collection, which will prove of great value to the prospector, the School of Mines student, and every mining man on the fields.

By educating the public in a ready recognition of minerals by means of a well stocked museum, the State will reap the benefit in the new finds that will be made in consequence, not only in auriferous deposits, but in minerals of commercial value, which are now too frequently overlooked or neglected by the prospector.

A sketch plan has been drawn out for a museum building, and it is hoped that this will be followed by authority to erect the building during the present year.

Conduct of Classes.—The regular school work has been divided into two main sections:—

I.—Mining.

II.—Metallurgy.

Each full course of study for an Associateship in either of these divisions will require three years and is calculated to qualify a student to enter upon responsible work about a mine or battery. As far as possible, the class subjects are treated from a practical standpoint, and lectures will be illustrated by periodical visits to the mines and batteries, the proximity of which to the School of Mines now being established on the goldfields affords an excellent opportunity to students to enter into the practical application of much of the work covered by the lectures.

A two years' course for assayer's certificate has been arranged for students who may be unable to attend the full course in metallurgy.

Whenever necessary, classes preparatory to and more elementary than the classes for the Associateship Courses will be held to enable those engaged in practical work to take advantage of the school.

To meet the requirements of students working in the mines and batteries, all the class work is duplicated by repeating in the evening the lectures delivered during the day; and students unable to enter upon a full course in either division for the Associateship are afforded opportunities of taking a partial course of study in the subjects more immediately useful to them.

As a guide to students desiring to take a partial course only, the following subjects are suggested, and should be taken in the order indicated. Such partial courses will, in general, require two years' study:—

For Mining Men.—Mathematics, mining geology, drawing, mining, surveying, mechanics applied to mining, ore-dressing.

For Engine-drivers.—Mathematics, electricity, drawing, applied mechanics, mining.

For Assayers.—Mathematics, chemistry, geology, mineralogy, assaying.

For Electrical Workers.—Mathematics, chemistry, electricity, drawing, mechanics.

For those desiring a knowledge of Ore Treatment, Cyaniding, etc.—Mathematics, chemistry, geology, mechanics, drawing, assaying, metallurgy, mineralogy.

Mathematics, being the groundwork of all the classes, and of especial value in the study of surveying, mechanics and electricity, should be among the first subjects taken up, and students are recommended to make an early commencement with chemistry, geology, and mechanical drawing.

Students intending to take up assaying should recognise that they should have a previous knowledge of chemistry, in order to obtain a complete acquaintance with the subject.

Examination Prizes.—Students who are first in order of merit and obtain a first-class pass in any subject of the examination for diplomas and certificates will be granted free tuition for one year in the next grade of the same subject, or, if there is no further grade, in an allied subject.

Eighty-six assays were conducted during the year of samples received from various parts of the State.

During 1903, I also made a number of minor reports on various matters affecting the mining industry around Coolgardie, such as "Report on an Opal Find at Coolgardie"; "Report on Trial of Phillips's Dry Concentrator at Kalgoorlie"; and "Report on Marshall's Puddling and Sluicing Scheme at Coolgardie."

Considering that the Kalgoorlie School of Mines is just commencing its work, the number of students already attending classes is very satisfactory, and I believe that even in its first year the School will be able to show good results.

The immediate erection of a mineral museum in connection with the School of Mines, for the proper display of mineral and geological samples, cannot be too strongly urged, more especially as the extra class rooms which would be included in it for geology and mineralogy are very much needed at the present time.

I have, etc.

F. B. ALLEN,
Director, School of Mines.

23rd April, 1904.

DIVISION III.

Report by the Superintendent of State Batteries for the Year 1903.

To the Secretary for Mines, Perth.

SIR,

I have the honour to submit my sixth Annual Report for past year on the work and progress of State Batteries for the information of the Hon. the Minister of Mines.

INCREASE OF PLANT.—At the close of the year 1902 there were 14 batteries, 4 cyanide plants, and one tin dressing plant in operation. At the end of 1903, the number in operation were 16 batteries, 7 cyanide plants, 1 tin dressing plant and 1 Huntington mill. Three additional batteries were erected, viz.:—

Boogardie	10 head battery started in	March,
Burtville	10 „ „ „	October,
Southern Cross	10 „ „ „	December,

whilst Paynesville Battery was closed.

Cyanide plants were erected and kept working at—

Meekatharra, in May	Laverton, in May
Darlot, in June	Southern Cross, in December

Huntington mill plant was erected at Yundamindera and started in November.

A puddling plant was erected at Paddington, but owing to the poor quality of the dirt treated and the apparent inability of the prospectors to supply ore, the plant was closed and dismantled.

The number of stamps represented by these batteries is 180 as against 150 last year.

WORK IN PROGRESS.—In addition to the increase as above alluded to, the following work is in hand, most of which is nearing completion.

STAMP BATTERIES.—A new 10-head battery with all accessories has been erected at Norseman to replace the old battery which has done service for the last six years, and which was a second-hand plant when purchased.

At Menzies a complete 10-head battery has been erected, and was just about starting operations at the close of the year.

At Wiluna a 10-head battery is nearing completion; and at Black Range the battery formerly at Paynesville is in course of erection.

At Coolgardie a 10-head battery has been arranged for, the manufacture of same having been entrusted to a local firm, with the object of fostering local industry.

Cyanide plants are in course of erection at Leonora, Boogardie, and Norseman, and a slimes plant at Mulline.

LEASED PLANTS.—Two plants, viz., Ravelstone and Tuckanarra, are still leased, but neither have shown that the action of the Department in closing them as regards direct working control was uncalled for; and the lessees have not apparently succeeded in resuscitating districts which were liberally dealt with by the Department before any offer to lease them was received or entertained.

One other plant, viz., Paynesville, was also leased, but early in the year it was handed back to the Department, and remained closed till its removal to Black Range was decided upon.

WATER SUPPLY.—During the year the water supply partly failed at Meekatharra, Burtville, Boogardie, Mulwarrie, Niagara, Widgiemooltha, Darlôt, and Greenbushes, and the work of extending the water shafts by sinking or driving is still in hand at most of these places. It is found as a rule that the supply, which at first appears adequate to meet the demands, gradually falls off, and further extensions are necessary to tap new country. At each successive undertaking the work becomes more costly, and the water as a rule more dense.

At Menzies the supply for battery purposes is obtained from a well sunk by the Mines Water Supply, about four and a-half miles distant, while the boilers are supplied from the Government Fresh Water Tank.

At Southern Cross the battery supply is obtained from water pumped from the Fraser's South Extended mine, and conducted in an open cutting to battery. It is very dense, and although fit for crushing is not so for cyaniding. The boilers are fed by fresh water from the Government tank, known as the New Zealand Gully Tank.

At Yundamindera, where the Huntington mill is situated, the water is obtained from a shaft on an adjoining lease, granted by the prospectors as an inducement to erect a plant.

At Boogardie, where trouble was experienced shortly after starting, temporary arrangements were made to secure a water supply by obtaining same from a mining property close at hand; an abundant supply has since been met with in the battery well.

At Meekatharra most trouble has been experienced owing to what proves to be an ample supply, only lasting a comparatively short time, when the work of again looking for a supply has to be resumed.

At Mulwarrie, it was found necessary to sink a second well for water supply purposes ; this work was undertaken by the Mines Water Supply Branch, and although water has been met with, the supply from the two wells is still limited.

At Niagara water is also obtained from two wells, the supply in each being small.

At Greenbushes it has been found necessary to sink and drive on present well for an increased supply, which is at present sufficient for demands.

At Burtville, on two occasions during the year, extensions in water shaft had to be undertaken to increase the supply.

Increase in Output for Year.—As showing the increase over previous years, I submit the following figures by way of comparison—

Total tonnage from inception to close of year	1902	108,308 tons
„ „ „	1903	157,541 „

or an increase of 46 per cent over the total output of the previous five years.

Referring to the Cyanide output the figures read—

Treated prior to 1903		29,255 tons
As against		61,624 „ at close of 1903,

showing an increase of over 100 per cent. in excess of the total tons previously treated.

The quantity of stone treated for the year amounts to 49,233 tons, yielding 58,305ozs., and valued at £221,567.

The total quantity treated through State batteries to end of year is 157,541 tons, yielding 193,093ozs., value £723,332; while from Cyanide plants the value of gold obtained amounts to £60,558, making a total value of £783,890, produced through State batteries.

During 1902 when 39,516 tons were treated ; although the general charge was 15s. per ton, 5,000 tons were treated at rates varying from 16s. to 20s. per ton.

In several instances parcels of stone crushed failed to realise sufficient gold to pay the ruling rates ; but taken as a whole the receipts from crushings averaged 14s. 7d. per ton.

On 1st June last a sliding scale of charges was introduced, of which the following is a copy :—

		s.	d.	
Stone yielding	8dwts. per ton or under	10	0	per ton
„	from 8 dwts. to 9 dwts.	10	6	„
„	„ 9 „ 10 „	11	0	„
„	„ 10 „ 11 „	11	6	„
„	„ 11 „ 12 „	12	0	„
„	„ 12 „ 13 „	12	6	„
„	„ 13 „ 14 „	13	0	„
„	„ 14 „ 15 „	13	6	„
„	„ 15 „ and over	14	0	„

The primary object in giving this concession to those patronising the batteries was to induce the working of low-grade shows, and, in addition to the sliding scale, a system of crushing by time was also granted to those anxious of having their stone treated by taking the time occupied in crushing as against a stated price per ton. The rate charged for time-crushing having been fixed at 8s. per hour when five heads of stamps are used, and 16s. per hour when using the 10-head of stamps.

The results, as shown by the total output for the year, are a clear indication of the success of the reduced charges, which is more apparent by comparing the tonnage of the first six months of the year as against the second half, when the sliding scale was in force. The figures being :—

19,525 tons up to end of June.
29,708 „ from 1st July to end of year.

That the object in encouraging the working of low-grade shows has been attained, is more apparent when we take the gold output for the two years 1902 and 1903; with the increased tonnage the difference in yield of gold for the two years is only 1,050ozs., thus showing a big reduction in value of ore treated, and a consequent falling-off in revenue, when compared with previous years, on the tons treated.

Cyanide Plants.—The four plants operating on tailings previous to 1903, and referred to in last year's report, were Mount Ida, Norseman, Mulline, and Lennonville.

In reference to Mount Ida this plant was closed after treating 1,170 tons, as it was found too costly to treat the tailings, owing to the presence of copper. Several experimental tests were made, with unsatisfactory results, before it was finally decided to suspend operations. Gold to the value of £445 was obtained from the tons treated, but the working costs were too high.

At Norseman 4,325 tons have been treated, producing bullion valued at £3,165.

At Mulline, 7,285 tons, yielding bullion worth £8,177. The Slimes plant was not proceeded with as early as anticipated, owing to various systems being brought under the Department's notice. Eventually, however, Mechanical Agitation and Filter Pressing was adopted, and the plant is now just on completion.

At Lennonville, 4,700 tons were treated for the year, realising £6,441 worth of gold.

At the plants started during the year, the following are the results :—

Meekatharra	3,055 tons,	Gold extracted ...	£1,944
Laverton	3,750 „	„ „ ...	£1,746
Darlôt	4,044 „	„ „ ...	£2,376
Mulwarrie	4,040 „	„ „ ...	£3,724

The total tonnage cyanided for the year amounts to 32,369 tons, which has produced 6,582ozs. fine gold, valued at £28,016. The cost of treatment has amounted to £12,421·76, and £11,072 has been paid to owners of tailings.

Improvements and Additions.—Every endeavour has been made to keep the batteries in good working order, and it has been necessary to replace boilers at three batteries, viz., Leonora, Niagara, and Darlôt; while the cost of extending the water shaft at Meekatharra has also, in addition to the cost of boilers, been met from Revenue. These and other items which are not directly chargeable to working costs have amounted to £2,390 for the year.

While on the subject of improvements to plants, and the profit or loss shown on working expenses, I would recall a statement touched upon by the Civil Service Commissioners when interviewing me on my work in connection with State Batteries. They argued that unless interest on capital was met, and an ample margin allowed for depreciation in value of plant, that no credit should be shown. I would, however, point out that the results, as submitted each year, are not intended to convey any wrong impression—the figures merely represent the results of working, while at the same time endeavouring to maintain the plants in good working order. It must also be admitted that, although charges have been reduced, and, as a consequence, less revenue obtained for a like amount of work than in the past, the principle of the system which is being adopted by the Hon. the Minister, and which I understand meets with the approval of Parliament, does not directly aim at money-making; the advantages of the system in an indirect way are many, such as increased payment of lease rents, developing a larger number of reefs than would otherwise take place, the inducement to prospectors to look for new reefs, and the possibility of inducing outside capital to further develop properties of prospectors who, in their early stages, relied on the State batteries to prove their reefs. It appears to me that there is no direct reason why the initial cost of State batteries should be placed on a different footing than the expenditure incurred in sinking wells throughout the country; both have primarily one main object in view, viz., to assist in the further development of the interior of the State.

Revenue and Expenditure.—The result of the year's operations have been as follows :—

Revenue	£49,215·98
Expenditure	46,676·75
Credit balance	£2,539·23

Included in the expenditure is the sum mentioned previously for improvements and additions, viz., £2,390 which, if added to the above credit balance, would show an amount of £4,929 over working expenses. When the increased tonnage put through for the past year, which amounts to 9,716 tons, is taken into consideration, it shows that the expenses in treatment have been considerably reduced, while the average receipts proves the material difference that the sliding scale of charges has effected.

General.—The statement showing the output of each battery gives in detail the comparative work and results for the year. Some of the later plants, notably Boogardie, have been disappointing, while the Huntington Mill at Yundamindera has not proved the success anticipated. The principal object in introducing this class of mill was to supply a want in districts which did not warrant, at time of erecting, a more costly plant.

Tin Dressing Plant.—During the year this plant has treated 2,009 tons for 61 tons of black tin valued at £3,251, and has been fairly successful in supplying the requirements of the district.

Extra Staff.—For a considerable time past I felt that, to enable me to more successfully cope with the increased work attaching to the battery system, it was essential to have an outside inspector to pay periodical visits to the different batteries and cyanide plants which, in the earlier stages of the work, I had personally attended to. I am pleased that an appointment has been made, as there is ample scope for the services of a good, qualified man. In Mr. H. O. Allom, who has occupied the position for about six months, I hope to find I have secured a suitable person, and one who will from time to time remove the many obstacles which frequently arise and interfere with progressive work.

At Head Office I have now the services of a draftsman, and hope by his assistance to gradually regulate the various works, so that as far as possible a more uniform system is adopted, and by this means minimise the initial outlays during erection and preliminary working of plants.

In conclusion, I trust that the results of the year's work will be considered satisfactory and that Parliament will continue its support in further extending a policy which, after six years in force, has demonstrated the fact that State enterprise of this kind is conducive to the welfare of the mining industry without proving an obstacle to private efforts in a similar direction.

DAVID H. WHITE,
Superintendent State Batteries.

3rd May, 1904.

Government State Batteries.

Expenditure from General Loan Fund from Inception of Scheme to March, 1903, when Loan Authorisations were exhausted.

Name of Battery.		Amount from Inception.	Total amount from Inception.
		£	£
Head Office		619·81	
Donnybrook	£1,542·16		
Less credits	120·00		
		1,422·16	
Niagara	2,947·04		
Less credits	21·19		
		2,925·85	
Mulline		12,344·96	
Norseman		9,315·58	
Meekatharra	£6,799·80		
Less credits	·45		
		6,799·35	
Mt. Ida		10,956·13	
Paynesville		2,752·86	
Greenbushes		2,457·12	
Laverton		4,878·90	
Lennonville		8,988·21	
Mulwarrie		7,610·14	
Widgiemooltha		2,413·19	
Lake Darlôt		3,473·06	
Bulong		5,879·56	
Tuckanarra		6,294·25	
Yerilla		8,061·99	
Yalgoo		4,813·40	
Ravelstone		6,456·99	
Mt. Leonora		6,178·17	
Boogardie		4,301·40	
Burtville		132·61	
Subsidies (Mosquito Creek, etc.)		924·31	
Grand Total from Loan Funds		...	£120,000

Made up as follows:—

62 Vic., No. 7		£40,000
63 Vic., No. 44		30,000
64 Vic., No. 13		30,000
1 Edward VII.	£21,200	
Less discount	1,200	
		20,000
Total of Loan Authorisations		£120,000

Expenditure from Consolidated Revenue Vote "Erection of State Batteries," from March, 1903, to 31st December, 1903.

	£	£
Lake Darlôt	708·80	
Mulwarrie	875·81	
Greenbushes	150·10	
Wiluna	3,393·17	
Meekatharra	951·04	
Laverton	570·07	
Boogardie	1,471·77	
Burtville	4,361·66	
Niagara	552·54	
Norseman	3,068·47	
Mulline	2,322·72	
Menzies	4,337·38	
Yundamindera	2,345·93	
Kanowna	57·23	
Southern Cross	3,647·50	
Coolgardie	400·00	
Black Range	42·87	
Leonora...	299·75	
Total Expenditure from Vote "Erection of State Batteries," to 31st December, 1903		29,556·81
Total of Loan Expenditure...		120,000·00
Grand Total		£149,556·81

Government State Batteries.

Return showing number of Tons Crushed, Gold Yield, and Average per ton for Year ending 31st December, 1903.

Name of Battery.	Tons Crushed.	Gold Yield.	Average.
Norseman	3,910·50	4,965·15	1·27
Mulline	7,932·95	9,427·85	1·19
Lennonville	3,777·69	4,315·55	1·14
Mulwarrie	4,617·35	4,943·85	1·07
Laverton	1,989·50	1,912·65	·96
Meekatharra	5,668·50	4,393·60	·77
Darlôt	3,427·00	9,736·35	2·84
Niagara	5,502·75	5,277·96	·95
Leonora	3,648·50	3,359·05	·92
Mt. Ida	1,245·65	2,374·65	1·90
Boogardie	2,816·00	1,549·90	·55
Tuckanarra	993·00	955·35	·96
Ravelstone	1,011·00	972·65	·96
Widgiemooltha	568·50	260·15	·45
Yundamindera	468·00	603·00	1·29
Burtville	1,072·00	2,826·55	2·63
Southern Cross	393·00	384·45	·97
Paddington	191·00	46·80	·24
Total	49,232·89	58,305·51	1·18
Greenbushes	2,009	Tons Black Tin. 60·9	...

State Batteries.

Returns showing the number of Tons Crushed, Gold Yield, and Average per Ton and Value from Inception to 31st December, 1903.

Name of Battery.	Tons Crushed.	Gold Yield.	Average.	Value.
		ozs.	ozs.	£
Norseman	14,132·50	14,000·55	·99	53,199·23
Mulline	31,892·20	45,633·13	1·43	163,006·56
Lennonville	14,952·94	23,143·35	1·54	87,943·90
Mulwarrie	10,552·35	14,530·15	1·37	55,212·13
Laverton	4,700·25	5,199·25	1·10	19,756·32
Meekatharra	12,343·35	10,907·75	·88	41,443·72
Darlôt	6,279·75	14,772·05	2·35	56,131·70
Niagara	11,409·50	12,855·02	1·12	48,856·15
Leonora	12,334·50	11,243·82	·91	42,725·18
Mt. Ida	13,030·90	15,156·51	1·16	57,592·90
Boogardie	2,816·00	1,549·90	·55	5,889 72
Tuckanarra	4,322·10	7,233·16	1·67	27,482·23
Ravelstone	5,546·25	5,919·13	1·07	22,490·13
Widgiemooltha	31,85·50	1,292·90	·40	4,911·49
Yundamindera	468·00	603·00	1·29	2,291·40
Burtville	1,072·00	2,826·55	2·63	10,740·89
Southern Cross	393·00	384·45	·98	1,460·91
Batteries closed	8,110·00	5,842·90	·72	22,197·84
Total	157,541·09	193,093·61	1·22	723,332·40
Cyanide	61,624	...	...	60,558
Greenbushes (Tin Plant)	3,178·50	Tons Black Tin. 101·5	...	5,410

State Batteries and Cyanide Plants.

Statement showing Transactions for the Year ending 1903.

Goldfield.	Name of Battery.	No. of Stamps.	Tons Crushed and Tailings treated.	Gold Yield.	Total Expenditure, including Wages, Maintenance, Additions, and Improvements.	Revenue.	Profit.	Loss.	Cost of Treatment.	Payments to Owners of Tailings.
			tons.	ozs.	£	£	£	£	£	£
Dundas	Norseman	10	3,910·50	4,965·15	3,119·45	2,644·86	...	474·59	·79	...
	(Cyanide)	...	4,325	743	1,895·21	2,223·90	328·69	...	·44	941·07
North Coolgardie	Mulline	20	7,932·95	9,427·85	3,666·77	5,210·28	1,543·51	...	·46	...
	(Cyanide)	...	7,285	1,923	2,994·89	4,059·06	1,064·17	...	·41	3,985·17
Murchison	Lennonville	10	3,777·69	4,315·55	2,342·23	2,467·45	125·22	...	·62	...
	(Cyanide)	...	4,700	1,517	2,123·54	2,900·41	776·87	...	·45	3,523·21
North Coolgardie	Mount Ida	10	1,245·65	2,374·65	969·88	920·36	...	49·52	·77	...
	(Cyanide)	...	1,170	105	287·57	436·71	*f* 149·14	...	·41	8·63
Mount Margaret	Leonora	10	3,648·50	3,359·05	*a* 2,364·68	2,206·54	...	158·14	·65	...
North Coolgardie	Niagara	10	5,502·75	5,277·96	*b* 3,987·55	4,135·64	148·09	...	·72	...
Coolgardie	Widgiemooltha	10	568·50	260·15	710 68	484·30	...	226·38	1·25	...
Murchison	Meekatharra	10	5,668·50	4,393·60	*d* 3,261 84	3,344·93	83·09	...	·57	...
	(Cyanide)	...	3,055	455	1,110·59	1,204·76	94·17	...	·36	741·22
North Coolgardie	Mulwarrie	10	4,617·35	4,943·85	3,104·44	3,229·37	64·93	...	·68	...
	(Cyanide)	...	4,010	877	1,847·41	2,395·20	547·79	...	·45	1,330·43
Murchison	Tuckanarra	10	993	955·35	87·59	164·36	76·77	...	...	...
Peak Hill	Ravelstone	10	1,011	972·65	8·46	55·98	47·52	...	...	...
Mount Margaret	Laverton	10	1,989·50	1,912·65	1,373·24	1,398·21	24·97	...	·69	...
	(Cyanide)	...	3,750	407	966·90	1,552·77	585·87	...	·25	196·56
Murchison	Boogardie	10	2,816	1,549·90	2,242·56	1,598	...	644·56	·79	...
Mount Margaret	Burtville	10	1,072	2,826·55	706·24	728·65	22·41	...	·66	...
Yilgarn	Southern Cross	10	393	384·45	319·46	216·10	...	103·36	·81	...
North Coolgardie	Yundamindera Huntington Mill	...	468	603	446·57	240·70	...	205·87	·94	...
Broad Arrow	Paddington Puddler	...	191	46·80	130·57	42·26	...	88·31	·68	...
Head Office	... ...	...	...	...	*e* 1,411·93	...	...	1,411·93	...	...
Murchison	Paynesville	5	...	...	7·40	20	12·60	...	...	...
East Murchison	Lake Darlôt	10	3,427	9,736·35	*c* 3,097·05	2,611·34	...	485·71	·90	...
	(Cyanide)	...	4,044	555	1,195·65	2,040·28	844·63	...	·29	346·55
Total Batteries		175	49,232·89	58,305·51	45,840·35	48,532·42	6,540·44	3,848·37	·67	...
Cyanide		...	32,369	6,582	...	...	...	...	·38	11,072·84
Greenbushes Tin-dressing Plant		5	2,009	60·90 tons black tin	836·40	683·56	...	152·84	·41	...
		180	83,610·89	64,948·41	46,676·75	49,215·98	6,540·44	4,001·21	...	11,072·84
							4,001·21			
						Profit	2,539·23			

a. Includes £519·00 for cost of new boiler and fixing same.
b. „ 520·00 „ „
c. „ 550·00 „ „
d. „ 315·00 Sinking for water.
e. „ 745·00 Head Office salaries.
282·50 Wages of draftsman and travelling inspector.
384·43 Travelling expenses, postage, etc.
f. „ Portion of cost of treatment charged against previous year.

ANNUAL

PROGRESS REPORT

OF THE

GEOLOGICAL SURVEY

FOR THE YEAR 1903.

DIVISION IV.

Annual Progress Report of the Geological Survey for the Year 1903.

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Annual Progress Report of the Geological Survey for the Year 1903.

The Hon. Henry Gregory, M.L.A., Minister for Mines, Perth.

Geological Survey Office, Beaufort Street,

SIR, Perth, 1st May, 1904.

I have the honour to submit, for your information, the Report of the Geological Survey for the Calendar Year 1903. In order that the Annual Reports may be more easily comparable, and perhaps of greater general usefulness, the arrangement of the different matters dealt with follows approximately the same plan and sequence as that hitherto adopted. The work of the Department, during the year covered by the report, proceeded practically on the lines of previous years.

THE STAFF.

During the year 1903 the work of the Department has been carried out by 13 officers, other than camp assistants, etc.

The field staff was increased by the appointment of Mr. C. F. V. Jackson, as Assistant Government Geologist. This gentleman was selected from 37 candidates, who sent in applications in response to an advertisement inserted in the leading Australian and New Zealand press. Previous to his appointment, Mr. Jackson served as Assistant Geologist on the staff of the Geological Survey of Queensland. Mr. Jackson's appointment dated from the 15th of June.

The Laboratory Staff was increased, on the 13th of January, by the appointment of Mr. J. H. Brooking as Senior Laboratory Assistant.

Owing to grave irregularities in connection with his accounts, Mr. F. J. Kelly, the Clerk and Accountant, was dismissed from the service, and his post filled by the transfer of Mr. P. J. Atkins, from the Statist's Branch of the Mines Department.

FIELD WORK.

The field work of 1903 has been distributed over various portions of the State, and a good deal of valuable data has been amassed, entailing a considerable amount of travelling on the part of the different officers.

A. GIBB MAITLAND: The latter part of January and the early portion of February found me engaged upon a partial examination of the Irwin River Coalfield, in connection with applications for State Aid towards the development of mining. On the 3rd of March I left Perth for the Eastern Goldfields, and was engaged in an examination of Yarri, Edjudina, Linden, Yundamindera, Pennyweight Point, Eucalyptus, and Mount Malcolm, returning to headquarters on the 17th of April. Having completed the necessary office work consequent upon my absence in the field, I left Perth on the 17th of July for the Pilbara Goldfield, and was engaged in an examination of the country between the Turner, and the Oakover Rivers until the 23rd of December, when I returned to Perth. During this journey in the North-West the mining centres of Lalla Rookh, North Pole, Talga Talga, Moolyella, Bamboo, Elsie, Boodalyerri, Mosquito, Sandy, and Middle Creeks were examined in such detail as the circumstances seemed to warrant. During the year I was employed for 222 days in the field.

C. F. V. JACKSON: During the year this officer, who was appointed on the 15th June, was engaged in the field for 82 days; having been employed from the 7th of July to the 10th of October upon an examination of the Leonora District, in the Mount Margaret Goldfield.

W. D. CAMPBELL: An examination of the valley of the Canning was made in the month of January, involving 16 days' field work and 12 days in the office. An examination of the proposed extension of the Paddington town boundary occupied three days in the field, from the 13th November. Applications for the alienation of mineral lands in the Yandanooka and the Northampton Districts occupied seven days in the field. Fifteen days during October and November were devoted to an examination of mines at Kalgoorlie. From the 19th May to the 18th of September, this officer was absent on leave. The total number of days Mr. Campbell was employed in the field during the year has been 74.

C. G. GIBSON: During the year this officer was employed 183 days in the field. On the 4th February Mr. Gibson left Perth for Mingenew, and travelled by road from there to Mount Magnet, arriving at the latter place on the 16th of the month, and on the 19th he left Mount Magnet for the then recently discovered find at Black Range, at which place he was engaged for about three weeks, returning to headquarters on the 10th of March. On the 6th of May Mr. Gibson left Perth for York, where he remained for two or three days, examining and reporting upon the site of a proposed reservoir. Leaving York, this officer proceeded to Kookynie in connection with an application for State Aid towards the development of mining. From Kookynie Mr. Gibson proceeded to Ularring, upon an examination of which district he was engaged until the 26th of June. Several visits of inspection were made to outlying districts in connection with the alienation of mineral lands, viz., at Donnybrook, Arrino, and

Northampton. On the 13th of August Mr. Gibson left Perth for the Murchison, in which district he was practically continuously engaged until the 13th of December, when he returned to Perth.

E. S. Simpson: During the year this officer was engaged in the field as follow:—Three or four days in March were devoted to an examination of the infusorial earth deposits in the vicinity of Wanneroo, and on the 31st of March a visit was paid by him to Jandakot, to inquire into some supposed indications of the presence of petroleum on Block 214. From the 11th to the 18th of May Mr. Simpson was engaged in examining certain lands in the Yandanooka and Northampton mining districts, with a view to determining whether their alienation for agricultural purposes would be detrimental to mining interests. Between the 15th of June and the 4th of July found Mr. Simpson at Mingenew, in company with an officer of the Public Works Department, Mr. Wilde, endeavouring to obtain evidence as to the existence or otherwise of a seam of coal said to have been cut at a depth of 905 feet in the State-aided bore put down by the Irwin River Coal Prospecting Syndicate.

LABORATORY WORK.

The work of the Laboratory Staff has been carried out as usual under the immediate supervision of Mr. E. S. Simpson, the Mineralogist and Assayer.

Reporting on the work performed by the staff during 1903, Mr. Simpson informs me that 800 assays, analyses, and other determinations were made, which numerically is somewhat less than that performed during the previous year.

The following figures, in tabular form, shows in detail the routine work of the laboratory during 1903:—

Table showing details of Assays, etc., made in the Geological Laboratory during 1903.

Classification.	Public.		Official.		Totals.
	Pay.	Free.	Geological Survey.	Other Departments.	
Total Samples dealt with	94	240	67	140	541
Determinations	21	77	11	5	114
Assays for Gold	74	168	15	85	342
„ Silver	11	45	2	37	95
„ Platinum	...	9	...	1	10
„ Osmiridium	...	9	...	1	10
„ Copper	3	26	2	34	65
„ Tin	1	26	...	2	29
„ Lead	...	4	2	...	6
„ Iron	...	1	15	...	16
„ Antimony	...	1	...	...	1
Analyses Complete	3	3	16	10	32
„ Proximate	...	...	8	2	10
„ Partial	...	2	16	...	18
Miscellaneous	29	3	...	20	52
	142	374	87	197	800

PALÆONTOLOGICAL WORK.

The necessary palæontological work required by the Department has been, as in former years, carried out gratuitously by Mr. Robert Etheridge, jun., the Curator of the Australian Museum, Sydney, and valuable assistance has also been rendered by Professor Howchin, of the University of Adelaide.

Mr. Robert Etheridge, jun., furnished the following reports and lists during the year, which it is contemplated embodying in a separate Bulletin:—

(*a*) Plant remains from the Collie Coalfield, and in his report corroborates the view of the late Mr. R. Etheridge that the Collie River Beds are of Permo-Carboniferous Age.

(*b*) Organic remains of the Pelican Hill Bore, near Carnarvon, Gascoyne, from which it appears that the first 150 feet comprise strata of Newer or Post Tertiary Age, from a depth of 1,238 feet Mesozoic and possibly Cretaceous Beds, and beneath these beds of undoubted Carboniferous Age.

(*c*) A series of fossils from the mouth of the Margaret River, Ellensbrook, and Busselton.

(*d*) A series of fossils from the Causeway Artesian Bore at Perth.

(*e*) A series of fossils from the neighbourhood of Eucla.

(*f*) Fossils from near Albany, which, owing to the poor state of preservation, could not be specifically determined, though they indicate a comparatively recent deposit.

(*g*) 1. Carboniferous fossils from the Irwin River Coal Measures.

2. Fossils from Mingenew, Irwin River Coalfield.

Professor Howchin, of Adelaide, supplied notes and lists of "Foraminifera from a Calcareous Marlstone, Gingin, Western Australia."

GEOLOGICAL AND MINERAL COLLECTION.

New specimens to the number of 974 were added to the Survey Collection during 1903, bringing the total number registered up to 5,364. The total number of microscopic slides registered amounts to 500, whilst the number of negatives of geological and mining subjects taken by the staff is 192.

The additions principally comprise the material acquired by the officers in the ordinary course of their field duties, and are designed to illustrate their maps and reports.

PUBLICATIONS.

The following is a list of the different publications prepared by the Geological Survey during the past year:—

Annual Progress Report for the year 1902.

Notes on the Auriferous Reefs of Cue and Day Dawn, by W. D. Campbell. With a map.

Lennonville, Mount Magnet, and Boogardie, Murchison Goldfield, by C. G. Gibson. With two maps.

The Geological Features and Mineral Resources of Northampton, by A. Gibb Maitland; with Appendices by H. P. Woodward, John Provis, and E. S. Simpson. With a map.

Palæontological Contributions to the Geology of Western Australia. 1. Descriptions of Carboniferous Fossils from the Gascoyne District, by R. Etheridge, jun.

Notes on the Country between Edjudina and Yundamindera, North Coolgardie Goldfield, by A. Gibb Maitland. With two maps.

The Geological Features and Mineral Resources of Mulline, Ularring, Mulwarrie, and Davyhurst, North Coolgardie Goldfield, by Chas. G. Gibson.

Geological Map of the Boulder Belt, and sheet of Horizontal Sections, by A. Gibb Maitland and W. D. Campbell.

In addition to these, the following reports are now in the printer's hands, and should be available to the public at an early date:—

The Geology and Auriferous Deposits of Leonora, Mount Margaret Goldfield, by C. F. V. Jackson. With map and sheet of Sections.

The Geology and Mineral Resources of a part of the Murchison Goldfield, by C. G. Gibson. With nine maps.

Preliminary Report on the Geological Features and Mineral Resources of the Pilbara Goldfield, by A. Gibb Maitland. With six maps, two plans, and twenty-five figures.

There being so many inquiries on the part of the general public for information—much of which is contained in the earlier reports, and to which reference is difficult owing to the want of an adequate table of contents—the preparation of a general index to the various geological reports has been commenced, and it is hoped that it will be completed at an early date. The present index begins with the reports of Mr. H. Y. L. Brown, who occupied the position of Government Geologist during the years 1870-1872, and embraces all succeeding reports, ending with those published during 1903. In addition to the regular reports of the Geological Staff, there have appeared from time to time, under Government authority, several miscellaneous reports by the Inspectors of Mines, etc., containing much valuable geological and mining information; hence, in order to render the index of greater utility, it has been deemed advisable to include these within the scope of the General Index.

GEOLOGICAL MAP OF WESTERN AUSTRALIA.

The Geological Map of Western Australia, issued in 1894, under the direction of Mr. H. P. Woodward, having been for many years out of print, and our knowledge of the geological formations of the State having been materially increased, it has been deemed necessary to take steps to issue a new edition. Having this in view, several traverses have been made by myself in different portions of the State, when engaged on other work, and a forthcoming visit to the, as yet, unmapped portion of West Pilbara will afford the means of connecting the recent work in Pilbara with that accomplished on the Gascoyne and the Minilya some years ago, and thus tend to bridge the gap in the North-Western Division. It is hoped that the new edition of the map will be ready for the lithographer by the close of the present year. It is contemplated basing the Geological Sketch Map upon the 4-sheet map of the State issued by the Department of Lands on the scale of 25 miles to the inch.

PRINCIPAL RESULTS OF THE YEAR'S FIELD OPERATIONS.

Mineral Resources.

Pilbara Goldfield.—In view of the attention being paid to the resources of the comparatively little known Pilbara Goldfield, and the efforts which had been made by private enterprise towards the development of mining, instructions were issued to have such an examination of the country made as would be necessary for acquiring a knowledge of its resources and future prospects. Owing to circumstances beyond my control, coupled with an illness acquired towards the latter end of the year, it was not found possible to make a complete examination of the district.

The Pilbara Goldfield is, with the exception of Kimberley and Yilgarn, the oldest and perhaps the least known of any of the mining fields of Western Australia.

Prospecting has been carried out in the Pilbara District since the year 1877, but serious mining operations can scarcely be said to have yet begun. The gold yield of the district, as reported to the Mines Department up to the close of 1903, has been 119,383·34ozs., derived from the milling of 54,883 tons of ore, thus giving an average yield of 2·17ozs. per ton.

The Pilbara District affords better and more continuous sections than are generally to be met with on any of the Goldfields of the State which I have yet examined, and thus reveals geological structures which are not to be found in the more southerly districts, and on this account serve to throw light upon many obscure points in connection with the geology of other fields.

General Geology.—What are believed to be the oldest rocks occurring in the Pilbara are the granites and gneisses, which form the platform upon which the newer formations were laid down, and which everywhere underlie the great plain extending from Port Hedland to Doolena Gorge, on the Shaw River. To these succeed the greenstone schists and allied rocks, which occupy an extensive area of country, and which appear to be almost everywhere genetically connected with the occurrence of gold. These schists are associated with laminated, sometimes hematite-bearing, quartzites. The rocks of the greenstone schist series have as yet not been closely studied microscopically, but some at any rate appear to owe their origin to the transmutation of eruptive rocks. There are, however, associated with them beds of undoubted sedimentary origin. Next in antiquity to the greenstone schists comes what may be called the sandstones, grits, conglomerates, thin limestones, and associated volcanic rocks, so well exposed in many portions of the district. For convenience of description, these will be referred to as the Nullagine Beds. This formation, the actual base of which is rarely seen, forms an important feature in the geology of Pilbara. The Nullagine Beds cannot be exactly correlated with those yet described in any of the previous official reports on the geology of Western Australia. On the strength of the lithological and structural similarity to those of the Leopold Range in Kimberley, the Nullagine Beds are assumed to be of the same age, viz., Cambrian. In view of the deficiency of our knowledge of these beds, it is obvious that this assumption is more or less guesswork. Above the Nullagine Beds comes the sandstones, limestones, cherts, etc., which form the table-topped hills in the vicinity of the Oakover River. These do not, so far as has yet been noticed, occupy any very extensive area of country, nor are they very thick. They will be referred to as the Oakover Beds. In addition to the beds above mentioned, a series of igneous rocks have invaded the schists, gneisses, and granites in the form of dykes, which run in long approximately parallel lines. The dykes, which are all basic compounds, often form very conspicuous features in the landscape, owing principally to their black weathered summits, which stand out in bold relief. Wherever good sections can be seen of these dykes they invariably have a tendency towards verticality, but do not attain any very great width. So far as any observations have at present been carried, these dykes have no apparent connection with any deep-seated rock of similar composition. These dykes have been nowhere seen to pierce the Nullagine Beds.

Economic Geology.—The district contains several gold and tin-bearing areas, scattered over different portions of it. Economically, the auriferous deposits have proved up to the present to be the most important.

The geographical position of the various mining centres, so far examined, suggest a zonal development of the auriferous deposits. So far as observations have yet been carried, it appears that the auriferous deposits of the district may be divided into four main and distinct groups, viz. :—(*a*) Lalla Rookh; (*b*) Talga Talga, Bamboo; (*c*) Marble Bar, Yandicoogina, Mount Elsie, and (*d*) Mosquito, Middle Creek, Nullagine.

The general direction of these belts almost everywhere coincides with the strike of the greenstone schists, which, with two exceptions, invariably form the matrices of the auriferous reefs. The width of the belt naturally varies, and in the three most northerly zones the exact width cannot be defined. The prevailing dip is that of the enclosing schists, which is generally to the southward. Quartz reefs occur in great abundance all through the schistose rocks, as well as to a more limited extent in the areas occupied by the granitic rocks. The quartz reefs are of two distinct types, viz., white quartz reefs and laminated quartz and jasper veins, approaching very closely the hematite-bearing quartzites (?) which invariably form a conspicuous feature in most of the goldfields of the State which have yet been examined. In many cases the laminated quartz veins are traversed by quartz veins of a later date. Some of the laminated quartz veins (quartzites) range from almost pure quartz, through banded jaspers, with crystals of magnetite, to bands appearing to the eye to be virtually pure hematite. Some of these, notably those in the Lalla Rookh zone, could be readily concentrated to high-grade ores. The quartz reefs of what may be called the massive type occur plentifully in both the schist and the granite areas, though it is only in the former that the laminated and iron-bearing quartz veins have been found. The reefs invariably occur along the planes of foliation (? bedding) of the schists, or at any rate cut them at a very low angle. The auriferous reefs cannot be said to be long, and as a rule are small, though they occasionally swell out into large lenticular masses. The value of any reef being in a large measure influenced by its richness and its quantity, by which latter is meant the thickness, length, and breadth of the shoots of gold, wherever possible observations were made tending to throw light thereon. In no case, however, had the workings been carried sufficiently deep to enable any very reliable data being obtained as to the exact mode of occurrence of the ore shoots. So far as may be judged from the official returns from the various properties, it appears that the shoots of gold are rich, but when the shoots got relatively poor, operations ceased, for, owing to the economic conditions prevailing, only the richest ores could be worked at a profit. The auriferous ores are, with one exception, all of such a character as render them readily amenable to battery amalgamation and cyanidation, whilst the tin ores so far examined seem to be free from those deleterious constituents which are known to occur associated with the ores of the Greenbushes Tinfield.

The following table shows the value of the mineral production of the different portions of the Pilbarra field visited and reported on up to the end of the year 1903.

Mining Centre.	Gold.			Tin.	
	Ore crushed.	Gold therefrom.	Rate per ton.	Ore raised.	Value.
	tons.	ozs.	ozs.	tons.	£
Bamboo Creek	10,698·25	20,444·35	1·91		
Boodalyerri	106·25	1,037·05	9·76		
Elsie Creek	428·25	1,431·72	3·34		
Lalla Rookh	6,532·50	7,602·96	1·16		
Mosquito Creek	3,053·94	5,305·35	1·73		
Moolyella	...	...	...	855·58	56,163
North Pole	416·00	324·40	·78		
Sandy and Middle Creeks ...	3,816·30	9,025·65	2·36		
Talga Talga	891·65	2,012·28	2·25		
Yandicoogina	2,162·75	5,767·50	2·66		
Total	**28,105·89**	**52,951·26**	**1·88**	**855·58**	**56,163**

While the above table gives fairly reliable data as to the production of the reefs, the amount of alluvial gold can only be roughly approximated. The large nuggets for which the district is famed are distinctly of local origin, and are derived from the disintegration of quartz veins. From the data given in the above table, it appears that the average yield per ton of ore crushed from the districts alluded to has been 1·88 ozs. per ton; it is, however, unlikely that the high average of the last few years will be maintained under existing conditions. There is, however, a fair extent of low-grade ore deposits not yet developed, and which, under more suitable conditions, might be turned to profitable account.

The tinfield of Moolyella, which was also examined, is situated on the relatively high granite plateau drained by the head waters of Brockman Creek, Talga River, and their tributaries, all of which fall into the Coongan River. The principal productive area of Moolyella embraces about nine square miles, and is shown on the geological sketch map attached to the detailed description of the field in Bulletin No. 15. Tin appears to have been first discovered at Moolyella in 1898. The tinfield presents a remarkable uniformity in its geology, the whole area being formed of a granite composed of quartz, felspar, and mica. The granite covers a very wide expanse of territory, extending over an area of about 900 square miles. The granite is traversed by several north-and-south quartz reefs, some of which are over 50 chains in length, and a series of parallel pegmatite veins. Practically all the tin hitherto obtained from Moolyella is derived from the alluvial deposits forming the existing valleys. The alluvial deposits do not attain any very great thickness, although in some places their width exceeds 10 chains. The tin found in the alluvium is very much waterworn and rounded. In addition to the alluvial deposits, a large quantity of residual tin, *i.e.*, ore derived from the decomposition *in situ* of the tin-bearing pegmatites, occurs, and is very ragged and angular. These residual deposits, occurring as they do all over that portion of the granite area which is reticulated by pegmatite veins, afford a good stand-by for prospectors at such times as prospecting in other portions of the district becomes impossible. Lode tin is known to occur in the field, but the deposits have not been worked owing presumably to their low grade; it is by no means impossible, considering the large area of what may be called stanniferous country, that other deposits may yet be discovered that can be profitably mined.

General.—Those portions of Pilbara so far examined are on the whole promising, and the reefs give every indication of being permanent. The average return from the mines visited has been, up to the close of the year 1903, high, viz.: 1·88 ozs. per ton of ore crushed. An impartial observer cannot but fail to be struck with the backward state of the district considering the number of years which have elapsed since Pilbara has been opened. Far less genuine and judicious prospecting appears to have been done than the prospects of the district warrant.

A full report upon those portions of the Pilbara field so far visited is now in the press.*

Murchison Goldfield.—It was considered desirable, in view of the light conferred by the results of the geological survey of Lennonville, Mount Magnet, and Boogardie, carried out in 1903, that the northern extension of the Murchison Auriferous Series, in the direction of Abbotts, should be undertaken.

The work was intrusted to Mr. Gibson, who, in the course of his duties, examined the mining centres of Lake Austin, Tuckanarra, Quinns, Gabanintha, Star of the East, Nannine, Meekatharra, Abbotts, and the Wilgie Mia (Weld Range), in addition to a short account of the country traversed between the different localities.

The Murchison is of some historical interest, in that in the year 1855, when the economic value of the district as regards its mineral resources was entirely prospective, it was officially set forth in a report to the Government that the country to the east of the Murchison River had every appearance of being one of the finest goldfields in the world. While it cannot be said that the district (which constitutes one of the most important auriferous regions of the State) has come up to the high expectations then formed of it, still the Murchison does possess what is believed to be the largest solid quartz reef yet mined anywhere—the Great Fingal Reef at Day Dawn, and the phenomenally large and rich iron ore deposits of the Wilgie Mia, in the Weld Range.

* Preliminary Report on the Geological Features and Mineral Resources of the Pilbara Goldfield, by A. Gibb Maitland. Bulletin 15, Perth: By Authority, 1904. With six maps, two plans, and twenty-five figures.

The Murchison rose from the position of a pastoral district in the year 1891, when the first gold find of any real importance took place at Nannine. Gold was, however, discovered in 1888, a few miles to the north of what is now the mining centre of Cuddingwarra, but the find attracted but little attention. Since the first discoveries of gold, operations, despite many causes which stood in the way of mining development, have been carried out in the Murchison district, which, including Yalgoo, has been responsible for 1,122,625·97 ounces of the State's total output of gold at the close of the year 1903. There is every reason to believe that this portion of Western Australia will continue to be a prominent gold producer, and that the output will materially increase.

General Geology.—The geological structure of the portion of the Murchison District embraced by Mr. Gibson's work is remarkable for its uniformity. The district may be described as a series of persistent zones of schists and allied metamorphic rocks, which everywhere constitute what may be called the Auriferous Series. These zones of schists are surrounded by granite which, the evidence accumulated during the progress of the field-work would seem to indicate, belong to two distinct periods, viz.: an older, which has been subject to the shearing, etc., which affected the schists; and a newer, which penetrates the older granite as well as the Auriferous Series. The greenstone schists are remarkable for their persistent strike and horizontal extent, one belt alone having been proved to extend for at least sixty miles. So far as observations have at present been carried, the schists appear to be merely sheared and foliated igneous rocks. By far the larger portion of Mr. Gibson's duties, however, were of necessity devoted rather to economic than to stratigraphical geology, hence it has not been found possible to devote very much time to the solution of the exact relation of the different greenstones to one another, and such other cognate points. It is quite conceivable that much more detailed research than has hitherto been found possible would result in the recognition of highly metamorphosed sedimentary beds among the foliated greenstones of the Murchison.

Economic Geology.—Two distinct types of auriferous deposits have been shown to occur in the North Murchison, viz.: the laminated quartzites (which often contain hematite to such an extent as to warrant their being classed as iron ores), and the pure quartz reefs. The quartz reefs occur in the granite, in addition to the greenstones and allied rocks, but it is only those in the latter that have proved to be auriferous to any extent; those occurring in the granite have invariably proved to be of too low a grade to be successfully worked under present conditions. The quartz reefs occurring at or near the junction of the greenstones and the granite appear to be usually large and well defined, and outcrop for considerable horizontal distances; whilst the gold contents appear to be more uniformly distributed throughout the body of the reefs than in those associated with the quartzites.

The quartzites form one of the most characteristic features in the district; they are everywhere confined to the greenstones, and extend as roughly parallel bands, many miles in extent, and outcrop in the form of rough serrated ridges. The beds vary from almost pure quartz, through varieties of banded jaspers, often of great beauty, to practically pure banded hematites, some of which (notably those in the Weld Ranges) might be turned to profitable account as sources of iron ore, under more suitable conditions. The quartzites are not, as their name (under the present somewhat unsatisfactory system of nomenclature) implies, of sedimentary origin, but are merely quartz reefs of a peculiar type. The quartzites themselves are not, as a rule, highly auriferous, except in those places where they are traversed by ordinary quartz reefs; in which latter case, rich but narrow chutes of gold occur.

So far as observations have at present been carried out, within the area examined by Mr. Gibson in the North Murchison, very few workings extend below a vertical depth of 300 feet from the surface.

The following table shows the total gold returns from the mining centres examined up to the end of 1903:—

Mining Centre.	Ore treated.	Gold therefrom.	Average Grade per ton.
	tons.	ozs.	ozs.
Lake Austin	34,483·40	71,328·62	2·07
Tuckananarra	11,689·75	15,273·50	1·30
Munarra Gully	13,115·50	8,059·27	·61
Quinns	959·00	1,135·67	1·18
Gabanintha	35,716·75	34,600·15	·96
Nannine	61,955·13	59,002·56	·95
Meekatharra	13,906·33	13,783·09	·99
Abbotts	29,402·00	35,039·01	1·18
District generally	...	*3,087·70	...
Total	203,227·86	†238,221·87	1·17

* Alluvial. † Does not include the alluvial gold.

Considering the number of reefs already proved to exist, and those which have been worked with (as shown by the official returns) an average grade of over an ounce to the ton, there are good grounds for judiciously carrying out a more vigorous prospecting policy than has been the case in the past, for the reefs give every promise of being, as a whole, as persistent in depth as such deposits ever can be.

A full report upon those portions of the Goldfield visited by Mr. Gibson is now in the press. ‡

Iron Deposits of the Murchison.—In view of the importance of obtaining some further information as to the iron ores of the State, alluded to in the Annual Report of 1902, Mr. Gibson devoted special attention to the deposits of the Murchison.

‡ The Geology and Mineral Resources of a part of the Murchison Goldfield. Chas. G. Gibson. Bulletin 14. Perth: By Authority, 1904. With nine maps and eight figures.

Weld Range.—The Wilgie Mia deposit is situated about five miles to the east of the Weld Hercules G.M., and two miles south-west of Mount Lulworth, on a ridge running in an east and west direction along the south side of the Weld Range. The deposit, which is almost pure hematite, is, roughly, some 150 to 200 feet in width, and forms a ridge about three miles in length, rising in many places to a height of 400 feet above the general level of the surrounding country. An estimate was made by Mr. Gibson as to the probable quantity of iron ore in sight at the Wilgie Mia, and the amount of ore above the general level of the country is about 26·5 million tons. In arriving at these figures, the length of the deposit has been taken as three miles, the average width as 150 feet, the average height of the cap of the deposit as being 100 feet above the level of the plain, and the weight of a cubic foot of ore to be 250lbs.

Gabanintha.—From Mr. Gibson's report it appears that:—"About half way between Gabanintha and Star of the East is a low ridge consisting of titaniferous magnetite, and extending on a bearing slightly west of north and east of south for about two and a-half miles; the belt of iron ore which forms this ridge is from one to two chains in width, and rises in places to a height of 50 feet or 60 feet above the surrounding country; it appears to be of similar origin to the hematite-bearing quartzites occurring so commonly throughout the district. There is a huge amount of iron ore of first-class quality in this deposit, but its geographical position renders it practically valueless."

The following is a partial analysis made in the Departmental Laboratory of a sample [5344] of this ore taken from a spot 40 chains E.N.E. of G.M.L. 241, Star Extended:—

Metallic iron	52·14	per cent.
Silica	·20	,,
Phosphorus	·008	,,
Sulphur	*Nil*	
Titanic Oxide	12·68	,,
Hygroscopic water	12·68	,,
Combined water	1·15	,,

Taking the deposit as having an average width of 50 feet, an average height of 25 feet above the plain, and a length of two miles, Mr. Gibson estimates as the quantity of ore actually above the surface of the ground as being 1·5 million tons. The high percentage of titanic acid, as disclosed by the analysis, will tend to preclude its being profitably worked, although this is a metallurgical difficulty which is being rapidly overcome.

Full details in connection with these deposits will be found in Bulletin No. 14.*

Leonora.—Continuing the policy of the Department of having each of the important mining centres examined in such detail as is deemed necessary, Mr. Jackson, the senior assistant Geologist, visited Leonora, remaining there from the 7th of July to the 10th of October, and prepared a report upon the Geology and Auriferous Deposits of the district.†

The Leonora District forms portion of the eastern watershed of Lake Raeside, the divide between this and the Lake Carey drainage area being approximately 12 miles to the east, while in a westerly direction, at a distance of from four to five miles, the country begins to fall towards the Lake Barlee Basin.

Approaching Leonora from the south, the district presents the general appearance of a long ridge of more or less pointed hills, extending north-westerly to Mount George, and southerly to Mount Leonora, and beyond it to Lake Raeside. This ridge forms a natural boundary, dividing the district into two distinct portions; the western side being occupied by wide flats, passing almost imperceptibly into the Lake Raeside salt marsh, whilst that on the east, though occupied largely by flats, is somewhat more broken.

General Geology.—The fundamental rocks of Leonora consist of a complex of crystalline schists which form the continuation of that group which is so largely developed in other portions of the Eastern Goldfields. These crystalline schists, according to Mr. Jackson's observations, comprise both basic and acidic rocks. The basic rocks, which constitute the auriferous series, form a belt of about a mile in width, and a proved length of 10 miles. This belt, however, extends much farther to the north and south than the area embraced by Mr. Jackson's work. Some of the basic rocks (the greenstones) have been converted into schists, which are largely developed along the outer margin of the main belt, whilst the centre portion is occupied by more or less massive rocks. There seems to be good reason to believe that the foliated and schistose rocks are merely portions of one and the same mass which has suffered more or less dynamical metamorphism. All the important ore deposits are confined to the greenstones and their derivations, which have yielded fully 95 per cent. of the total gold output, which up to the end of 1903 amounted to 331,824·92ozs., derived from the milling of 420,792·50 tons of quartz. The greenstones have been invaded by granitic rocks, which latter occupy by far the most extensive area of country examined. The acidic rocks are both massive and foliated, though it has, however, not been found possible to, in all cases, separate the different varieties. It is, however, quite possible that rather more detailed examination than was deemed expedient would result in the recognition of two distinct series of granitic rocks (*a*) an older, traversed by zones of secondary shearing, possibly associated with auriferous quartz reefs, and (*b*) a much newer and comparatively unmodified granite, which may be represented by the felsite dykes, which intersect the greenstone schists in the north-west corner of the area in the vicinity of the Leonora Gold Blocks. Detailed mapping, however, has been rendered difficult by the cover of superficial deposits which occupy such an extensive area, and effectually conceals important geological boundaries, often in critical localities. The granites and greenstones are covered in places with lateritic deposits, a high and a low level laterite having been recognised, but it has not been found possible to separate both upon the geological map of Leonora.

* The Geology and Mineral Resources of a part of the Murchison Goldfield. Chas. G. Gibson. Bulletin 14. Perth: By Authority, 1904. With nine maps and eight figures.

† The Geology and Auriferous Deposits of Leonora, Mount Margaret Goldfield. C. F. V. Jackson. Bulletin 13. Perth: By Authority, 1904. With map and sheet of sections.

A full account of the ore deposits of Leonora is given in Bulletin No. 13.

Edjudina-Yundamindera.—The country between Edjudina (Lat. 29, 44, 40, S.) and Yundamindera (The Granites) was examined by myself in the early part of the year, with the object of investigating its mineral resources, and during the course of the journey, the mining centres of Yerilla, Yarri (New Edjudina), Edjudina, Linden, Yundamindera, Pennyweight Point, Eucalyptus, and Mount Malcolm.

No mining was going on at Yerilla, hence very little was to be seen of the condition of affairs prevailing underground.

The mining centre of Yarri is situated about six miles west of Edjudina, the staple formation consists of massive greenstone penetrated by intrusive granite and felsite dykes. The quartz reefs traverse both the granite and the greenstone; those occurring in the former are, when viewed as a whole, approximately parallel to one another. The reefs in the greenstone strike at varying angles, although when their position is laid down on a map a general east and west trend may be detected. Whatever may be the date of the intrusion of the granite it is quite clear that the formation of the quartz reefs took place much later.

The mining centre of Edjudina is of interest in that a virtually continuous line of reefs has been proved to extend for a distance of about 10 miles in a north-west and south-east direction, and has been worked more or less along the whole line. The width of the belt embracing the auriferous quartz reefs nowhere exceeds 20 chains. So far as may be seen the reefs consist of exceptionally lenticular veins of quartz occurring along the planes of foliation. About two miles to the north-east, and parallel to the auriferous quartz reefs, is a long razor-backed ridge formed of the laminated hematite-bearing quartzites (cherts?) which can be followed for about 15 miles in the vicinity of Edjudina. The width of this belt is about 15 chains, and it is made up of a series of remarkably attenuated lenses, each of great horizontal extent; wherever these quartzites can be seen in sections, they are either vertical or are inclined at high angles to the north-east. The quartzites are all enclosed in a slaty cleaved rock, of a nature which it is impossible to determine owing to the extensive surface decomposition it has undergone. The rock, however, has the appearance of being a bleached greenstone schist. Several bands of quartzite occur within a few chains on either side of the auriferous quartz reefs and can be followed with very little interruption along the known extent of the auriferous series. Many of the bands are minutely puckered and contorted between their walls, though it is only occasionally that their place is taken by breccias. All the available evidence seems to indicate that these lines or bands of quartzite have been formed along shear planes, and that a certain amount of faulting took place subsequently to the formation of the deposits themselves.

The mining centre at Linden, at present practically at a standstill, lies about eight or nine miles to the east of the Edjudina and Camel Back Soak belt of hematite quartzites. The productive centre lies just along the junction of the greenstones and allied rocks, with the granites, which may form part of the Quartz Blow Soak mass.

The auriferous reefs of Yundamindera occur along the Eastern boundary of the belt of granite which extends from Lake Raeside northwards. Some portions of the granite have a rude foliation, and contain lenticular patches of micaceous schist. Some of the quartz reefs from their laminated nature have evidently undergone a certain amount of crushing since their formation. There was very little mining going on at the date of my visit. The mining centre of Pennyweight Point lies east of Yundamindera and due north of the Trig. Station on Mount Keith. There were only about four or five men at work at the date of my visit, hence very little could be seen. A good deal of dry-blowing must have been carried out at one period in the history of the district. The surface of the ground is covered with a shallow deposit of surface loam, beneath which is a relatively small thickness of aluminous laterite (bauxite?). The country rock of the field is diabase of the prevailing type.

The all but deserted mining centre of Eucalyptus lies some miles due east of Linde Mia (Pindinnie Soak). A good deal of *bonâ fide* work must have been carried out in the neighbourhood at one period of its existence, and, so far as may be judged by the state of the surface, a good deal of dry-blowing must have been done. The productive area is embraced within the limits of about half a square mile. Nowhere on the surface of the area does the cover of superficial deposits exceed 6 or 8 feet in thickness. From what may be seen in the workings, costeens, etc., it is quite evident that the diabase (which is the staple formation) is intersected by a network of quartz veins, in reality an auriferous stock, to the residual decomposition of which the rich dry-blow patches may be ascribed. The drainage from Eucalyptus flows north-east into Lake Carey, along several well-defined water-courses. The rich residual deposits have led to prospecting in these valleys for deep leads, but so far nothing but a thin cover of wash resting upon rock decomposing *in situ* in the direction of Kaolin has been met with. Between Eucalyptus and the Lake some miles distant, the fall is very slight, and hardly sufficient to warrant the inference that the country is likely to develop an extensive system of deep leads.

One of the most noteworthy features in the country under examination is the occurrence of a continuous belt of iron-bearing quartzites, which has been followed for a distance of not less than fifty miles. There are strong reasons for believing that it extends northwards as far as Mount Morgans. The beds of which the belt is composed range from an almost pure quartz, through banded jaspers, to what appears to the eye to be practically pure hematite. Analyses of the typical varieties of the different classes of ore showed that, contrary to their general appearance, they all contain a high percentage of silica and a relatively low percentage of iron. Many of the deposits could be readily concentrated to high-grade ores, which, under far more favourable conditions, might be turned to profitable account. Of the origin of the deposits it is difficult with our present knowledge to form any precise opinion. They are evidently not of clastic origin, and the greenstone schists in which they invariably occur have been subject to a great amount of bleaching and decomposition in close proximity to the deposits. The schists contain a certain proportion of iron compounds in their composition, and the bleaching action in

proximity to the quartzites would seem to imply that these form the source of the iron ore, and possibly that of the silica, with which these ores are invariably associated. On either side of the hematite-bearing belts numerous quartz reefs outcrop, and the several mining centres previously alluded to have been opened up, and so far as may be judged by the official statistics, a considerable quantity of gold has been won, though it is doubtful if all the gold actually obtained has been officially recorded. In view of the extent of the Edjudina-Yundamindera belt, and the number of reefs outcropping in addition to those actually worked, there seem sufficient grounds to warrant rather more vigorous prospecting than has hitherto been the case. Full details with reference to the district will be found in Bulletin 11.*

Mulline, Ularring, Mulwarrie, and Davyhurst.—An examination of this portion of the North Coolgardie Goldfield was primarily undertaken at the instance of the local residents, with the object of showing the mutual relationship of the auriferous series at these different localities.

The staple formation of the district, apart from the extensive cover of the ubiquitous superficial deposits, is made up of a complex of hornblendic (?) rocks, which form the auriferous series, conforming in this respect to the salient features of the other mineral fields examined. The series forms a belt of about 10 or more miles in width; there seem to be good grounds for believing that this forms part of the belt which includes Coolgardie and Mount Ida, along which it would not be unreasonable to anticipate the occurrence of other deposits quite as rich as any of those already opened up. The hornblendic rocks are intersected by a biotite granite, from which dykes attaining a thickness of 30 or 40 feet emanate. Some of these have been followed across country for several miles, and in one instance a dyke has been worked for its gold contents. The quartz reefs, though with one or two exceptions small (and when worked below water level containing large quantities of sulphides) seem on the whole to be well-defined, and give every promise of being permanent.

The district as a whole is not particularly well watered. A good supply of fresh water can, however, usually be obtained during the winter months from the soaks at the Mulline, Cooladdie, and Ularring Rocks. This supply, depending as it does on the rainfall, is not permanent and generally gives out before the end of the summer. Fresh water has been struck in many of the mines. Generally speaking, however, the water supply of the district is salt, and being unfit for domestic purposes, necessitates the use of extensive condensing plants.

The water supply in each of the Government wells is salt, but at both State Batteries it is suitable for and is being used in connection with both milling and cyaniding.

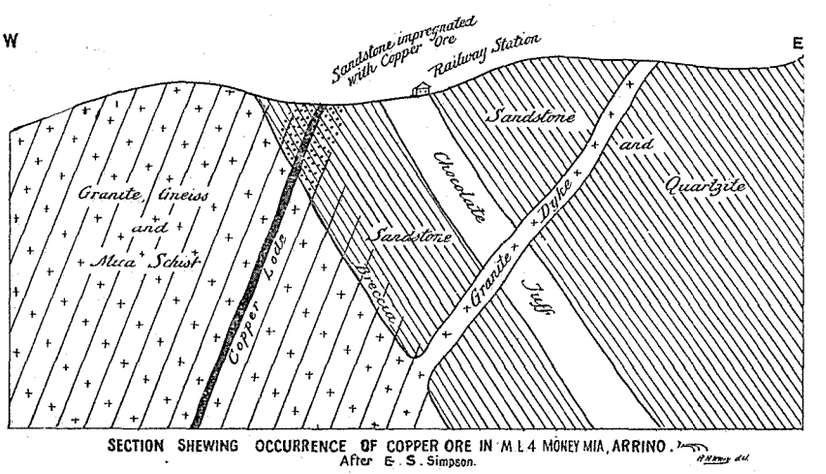
The district is as a whole well-timbered, such being especially the case in the vicinity of Mulwarrie and Davyhurst, where the low-lying flats are covered with a heavy growth of mulga, gimlet, and white gum.

The average gold yield per ton of ore treated from the district is a high one, and the total gold production has been steadily increasing, and there seems every reason to believe that the district will show a marked increase in its gold output in the future, provided systematic scientific mining, aided by the erection of suitable machinery, be adopted. The results of Mr. Gibson's investigations are given at length in Bulletin 12.†

Arrino Copper Deposits.—There being so many applications in connection with the alienation of land in the vicinity of the Arrino copper deposits, it was deemed expedient to instruct one of the Assistant Geologists to visit the district and map the junction of the crystalline rocks with the copper-bearing sandstones, and the copper lodes; with the view of defining the area over which the copper deposits extended.

The Arrino district is made up of a series of crystalline rocks and sedimentary rocks, the geological age of which has not been definitely fixed. These sandstones carry ores of copper, in close proximity to the junction of what appears to be a mass of intrusive (?) granite.

The following figure shows an east generalised section from Arrino Railway Station and M.L. 4:—



SECTION SHEWING OCCURRENCE OF COPPER ORE IN M L 4 MONEY MIA, ARRINO.
After E. S. Simpson.

* Notes on the Country between Edjudina and Yundamindera, North Coolgardie Goldfield. A. Gibb Maitland. Bulletin 11. Perth: By Authority, 1904. With two maps and sixteen figures.

† The Geological Features and Mineral Resources of Mulline, Ularring, Mulwarrie, and Davyhurst, North Coolgardie Goldfield, by C. G. Gibson. Bulletin 12. Perth: By Authority, 1904, With two maps.

The sandstones strike 355 degrees and dip east at an angle of 70 degrees. The foliation (? jointing) of the adjoining crystalline rocks passes for some distance into the adjacent sandstone. The copper lode is in the form of a "sheeted zone" of mica schist and sandstone parallel to the adjacent gneiss, the sandstone for some distance on either side of the lode being impregnated with copper carbonates.

The junction between the crystalline rocks and the sedimentary beds is shown on the accompanying maps. From Mr. Campbell's observations it appears that:—

"The northernmost point at which the sandstone appears is at an old shaft or well about seven chains north of the Government Reserve 2326 and a quarter mile west of the railway. The next place is in the stream bed to the north of the M.L. 4 (now No. 12); the strike of the sandstone is here about 180 degrees and dip 60 degrees to the east. Granite forms the rising ground to the west.

"At the workings on M.L. 4, the strike of the sandstone immediately to the west of the northern shaft is 163 degrees, while the bearing of the outcrop is 155 degrees, the lode underlying apparently 60 degrees to the west: the old shaft on the south bank shows these characters also, but a crosscut west from the shaft at 45 feet depth failed to find the lode opened out at the north shaft, at least up to a point perpendicularly below it. The workings were full of water. In the paddock, about a quarter of a mile west of the homestead at the Arrino spring, the sandstone can be traced.

"About one and a-half miles to the southward granite forms a line of hills, on which the north-west corner of location 342, freehold, is situated. Baxter's mine is probably about five chains east of the granite; here two shafts have been sunk, with an opencut at the northernmost one, which are both 60 feet deep, but they were full of water at the time of my visit. The strike of the sandstone is here 15 degrees, and the dip 58 degrees to east, with cross faces 134 degrees dipping 70 degrees to west. At the New Main shaft, 82 feet southerly bearing 148 degrees from the last, the depth is 41 feet; at which level a crosscut 21 feet long is being put in, the sandstone showing staining of carbonate of copper: it passed through the lode where a bunch of black sulphide of copper was met with. Two drives have been made, the southern one is 14 feet and the other to the north is 22 feet, the bearing of the lode being 150 degrees and 144 degrees respectively, and underlaying 60 degrees to west: it is only very thin in either drive.

"Two pot holes to the west of this shaft show veins of copper, the northernmost one has a breccia or vein stuff, and is probably not far off the granite. Towards the south-east corner of the property a quartzite outcrops on the hill side, and a pot hole has been put down near the corner. The shaft about three chains north of the north-east corner of location 342 is said to be 60 feet deep; it is in sandstone, showing carbonate of copper staining, but it was full of water. The sandstone outcrops freely at the middle of the south boundary of location 342, and can also be seen to the southward in M.L. 17 and in application 21. Three pot holes have been opened out here without success.

"In application 22, the sandstone can be seen at the eastern foot of the granite ridge, which has a south-east direction as far as the south end of application 23. The true position of the tank is here, instead of being one mile more to the west, as shown on the one-mile scale litho. Application 27 is over a flat of granite and sandstone, on which a good patch of white gum occurs which might be useful for mining timber. No mineral indications were noticed here. This was the southernmost point of my inspection. M.L. 20 is wholly on granite and contains the foot of a quartz ridge which appears on the granite hill to the westward; some green colour occurs in some of this quartz, but I am doubtful of its being copper."

Black Range Find.—In view of the discoveries made during the year at Black Range, the Assistant Geologist, Mr. Gibson, was instructed to visit the district and report upon the field. His report, issued in March, is as follows:—

"The Black Range Find is situated in the East Murchison Goldfield, about half way between Mount Magnet and Lawlers, and about 10 miles north of the main Mount Magnet-Lawlers road, some 103 miles from the former place. The workings are located in the middle of a belt of amphibolite rocks, which, attaining a width of 20 miles, runs approximately north and south, extending southerly to Lake Barlee, and northerly for a distance of 20 miles, when it disappears beneath sandy plains. This belt of rock is similar in all respects to the auriferous formations of the Murchison field. It is bounded on the east and west by belts of intrusive granite, the amphibolite in proximity of the granite being highly altered and foliated, the lines of foliation running parallel to the junction line of the granite, *i.e.*, approximately north and south. It is traversed by numerous small bands of hematite-bearing quartzites. These bands form low, rough ridges, and run in a general north and south direction. They are similar in all respects to the hematite-bearing quartzites of the Mount Magnet-Boogardie district. In the neighbourhood of the '8-mile' are several of these bands of quartzites, running east and west. They appear to be newer than the quartz reefs, which, in several cases, they cut right through. One or two of the smaller bands here have been proved to carry very good gold on the surface. No work has been done to prove them to any depth.

"There are two workings on the field, one at what is known as 'The Patch,' the other at the '8-Mile.'

"'The Patch' is the older of the workings, and it is here that the Government well has been sunk. Most of the gold got here has been alluvial, and is now, in this particular locality, almost worked out. There are about 150 men working here, and most of them are making very little more than tucker. The country in the vicinity of 'The Patch' consists of heavily timbered mulga flats, with a few low ridges. The only rock outcrops are on these ridges, the flats being covered by a considerable thickness of recent superficial deposits, resulting from the weathering of the older rocks. The alluvial workings are situated on and to the east of a slight rise about 20 chains east of the well, and are about a quarter of a

GEOLOGICAL SKETCH MAP

No1

OF

ARRINO

YANDANOOKA MINING DISTRICT

BY

W D Campbell

ASSISTANT GEOLOGIST

1903

TO ACCOMPANY ANNUAL PROGRESS REPORT OF THE GEOLOGICAL SURVEY

0 40 80

Scale of Chains.

ARRINO

ARRINO SIDING

2326

Gn

Si

Granite Ridge

Sandstone 3 Chains E of Old Shaft

M.L.A. Cu Shaft Mercy Min.

M.L. 15

24

25

Loc 1489

Loc 362

MIDLAND RAILWAY

48/2153

Loc 255/55

Loc 3317/55

Ferruginous Sandstone

M.L. 18

Arrino Copper Block N.

M.L. 20 Arrino Copper Lode

Cu

Loc 342

M.L. 16 Arrino Copper Block 1st

M.L. 5

M.L. 17

Arrino Copper Block South

21.

22

23

27

Granite Ridge

Sandstone

Ferruginous Sandstone Hills

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

Explanation of Signs & Colours

GRANITE & OTHER CRYSTALLINE ROCKS ..... Gn

SANDSTONES & GRITS (Age undetermined) ..... Si

ORE DEPOSITS { Quartz Reefs ..... Q
Copper Lodes ..... Cu

GEOLOGICAL BOUNDARIES (Approximate only) .....

SHAFTS .....

MINERAL LEASE ..... M.L

LINES OF FOLIATION .....

Alfred Maitland
Government Geologist

29.9.03

R.H. Irwin del.

H. J. Pether, Government Photolithographer, Perth, W.A.

GEOLOGICAL SKETCH MAP

No2

OF

ARRINO

YANDANOOKA MINING DISTRICT

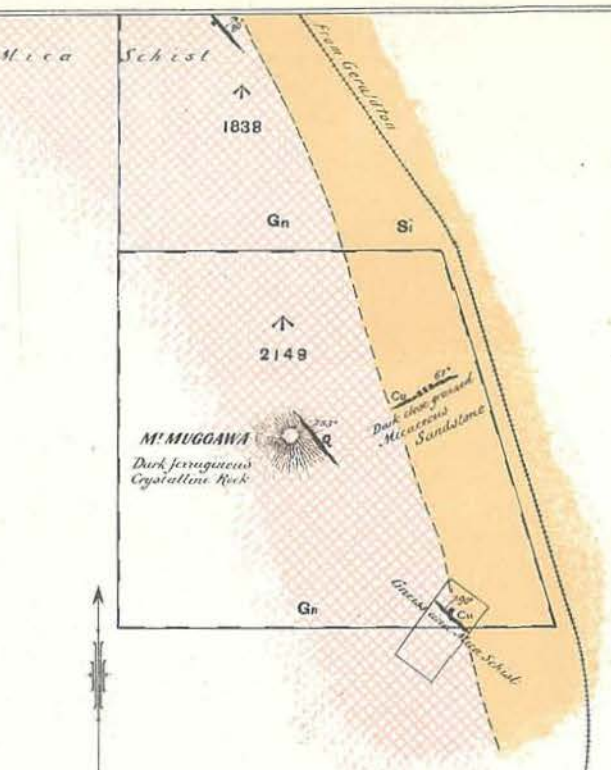
BY

W D Campbell
ASSISTANT GEOLOGIST.

1903

TO ACCOMPANY ANNUAL PROGRESS REPORT OF THE GEOLOGICAL SURVEY

0 40 80
Scale of Chains.



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

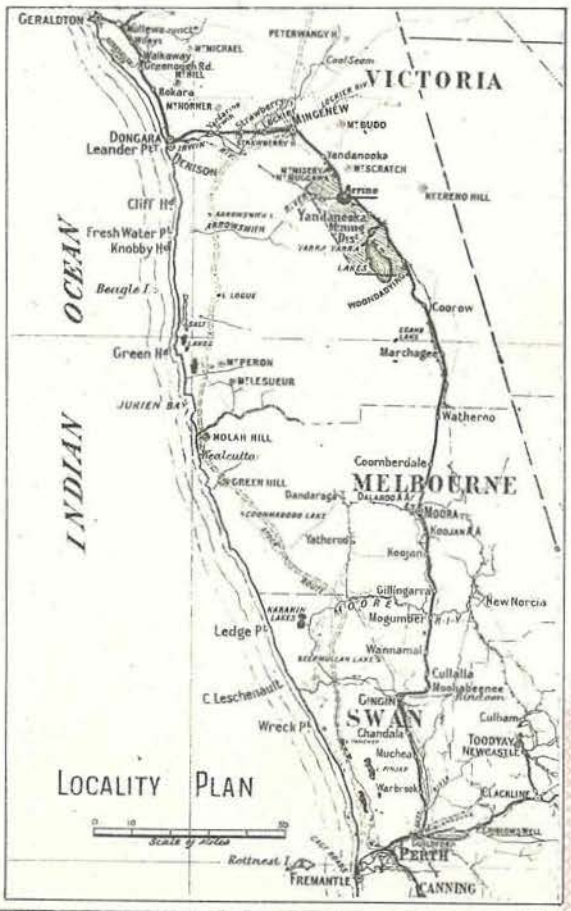
Explanation of Signs & Colours

GRANITE & OTHER CRYSTALLINE ROCKS ..... Gn

SANDSTONE & GRITS (Age undetermined) ..... Si

ORE DEPOSITS { Quartz Reefs ..... Q
Copper Lodes ..... Cu

SHAFTS .....



MIDLAND RAILWAY

Alfred Maitland
Government Geologist

H. J. Pether, Government Photolithographer, Perth, W. A.

square mile in extent. Several large quartz reefs outcrop on this rise; these, as far as tested, contain but a very slight trace of gold. The alluvial gold appears to have been shed from a number of small quartz leaders, which run through the country in all directions, and which are too small for working.

"Three mining leases have been taken up at 'The Patch,' and are now being worked. These are the 'Black Range Main Reef,' by Messrs. Lyons and Party; 'Bryant's Reward Claim,' by Bryant; and 'The Groper,' by Messrs. Bryant and Titlow."

Black Range Reef (Messrs. Lyons and party).—This is a 24-acre lease, situated about two miles east-south-east from the Government well. Three quartz reefs run through the property in a general north-east direction. On the most southerly of these an underlay shaft has been sunk to a depth of about 30 feet. The reef, as opened up, consists of white quartz, and is about one foot wide on the surface, rapidly widening to some four feet, which is its width at the bottom of the shaft. The reef strikes south-west, and underlies about 60° to the north-west. The walls are well defined, and consist of soft decomposed greenstone (amphibolite). Both walls carry a little gold. The greater part of the stone shows fine gold throughout. A little stoping has been done at the 30-feet level, and altogether 20 tons of stone have been taken out. One crushing of 15 tons has been put through the battery for an average of 1oz. 15dwt. per ton. A second vertical shaft is being commenced on a second parallel reef at the north end of the property. The reef, where exposed, is about two feet wide, and consists of white quartz considerably ironstained, showing a fair quantity of free gold.

Bryant's Reward Claim.—This is a 24-acre claim, located about three-quarters of a mile from the Government well. A small quartz leader runs through the claim in a north-west direction, underlying about 45° to the south. The leader varies in thickness from one to six inches. An underlay shaft has been sunk to a vertical depth of about 50 feet. A little stoping has been done at 25 feet, and at 40 feet. A vertical shaft has been sunk to cut the underlay shaft at 50 feet. This is used as a hauling shaft. Water was struck in this shaft at a depth of about 55 feet. It is brackish, and though hardly fit for human consumption, would yet make good stock water. Altogether about 15 tons of stone have been taken out; this has been crushed for an average yield of 7ozs. per ton. About 70ozs. of alluvial have been obtained on and in the vicinity of this property.

A vertical shaft is being sunk on a small quartz leader 18 chains south from Bryant's; it is down some 15 feet. So far there have been no returns.

The "Groper" (Messrs. Bryant and Titlow).—This is a 10-acre lease, three-quarters of a mile north-east from the Government well. There are two reefs on the property, both of which have been proved to carry gold; only one of these, however, is being worked. On it an underlay shaft has been sunk to a vertical depth of 25 feet. The reef, as exposed in the shaft, is two feet wide, and strikes to north-east and south-west, with an underlay of about 60 degrees to the south-east. The quartz is white and glassy, and shows coarse gold freely. The walls are of soft greenstone, decomposed, and are clean and well defined. The country on the hanging-wall carries an appreciable amount of gold for a thickness of several inches. The best stone is obtained from the hanging-wall side of the reef. About 15 feet of driving and stoping has been done at the 25-feet level, and seven tons of picked stone have been crushed for a total yield of 30ozs.

The "*Eight-mile*" is situated some six and a-half miles north of the "Patch." It is here that the more recent discoveries of rich quartz reefs have been made. Very little alluvial has been got here up to the present. The country in the vicinity is hilly. The hills are low, and for the most part capped with a considerable thickness of ironstone gravel. A heavy growth of mulga covers the whole locality. Quartz reefs are numerous, and generally run north and south. They are frequently cut through by east-and-west bands of hæmatite-bearing quartzites. These quartzites, wherever tested, usually carry a small amount of gold. The quartz reefs are generally richer in proximity to the quartzites. Several leases have been pegged out in this neighbourhood, but up to the present little or no work has been done on them. The two most important leases on this end of the field are "The Adelaide," held by Messrs. Hack Bros. and Dent; and the "Black Range Gold Mine," owned by Messrs. Pead and party. Other shows are being prospected by Messrs. Gay Bros., Adlam, Griffiths and party, Sullivan and party, and Messrs. Muir and party.

"*The Adelaide*" (Messrs. Hack Bros. and Dent).—This is a 12-acre lease, situated at the "8-mile," about six and a-half miles north from the "Patch." A white quartz reef runs through the property in a north-and-south direction. This reef outcrops very strongly for about two chains in the centre of the ground, where it is about six feet wide. Near the north boundary of the property it appears to be cut right off by a quartzite bar running east and west. The reef can be followed right up to this bar on the south side, but no trace of it can be found on the north. South from the main outcrop the reef disappears beneath the surface for about four chains, outcropping again near the southern boundary of the lease, and continuing through Pead and party's property. The reef here appears to be much smaller, the outcrop being from 12 inches to 2 feet. The quartz is very much ironstained, and shows fine gold freely throughout. At the time of my visit no work had been done on the property, but 14 tons of surface stone had been crushed for an average yield of slightly over 12ozs. per ton.

"*Black Range*" *G.M.* (Messrs. Pead and party).—This is a 12-acre block, adjoining the "Adelaide" on the south. Two quartz reefs run through the property; one of these, which runs north and south, is undoubtedly a continuation of the "Adelaide" reef. It can be traced right through the lease; the outcrop, however, is rather broken, and varies from almost nothing to about four feet. The greater part of the stone in this reef is a blue glassy quartz, which in places shows a considerable quantity of fine gold. A good deal of white quartz is also associated with the blue. Both classes of stone yield good prospects. Samples of the bluestone crushed and washed by myself gave results averaging at least 2ozs. The second reef is about two chains to the east of the main reef, and runs about north-north-west and south-south-east. The outcrop, which is considerably broken, can be traced almost right through the lease. At the south end it appears to die out altogether near the boundary of the property, and at the north side it also thins out rapidly, and runs but a short distance into the adjoining lease. The stone in

this reef is similar to that in the main reef, and also carries a fair amount of gold, but its contents are not so uniform. A quartzite bar traverses the lease in an east-and-west direction, and cuts through both quartz reefs. This bar can be followed for about a mile in an easterly direction, and also for a considerable distance to the west. It varies in thickness from a few feet to nearly a chain; where it crosses the lease it is from two to four feet wide, and in one place has been proved on the surface to carry a very appreciable amount of gold. At the time of my visit work was just being commenced on this property. No stone has, so far, been crushed.

A 12-acre block has been pegged out on the south end of this property. A small quartz reef runs north and south through the middle of the block, and is probably a continuation of the reef in Pead's lease. A small quartzite bar, similar to the one in the adjoining property, also runs through this holding. This has not been tested as yet. No work has been done on this block.

Messrs. Gay Bros.—This party has pegged out a 12-acre lease adjoining the "Adelaide" on the north side. There are no outcrops on the claim. A vertical shaft has been sunk to a depth of about 60 feet near the southern boundary of the property, with the purpose of cutting the continuation of the "Adelaide" reef. No stone has been struck in the shaft to date. The country sunk through consists of soft decomposed greenstone (amphibolite).

T. Payne has pegged a 6-acre block about one mile north-east from the "Adelaide." Here a shaft has been sunk to a depth of 12 feet on a lode formation which appears to be an old fault, throughout which a large quantity of gold-bearing quartz has been disseminated. This formation, which runs north and south, and dips at an angle of 60 to the west, is about six feet wide. It carries a little gold throughout, but the best stone is got on the hanging-wall side. Several samples, taken and tested by myself, gave results averaging about half-an-ounce. Several small quartz veins, about one inch in thickness, run through the formation near the surface; these carry a considerable amount of coarse gold. No stone has yet been crushed from this lease.

Adlam's.—This claim is situated half-a-mile north-west from the "Adelaide." On it a shaft has been sunk to a depth of some six feet on a large quartz reef running north-north-east and south-south-west. This reef is from four to six feet wide, and can be traced for a distance of about 10 chains. It has been proved to carry a small amount of gold for almost its entire length. Some samples, taken and tested by myself, showed only a trace of gold.

P. Sullivan and party.—This property is situated some 3½ miles south-east from the "8-mile." A large quartz reef runs north-west and south-east through the centre of the lease. This reef is from six to seven feet wide, and outcrops very strongly for a distance of about 10 chains; it has been proved to carry gold for almost its whole length, but its contents are very variable, ranging from a mere trace up to about 7ozs. in some places. A large quartzite bar runs east and west through the property near the north-west boundary. The reef splits on approaching this bar on the south side, but makes again on the north, and apparently continues down through the adjoining property. At the time of my visit no work had been done on this lease beyond sinking a couple of prospecting shafts. No stone had been crushed.

Muir and party.—This party hold a 12-acre block situated about 20 chains north-west from Sullivan's. A reef from four feet to six feet wide, thinning out rapidly to the north, can be traced through the property in a north-west direction. This is undoubtedly a continuation of Sullivan's reef. It shows free gold in several places along the surface. Two smaller reefs run parallel to the main one, on each side, and distant about two chains from it. These vary in width from six inches to two feet. The one on the south-west side carries the best gold, and gives results averaging up to 2ozs. A large quartzite bar also runs through about the middle of the lease in an east-and-west direction, and cuts through all three reefs. The best results have been obtained from the reefs close to their intersection by this bar, and on the north side of it. Very little work has been done on the property to date, and no stone has been crushed.

Griffith's party have taken up a prospecting area about one and a-half miles west from the "8-mile," where they are engaged in sinking on a small vertical quartz reef. This reef strikes east and west, and can be traced on the surface for a distance of five or six chains. It is from one foot to two feet wide, and averages from 10 to 15dwts. per ton. A small quartzite bar runs parallel to the reef about 10 feet from it, and has been proved to carry a small amount of gold. At the time of my visit sinking had only proceeded to a depth of about 10 feet, and no stone had then been crushed.

Several other parties are prospecting in the neighbourhood, but no particulars are available.

With regard to the general prospects of the field, the prospectors are at present greatly handicapped owing to the fact that there is no battery in the district. So far, the greater part of the stone crushed has been sent into Lennonville, but as this costs from £6 to £8 per ton for cartage alone, it is only exceptionally rich stone that will pay under these conditions. There are numerous reefs in the district whose gold contents are not sufficiently high to pay for this treatment, viz., carting into Lennonville and crushing there, and which, therefore, are being neglected. With a battery close at hand, these same reefs would probably yield good profits.

With regard to moving the Paynesville State Battery out of the district, I would advise the Government to await further developments at Black Range before deciding on the matter.

There is an abundance of timber (mulga) in the district of such a size as to be suitable both for mining purposes and for fuel.

A Government well has been sunk at the "Patch," and a good supply of fresh water struck at about 50 feet. Water will probably also be struck at the "8-mile," by sinking on any of the low-lying country to a depth of about 70 feet. At present, owing to the recent heavy rains, there is a good supply of surface water over the whole district.

Since my return from the field a new discovery of alluvial has been reported at a spot situated some six miles to the west of the "Patch."

Irwin River Coalfield.—In the month of February, 1903, the following report was prepared by myself in connection with State Aid towards the development of the coalfield:—

"Two applications have been received for a subsidy in connection with boring for coal on the Irwin River field. The Irwin River beds are known to contain coal seams, which have been fully described in official reports, and the associated fossils show that the strata belong to the permo-carboniferous formation, which has proved so valuable elsewhere. A good deal of boring has already been carried out at the cost of the State, in the lower reaches of the Irwin River valley, with the object of the delimitation of the western margin of the Irwin River coal measures. The first bore was put down at Dongarra. This attained a depth of 2,111 feet, when operations were stopped, owing to the capability of the plant being exhausted, without having proved the presence of the coal measures. The Government then decided upon putting down a bore hole at Yardarino. Here operations were suspended at a depth of 1,607 feet owing to the tools being lost in the hole. Neither the Dongarra nor the Yandarino bore having entered the coal measures, and the main object of the operations being yet unaccomplished, the necessity for definitely setting at rest the question may be held to justify the expenditure necessary to subsidise private persons in boring with this end in view. At the date of my visit to the Irwin and the Lockier Rivers, boring operations had been carried on in two localities about eight miles apart. Neither boring plants, which I understand are the property of the Government, were at work at the time of my inspection. That on the Irwin River, at Depôt Hill Reserve 2360, had evidently been idle for some time, and was left without anyone in charge.

"The Work at the Depôt Hill site consisted of sinking a well, and boring from the bottom thereof to a depth of 160 feet from the surface. The well was inaccessible to me, but I am credibly informed that the section exposed therein is as follows, in descending order:—

Nature of Strata.	Thickness in feet.	Depth.
Sandstone	65	...
Shale	6	65
Sandstone	89	71
	160	160

"At the Mingenew site, adjacent to the railway line, near the northern boundary of the Eyeregulla Reserve 2324, the total depth attained was said to be 400 feet. The following is a copy of the bore journal supplied to me by the manager, Mr. W. T. Atkinson:—

Nature of Strata as designated by the Manager.	Thickness in feet and inches.		Depth.	
	ft.	in.	ft.	in.
Surface subsoil, etc.	5	0	...	
Ferruginous sandstone (crystalline)	16	0	5	0
Indurated argillaceous sandstone	7	0	21	0
Same strata, less calcareous	43	4	28	0
Similar strata	29	6	71	4
Hard grey sandstone	14	0	100	10
Very hard ferruginous sandstone	3	6	114	10
Clay shale with thin sandstone partings	20	0	118	4
Sandstone, not very hard	15	0	138	4
Clays and sandstones	25	0	153	4
Soapstone (white clay shale, A.G.M.)	5	0	178	4
Clays and sandstone	21	6	183	4
Similar with thin, hard 5in. bands	15	0	204	10
Clay shales and sandstones	56	9	219	10
Indurated clay shales and sandstones	27	4	276	7
Stealite (white clay shale, A.G.M.)	41	6	303	11
Dark shales and coal threads	14	5	345	5
Dark shales	4	10	359	10
Very dark shales	10	7	364	8
Coal seam (bored one foot)	...		...	

"No complete cores having been kept, I have been unable to personally verify the above record. There is, however, no reason to doubt the authenticity of the data supplied to me.

"Boring operations have since been recommenced, and a case of the cores sent shows that at a depth of 410 feet white clay shale was met with; between 422 and 436 feet grey shales were passed through; and at 460 to 474 feet grey sandy clay shales were pierced.

"Owing to there being little or nothing to be seen in the vicinity of Depôt Hill, or the site near Eyeregulla, it became necessary for me to make a traverse of both the Lockier and the Irwin Rivers, with the view of gaining an acquaintance with the stratigraphy of the field from personal observation.

"As a result of my inspection, it appears that the area of the field, as shown by the latest geological map, dated 1896, will require some considerable modification, in that the crystalline rocks of

Mount Scratch extend practically to the Lockier River. This reduces the possible area of the coalfield. In view of this, no attempt was made to define the area of these crystalline rocks, but rather to gain such knowledge of the field as would throw light upon the question connected with the applications for State aid. It may be well to remark here that, when a favourable opportunity offers, the field should be re-examined, and its geological limits accurately defined.

"The north-western boundary of the field is marked by a fault, which throws the beds against the crystalline rocks. In the vicinity of the fault the strata have been thrown into a series of gentle folds but the whole series has a prevailing dip to the eastward. To the west the beds dip at a slight angle, towards the sea, in such a way that the coal seams of the Upper Irwin should, if continuous, pass beneath the mesozoic rocks of Mingenew and Depôt Hill.

"The situation of the Depôt Hill and the Mingenew sites is equally favourable, in a geological sense, for boring. It therefore becomes a question to consider which of the two sites should be selected for the purpose of State aid. The Depôt Hill bore is some distance from the railway line, and up to the date of my visit very little work had been done, only 160 odd feet having been bored; whereas the Mingenew site lies alongside the railway line, and over 400 feet of boring has been carried out, and work is still going on.

"It seems that the conditions in favour of the Mingenew site are immeasurably greater than those at Depôt Hill. On these grounds, I am of opinion that, if the Government is satisfied that boring in such a locality would advance the future interests of the State, and not those of a private corporation, the Mingenew site be subsidised to the extent of £ for £ from a depth of 500 feet, to enable the bore to be carried down to a depth of 1,000 feet. If the indications so warrant, the question of further State aid could be considered when that depth is reached.

"It should be specially noted in this connection that both the boring plants at present on the Irwin field are the property of the State.

"The importance of keeping a careful record of the strata and a full suite of samples, properly marked, should be specially emphasised in all cases where the State grants aid for boring purposes."

On the 22nd of May the following further report was submitted:—

"Since the date of my report of the 21st of February last, boring operations have been carried out by the manager of the Irwin River Coal Prospecting Syndicate; and, according to the information supplied, the bore had attained a depth of 913 feet 6 inches on the 11th of May. At a depth of 905 feet 10 inches the manager reports a hard and strong coal seam of six feet two inches, resting upon a seat of clay of one foot in thickness.

"The following report upon the quality of the coal has been submitted to me by Mr. Simpson:—

"'The following is the analysis of the sample of coal forwarded with the Mingenew cores and submitted by you for report:—

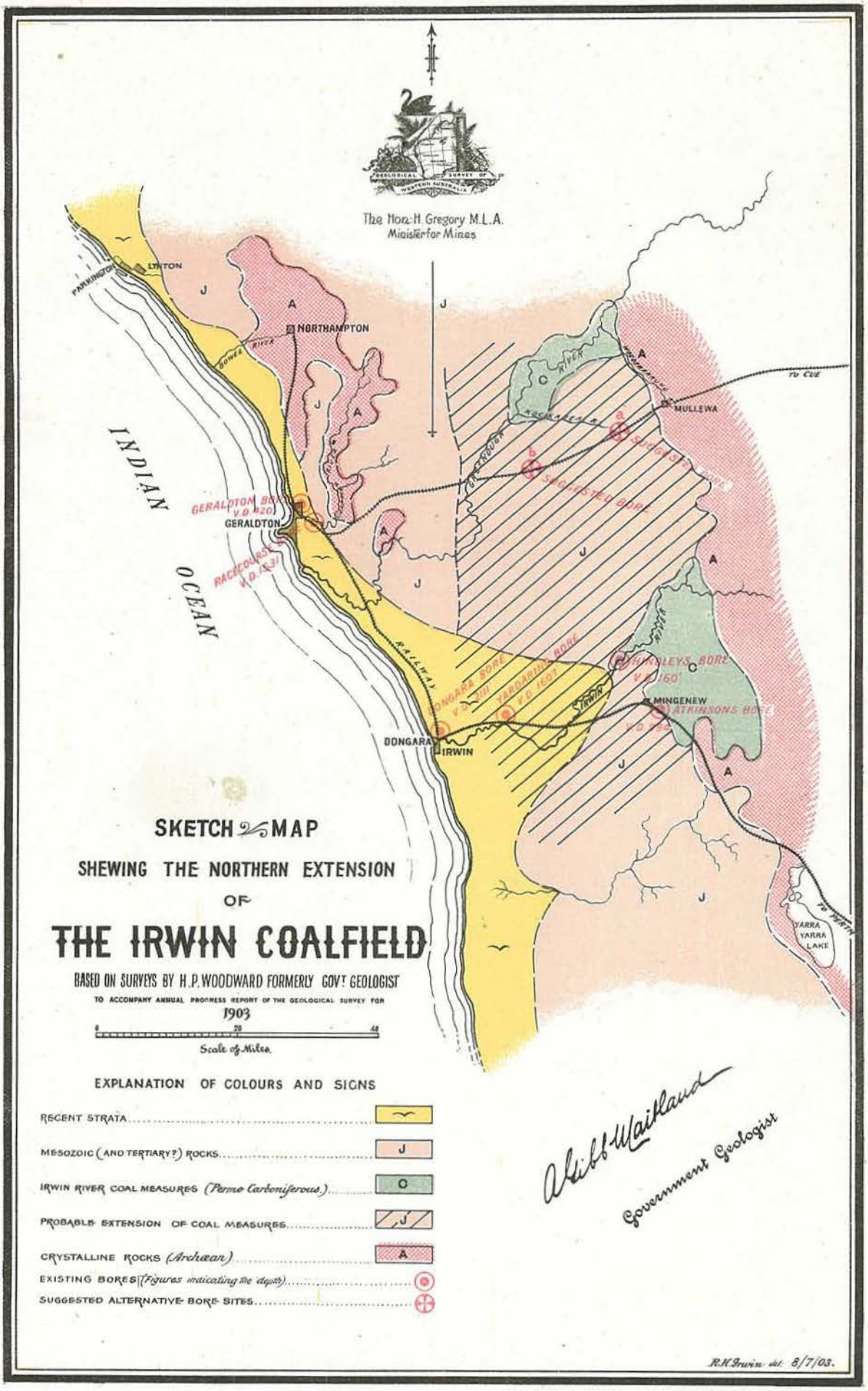
Specific Gravity	1·410
Calorific Value:—	
Pounds of Steam Evaporated	12·38
British Thermal Units	11,959
Proximate Composition:—	
Moisture	2·66
Volatile Hydrocarbons	29·68
Fixed Carbon	52·92
Ash	14·74
	100·00

"The greater part of the sample submitted is a clean, hard, bright bituminous coal, with which are associated a few small duller pieces, which may perhaps represent 'stone' partings in the seam, and to which the comparatively high percentage of ash may be due. The coal is of the caking variety, yielding a dense, hard coke of good quality. The percentage of moisture is low, being about the same as that of Newcastle coal. The ash, though high, does not clinker readily; the coal, in this respect as in many others, resembling the N.S.W. Southern District coal.

"In heating capacity this sample is superior to the best Collie coal, and about 16 per cent. better than the average of 23 samples from the Collie Coalfield, quoted in Bulletin No. 6 of this Department. In this respect it is about 10 per cent. less efficient than good Newcastle coal.

"This coal appears well-suited for all ordinary purposes, including coke-making, gas-making, and steam-raising in either stationary, marine, or locomotive boilers.

"On the 13th of May the company asked for a further subsidy, in order to test the country beneath the present seam. In paragraph nine of my first report the conditions under which a subsidy should be granted to this company were fully set out; it was further pointed out that when the depth of 1,000 feet had been attained the question of further State aid could be considered, if the indication so warranted.



SKETCH MAP

SHEWING THE NORTHERN EXTENSION OF

THE IRWIN COALFIELD

BASED ON SURVEYS BY H.P. WOODWARD FORMERLY GOVT GEOLOGIST

TO ACCOMPANY ANNUAL PROGRESS REPORT OF THE GEOLOGICAL SURVEY FOR 1903

0 20 40

Scale of Miles.

EXPLANATION OF COLOURS AND SIGNS

- RECENT STRATA
- MESOZOIC (AND TERTIARY?) ROCKS — J
- IRWIN RIVER COAL MEASURES (Permo Carboniferous) — C
- PROBABLE EXTENSION OF COAL MEASURES — J
- CRYSTALLINE ROCKS (Archæan) — A
- EXISTING BORES (Figures indicating the depth)
- SUGGESTED ALTERNATIVE BORE SITES

Alfred Maitland

Government Geologist

R.H. Irwin del. 8/7/03.

H. J. Pether, Government Photolithographer, Perth, W. A.

"The section exposed in the Upper Irwin shows two coal seams about 60 feet apart. If the seam described in the bore journal be the same as the topmost bed outcropping, then the lower seam, which is four feet thick, should very soon be met with.

"The company having already reported a good workable seam, at a comparatively shallow depth, alongside an existing railway line, it does not appear that much further State assistance is necessary.

"At the same time, I am of opinion that if the Government receive satisfactory assurances that any further State aid is devoted to deepening the present bore, so as to enable the strata lying beneath the seam reported to be thoroughly tested, assistance might very reasonably be granted. This assistance might be granted on the basis of either—(*a*) an increased rate per foot below the depth of 1,000 feet, or (*b*) a subsidy on the total depth from the surface at the rate of £ for £ on the actual cost of boring, as set forth in the agreement already entered into between yourself and the company.

"In the event of this latter method being adopted it would be advisable to pay only the amount as set forth in the present agreement, and the balance due on the cost of boring down to a depth of 631 feet on the completion of the boring operations below 1,000 feet.

"Before any payment is made under the present agreement, I purpose despatching an officer to personally certify to the depth of the bore-hole."

The following is a section of the strata pierced by this bore, as compiled from the manager's reports and the samples submitted to this office:—

Description of Strata.	Thickness of Strata.			
	Ft.	in.	Ft.	in.
Surface soil and soft sandstones	...		28	0
Soft sandstones and grey sandy clay shales	28	0	118	0
Clay shales	118	0	178	0
Clay shales	178	0	244	6
Soft sandstone and grey sandy clay shales	244	6	328	7
White and grey clay shales	328	7	370	1
Clay shales, with bands of soft sandstone	370	1	400	1
Clay shales, with bands of soft sandstone	400	1	418	10
Grey clay shales, with bands of soft sandstone and nodules of pyrites ...	418	10	587	0
Soft shales and sandstones	587	0	612	11
Hard band of sandstone	612	11	613	1⅓
Soft shales and sandstone	613	1⅓	621	0½
Dark shales and sandstones, with small coal	621	0½	675	8½
Dark clay shales and sandstone and sandy shales with small coal ...	675	8½	694	2
Hard band of sandstone	694	2	694	3⅓
Yellow clay shales and sandstones	694	3½	725	7½
Coaly shales and bands of sandstone	725	7½	752	1⅓
Ferruginous sandstones	752	1⅓	761	5½
Hard band of sandstone	761	5½	761	9⅓
Clay shales	761	9½	771	5⅓
Coal seam	771	5½	771	8⅓
Dark shales...	771	8½	775	11⅓
Grey sandstone	775	11½	784	6½
Dark coaly shales	784	6½	790	10⅓
Grey sandstone and dark shales...	790	10½	807	4½
Hard band ferruginous sandstone (wore out seven settings)	807	4⅓	807	11⅓
Yellow clay	807	11½	808	5½
Grey sandstone and shales	808	5½	859	7½
Dark shales and sandstones	859	7½	869	7½
Hard band sandstone	869	7½	869	9½
Fairly hard sandstone	869	9½	875	7½
Hard ferruginous sandstone	875	7½	876	1½
Sandstone and shales	876	1½	885	1½
Sandstone and shales, fairly hard	885	1½	887	6½
Coal	887	6½	887	8½
Sandstones and shales	887	8½	900	1½
Grey sandstone	900	1½	905	3½
Hard coal	905	3½	911	5½
Fire clay	911	5½	912	5⅓
Sandstone	912	5½	912	11½

Mr. E. S. Simpson, accompanied by an officer of the Works Department, Mr. Wilde, visited Mingenew in the month of June, and on the 22nd June a report was received from the former officer,* from which it appeared that—

(*a*.) A further confirmation has been found of the reduction of the geological area of the Coalfield alluded to above;

(*b*.) The actual measured depth of the subsidised bore hole did not agree with that reported by the manager, and

(*c*.) That there were grave doubts as to whether the coal reported to the Government, and samples of which were supplied to this office, actually came out of the seam reported as being met with in the bore hole.

Owing to the bad condition of the bore hole, Messrs. Simpson and Wilde failed to recover any samples of coal or other strata from the Mingenew Bore hole, and it was eventually decided to start operations afresh at a site a few feet away.

* It has not been deemed necessary to print the report *in extenso*.—A. G. M.

The following are the particulars of the strata pierced in this bore hole No. 2:—

Description of Strata.	Depth from which sample was taken in feet.
Grey clay shale	78
Grey clay shale	126
Hard sandstone	130
White clay shale	207
Fine grey clay shale	228
Fine grey clay shale	290
Grey clay shale	380
Fine white clay shale	386
Hard sandstone	390
Fine white clay shale	400
Hard coarse sandstone	420
Fine white clay shale	435
Grey clay shale	500
Grey clay shale	548
Grey clay shale	578
Grey sandy shale	640
Grey clay shale	675
Grey clay shale	700
Grey clay shale, with undeterminable plant remains...	736

A series of fossils were obtained by Mr. Simpson from a bed of ferruginous sandstone forming the northern end of a low ridge, about a mile East of Mingenew Station, and not far distant from the site of the bore hole.

The fossils were submitted for identification to Mr. R. Etheridge, jun., who reports that "on the whole the aspect of these fossils is decided by that of the permo-carboniferous of New South Wales.

The following is a list of the fossils, as determined by Mr. Etheridge:—

Dielasma nobilis, *sp. nov.*
Spirifera, *sp. ind.*
Cyrtina carbonaria, *uar*, Australasica, *Eth. fil.*
Cleiothyris Macleayana, *Eth. fil.*
Productus subquadratus (Morris), *Eth. fil.*
Chonetes, *sp. ind.*
Aviculopecten subquinquelineatus, *McCoy.*
Modiola (?) *sp. ind.*
Myalina (?) Mingenewensis, *sp. nov.*

A request having been made for an examination of the Greenough River to ascertain the extent of the Coal Measures in that direction, it was reported that the geological evidence bearing upon the probable extent and nature of the Carboniferous Rocks of the Irwin River Series was far from complete, and that a good deal had already been done by the State in testing the seaward extention of the strata by bores at Dongara and Yandarino, but that owing to unforeseen circumstances, operations in both places were stopped before the base of the series had been unequivocally reached, and I submitted the following report on the 8th of July:—

"As may be seen by an inspection of the geological sketch map, herewith, the Irwin River beds extend northwards, beneath the cover of Mesozoic Strata, and come to the surface in the valley of the Greenough River, beween Kockatea and Wooderarrung Creeks. This map shows (*a*) the area over which the Irwin River beds have been proved to extend; (*b*) their probable extent below the surface; and (*c*) the site and depths of the various bores which have been put down in the district, by which means the whole situation may be grasped at a glance.

"The railway line from Geraldton to Mullewa thus traverses a portion of the area, beneath which there are strong geological grounds for believing the Irwin River beds lie at relatively shallow depth.

"As the discovery of commercial coals along any portion of the Murchison Railway line would be of the utmost public importance, I am of opinion that the necessity of definitely setting this question at rest may be held to justify the expenditure necessary to carry out experimental boring operations in the vicinity of the Northern Area.

"Our present knowledge of the geological features of the district is not sufficiently detailed (as it is desirable in the interests of the State it should be) to definitely fix any stratigraphical horizon, which would serve as a guide, and in the absence of such datum, any site selected for preliminary experimental boring must largely be governed by considerations of water supply and the like.

"Having this in view, I would suggest that if the Government wish to definitely solve the problem, operations be started on any convenient Crown lands, between Mullewa and the Greenough River, where an adequate water supply is available. For this purpose, I would suggest either (*a*) Reserve 945, Walya Wells, at the head of Kockatea Creek, or (*b*) Reserve 1017 near the 47-mile peg.

"It is desirable that arrangements be made to bore to a vertical depth of 1,000 feet, with the proviso that such a plant be used as will bring up a solid core, and capable of penetrating to a depth of from 2,000 to 3,000 feet, should the exigencies of the situation so demand. In the event of the bore piercing the coal measures, I cannot too strongly impress upon the Government the necessity for continuing the bore until the base of the formation has been unequivocally reached.

"Our present knowledge of the district has proved that considerable modification of the area occupied by the Irwin River beds, as shown in the existing maps, is necessary. The work at present in hand, by all the available members of the field staff, renders it impossible for the stratigraphy of the Irwin River field and its extensions to be worked out as the interest of the State demands, at the present time. It is proposed, however, to undertake this work at the earliest possible opportunity."

Cue Boring.—In the Annual Report of the previous year reference was made to the question of boring for reefs at Cue.*

Three bores were put down with the object of proving the Volunteer Group of leases at considerable depths.

The following are the particulars of the rocks, etc., pierced in the respective bore holes:—

No. 1 Bore.

Depths from which Samples were taken.				Description of Strata.
Ft.	in.	Ft.	in.	
208	0	224	0	Quartz diorite
224	0	397	0	Hornblende granite
397	0	400	0	Hornblende schist, with a little quartz
400	0	417	0	Hornblende granite
417	0	424	0	Chlorite schist
424	0	427	0	Altered amphibolite
427	0	446	0	Altered amphibolite
446	0	447	0	Talc schist, with veins of quartz
447	0	460	0	Hornblende granite
460	0	468	0	Highly altered amphibolite (?) and quartz
468	0	485	0	Foliated granite
485	0	486	0	Quartz (no core sent)
486	0	490	6	Amphibolite
490	6	504	0	Hornblende granite
504	0	506	6	Chlorite schist
506	6	534	6	Hornblende granite
534	6	535	0	Chlorite schist and hornblende granite, showing junction
535	0	571	0	Hornblende granite
571	0	575	0	Hornblende granite and chlorite schist
575	0	597	0	Coarse hornblende granite
597	0	602	0	Fine-grained and much altered hornblende granite
602	0	614	0	Coarse hornblende granite
614	0	626	0	Chloritic schist (foliated granite)
626	0	656	0	Coarse hornblende granite
656	0	660	0	Fine-grained and much altered hornblende granite
660	0	660	9	Quartz
660	9	690	0	Fine-grained and much altered hornblende granite
690	0	714	0	Coarse hornblende granite
714	0	736	0	Quartz felspar porphyry
736	0	738	0	Coarse hornblende granite
738	0	754	0	Fine-grained and much altered hornblende granite
754	0	760	0	Hornblende granite, somewhat foliated
760	0	761	3	Lode. Crushed sample forwarded by Mr. Cape, assayed 5ozs. 18dwts. 16grs. per ton. An assay of pieces of core marked A to 1 gave the result of 7dwts. 2grs. per ton
761	3	807	0	Coarse hornblende granite
807	0	809	0	Do. do. with pyrites
809	0	822	0	Do. do. without pyrites
822	0	832	0	Fine-grained and much altered hornblende granite
832	0	881	0	Coarse hornblende granite
881	0	882	6	Fine-grained and much altered hornblende granite
882	6	917	0	Coarse hornblende granite
917	0	920	0	Fine-grained and much altered hornblende granite
920	0	922	0	Coarse hornblende granite
922	0	928	0	Fine-grained and much altered hornblende granite
928	0	960	0	Coarse hornblende granite
960	0	966	0	Chloritic schist (foliated granite)

No. 2. Bore.

Ft.	in.	Ft.	in.	
0	0	194	0	Decomposed hornblende granite
194	0	194	1	Quartz leader. Gold, 4dwts. 22grs. per ton
194	1	204	0	Decomposed fine-grained rock, either diorite or crushed granite
204	0	204	1	Quartz leader. Gold, trace
204	1	210	0	Decomposed hornblende granite
210	0	214	0	Fine-grained much altered hornblende granite
214	0	256	0	Hornblende granite, somewhat decomposed
256	0	257	0	Fine-grained much altered hornblende granite
257	0	267	0	Hornblende granite
267	0	267	7	Pyritous chlorite schist. Approx. dip 75 degress to West. Gold, 20grs. per ton
267	7	268	0	Quartz reef. Actual width, four inches. Dip (approx.) 75 degrees to West. Gold, trace
268	0	314	0	Hornblende granite
314	0	343	0	Granite
343	0	364	0	Do.
364	0	372	0	Do.

* Annual Progress Report of the Geological Survey for the Year 1902. Perth: By Authority, 1903, pp. 15-16.

Depths from which Samples were taken.				Description of Strata.
				No. 2 Bore—*continued.*
Ft.	in.	Ft.	in.	
372	0	400	0	Hornblende granite
400	0	401	0	Chlorite schist, with small veins of quartz. Top six inches assay, trace of gold; bottom six inches assay, 20grs. of gold per ton
401	0	404	0	Altered hornblende granite
404	0	408	0	(No core)
408	0	510	0	Hornblende granite
510	0	511	0	Pyritous chloride schist. Top four inches assay, trace of gold
511	0	549	0	Hornblende granite. Sample from 549 feet assay, a trace of gold.
				No. 3 Bore.
Ft.	in.	Ft.	in.	
172	0	184	0	Coarse granite
184	0	196	0	Do.
				Aplite
				Foliated granite
196	0	206	0	Do.
				Coarse granite
				Fine granite
206	0	217	5	Do.
				Coarse granite
217	5	222	0	Do.
222	0	235	0	Do.
				Fine granite, much altered
235	0	245	0	Crushed and foliated granite
				Coarse granite
245	0	257	0	Do.
257	0	263	0	Do.
				Fine granite
263	0	268	0	Coarse granite
268	0	273	0	Do.
				Fine granite
273	0	286	0	Do.
286	0	340	0	(No core)
340	0	341	9	Fine granite
341	9	352	0	(No core)
352	0	353	0	Coarse granite
353	0	354	0	Fine granite, with pyrites. Gold, trace
354	0	389	0	(No core)
389	0	390	0	Fine granite, with pyrites. Gold, trace
390	0	391	0	Coarse granite
391	0	438	0	(No core)
438	0	441	0	Fine granite
				Coarse granite
				Chlorite schist, with pyrites. Gold, trace
441	0	470	0	(No core)
470	0	471	0	Quartz leaders, with pyrites and copper pyrites
				Chlorite schist
471	0	477	0	(No core)
477	0	480	0	Coarse granite
				Fine granite, with pyrites
480	0	509	0	(No core)
509	0	510	0	Coarse granite
510	0	512	0	(No core)
512	0	513	3	Coarse granite, with veins of pegmatite. Gold, trace
513	3	515	0	(No core)
515	0	518	0	Coarse granite, with veins of pegmatite. Gold, trace
518	0	545	3	Coarse granite
545	3	546	7	Granite, with veins of pegmatite
546	7	555	6	Coarse granite
555	6	556	3	Coarse granite, with small veins of quartz
556	3	566	0	Coarse granite
566	0	568	4	Chlorite schist
568	4	569	0	Coarse granite
569	0	574	4	Chlorite schist
570	4	623	0	Coarse granite
623	0	624	6	Coarse granite, with small veins of quartz
624	6	630	0	Granite
630	0	630	1	Crushed granite, with copper pyrites
630	1	640	0	Coarse granite
640	0	644	0	Crushed granite, with a trace of gold
644	0	680	6	Coarse granite
680	6	680	10	Coarse granite, with small veins of quartz
680	10	684	0	Coarse granite
684	0	684	3	Coarse granite, with small veins of quartz
684	3	690	3	Coarse granite
690	3	693	2	Chlorite schist
693	2	728	9	Coarse granite
728	9	740	0	Chlorite schist, with pyrites; no gold
740	0	762	8	Coarse granite

State Battery, 20-mile Sandy Creek, Nullagine.—The following report upon a proposal to establish a State Crushing Plant in the Nullagine District was prepared and submitted:

In accordance with your instructions, I devoted special attention to the question of a State battery at the 20-mile Sandy Creek, which lies between Mosquito and Nullagine.

The 20-mile Sandy district is embraced within a mineral belt which extends from Mosquito to Nullagine for a distance, as shown by the official maps L 76, 77, of about 24 miles.

It is unnecessary in a report of this nature to go into any minute details as to each individual mine; suffice to say that, along the whole distance between the two localities, numerous quartz reefs outcrop over a belt of about a couple of miles or so in width. Many of these reefs have been opened up at one time or another and worked. An examination of such of the mines as were open to inspection demonstrated that the deposits gave every promise of being permanent, though they naturally vary in their dimensions and richness in different portions.

According to the official figures, it appears that the country between Mosquito and Castle Creeks has yielded gold to the extent of 19,157·41ozs., which has been extracted from 8,872·24 tons of quartz, being at the average rate of 2·16ozs. per ton. From these figures it will be seen that some high-grade ore has been raised, though it must be remembered that, under the conditions prevailing, only rich ore could be mined at a profit. Of the 57 * crushings recorded from the district lying between the two localities, it appears that seven yielded under 1oz. of gold per ton, 24 up to 2ozs., 11 up to 3ozs., eight up to 4ozs., and the remaining seven fluctuated between 5ozs. and 9ozs.

The present crushing facilities in the district in question comprise the Barton Mill at Middle Creek; the Parnell Battery (owned by the Bell Exploration Company) at Mosquito, and the Royer's Public Crushing Battery on M.A. 6, Mosquito Creek. What is known as the Lady Ray Battery was originally erected on M.L. 5 at the 20-mile Sandy, and crushed for the public during the years 1900 and 1901. This battery was subsequently removed, and is now stored at the Barton, and may possibly be erected in conjunction with the present mill if the development at the mine so warrant.

The Barton Battery at Middle Creek is available for public crushing at the following rates:— For parcels up to 20 tons, 35s. per ton, and 30s. per ton for anything over that.

It appears that up to the end of November, 1903, the stone crushed for the public amounted to 1,693·71 tons, yielding 5,940·40ozs. of gold, whilst up to the end of October, 1903, 1,669·65 tons of stone from the company's own property were also crushed, and yielded 2,194·70ozs. of gold. These latter figures do not, however, represent the total yield of the Barton mine, the first crushing having been recorded in 1898.

Table showing (a.) the Public; and (b.) the Private stone crushed at the Barton Battery during the Years 1901, 1902, and 1903.

Year.	Public.		Private.	
	Ore crushed.	Gold therefrom.	Ore crushed.	Gold therefrom.
	Tons.	Ozs.	Tons.	Ozs.
1901	335·95	572·30	356·65	373·10
1902	772·10	2,670·02	622·00	876·60
1903	*n* 585·66	2,698·07	*o* 691·00	945·00
	1,693·71	**5,940·40**	**1,669·65**	**2,194·70**

n Up to November. *o* Up to October.

These figures demonstrate that for the last three years the public stone crushed at the Barton mill practically equalled that from the company's own lease, or, roughly, about 50 tons per month.

The Lady Ray Battery, originally located on M.L. 5, at 20-mile Sandy Creek, crushed for the public during 1900 and 1901 647·85 tons of stone, which yielded 981·54ozs. of gold, as shown in the following table:—

Year.	Ore Crushed.	Gold therefrom.
	Tons.	Ozs.
1900	339·00	490·80
1901	308·85	490·74
	647·85	**981·54**

This table demonstrates that the public stone crushed, during the two years the battery was located there, amounted to about 27 tons per month.

* Taking the annual return from each mine or claim as representing one crushing.—A.G.M.

The Royer's Public Crushing Battery, located on M.A. 6, Mosquito Creek, treated, since it was erected in 1900, 1,893·10 tons of stone, which yielded 2,928·95ozs. of gold, as shown in the following table:—

Year.	Ore Crushed.	Gold therefrom.
	Tons.	Ozs.
1900	355·25	533·25
1901	964·95	1,373·55
1902	572·90	1,022·15
1903	*nil*	*nil*
	1,893·10	**2,928·95**

Or, roughly, about 52 tons per month.

I have no knowledge of the rates charged for crushing at either of these batteries.

At the Parnell Battery, owned by the Bell Exploration Company and situated at Mosquito Creek, during the year 1903 the official statistics show that 120·50 tons of public stone were treated, and yielded 221·45ozs. of gold, or, roughly, about 10 tons per month.*

Under an agreement recently entered into with the Government, the owners of the battery have received State aid in consideration of the mill being available for public crushing during a stipulated number of days per month at the following rates (which have already been made public), viz.:—For less than and not exceeding five tons, 40s. per ton; up to and not exceeding 10 tons, 35s. per ton; up to and not exceeding 50 tons, 30s. per ton; and for anything over 50 tons, 25s. per ton.

This rate is the lowest in the district at the present time for parcels over 50 tons. It is possible the effect of this agreement will be for the owners of the other batteries to adopt a similar scale of charges, in which case there would be a tendency for any of the available public stone being sent to either of these two mills.

On the other hand, the supplementary petition signed by the prospectors and leaseholders of the district, recently submitted, shows (and there seems to be no valid reason for questioning the *bona fides* of the signatories) that practically all the stone raised will be sent to the State mill if one is erected.

As gauging the quantity of stone likely to be available, the figures above mentioned show that the public stone crushed in the district amounted on the average to about 50 tons per month. On the other hand there is no question that, could crushing be carried out at lower rates than those at present prevailing, stone that must under present conditions be left would be raised and milled, for a few shillings less for crushing and carting makes all the difference between profit and loss.

It has already been pointed out that, so far as my observations of the district have gone, the statement that the petitioners would guarantee 150 tons of stone per week is rather over the mark. At the date of my visit to the district the quantity of stone awaiting crushing was under 1,000 tons.

It was pointed out by a deputation, consisting of representatives from the prospectors and leaseholders, which waited upon me by request at 20-mile Sandy, that all the gold in the stone treated at the private crushing plants was not recovered, and that this was a considerable loss to them. Upon this point I am not in a position (for obvious reasons) to throw any other light than to merely draw attention to the returns obtained at the Lambert's Treatment Works, M.A. 41, where certain tailings from the district have been cyanided:—

Lambert's Treatment Works, M.A. 41.

	Tons.	Ozs.
1902	1,960	1,259·05
1903 (up to October)	840	379·45
	2,800	**1,638·50**

Owing to the way in which the returns are furnished, it has not been possible to separate the yield of the tailings from each centre. These data, so far as they go, show conclusively that the statement regarding the loss of some of the gold is based upon reasonable grounds.

In the event of (*a.*) a State Battery being erected, it would probably be as well to have a suitable cyanide plant, or (*b.*) a crushing subsidy being paid to any existing mill; the erection of a cyanide plant should be stipulated, or else an allowance (based upon an assay value) being paid for the tailings.

I satisfied myself, by personal observation, that timber suitable for firewood was to be obtained in the 20-mile Sandy Creek, both above and below the crossing of the Nullagine and Mosquito Roads.

The question of the actual quantity of water available in the water shaft on the site of the old Lady Ray Battery at Sandy Creek can readily be ascertained by the local officer in charge of the Mines Water Supply.

* On the 16th November, the books of the mine showed that, during the 12 months, six parcels of public stone, amounting in all to 195·95 tons, were treated. The following figures give the details of the crushings in tons:—20·45, 9·05, 4·80, 17·20, 36·00, and 108·45. The discrepancy between the two sets of figures may, in all probability, be due to the fact that the full list of crushings has not yet been furnished to the Department.—A.G.M.

Reviewing the whole situation, it may be said that at the present time:—

(*a.*) There are three batteries crushing for the public, though one of these, owing to its situation, is not available unless after rains.

(*b.*) One of the three mills has received a subsidy, contingent upon crushing for the public at scheduled rates during a certain number of days per week; but the majority of lessees and prospectors have given a guarantee to the Government that all the stone will be sent to a Government mill if erected at 20-mile Sandy, and it is possible, if the mine upon which the other is situated opens up well, that the other mill will be fully employed on its own stone.

(*c.*) There are plenty of reefs in the district, many of which would be opened up if cheaper crushing than at present obtains is available.

As to the possibility of the battery paying its expenses, it is doubtful if such would be the case for some time at any rate; in this regard, it may possibly be held that any loss thereon might be counterbalanced by the impetus which the erection of a properly equipped State mill would tend to give towards the much needed development of the district. The consideration of the minimum rate at which it would be possible to crush in the hope of paying working expenses, etc., is a matter which comes within the province of the Superintendent of Public Batteries, and is one upon which I am not in a position to offer any opinion.

State Aid for Shaft Sinking at the Barton Mine, Nullagine.—The following reports on an application for a loan for shaft sinking at the Barton mine, Nullagine District, were submitted:—

"Messrs. Doherty, Jenkins, & Co. apply for a loan of £1,000 to sink a new main shaft for the purpose of testing the Barton Reef at a depth; though I am not aware whether the application has been made in the form required by Clause 6 of "The Mining Development Act, 1902." The request of the applicants may either be dealt with under Part 2 (Pioneer Mining) or the section (*c.*) Clause 27 of Part 6.

The Reef.—The Barton Reef is strong and well defined, and enters the property on the southern boundary of the lease at about 100 feet from the south-west corner, and continues without interruption to the northern boundary of the lease, and having a proved outcrop of at least 1,250 feet.

The reef has been opened up by six shafts put down along the outcrop of the reef. In addition to this, the reef is intersected in the water shaft (distant 58 feet from C) at about 120 feet from the surface.

Shaft A, which was inaccessible, has been carried down on the reef to a depth of 15 feet; at the foot of the shaft, I am credibly informed that the reef attained a thickness of six feet.

Shaft B was likewise inaccessible, and attained a depth of 30 feet.

Shaft C had been carried down on the reef to a depth of 65 feet, but, beyond sinking the shaft, nothing appeared to have been done. At the foot of the shaft the reef measures about four feet from wall to wall, and, from the information supplied to me by the manager, it does not appear to be payable at the bottom. Down to about 53 feet the stone is stated to have been payable. It is contemplated continuing this shaft by following the reef down to the depth at which it is met with in the watershaft, viz., 120 feet.

Shaft D had, at the date of my visit, been carried down to a depth of 40 feet. At the foot of the shaft a drive had been put in for a distance of 35 feet northwards, and the stone stoped out to about 10 feet from the surface. Southwards from the shaft the drive had been continued for a distance of 40 feet, along a reef which varied from seven to eight feet; from this level the stone has been stoped out to within 10 feet of the outcrop.

Shaft E attains a depth of 110 feet, and has been carried down on the reef, the underlay of which is about 65 degrees to the South-East. At a depth of 60 feet, levels have been opened up to the north and south for distances of 40 and 80 feet respectively. In the Northern drive, 40 feet from the shaft, a winze has been carried down to the 110 feet level. The reef is represented by a schistose formation, intersected by several quartz veins. The reef has been stoped out for a distance of 40 feet along this drive to a point about 20 feet from the mouth of the shaft. The southern drive has been carried for a distance of 80 feet from the main shaft, and at 39 feet therefrom it intersects shaft F, which is 60 feet deep. The maximum thickness of stone in this drive is eight feet eight inches. The whole of the stone in this drive has been stoped out to within three feet of the outcrop. The main shaft has been continued from the 80 feet level down to 110 feet, from which point a level has been driven 95 feet to the north. The reef at the foot of the shaft, as showing on the south side, is four feet thick, and at the face of the drive it has dwindled to twelve inches. No work has been done at this level.

As shown by the official figures, the yield of the Barton Reef has been as follows:—

Year.	Ore crushed.	Gold therefrom.	Rate per ton.
	Tons.	Ozs.	Ozs.
1898	56·00	88·50	1·58
1899	30·00	18·30	·61
1900	144·00	204·20	1·41
1901	356·65	373·10	1·04
1902	622·00	876·60	1·40
1903 *	706·00	745·00	1·05
Total	**1,914·65**	**2,505·70**	**1·31**

* Up to October.

In addition to what may be called the Barton Main Reef, there are two other parallel reefs on the property, as shown on the plan attached.* No work of any importance has been done upon either of these reefs.

It is proposed to sink a new shaft somewhere about the position shown on the plan,† and to do this State aid is sought.

The new operations are of the nature of pioneer mining, as defined by the Mining Development Act. So far as may be judged by a careful examination of the reef itself, coupled with a knowledge of the mineral belt or zone in which it lies, there is every reason to regard the reef as being permanent, and as far as can be foreseen, there is a reasonable probability of the proposed operations proving remunerative. On the grounds that the sinking of a deep shaft on what may be called the Mosquito and Nullagine mineral belt would test the country at a much greater depth than has hitherto been done, and, if successful, would tend to encourage deeper sinking elsewhere along the belt, I am of opinion that the application for assistance should be favourably considered."

A proposal having been made to modify the original application for assistance, I reported :—

"In advising that the application of Messrs. Doherty and Jenkins should be favourably entertained, it was done on the grounds that the sinking of a deep shaft on the property would test the country at a greater depth than has hitherto been attained, and, if successful, would tend to encourage deeper sinking elsewhere along the mineral zone, in which the Barton Reef lies. The same object would be obtained by sinking the water shaft a further distance of 250 feet, but as the Barton Reef is intersected at 120 feet, it would be necessary to crosscut south-east for a distance of about 120 feet before the reef would be struck, if it maintained a uniform underlie, as shown in the diagram. There are, unfortunately, no definite data as to the trend of the ore chutes in the Barton, for a knowledge of the behaviour of these is of even greater importance than that of the reef itself; but, so far as any available information goes and probabilities can be foreseen, I incline to the opinion that the sinking of the shaft originally proposed affords greater possibilities of being remunerative, and thus renders the chances of the Department recovering the loan from work actually carried out greater.

At the same time, I do not think there is any real, valid reason for advising that the modified proposal be refused, for there is a possibility of payable chutes being met with in what may be called the water shaft extension of the Barton Reef."

Miscellaneous Mineral Notes.

During the year a good deal of material passed through the hands of Mr. Simpson, in the Survey Laboratory. The following are notes by the Mineralogist and Assayer with regard to several interesting specimens examined during the year, and are placed on record in this place.

Platinum and Osmiridium.—A small sample of very fine, yellow sand was forwarded through the Under Secretary for Mines by a Mr. M. Conlon, of Kojonup, with the information that it was obtained from concentrating river sands on the Donnelly River. On examination this was found to consist almost wholly of cassiterite (oxide of tin), monazite, zircon, platinum, and osmiridium. Two different samples were assayed with the following results:—

Geological Survey Laboratory Number.	4444.	4480.
Tin	65 per cent.	?
Platinum	244·35 ozs. per ton	291·05 ozs. per ton
Osmiridium	30·20 „ „	54·90 „ „
Gold	18·47 „ „	34·65 „ „

Though efforts have been made to locate the origin of this sand, up to the present they have been without success, none of the samples sent in by various prospectors in the district having contained any of the above metals beyond traces of tin or gold.

Monazite (Phosphate of cerium and lanthanum with traces of silicate of thorium).—This mineral, as stated above, occurred in Conlon's samples in yellow rolled grains to the extent of five to 10 per cent. It has since been detected in small quantities in samples of black sand from Jasper Lake and Donnelly River, Nelson district; from Koombana Bay, near Bunbury, and from Melville Water, Swan River. This mineral is of value from the presence in it of varying amounts of oxide of thorium, used in the manufacture of the Wellsbach lamp mantles. None of the deposits mentioned above, however, would appear to be workable.

Zircon (silicate of zirconium) and *Cyanite* (silicate of aluminium) appear to be constant constituents of the black sands of the south-western portion of the State. The former occurs in small prismatic crystals, colourless or yellowish, with many small inclusions, and extinguishing parallel to the vertical axis. The latter occurs in rolled grains or tabular fragments, colourless to pale or bright blue or green, with vertical and basal cleavages usually well marked and extinguishing at an angle approximating to 30° with the vertical axis.

* *Vide* Bulletin 15.

Gemstones. Garnet.—Some fine garnets, both cut and in the rough, were inspected during the year. They are said to come from near Uaroo, Lyndon district.

Moonstone.—Some good moonstones were discovered on the beach at the mouth of the Bowes River, Victoria District, during the visit paid to that district in May. These stones appear to be washed out of a Mesozoic conglomerate outcropping at the water's edge.

Tigers-Eye (Crocidolite).—A sample of this mineral was first received from Yarra Yarra Creek, Murchison District, in March 1899. The deposit was subsequently opened up to a slight extent under the name of the Bulgaroo Opal Mine, but has since been abandoned, none of the material having ever been placed on the market. During the last year some pieces of it have been cut and polished in the Laboratory, and a representative series of considerable beauty placed in the Departmental Museum. Some of this was sent to Dr. Geo. F. Kunz, the well-known American gem expert, who expressed the opinion that it was more beautiful than the original South African gem.

Turquoise.—In "The Mineral Industry," Vol. XI., the following statement occurs :—

"In Western Australia turquoise has been found by a copper company while developing its property in the Murchison District. The stone occurs in pockets in a highly ferruginous sandstone near copper and gold veins, and some blocks have been found weighing 100lb." I have examined several samples of this so-called turquoise, including some submitted by the owners of the lease, and others recently collected by Mr. C. G. Gibson. In every case the mineral has proved to be Chrysocolla of a particularly pleasing colour, somewhat more brilliant than true turquoise. It occurs in nodules from the size of a pin's head up to that of a hazel nut, embedded in a matrix of tile ore, silica, and malachite. The owner informs me that this material occurs in occasional vughs in a copper lode.

The following is an analysis of the clean Chrysocolla :—

Silica SiO_2	39·90
Copper Oxide, CuO	43·36
Iron Protoxide, FeO	·65
Magnesia, MgO	Trace
Alumina, Al_2O_3	*Nil*
Phosphorus pentoxide, P_2O_5	*Nil*
Water at 100° C.	9·36
Water at red heat	7·42
	100·69

Opal.—The following statement also occurs in "The Mineral Industry," Vol. XI :—

"An opal mine at Niagara, Western Australia, was sold to an English Company for £3,500. A parcel of 119 tons was treated and yielded 83oz. 12dwts. of gems." Inquiries with regard to this statement have been made of the Warden of the North Coolgardie Goldfield. He informs me that gold mining lease 419G at Niagara, named the "Opal," was sold to the Hannans Main Reef G.M. Co., Ltd., by Ryan Bros., for £3,500, and that a parcel of stone from this lease was crushed at the State Battery for a yield of 83ozs. 12dwts. of gold. No authentic occurrence of precious opal has ever been recorded in Western Australia.

Tourmaline.—Some pink and green tourmalines were received from Coconarup (Kent District). They were embedded in a hard coarse pegmatite and being surface specimens were naturally somewhat dull and fractured. There is a strong probability that at a slight depth good gems would be found.

Gadolinite (Silicate of yttrium, lanthanum, beryllium, and iron.)—This mineral was first recognised in 1900 in granite from Coglegong Creek (Pilbarra Goldfield), and recorded in my annual report for that year.* A specimen from this locality has recently been analysed in Sydney by Mr. B. F. Davis, with the following result :—

Silica, SiO_2	23·33
Iron protoxide, FeO	10·38
Beryllium oxide, BeO	12·28
Cerium sesquioxide, Ce_2O_3	2·50
Lanthanum sesquioxide, La_2O_3)	
Didymium „ Di_2O_3)	18·30
Yttrium „ Y_2O_3	33·40
Magnesia, MgO	·69
Ignition Loss, He,H,N,CO_2	·32
	101·20
Specific gravity	4·14

* Annual Progress Report of the Geological Survey of W.A. for 1900. Perth : By Authority, 1901. Page 32.

Gypsum (Hydrated Sulphate of Lime).—A workable deposit of this mineral, occupying a dry lake bed, has been discovered near Cliffy Head, Victoria District. It is in the form of a fine crystalline powder, associated with which are numerous shells of *Cardium unedo* (a living species). The following is an analysis of a bulk sample:—

Lime, CaO	32·18
Magnesia, MgO	·39
Iron Oxide, Fe_2O_3 } Alumina, Al_2O_3 }	·11
Soda, Na_2O	·87
Potash, K_2O	·13
Sulphuric anhydride, SO_3	41·75
Carbonic anhydride, CO_2	2·46
Chlorine, Cl	·57
Combined Water, H_2O	16·99
Hygroscopic Water, H_2O	·84
Organic Matter	2·68
Insoluble	1·74
	100·71
Less oxygen equivalent of chlorine	·13
	100·58

The insoluble matter contained 1·39 per cent. silica; the soluble matter, 70·98 per cent. of calcium sulphate, 5·27 per cent. of calcium carbonate.

Diatomite (Diatomaceous Earth, Infusorial Earth).—This material, in the form of a black or grey mud, has been found to fill the beds of a number of lakes in the Wanneroo and Jandakot districts. A further examination of the Lake Gnangara deposit, referred to in my last annual report,* showed that it completely fills the bed of that lake, but is thickest at the north-western end. Towards the south-east it thins off considerably, being permanently covered over by water in this portion, the balance of the lake becoming dry at the end of the summer. This lake has an appropriate area of 300 acres, and if the deposit be held to average three feet in depth, would yield a million cubic yards of calcined earth, weighing 175,000 tons. This deposit being only 14 miles by road from Perth Station, and being of large extent, of pure quality and capable of calcining itself, is probably the most important in the district. A prospecting area (P.A. 68H) is now held over portion of it. The calcined earth from this lake, as shown by analysis, contains 92·96 per cent. of silica.

The accompanying map of Wanneroo shows the position and extent of several other deposits in this district that have been examined. It will be observed that along the coast, and parallel to it, is a range of foraminiferal limestone, nowhere exceeding 500 feet in height. Immediately inside this range is a more or less continuous valley with a series of lakes, commencing with Lake Goollelal on the South and continuing beyond Lake Carabooda on the North. On the East of this valley is a large low-lying area of drift quartz sand with numerous scattered lakes and swamps. It is in this sandy country that the best diatomite occurs.

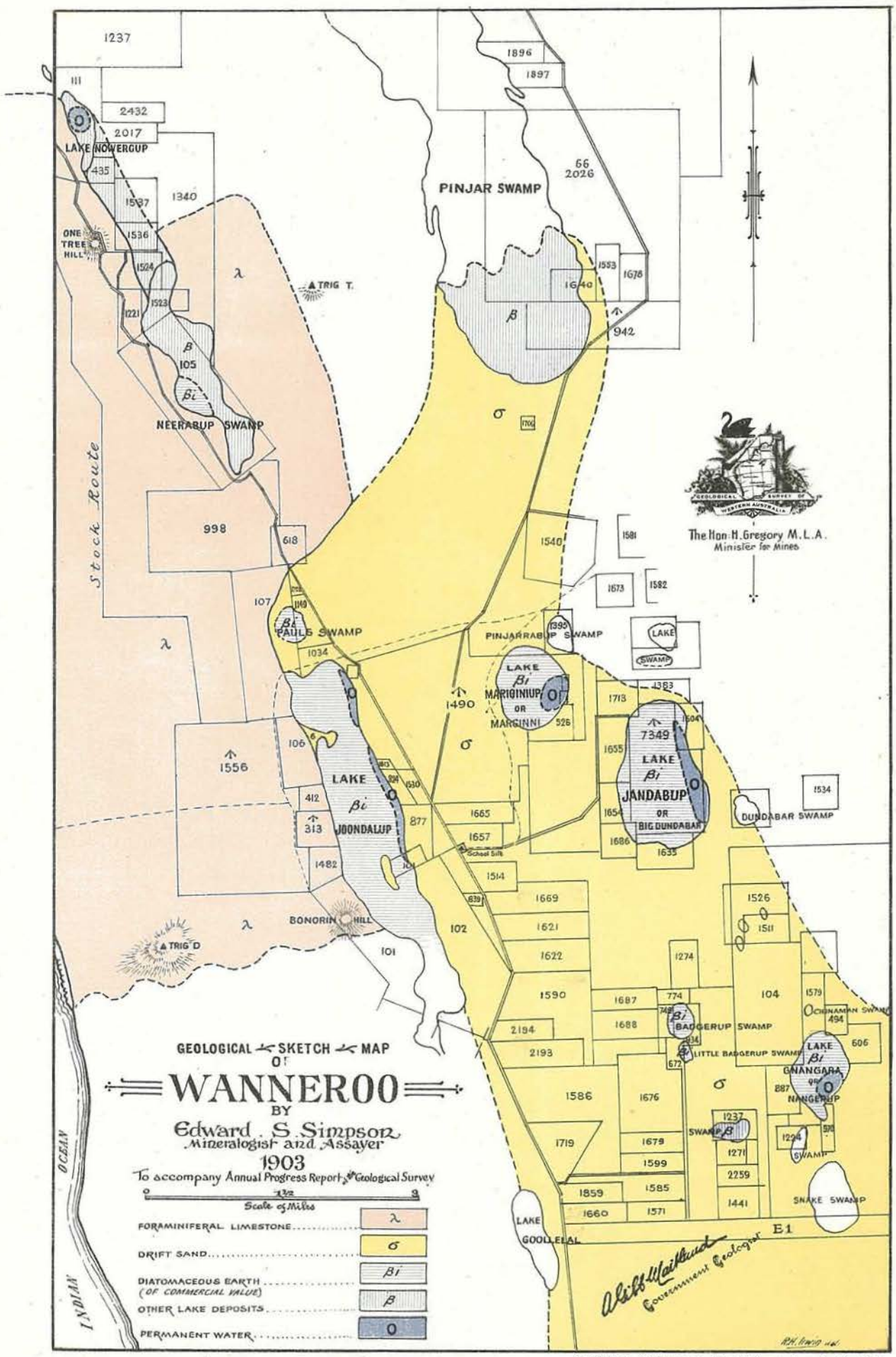
North of Lake Gnangara on Block 48/1579 is a swamp of several acres extent, now converted into a market garden. This swamp is filled with diatomite of good quality to a depth of three feet, as shown by water holes. It forms an excellent soil for vegetable growing.

North of west from Lake Gnangara is Little Badgerup Swamp, about 16 acres in extent, and filled with diatomite to a depth of about five feet in the centre, and overgrown with tall rushes. The earth is of good quality, very firm on the surface, and cracked by drying into large blocks. Beneath this it is black and mud-like. This earth burns readily after airdrying, owing to the large proportion of organic matter in it.

Immediately north of Little Badgerup Swamp is Badgerup Swamp itself, dry and thickly covered with rushes. It is filled with diatomite of apparently inferior type, which has in places been ploughed up and used as a market garden.

Two miles North of Badgerup Swamp is Lake Jandabup or Big Dundabar, about 700 acres in extent. This is completely filled with diatomite, dry and firm for some distance in from the west side, and nowhere less than six feet in depth at a short distance from the shore. The freshly deposited diatomite here as elsewhere burns readily when air dried with an acrid smell like that of Irish peat. In previous dry seasons the deposit at this lake has evidently been set on fire by bush fires with the result

* Western Australia. Report of the Department of Mines for the year 1902. Perth: By Authority, 1903. Page 79.



H. J. Pether, Government Photolithographer, Perth, W.A.

that large areas of it are comparatively free from organic matter. A sample taken some chains from the west shore, near Block 1654, had the following composition :—

	Lake Jandabup.	Lake Mariginiup.
Air-dried earth—		
Moisture and organic lost at 100°	10·27	12·38
Moisture and organic lost on ignition	29·97	94·11
Calcined earth—		
Silica, SiO_2	89·45	85·25
Alumina, Al_2O_3 / Iron peroxide, Fe_2O_3	5·18	4·75
Lime, CaO	1·29	2·76
Magnesia, MgO	·69	1·50
Soda, Na_2O	1·32	2·90
Potash, K_2O	·07	·08
Sulphuric anhydride, SO_3	1·07	·54
Chlorine, Cl	1·20	2·87
	100·85	100·65
Less oxygen equivalent of chlorine	·16	·65
	100·69	100·00

North-west of Lake Jandabup is Lake Mariginiup or Marginni, also completely filled with diatomite of the composition given above. The earth in this lake dries on the surface in a mass of thin curved flakes, quite different to the dried surface of any other deposit in the district.

West of Lake Mariginiup is Lake Joondalup, five miles in length and half a mile in width. Only the northern portion of this lake was examined, but the whole of it appears to be filled with diatomite. A limestone ridge forms the western side of the lake, the eastern being drift sand, and the presence of this limestone has a marked effect on the deposit which is contaminated in consequence with small shells (gasteropods) and calcareous mud. All the north-western portion of this deposit was on fire at the time of my visit, smouldering quietly with the production of a considerable amount of rank smoke and leaving behind a loose, white powder, two or three feet deep. The surface of this deposit is covered, to a large extent, with a white, moss-like growth of *Chara*.

North of Lake Joondalup is Paul's Swamp, filled to a depth of two or three feet with diatomite, partly jet black, and very full of organic matter, partly burnt to a grey or reddish ash. The Eastern half of this swamp has been ploughed up and cultivated.

Meerabup Swamp, north of Paul's Swamp, is covered with rushes and reeds, and surrounded by limestone hills. Though filled with diatomite, the deposit appears to be very impure, except for a small area along the western side.

Nowergup Lake, still farther north, is largely occupied by water, but the southern portion and edges were dry and occupied by a material resembling diatomite in appearance, but proving on examination to be a calcareous mud, with not more than 10. per cent. of diatom frustules. The surface of this deposit is thickly covered with *Chara*.

The southern end of Pinjar Swamp was visited and found to be covered with small rushes growing in a thin layer of impure diatomite, overlying white sand.

The whole of Lakes Jilbup (or Thompson) and Walliabup (or Bibra), in the Jandakot District, a few miles south-east of Fremantle, are filled with diatomite, but no detailed examination has been made of the material collected there. The occurrence there is exactly similar to that in the Wanneroo district, the diatoms apparently growing freely in the winter, when the lakes are covered with a few feet of water, and their dead remains helping to fill the Lake beds during the summer, when they are wholly, or for the greater part, dry.

Diatomite, more or less impure, was found to occur round many of the soaks in the Irwin River valley. At Irwin Spring, the deposit was set on fire by a bush fire early in 1902, and smouldered for something like six months, sublimates of ammonium chloride, half-an-inch in thickness, being found at the mouths of cracks in the ground. At Mingenew Spring this material is cut into large blocks, air-dried, and used for building.

Kanowna Pug.—A sample of the auriferous clay from Kanowna, locally known as "pug," and from which the gold is only extracted with considerable difficulty, was analysed with the following result :—

Silica, SiO_2	44·16
Titanium dioxide, TiO	3·74
Combined Water, H_2O	11·80
Soda, Na_2O	1·05
Potash, K_2O	·33
Magnesia, MgO	·70
Lime, CaO	·53
Magnese protoxide, MnO	*Nil*
Iron peroxide, Fe_2O_3	4·44
Alumina, Al_2O_3	30·38
Hygroscopic Water, H_2O	3·81
	100·94

Gold, 1oz. 19dwts. per ton.

From this analysis it would appear that the main constituent of this material is kaolin.

Chalk.—A sample of cream-coloured chalk, received from Gingin for analysis, was found to have the following composition :—

Silica, SiO_2	15·09
Carbonic anhydride, CO_2	33·02
Sulphuric anhydride, SO_3	·13
Combined Water, H_2O	1·18
Magnesia, MgO	1·32
Lime, CaO	42·41
Iron protoxide, FeO	1·16
Iron peroxide, Fe_2O_3	Trace
Alumina, Al_2O_3	3·15
Hygroscopic Water, H_2O	1·99
	99·45

It was representative of the lower portion of a bed of chalk, about 22 feet thick, which has been opened up on the top of a hill on lot 398, Gingin. The upper part of this bed yielded on burning a good fat lime, which has been used for building both in Perth and Kalgoorlie. The material analysed was found to yield a hydraulic lime on burning, and, with the addition of a little more clay, would doubtless yield a good Portland cement. Under the microscope it was seen to consist largely of foraminifera, no fewer than 37 different species being recognised by Rev. W. Howchin, of Adelaide, in portion of the sample. Numerous granules of glauconite were present, some in the form of internal casts of foraminifera.

Tellurides of Gold.—Two species of gold tellurides, viz., Petzite and Calaverite, were discovered during the year at Mulgabbie (North Coolgardie). The tellurides, of which petzite seems to be the more common, occur in a narrow vein of carbonates of lime, iron, etc., running across the planes of foliation of a chlorite schist.

Tourmaline in Gold.—Amongst the specimens recently returned from the Paris and Glasgow Exhibitions and added to the Department's collection was a gold nugget found at Mount Monger (North-East Coolgardie) by Messrs. Sheehan and Thompson in 1899. This nugget consisted largely of gold with, however, a fair proportion of quartz and ferruginous matter, its gross weight being 101·1oz., and its estimated net gold contents 85·9oz. More interest than usual attaches to this nugget from the fact that the gold is everywhere thickly studded with small crystals of black tourmaline. These vary in length from 1 to 5 millimetres, and in diameter from one-tenth to seven-tenths of a millimetre, and though they occur so frequently in the solid gold, the quartz is almost free from them. Tourmaline has frequently been observed in close association with gold, particularly at Kalgoorlie and Leonora, but never before actually penetrating the metal as in this instance.

Water Supply.

York Reservoir Site.—The Municipality of York, through the Town Clerk, approached the Government for an inspection of the catchment area of the proposed reservoir by a member of the staff with the object of reporting upon the Geological character of the site.

Mr. Gibson visited York in May and furnished the following Report :—

"In accordance with your instructions I have visited York and made an examination of the site of the proposed dam at that place. The site is some two-and-a-half miles west of the York Railway Station on a small creek, known as Dinsdale Brook, running Easterly down a small valley in the granite hills which surround the town. This creek is dry during the summer months, but is said to carry a good body of water during the rainy season.

"As regards the actual site of the dam, the valley of the creek appears to be an old fault line, and considerable fissuring can be noticed in places following along the bed of the creek; these fissures however are small and do not appear likely to cause leakage below the dam. Three small trial shafts have been sunk along the line of the proposed embankment. These, after passing through about four feet of surface deposits, have bottomed at six feet on soft decomposed granite; this decomposition appears to go down for at least another three or four feet.

"The country is traversed by numerous diorite dykes, which usually trend in a N.N.W. and S.S.E. direction, the granite being considerably broken and altered in the neighbourhood of these. The area however which will be covered by the water is entirely free from these dykes, the nearest being some five chains beyond the proposed limit of the water area.

"The catchment area for the most part consists of fairly hard granite country, covered for the most part with a few feet of surface deposits. At the western end of the catchment, the hills are for the most part covered with a capping of ironstone gravel, resting on highly decomposed granite.

"With regard to the matter of the salt, mentioned in the report of Mr. Christie, which accompanies this, unfortunately on the day of my arrival there was a light fall of rain in the district, and this caused the creek to run slightly, and I was thus unable to examine the deposit of salt mentioned by him; however, at the spot where the salt had been found there was a small waterhole containing some hundred gallons of water. The water in this pool was very slightly saline, but as the creek did not appear to have run below this point the amount of salt present could not have been very great. In spite of very careful examination, no further trace of salt could be found anywhere over the whole catchment area. As there is only a shallow depth of surface deposits over the catchment area and as the granite is

only, on the whole, slightly decomposed on the surface, I do not see where the large quantity is to come from. Moreover, the water in the creek is said, *vide* the report, to have for the last 14 years been perfectly fresh. I am therefore of opinion that nothing need be feared on the score of the water in the reservoir becoming salt; assuming, however, that the dam is to be fitted with a sluice pipe and the surplus water occasionally run to waste should remedy the evil.

"I am therefore of the opinion that, from a Geological point of view, the site is well suited for the purpose for which it is intended."

Canning River Reservoir.—In 1902 a report upon the Metropolitan and Suburban Water Supply was prepared at the request of the Chairman of the Royal Commission on Water Supply and Sewerage.*

In addition to the question of an artesian water supply, the Commission requested an opinion as to the suitability, on Geological grounds, of the proposed site at the Canning River, for a main storage reservoir, not only in connection with the foundations of the necessary dam, but also as to the possibility or otherwise of excessive leakage through possible fissures in the strata of the basin, which would be included within the waterspread of a reservoir, say, 120 feet deep. It being generally understood that as far as possible no site for storage reservoirs with high dams should be located in any district where there has been any great earth movement, for the fissures, etc., so produced might serve the purpose of gathering the water and forming channels for carrying it off beneath the embankment, and possibly endangering the safety of the structure, instructions were issued to Mr. Campbell to make a geological survey of the site, and to devote special attention to any structural features which might permit of the percolation of water under pressure.

The result of Mr. Campbell's work is embodied on the Geological sketch map of a portion of the Canning River Valley, attached, which, besides furnishing the information required, throws considerable light upon the geology of the valley of the Canning River.

In the month of March Mr. Campbell reported:—

"The examination of the gorge, where the dam for the proposed reservoir on the Canning River is proposed to be placed, shows that bare granite forms the steep sides of the gorge, and that a perpendicular diorite dyke, bearing 303 degrees, traverses the greater length along the watercourse, it then strikes up the northern side of the valley. The granite has the same character on both sides of the gorge, and is of somewhat coarsely crystalline type.

"In the upper part of the gorge there has been formed a bed of ferruginous conglomerate, consisting of pebbles and irregular fragments of granite and diorite; this fills up irregularities in the bed-rock.

"The line that has been marked out for the dam site is at the upper part of the gorge, where the steep granite sides are somewhat closer together than elsewhere, a considerable quantity of loose boulders occurs here. The granite on the south side is weathered into slabs near the stream bed, and presents a rather fragmentary appearance.

"A perpendicular drill bore has been put down at a spot 150 feet distant up stream, on the north bank, so as to be above freshets, to test the rock for a depth of 50 feet, on the line of dyke; the conglomerate here is about 10 feet thick. At the time my visit the depth reached was 35 feet, and in solid diorite.

"The existence of a dyke along the bottom of the dam must be a source of weakness and to be avoided if possible, so that I looked carefully over the adjacent ground for a possibly better site; about 200 feet above stream the valley opens out so that nothing further can be done there; but down stream there is a length of about 20 chains which might be selected along a line of fracture in the granite which occurs striking to the west from the line of dyke from near the gauge weir, and the valley denudation follows this line of weakness till a branch valley from the south-west joins it: before this is reached a cross or branch dyke occurs. At a point 500 feet below No. 1 site there is a flat granite floor to the water-course 60 or 70 feet wide, and the dyke is here on the north side. This spot was selected some years ago for a gauging weir, and a small concrete wall built about three feet high. It appears to present more favourable aspects for the dam than No. 1 and to be worth examination. The nature of the dyke at depth could be determined, if a bore be put down across it, with a dip of about 35 degrees for a length of about 60 feet, so as to penetrate both walls of the dyke. It is possible that the line of fracture already referred to may traverse the south side of the water-course, and there may be some leakage underground, for though there had been many heavy showers during the day before, there was no accumulation of water at the weir wall. Below this place the dyke strikes up the north side of the water-course and hill side. I hoped to have found a suitable spot where the dyke was clear of the water-course, but did not succeed."

In April a further report was received to the effect that:—

"The bore had reached a depth of 66 feet, and at about 38 feet had passed out of the diorite dyke into the granite; there was here a parting or casing about 6 inches thick, consisting of comminuted diorite rock. The rest of the bore was in solid granite. On my previous visit I had suggested the clearing of the sand banks at the weir site, and this had been done on the north side, exposing the top of the dyke. Casings of about six inches occur on both sides of the dyke, and this had been cleared out to a depth of about three feet. A similar clearing on the south side will show whether the fracture line, observable in the stream bed lower down, extends as far up as the gauging weir."

* Annual Progress Report of the Geological Survey for the Year 1902. Perth: By Authority, 1903, pp. 21-23.

Twenty-two bores were put down to test the bed and sides of the valleys; the particulars in connection with such of these as we have records, are as follows:—

Bore No. 5.

ft.	in.		ft.	in.	
0	0	—	19	8	Hard granite, fissured near surface
19	8	—	19	10	Soft crushed granite
19	10	—	53	7½	Hard coarse diorite
53	7½	—	55	1½	Kaolinised granite
55	1½	—	55	3	Soft crushed granite
55	3	—	64	2	Hard granite.

Bore No. 6.

ft.	in.		ft.	in.	
0	0	—	38	9	Entirely in hard granite.

Bore No. 7.

ft.	in.		ft.	in.	
0	0	—	42	5	Hard granite, fissured at surface
42	5	—	42	7½	Crushed granite
42	7½	—	92	7	Coarse diorite
92	7	—	95	0	Crushed granite
95	0	—	125	9½	Hard granite.

Bore No. 8.

ft.	in.		ft.	in.	
0	0	—	24	11	Entirely in hard granite, fissured at 11 feet from surface

Bore No. 9.

ft.	in.		ft.	in.	
0	0	—	19	11½	Entirely in hard granite, fissured at 3 feet 5 inches from surface

Bore No. 10.

ft.	in.		ft.	in.	
0	0	—	39	9	Hard granite
39	9	—	42	0	Soft kaolinised granite
42	0	—	107	6½	Hard coarse grained diorite

Bore No. 11.

ft.	in.		ft.	in.	
0	0	—	108	0	Hard granite
108	0	—	109	0	Soft crushed granite
109	0	—	168	6	Hard coarse diorite
168	6	—	169	0	Soft crushed granite
169	0	—	171	0	Kaolinised granite
171	0	—	178	2½	Hard granite

Bore No. 12.

ft.	in.		ft.	in.	
0	0	—	40	2	Entirely in hard granite

Bore No. 13.

ft.	in.		ft.	in.	
0	0	—	2	6	Surface deposits
2	6	—	23	0	Hard granite

Bore No. 14.

ft.	in.		ft.	in.	
0	0	—	28	11	Hard granite
28	11	—	29	4	Soft crushed granite
29	4	—	31	6	Hard diorite
31	6	—	32	2	Soft crushed granite
32	2	—	37	10	Hard granite

Bore No. 15.

ft.	in.		ft.	in.	
0	0	—	3	0	Slightly decomposed granite
3	0	—	49	6	Hard granite
49	6	—	50	3	Kaolinised granite
50	3	—	51	11	Diorite
51	11	—	57	6½	Hard granite

Bore No. 16.

ft.	in.		ft.	in.	
0	0	—	40	2	Entirely in hard granite

Bore No. 17.

ft.	in.		ft.	in.	
0	0	—	7	0	Slightly decomposed granite
7	0	—	30	0	Hard granite

Bore No. 18.

ft.	in.		ft.	in.	
0	0	—	60	3	Entirely in hard granite

Bore No. 19.

ft.	in.		ft.	in.	
0	0	—	40	2	Hard granite, fissured at 7 feet from surface

Bore No. 20.

(No cores)

Bore No. 21.

(No cores)

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

GEOLOGICAL SKETCH MAP
OF
A PORTION OF
THE CANNING RIVER VALLEY

BY

W. D. Campbell.
ASSISTANT GEOLOGIST.

TO ACCOMPANY ANNUAL PROGRESS REPORT OF THE GEOLOGICAL SURVEY FOR
1903

0 20 40
Scale of Chains

EXPLANATION OF COLOURS AND SIGNS.

IRONSTONE CONGLOMERATE *(Laterite)*	X
GREENSTONE *(? Dolerite)*	Di
CRYSTALLINE ROCKS *(Granite and Allied Rocks)*	Gn
CONTOUR LINES AT 10' INTERVALS	
do do SKETCHED	
QUARTZ REEFS	q

SECTIONS

C — D

Approximate Level for Surface of Proposed Reservoir 530.00.

Bore N°17 · Bore N°16 · Bore N°15 · Bore N°14 · Bore N°10 · Bore N°11 · Bore N°12 · Bore N°13

Hard Granite · Soft Crushed Granite · Kaolinized Granite · Hard Granite Dyke · Soft crushed Granite

Gn · Di · Gn

0 150 300
Scale of Feet.

A — B

Approximate Level for Surface of Proposed Reservoir 530.00.

Bore N°21 · Bore N°20 · Bore N°19 · Bore N°18 · Bore N°17 · Bore N°16 · Bore N°15 · Bore N°14 · Bore N°13

Hard Granite · Soft Crushed Granite · Crushed Granite · Hard Granite Dyke

Gn · Di · Gn

Locality Plan

0 70
Scale of Miles.

OCEAN · INDIAN · RAILWAY · PERTH · SWAN RIVER · SWAN LINE · HELENA RIVER · HELENA RESERVOIR · MUNDARING (GOLDFIELDS WATER SUPPLY) · MUNDARING RESERVOIR · MUNDARING WEIR · CANNING · BICKLEY BRIDGE · VICTORIA RESERVOIR (METROPOLITAN WATER SUPPLY) · FREMANTLE · CANNING RIVER · Proposed site of CANNING RESERVOIR

37
47
Loc 407

Alfred Maitland
Government Geologist

R. H. Irwin del

H. J. Pether, Government Photolithographer, Perth, W. A.

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

GEOLOGICAL SKETCH MAP
OF
A PORTION OF
THE HELENA RIVER VALLEY

BY

W. D. Campbell.
ASSISTANT GEOLOGIST

TO ACCOMPANY ANNUAL PROGRESS REPORT OF THE GEOLOGICAL SURVEY FOR
1903

0 20 40
Scale of Chains

EXPLANATION OF COLOURS AND SIGNS

IRONSTONE CONGLOMERATE (Laterite) X
GREENSTONE (? Dolerite) ..... Di
CRYSTALLINE ROCKS (Granite and Allied Rocks) ..... Gn
CONTOUR LINES AT 10' INTERVALS .....
do do SKETCHED .....
QUARTZ REEFS .....

Alfred Maitland
Government Geologist

Locality Plan
Scale of Miles

H. J. Pether, Government Photolithographer, Perth, W.A.

It appears quite clear from Mr. Campbell's work that the district does lie within what at one time had been a zone of disturbance. The valley of the Canning and its tributaries is traversed by a network of greenstone dykes, which merely represent fissures filled with molten matter which has subsequently congealed into solid rock. It will be noticed that a persistent dyke traverses the lower reaches of the Canning River, and passes directly beneath the proposed site of the dam.

All the available evidence seems to point to the fact that faulting has taken place along the line of the dyke, in which case there is a possibility of a leakage of water from this cause occurring. Before any dam is constructed it is essential that such steps be taken as to minimise the possibility of an influx of water into the fault fissure; but the exact nature of these precautions is a matter for an engineer rather than a geologist.

Helena Valley (Coolgardie Water Supply Scheme).—In 1899, the Department of Public Works requested a more or less detailed geological examination of the Helena Valley with the view of locating suitable supplementary weir sites in connection with the goldfields water supply scheme.

The necessary geological surveys were commenced by Mr. Campbell, but when good progress had been made with the work, it was intimated that the Department concerned did not require any further steps taken in connection with the matter. As the result of Mr. Campbell's observations throw some considerable light upon the geology of the Helena Valley, it has been deemed advisable to publish his map, which will be found attached.

Artesian Water, Eucla Division.—In 1897,* I directed attention to the probable occurrence of an artesian water area on the south coast of the State, extending from Eucla to Israelite Bay, and in 1900 † revived the question in connection with the Transcontinental Railway Line, the necessity for the selection of a well-watered route being of prime importance. After describing briefly the salient geological features of what may be called the Eucla Division, it was stated that "should it be contemplated putting down a series of experimental bores in this area, it would seem advisable to do so along a line due north and south from the head of the Bight, starting from any locality which might, on engineering grounds, be deemed most expedient. It would not be possible to convey a Calyx plant into the interior unless water could be obtained, so as to secure the retreat of the boring party should the exigencies of the situation demand it. A hand-boring plant capable of penetrating 100 or 200 feet would be essential to secure water for use in connection with the Calyx plant, unless any could be obtained on the surface, which from all accounts seems a remote possibility. . . ."

Experimental boring operations were eventually started by the Government near Madura *(vide* Lands Office Litho 37M).

The site of No. 1 Bore at Madura, on block 149/95, lies about 110 feet above sea level, at the foot of the tableland, distant about 30 chains from the face of the escarpment, which is 350 feet in height.

The following table gives a record of the strata pierced in No. 1 Bore, so far as may be judged by the cores submitted to this office:—

MADURA No. 1 BORE.

ft.	in.		ft.	in.	
0	0	—	8	0	No sample
8	0	—	30	0	Hard shell limestone
30	0	—	508	0	Soft limestone
508	0	—	766	9	Limestone with flints
766	9	—	903	0	Soft greenish grey limestone with flints
903	0	—	904	8	Hard calcareous grit with shells
904	8	—	927	3	Coarse quartz, sand and gravel
927	3	—	928	6	No sample
928	6	—	963	6	Mudstone in soft and hard bands
963	6	—	968	0	Grey mudstone
968	0	—	988	0	Mudstone in soft and hard bands
988	0	—	1016	8	Mudstone with quartz gravel
1016	8	—	1018	8	Hard calcareous mudstone with much glauconite
1018	8	—	1072	8	Glauconitic mudstone
1072	8	—	1104	0	Soft glauconitic mudstone
1104	0	—	1365	0	Grey shale
1365	0	—	1365	6	Hard compact dolomite
1365	6	—	1470	0	Grey shale
1470	0	—	1471	0	Hard compact dolomite
1471	0	—	1486	0	Soft dark shale
1486	0	—	1486	6	Hard compact dolomite
1486	6	—	1523	0	Dark grey shale
1523	0	—	1775	0	Grey shale with pyrites nodules
1775	0	—	1839	0	Grey mudstone
1839	0	—	1978	0	Dark grey mudstone
1978	0	—	1979	0	Hard compact dolomite
1979	0	—	1991	0	Soft gritty mudstone
1991	0	—	1991	6	No sample
1991	6	—	2014	0	Soft mudstone
2014	0	—	2015	0	No sample
2015	0	—	2041	0	Soft mudstone.

Salt water was met with at 100 feet three inches. A sub-artesian supply of salt water was struck at 905 feet, and yielded a pumping supply of 29,000 gallons in 20 hours. At 1,979 feet an overflowing supply of water at the rate of 1,000 gallons per diem was met with; whilst at a depth of 2,041 feet a supply of good stock water was met, which issued from a standpipe two feet above the surface at the rate of 5,700 gallons per diem. The bore did not apparently pierce the whole of the thickness of the water-bearing strata.

* Annual Progress Report of the Geological Survey for the year 1897. Perth: By Authority, 1898, p. 29.
† Annual Progress Report of the Geological Survey for the year 1900. Perth: By Authority, 1901, pp. 28—31.

No. 2 bore was situated 30 miles to the north of Madura at an altitude of about 300 feet above the level of No. 1. The strata pierced in this bore, so far as may be judged from the core samples submitted by the Public Works Department, are shown in the table.

MADURA No. 2 BORE.

ft.	in.		ft.	in.	
0	0	—	6	0	(No core)
6	0	—	30	0	Hard compact limestone
30	0	—	34	0	Fossiliferous limestone
34	0	—	72	0	Soft limestone
72	0	—	75	0	Hard limestone
75	0	—	104	0	Soft limestone
104	0	—	130	0	Soft limestone
130	0	—	160	0	Soft limestone
160	0	—	175	0	Soft limestone
175	0	—	185	0	Hard compact limestone
185	0	—	200	0	Hard (?) limestone
200	0	—	216	0	Hard compact fossiliferous limestone
216	0	—	230	0	Soft limestone
230	0	—	246	0	Soft limestone
246	0	—	260	0	Soft limestone
260	0	—	284	0	Soft limestone
284	0	—	300	0	Soft limestone
300	0	—	318	0	(No core)
318	0	—	326	0	Soft shell limestone
326	0	—	340	0	(No core)
340	0	—	360	0	Soft shell limestone
360	0	—	410	0	(No core)
410	0	—	412	0	Soft shell limestone

The boring appears to have been carried out in the Eucla Limestone.

Pelican Hill Bore, Carnarvon.

This bore, the record of which, down to a depth of 1,696 feet, was given in the last Annual Report,* has been carried down to a depth of 3,011 feet.

The following is a record of the strata pierced from 1,696 feet:—

Nature of Strata.	Thickness.		Depth.	
	ft.	in.	ft.	in.
White calcareous sandstone	31	4	2143	3
Dark blue shale	11	7	2174	7
(No record)	19	6	2186	2
Blue calcareous shale with shells and corals	101	8	2205	8
Shaley sandstone	55	8	2307	4
Solid white sandstone	25	0	2363	0
Chocolate shale	2	9	2388	0
Shaley sandstone with water	25	0	2390	9
(No record)	5	3	2415	9
Solid white sandstone	50	6	2421	0
(No record)	3	0	2471	6
White sandstone with soft bands carrying water	52	6	2474	6
Chocolate shale	4	6	2527	0
Fine white sandstone	5	0	2531	6
Green and chocolate shales and shaley sandstone	26	2	2536	6
Fine and coarse sandstone	448	4	2562	8
Total	...		**3011**	**0**

This experimental bore had for its object the twofold purpose of showing whether (*a*) the carboniferous rocks contained any coal seams, or (*b*) artesian water-bearing horizons, and it proved successful in the search for water. At a depth of 2,611 feet the supply of artesian water yielded 300,000 gallons per diem, and at 3,011 feet the supply was 520,000 gallons. Owing to difficulties connected with the boring plant, it was found impossible to continue operations until the base of the formation had been unequivocally reached, hence in so far as the bore affording conclusive evidence as to the occurrence of coal seams, it has not fulfilled its purpose. I am, therefore, of opinion that it is desirable, in the public interest, that such further experimental boring be carried out in the district as will definitely set at rest the question of the occurrence of coal in the carboniferous strata of this portion of the State.

A series of fossils were obtained from different portions of the core, and were submitted to Mr. R. Etheridge, junior, who reports as follows:—

"Following the bore core from above downwards, the following specimens are represented:—

"No. 3979†—38 to 40 feet: A decomposed calcareous deposit, containing shell fragments and Nullipores?

"No. 3982—82 to 100 feet: Limestone, containing fragments of indeterminable corals.

"No. 3985—146 to 150 feet: Comminuted beach material, consisting of fragments of shells, and Polyzoa, Crinoid ossicles, in places partly consolidated into a limestone.

* Annual Progress Report of the Geological Survey for the Year 1902. Perth: By Authority, 1903. pp. 23-24.
† Numbers in the Geological Survey Museum Register.

"These specimens represent either a Newer Tertiary or Post Tertiary deposit, but in the absence of "determinable material, it is difficult to say which.

No. **4681**—1,238 to 1,248 feet
No. **4687**—1,300 to 1,330 ,,
No. **4688**—1,330 to 1,357 ,,
} Blue-grey to Grey-black mudstone.

"This is a most interesting deposit. Foraminifera are present, and both longitudinal and transverse "sections of small lanceolate cylindroidal bodies having all the appearance of small, or young Belemnites, "and possessing the same shell structure. If of this nature the portions preserved are parts of the guard, "The only other alternative is to regard them as *Graphulariæ*, the internal structure of these widely diver- "gent fossils being by no means dissimilar. The accurate determination means a good deal geologically, "the former being indicative of Mesozoic rocks, the latter of Tertiary beds. My own inclination leads me "to regard them as portions of the guards of small Belemnites. The associated Foraminifera have been "kindly determined by the Rev. W. Howchin, of Adelaide, and are:—

Cristellaria crepidula, F. & M.
Nodosaria pauperata, D' Orb. ?
Nodosaria communis, D'Orb. ?

"The lithological structure of these portions of the core is precisely similar in texture and colour to "some of the Cretaceous mudstones of Queensland and South Australia, and the species of Foraminifera "mentioned are met with in that formation of the latter State. The mudstones are, even if not of Cretaceous "age, in my opinion high up in the Mesozoic series:—

No. **4691**—1,406 to 1,438 feet
No. **4693**—1,446 to 1,496 ,,
} Limestone and Calcareous Shale.

"The fractured surface of the core portions are covered with the impressions and testaceous remains "of *Spiriferæ*, which clearly indicate that this portion of the bore passed through either Carboniferous or "Permo-Carboniferous rocks. The sections of these fossils around the core sides give to the latter the "appearance of a "mussel band." The *Spiriferæ* does not seem to be identical with any of our eastern "species, so far as the state of the specimens will permit one to form an opinion. On one of the core "portions is the partial testaceous impression of an *Aviculopecten*.

"No. **4696**—1,496 to 1,546 feet: The limestone and shale is succeeded by a greyish-green shale, both "fractured ends exhibiting very numerous crushed and compressed bivalves, some impressions only, others "testiferous. These shells seem to be of the *Anthracoptera*, or *Naiadites* groups, and although too much "mutilated for description, are still sufficiently perfect to show the posterior alations, or wings, and sinusse "in the antero-ventral margins. They certainly confirm the, at least, palæozoic age of this portion of the "core, and I believe indicate a carboniferous horizon also.

"No. **4697**—1,546 to 1,596 feet: Shale with limestone patches, the latter containing a very large "number of minute bivalves and casts of Ostracoda. The former are readily recognisable by a limited "number of broad flat bands of growth as sculpture, separated by grooves, although they are too closely "embedded in the matrix to permit of detailed description, or even to define the genus, which is much to be "regretted. In the absence of evidence to the contrary, this portion of the core can only be looked on as a "continuation of the limestone and calcareous shale represented by Nos. **4691** and **4693**.

"No. **4844**—2,241 to 2,293 feet: Calcareous olive-green shale, breaking with rather hackly fracture "and crammed with small objects that to the naked eye look like tubes. On preparing sections, these prove "to be minute dendroid corals, either *Favosites* or Monticuliporids, but as no mural pores can be "distinguished, preference must be given to the latter. Beyond the general one of Carboniferous or "sub-carboniferous, I cannot suggest an age for this section of the bore.

"To sum up, this Carnarvon Bore presents an exceedingly interesting section, as revealed by the "portions of the core submitted to me. The first 150 feet comprise rocks of either newer or post-tertiary "age, but between this and 1,238 feet, I am not acquainted with the strata. At that depth appear "mudstones almost certainly of Mesozoic age, and possibly Cretaceous. At 1,406 feet is limestone and "calcareous shale containing carboniferous fossils, and, for all one can say to the contrary, strata of this age "continue to the end of the core, viz., 800 odd feet."

I have, etc.,

A. GIBB MAITLAND,
Government Geologist.

INDEX TO NAMES OF PLACES, MINES, REEFS, ETC.

Index to Names of Places, etc.—*continued.*

DIVISION V.

Report by the Chief Inspector of Boilers for the Year 1903.

The Secretary for Mines, Perth.

SIR,

1. I have the honour to submit my Annual Report upon the operations under "The Steam Boilers Act, 1897," for the year ending 31st December, 1903, for your information.

BOILERS REGISTERED.

2. The total number of boilers registered on the date mentioned above was 2,734, which gives an increase of 126 new registrations over the previous year, nearly all of which were "new" boilers at the time of registration. The total number registered represents 37,712·15 horse-power, based on grate-bar area, which can only be considered approximate on that basis. Attached to this Report please see two (2) tabulated statements (Appendices A and B), both of which give the necessary data relative to the districts proclaimed under the Act, which are self-explanatory. All inspections are now carried out in the several districts by practical Inspectors; final appointments in this direction having been accomplished during the year.

TOTAL REVENUE.

3. The total revenue received as furnished by the Chief Accountant came to £3,280 11s. 7d., or £267 1s. 7d. in excess of that received during the year 1902. This is the maximum revenue received since the inception of the Act, and I see no reason why this should not be exceeded when the current year closes.

TOTAL EXPENDITURE.

4. The expenditure for the year amounted to £4,959 16s. 11d., which exceeds the revenue by £1,679 5s. 4d. This loss is largely due to the heavy expenses incurred in carrying out inspection duties which are constantly increasing in remote and scattered parts of the proclaimed districts, and although careful consideration has been given to the question of laying out the work in the several districts to ensure its being done in the most economical way possible combined with efficiency, I regret I do not see how the expenditure can be materially reduced. In order that some idea may be formed of the amount of travelling done by the seven (7) Inspectors by trap, railway, and steamer during the year, I find that approximately 32,000 miles were covered, out of which some 14,000 were done by trap and horse, most of which was done by the Inspectors whose head quarters are at Malcolm and Cue. These officers have exceedingly large areas to cover, very often under most trying conditions, due to long dry stages, and hot weather, which render travelling slow at times, and the question of somewhat reducing these areas must receive consideration at no distant date.

CERTIFICATES ISSUED.

5. During the year there were 2,305 Certificates issued and 2,870 inspections made, which is a large increase on the previous year's work. On the basis of inspections made, and the total mileage travelled, this gives an average of nearly 11¼ miles of travelling by various means per inspection.

A greater number of Certificates have been granted for the maximum period allowed by the Act, viz., 12 months, than has been permitted hitherto. This is due to the use of good feed water and better care and attention being bestowed on the boilers than formerly. Where it is possible to do so, 12 months' Certificates have been granted, and a "working inspection" has been made when practicable during the currency of the Certificate; that is to say, under working conditions and without previous notice having been given, which is in accordance with English practice. This is done in order to ascertain whether the boiler is being carefully looked after, and if the authorised working pressure given on the Certificate is not being exceeded.

6. During the period under review 70 boilers were "temporarily" condemned, owing to their dangerous condition, pending important repairs being done, such as new barrel plates, stays, fireboxes, tubes, tube-plates, patches, etc., and 20 were "permanently" condemned, as they were completely worn out, and were therefore not worth repairing.

The percentage of boilers "temporarily" and "permanently" condemned, in relation to those inspected during the year, is 2·43 per cent. and ·697 per cent., and in order that comparisons can be made with previous years the results on the same basis are given below:—

Year.	Temporarily Condemned.	Permanently Condemned.
1899	2·64 per cent.	1·42 per cent.
1900	5·21 „	·498 „
1901	4·35 „	·511 „
1902	5·00 „	·958 „
1903	2·43 „	·697 „

Out of the 70 boilers "temporarily" condemned, 41 had the necessary repairs effected in accordance with written instructions, and certificates were granted to enable them to be used.

During the 12 months, 333 notices were served on owners for either repairs, alterations, or fittings, which is considerably less than for the previous year. This is more satisfactory, and is largely due to the greater care and attention given to boilers than hitherto.

Boilers fitted in accordance with Act.

7. Out of the total number of boilers registered, 2,223 are fitted in accordance with the Act, the remainder are amongst those out of use and will be fitted before certificates are granted again. Steam users fully realise now that instructions of this nature have to be complied with; seeing that liberal notice is always given there can be no reasonable excuse offered.

All new boilers arriving in the State are fitted as required, therefore trouble in this direction is a thing of the past.

Boilers out of Use.

8. At the close of the year there were 916 boilers out of use. Many of these may be brought into use during the current year.

Prosecutions under the Act.

9. I regret to state that it was found necessary to prosecute four (4) owners under the Act—three (3) for non-payment of fees, and one (1) for violating two of the provisions. Against this latter person there were two (2) charges formulated, firstly, for not exhibiting the certificate as required in Section 23, and secondly, for working a boiler at a considerably higher pressure than that authorised in the certificate. All prosecutions were successful and had the desired effect. With a few exceptions, however, very little difficulty has been experienced with the various steam users, who invariably desire to render all assistance possible in order that the inspections will be carried out expeditiously, which not only suits their interests but that of the Department also. There are a few steam users, however, who do not prepare their boilers in a satisfactory manner for inspection, and although they have been warned several times they always have some excuse for not complying with the Inspector's requests, causing at times unnecessary delay and expense to the Department, and I intend in future, where satisfactory explanations are not forthcoming, to institute proceedings in all cases where reasonable latitude has previously been given.

Explosions and Accidents.

10. Three (3) mild explosions occurred during the year: two (2) in the East Coolgardie District on the same mine, and one (1) in the South-Western District, without injury to any person. The two (2) former boilers were of the Babcock & Wilcox water-tube type, and the accidents occurred at different times. In one case a front header was blown out a considerable distance owing to shortness of water in the boiler, due to negligence. The other explosion was caused by some explosive material being left in the firewood, which raised the boiler in the brickwork, thereby cracking the main steam pipe and doing slight damage to the brickwork. Although each of these boilers was coupled to ten (10) others, with an authorised working pressure of 160lbs. per square inch, no one was injured in any way, and the other boilers did not receive any injury.

The explosion that occurred in the South-Western District was in connection with an underfired multitubular boiler, fitted with a mudwell rivetted to the bottom with bolted cover, to which the blow-off was attached. Sediment was allowed to collect in this receptacle through the negligence of the management, and although a protecting wall had been erected to guard this part from the fierce heat of the furnace, it appears to have fallen down without being noticed, with the result that the cover of the mudwell became overheated and was blown off, causing damage to the brickwork. In this case also, fortunately, no one was injured. Alterations have been effected by direction, which will prevent a similar occurrence from this part in future.

Staff Appointments and Changes.

11. During the year two (2) Inspectors were appointed to enable the remaining three (3) Inspectors of Mines to be relieved of inspection duties under this Act, and the change thus effected is appreciated by all concerned. No other change of any importance has taken place.

General Remarks.

12. Although a considerable improvement is noticeable in the general care and maintenance of steam plants, it is nevertheless surprising that the purification of feed water before it reaches the boiler does not receive much greater attention than it does at present. In one case the incrustation in a boiler erected on a mine was so thick and hard in the Galloway tubes that some person employed scaling it conceived an extraordinary idea to readily remove it from one of the Galloway tubes by using "Gelignite," with the result that a hole 8 inches x 4 inches was torn in the tube. Whilst on the subject of incrustation I would like to point out the great cost of cleaning some Lancashire boilers in the Mount Margaret and North Coolgardie districts, which varies, I am informed, from £49 to £60 per boiler after about three (3) months' steaming. Several cases have been reported where the density of the water in boilers has been from 10 to 22 ozs. to the gallon, and the incrustation deposited on the plates has been several inches thick.

Many boiler compositions are used in the State with more or less success.

13. It may be of interest to state that the *average* authorised working pressure allowed during the year 1899 was 70·44lb. per square inch, and for 1903 the average reached 77·44lbs. per square-inch, or an increase of 10 per cent. during a period of five (5) years. The average working pressure for the year under review compares favourably with some of the English Engine and Boiler Insurance Companies, which has been given in some of the engineering journals recently. I wish to point out that the increased average pressure is largely due to a much better class of boiler having been installed in the State during the last three (3) years, owing to the rigid inspection now enforced; thus the maximum pressure can invariably be allowed, as manufacturers in the Australian States, Great Britain, and elsewhere are fully aware that the boilers exported for use in this State have to be up to the standard. This is a great advantage to purchasers in this State, who benefit largely from the result of the work of this branch.

14. During the year twelve (12) large steel boilers (Cornish and Lancashire types) were manufactured in the State, which, although not many, is, nevertheless, a record. These were manufactured by a general engineering firm in Perth, and no very great exception could be taken either to the design, workmanship, or materials used; and they were turned out in a creditable manner. These boilers were all inspected periodically during construction, and if any defects were discovered they were immediately pointed out and remedied, if possible.

In view of the large amount of work and the travelling involved in some of the larger districts, I find it will be necessary to separate some of the districts and appoint another Inspector in the near future, in order that the work will be kept up to date.

I have, etc.,

C. J. MATHEWS,
Chief Inspector of Boilers.

4th May, 1904.

Appendix "A."

Statement showing Operations for Year ending 31st December, 1903.

Districts.	Number of Inspectors.	Total number of Boilers registered.	H.P. represented, based on grate area.	Boilers fitted in accordance with the Act.	Approximate number "Out of Use" on 31-12-1903.	Number of Certificates issued.	Total number of inspections including working inspections.	Boilers temporarily condemned.	Boilers permanently condemned.	Total amount of Fees represented.	Total amount brought to Revenue.	Remarks.
										£ s. d.	£ s. d.	
South-Western	3	1,020	10,366·22	781	366	847	1,197	23	17	1,110 11 0	1,156 11 7	
Coolgardie and Yilgarn	1	259	3,647·62	231	87	249	259	8	...	340 10 0	317 10 0	Inspector of Mines relieved and an Inspector of Boilers appointed 17th August.
Dundas		44	600·04	39	8	45	46	1	...	58 10 0	61 10 0	Inspector of Mines relieved and District placed under Inspector of Boilers, Coolgardie.
East Coolgardie	1	499	9,616·77	479	143	402	481	4	...	719 5 0	735 5 0	
North-East Coolgardie and Broad Arrow	...	146	2,131·99	103	45	112	145	2	...	208 10 0	168 0 0	N.E. Coolgardie now under Inspector of Boilers, Kalgoorlie. Broad Arrow District now under Inspector of Boilers, Malcolm.
Mount Margaret	1	183	2,821·17	158	70	138	166	7	...	188 5 0	204 5 0	Inspector of Boilers appointed 6th January.
North Coolgardie	1	192	2,769·86	147	59	175	200	14	...	251 0 0	263 10 0	
Murchison and Yalgoo	1	283	4,327·74	218	110	235	252	4	1	259 5 0	253 10 0	
East Murchison	1	89	1,188·74	67	28	102	124	7	2	123 10 0	120 10 0	
Pilbarra and West Pilbarra	...	19	242·00	...	...	...	...	...	...	...	...	Inspector not yet appointed. Districts not proclaimed under Act.
Grand Totals	7	2,734	37,712·15	2,223	916	2,305	2,870	70	20	3,259 6 0	3,280 11 7	

Appendix "B."

Return showing Classification and approximate Horse-power of Boilers Registered in each District for year ending 31st December, 1903.

Districts.	Vertical.		Portable.		Loco. Type (stationary).		Locomotive Engines.		Egg End.		Cornish.		Lancashire.		Semi-Cornish.		Underfired Tubular.		Return Tube and Marine Type.		Water Tube.		Other Types not mentioned.		Total Horse-power.	Remarks.
	No.	H.P.	No.	H.P.	No.	H.P.	No.	H.P.	No.	H.P	No.	H.P.	No.	H.P.	No.	H.P.	No.	H.P.	No.	H.P.	No.	H.P.	No.	H.P.		
South-Western	373	2,206·71	300	2,470·83	39	499·30	40	385·49	7	108·45	78	1,205·61	10	318·00	15	229·05	86	1,391·71	13	238·70	39	1,128·47	16	183·90	10,366·22	4 boilers of various types, broken up or unfit for use, not included.
Coolgardie and Yilgarn ...	78	628·41	20	221·83	9	127·87	5	49·10	7	76·00	87	1,504·72	7	217·50	1	16·75	24	452·20	1	2·30	9	302·20	3	48·70	3,647·62	8 do.
Dundas	14	126·84	6	58·70	2	15·50	...	...	...	...	18	316·50	...	...	2	26·50	2	56·00	...	...	...	...	...	...	600·04	
East Coolgardie	105	881·40	19	175·90	23	343·10	3	47·30	...	...	179	3,178·52	48	1,666·65	4	55·05	41	852·90	2	29·60	69	2,311·35	3	75·00	9,616·77	3 do.
North-East Coolgardie and Broad Arrow	45	400·74	9	85·17	14	213·80	4	81·30	2	28·00	55	985·09	5	143·00	2	37·96	9	141·93	...	...	...	...	1	15·00	2,131·99	
Mount Margaret	50	390·17	7	62·80	15	153·36	5	38·62	...	...	72	1,335·77	7	265·75	...	...	11	349·10	...	...	8	225·60	...	...	2,821·17	8 do.
North Coolgardie	71	562·95	10	97·55	3	16·14	2	16·30	...	...	74	1,402·78	8	290·00	4	63·29	16	320·85	...	...	...	...	...	...	2,769·86	4 do.
Murchison and Yalgoo ...	79	602·27	5	59·50	23	347·20	3	13·00	1	12·00	104	1,784·67	14	526·00	26	449·00	16	434·10	7	100·00	...	...	...	...	4,327·74	5 do.
East Murchison	21	183·77	4	49·67	7	72·30	3	9·00	...	...	40	686·40	1	38·50	5	73·50	...	...	...	...	3	63·60	1	12·00	1,188·74	4 do.
Pilbarra and West Pilbarra	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	19	242·00	242·00	
Grand Totals... ...	836	5,983·26	380	3,281·99	135	1,788·57	65	640·11	17	224·45	707	12,400·06	100	3,465·40	59	951·10	205	3,998·79	23	370·60	128	4,031·22	43	576·60	37,712·15	36 not included in this Table

Annual Report on Engine-drivers' Examinations.

The Secretary for Mines, Perth.

SIR,

1. I have the honour to submit my Annual Report for the year ending the 31st December, 1903, on the work done by the various Boards of Examiners appointed under "The Mines Regulation Act, 1895," and Amendments, also "The Coal Mines Regulation Act, 1902," for the purpose of granting certificates to engine-drivers.

2. At the end of the year there were nineteen (19) Examining Boards in existence, comprising 53 members, of whom 30 members represent the Chamber of Mines and the Engine-drivers' Association interests, and the remaining members being responsible officials of the Department. There were many changes amongst the members of some of the Boards, caused chiefly through their leaving the district for which they were appointed. These rapid changes, however, are not desirable.

3. There were 33 meetings held during the year, occupying in all 65 days. Three hundred and thirty-six applications were received for various certificates, and 247 certificates were granted, which include 18 copies issued in lieu of those "Lost or Destroyed," as tabulated hereunder :—

Class of Certificate.	Number Issued.
1st Class Certificate of Service	21
2nd „ „ „	9
1st „ „ Competency	40
2nd „ „ „	73
Learners' Permit Certificates	48
1st Class Interim Certificates	12
2nd „ „ „	26
Copies issued in lieu of those "Lost or Destroyed"	18
Total Certificates issued	247

4. The percentages of Candidates who passed the respective Examinations for First and Second Class Certificates of Competency, as compared with the applications received for the respective Classes during the year, are as follow :—

Class of Certificate.	1903.	1902.
	%	%
First Class Certificate of Competency	65·57	45·37
Second „ „ „	38·21	32·68

which shows a slightly better percentage than the results attained for the previous year, and conveys proof of the fact that the work done by the successful candidates showed an improvement on the preceding year. The standard and method of Examination for each Class of Certificate of Competency has been kept the same as near as possible, and the introduction of a specially designed model of a steam engine has been of great assistance to the candidates during the practical *viva-voce* Examination.

5. It is very gratifying to know that the Technical and Mining Schools in Perth, Coolgardie, and Kalgoorlie have decided to at once establish Engine-drivers' Classes for candidates who desire to qualify for Certificates, and I feel sure that, if competent Instructors be engaged, the result will be gratifying to all concerned.

6. The revenue derived in fees during the year came to £349 7s. 6d., and the expenditure amounted to £350 2s. 3d., which shows a debit balance of 14s. 9d.

7. During the year two (2) Engine-drivers were dealt with, both being the holders of First-class Certificates of Service. One was charged with seriously damaging a battery engine, caused through gross negligence whilst in charge of same, and the other case was one of overwinding whilst baling water. In the former case, the Engine-driver's Certificate was suspended by the Board for six (6) months, and in the latter case a warning was considered sufficient, as only very slight damage was done.

Both cases were, however, recorded.

8. I am glad to say the question as to whether Engine-driver's Certificates granted in any one State should be recognised in any other State of the Commonwealth, to which I briefly alluded in my Annual Reports for the years 1901-2, is now being considered by the respective States. But before that

Increase or decrease in quantity of principal kinds of Explosives, as compared with 1902:—

Explosives.	Increase per cent.	Decrease per cent.
Gelignite	...	1·58
Gelatine Dynamite	16·8	...
Blasting Gelatine	25·3	...
Dynamite	...	23·14
Gunpowder (including Sporting and Blasting Powders)	5·1	...

Return of Tests made on Explosives during 1903:—

Substance.	Passed.	Rejected.	Total.
Blasting Gelatine	326	...	326
Cheddite	21	...	21
Carbonite	2	...	2
Dynamite	14	...	14
Empire Powder	1	...	1
Fuse	144	...	144
Gelignite	810	54	864
Gelatine Dynamite	196	...	196
Pitite	1	...	1
Sundry analyses of Explosives and tests of materials	23	...	23
Totals	1,538	54	1,592

The above figures do not include samples which have been examined for their physical condition only.

The list of condemnations for the year has been very small, and was practically confined to some old stocks of Gelignite which had for some time been under observation, and which finally reached a condition when final disposal became necessary. They were accordingly condemned, and at the request of the owners they were allowed to be shipped to Melbourne for re-manufacture.

In addition to this, there have, during the year, been several small quantities of explosives condemned from time to time on inspection of premises, or destroyed at owner's request, being more or less in damaged condition.

These include:—

Sixteen cases of Tonite; five cases of Blasting Powder; one case of safety cartridges, and sundry small lots of Nitro-Glycerine explosives.

Several instances have also occurred in which stocks of explosives have been ordered to be put into consumption within a certain period on account of incipient deterioration.

Two new explosives have been added to the authorised list—viz., Cheddite and Empire Powder—after very careful and exhaustive tests.

There were seven licenses in existence for the importation of explosives at the close of the year.

Storage.

I regret to say that the year has acquired unusual prominence through the occurrence of the unfortunate explosion at Robb's Jetty in July last, by which a watchman (Thomas Whelan) lost his life.

This explosion occurred in a detonator magazine, erected by Messrs. Guthrie and Co. on the Fremantle reserve under the terms of the private magazine lease system, under circumstances which led to the conclusion that it had been occasioned by foul play.

The details of the circumstances surrounding this regrettable incident were fully ventilated at the very extended Coronial inquiry, and have already been set forth in official reports, so that I need not dwell upon the details here. The inquiry went to show that the watchman had died while endeavouring to fulfil his dangerous duties.

This explosion naturally led to an expeditious settlement of the many difficulties surrounding the removal of the magazine reserve to Woodman's Point, which had previously been determined upon. The scheme for the new reserve was referred to in my last report, but had been deferred through the late session of Parliament. It has, however, been put in hand, and is now, at the close of the year, on a fair way towards completion.

When the removal has been completed, this reserve will contain 20 main magazines with a total capacity of over 600 tons, and seven detonator magazines with a capacity of two and a-half million detonators, all enclosed by nearly four miles of fencing, and connected by about three miles of railway line; the latter also communicates with a jetty erected exclusively for handling explosives. The total area of the reserve is 327 acres.

I am also very glad to be able to report that the Kalgoorlie Reserve has been fenced during the year; and the more effective control ensured, together with the appointment of a caretaker, will remove many sources of danger which have previously existed. I trust that the enclosure of the Coolgardie Reserve will also soon be an accomplished fact.

Owing to the introduction of mining operations in the vicinity of the Menzies Reserve, the removal of the magazines thereon has been necessitated; and the transfer of explosives to a new site selected will be shortly undertaken.

With regard to explosives reserves established in the various parts of the State, and the private magazine system connected therewith, I am able to report their satisfactory working during the year.

There are now 36 reserves with a total of 2,216 acres. With the Fremantle reserve completed, there will be erected on these reserves 56 magazines, exclusive of detonator magazines (including Government buildings), with a total capacity of 1,245 tons. Outside of the Government reserves there are 22 magazines with a total capacity of 58 tons, five of which are on Government engineering works. Seventeen applications were made for magazine licenses during the year, of which 11 were granted. Nine existing licenses were revoked.

Sale.

Owing to the difficulties of inspection I regret to say that the licensed premises, under which are included all the small stores conducting the retail trade of explosives, are in anything but a satisfactory condition. I have reason to believe that a great many of them entirely avoid the obligations imposed under the Act, and on this account not only are undesirable sources of danger introduced in populous districts, but considerable loss is also entailed to the revenue.

Licensed Premises.

Year.	Applications received.	Licenses issued.	Licenses revoked.	Licenses remaining in force.
1896	27	18	...	18
1897	25	23	...	41
1898	24	13	4	50
1899	35	31	7	74
1900	46	42	16	100
1901	18	17	10	107
1902	31	32	14	125
1903	30	30	28	127

Inspection.

I would like to again call attention to the necessity, which is becoming more and more pronounced, for the appointment of a travelling inspector to assist me in supervising the widely-scattered licensed premises in various parts of the State. As will be seen above, there are 78 magazines, exclusive of detonator magazines, and 127 licensed stores, which require periodical inspection. These alone are enough to occupy the entire services of an officer to supervise, especially considering the distances which have to be covered; and there is a marked disparity between these numbers. It seems absurd to suppose that 127 stores are sufficient to meet the retail requirements of the State, while there are 78 large storage magazines. The few inspections which have been rendered possible for me by other duties have always revealed considerable avoidance of the Act, and I am convinced that, with an officer told off for this work, a good many stores could be found unlicensed which are not complying with their legal obligations. The retail trade in fireworks is particularly difficult to control, and a very large proportion of dealers entirely fail to comply with the Regulations. There are three very serious objections to this state of affairs:—

(1.) The danger involved to the general public.

(2.) The injustice involved to those who honestly comply with the Regulations.

(3.) Loss of revenue in the shape of license fees.

I beg earnestly to request, therefore, that such an officer should be provided during this year. Another difficulty which his appointment would meet is that which is experienced in conducting prosecutions in distant parts of the State, which is the only means in remote districts of bringing home to dealers the necessity of complying with the law.

Very great assistance has been rendered to me during the year by the Commissioner of Police and his officers, and by the State Mining Engineer and the Inspectors of Mines under his control. This assistance I would gratefully acknowledge.

Carriage.

I have for a long time been exercised in connection with the state of affairs which exists in connection with the carriage of explosives in and about Kalgoorlie. In connection with this matter, I have furnished a special report to you detailing the dangers which have arisen, and which, through the gradual development of the mines, have now assumed serious proportions.

I consider it absolutely imperative that some arrangement should be made in the near future to effectively cope with this matter, but the subject is surrounded with difficulties, owing to local circumstances which are not easy to overcome.

Suggestions have been made, and new regulations drafted, but these have received considerable opposition from the merchants controlling the trade, and from the mine managers, on the score of the extra expense involved. While it is desirable, as far as possible, to reduce the expense which may be forced upon a mining community, I cannot see that this should be allowed to overrule questions of public safety; and I think that this is a matter in which a strong stand should be taken.

PART 2.—ANALYTICAL.

Although statistics are not of much value in indicating the amount of work done in a Chemical Laboratory, it may be of interest to give, as in previous reports, a few figures in connection with this branch of my work.

Nearly 1,800 analyses have been made during the year, exclusive of tests of explosives, and the total examinations show a total of 3,369.

This includes criminal work conducted for the Law Department and Police; examination of multifarious articles for the West Australian Branch of the Federal Customs; examinations of waters, foods, and miscellaneous articles for other Government Departments, and analyses of fertilisers and soils in connection with my duties as Agricultural Analyst.

In connection with the last-named, I have been able during the year to assist in the drafting of a new Fertilisers Act by giving evidence before a Select Committee of the House of Assembly, and anticipate very large growth in this department of my work, owing to a decision arrived at by the Government to charge very low fees in order to encourage and assist those who are settling upon the land.

My staff now includes four permanent and one temporary analysts and two clerks, and I can only speak with the highest praise of the manner in which these officers have performed their work during the year. Considerable extra assistance will soon be necessary.

I have, etc.,

E. A. MANN,

Chief Inspector of Explosives and Government Analyst.

Report of the Engineer for Mines Water Supply.

To the Acting Secretary for Mines.

SIR,

For the information of the Hon. the Minister for Mines, I have the honour to submit my report for the year 1903.

In accordance with the decision of Cabinet the Mines Water Supply Branch was brought into existence on the 1st July, 1903, on which date I was appointed Engineer to the Branch.

The work, as in previous years, has been of a varied and miscellaneous character comprising the construction of tanks, sinking and deepening of wells, increasing existing supplies of water, conservation of water in soaks, clay pans and lagoons, clearing roads, boring for water, boring for alluvial deep leads, examination of water rights under the Act, maintenance of existing tanks, wells, etc., collection of revenue derived from the sales of water, investigating and reporting upon requests and petitions from the various Municipalities and Local Authorities relating to Water Supply, etc.

During the period under review, in addition to the numerous wells that have been sunk and equipped both for General Water Supply and State Battery purposes, the following tanks have been constructed, viz.: Mulgabbie Tank, 250,000 gallons; Emu Lake Tank, 150,000 gallons; Edjudina Tanks (2), 370,000 gallons, and Davyhurst Tank, 4,000,000 gallons. Also pipe lines have been laid from Menzies Tank to Town; Norseman Tank to Princess Royal with a branch to Norseman Townsite. These connections have been highly appreciated by the public, as it has enabled them to procure water at a much cheaper rate than formerly.

Another pipe line laid is one connecting the Menzies Well, on the Mulline Road, to the State Battery. This is purely a battery water supply, and in addition to supplying the State Battery with water it also supplies the Queensland Menzies mine, and latter on will no doubt be availed of by other mines in the district.

On the Murchison and Pilbarra districts the work has principally been confined to boring, well-sinking, surveys, and maintenance works.

The revenue for the year amounts to £5,249 15s. 6d., whilst the expenditure was £10,671 19s. 11d.; but I would explain that very little revenue is derived from the Murchison and none at all from the Pilbarra district. It will be seen that the disproportion between maintenance and revenue is in favour of maintenance expenditure; but it should not be overlooked that the large indirect revenue from the works of this branch was by far the more important factor.

During the latter half of the year the price of water sold to the public was reduced 30 per cent., which, although it conduced to increased sales, did not lead to a corresponding increase of revenue. This reduction was solely in the interests of the public, and not made from a commercial point of view,

The Water Boards Act was passed during the last session which enables local authorities to have portions of their districts constituted as Water Areas and to form Boards of Management. These Boards are empowered to raise funds to carry out the necessary work for Water Supply, or, by giving sufficient security, the work may be done for them by the Government. The first districts to avail themselves of this Act were those of Cue and Day Dawn, who, combining for that purpose, availed themselves of a clause by which the Governor could authorise the Hon. the Minister for Mines to exercise within a Water Area all or any of the powers conferred by this Act on a Water Board until the constitution of the Board, and with respect to any works constructed before or after the commencement of this Act until such works are transferred to the Board. A large amount of inspection, survey, and boring was done in order to locate a source of supply, and a suitable one having been found, the necessary works are now in progress. The scheme comprises the pumping of water 12 miles to a service reservoir near Cue, whence the water will gravitate to the towns of Cue and Day Dawn.

The rainfall for the Coolgardie and Eastern Goldfields District for the year was slightly higher than the average, and about equal to that of the previous year.

It is to be regretted that so large a proportion of the water conserved in our tanks should be lost by evaporation. Our returns show that the evaporation exceeds the sales by nearly 25 per cent.

The difficulty of finding impervious sites is another drawback on the Eastern Goldfields, and has necessitated asphalt lining in two cases, with excellent results, but rather costly, though cheaper than with any other known form of lining.

During the year, in addition to the three tanks before mentioned, there were sunk 33 wells, totalling a depth of 1,516 feet of sinking and 235 feet of driving, and affording a total supply of 203,256 gallons per day fresh and good stock water, and 86,400 gallons per day salt water; also 170 bores were put down, totalling a depth of 10,787 feet; in 91 of these water was struck, 79 bores proving dry.

Ten (10) tanks, sixteen (16) wells, and one (1) soak are leased as watering stations at present.

I have, etc.,

P. V. O'BRIEN,
Engineer for Mines Water Supply.

Per J. T. A.

Perth, 13th May, 1904.

can be satisfactorily accomplished, several alterations will be necessary; as every State, with the exception of South Australia, where Certificates are not required, has its own standard and method for conducting this work. It is, therefore, apparent if this change be desired it seems necessary:—

Firstly.—To uniformly grade Engine-drivers' Certificates issued in the various States, clearly indicating what engines each class of Certificate would entitle the holder to take charge of.

Secondly.—Examinations for each class of Certificates should be conducted on a uniform basis, and the standard and method of conducting Examinations for each class of Certificate should be well defined and adopted in all States.

Thirdly.—The constitution of the Examining Board for each State should be the same.

If this be established somewhat on the lines indicated, I see no reason why this reciprocity should not be agreed to. The question as to whether Certificates issued prior to that time should be recognised or not is a matter that would require special consideration, for the reasons stated herein.

9. During the year under review an "Inspection of Machinery Bill" was introduced, one of its objects being to abolish all Boards of Examiners under the Acts mentioned in paragraph 1, by the appointment of one Central Board who would control these Examinations for the whole State, and which would be far more satisfactory in every way than under the existing system; but unfortunately the consideration of the Bill was deferred by the Legislative Council, and has therefore been thrown out. It is to be hoped that it will be re-introduced when Parliament next meets.

10. The various members of the Boards have been most assiduous in carrying out their duties.

I have, etc.,

C. J. MATHEWS,
Chairman Board of Examiners.

25th March, 1904.

DIVISION VI.

Eighth Annual Report of the Chief Inspector of Explosives and Government Analyst, for the Year 1903.

The Secretary for Mines, Perth.

SIR, Perth, 31st December, 1903.

I have the honour to submit my Annual Report for the year ending 31st December, 1903, on the work done in this branch.

This work includes all the ground covered by my duties as Government Analyst, Inspector of Explosives, Agricultural Analyst, and Analyst for the Commonwealth Customs.

Owing to the transfer of my offices from Fremantle to Perth during the year, very much greater facilities have been afforded for performing the very varied classes of work engaging my attention, and the new laboratory and offices admirably fulfil that purpose.

I propose to divide my report into two parts, dealing respectively with (1) my work as Inspector of Explosives, and (2) various branches of my duties as Analyst.

PART I.—EXPLOSIVES.

Important changes have been effected, as regards the jurisdiction of Explosives, by the formation of the Fremantle Harbour Trust, who took over the control of explosives within the range of their jurisdiction, especially of all licensed lighters in the Port. In order, however, to preserve uniformity, I have been appointed Inspector under the Harbour Trust, and continue to act as adviser to that body. Great improvements have been made in consequence of this change, the Trust having appointed, at my suggestion, an officer to personally supervise the handling of explosives within the Port, and I think that every reasonable precaution is now taken in handling the large shipments of dangerous goods which are landed in Fremantle. The Regulations dealing with the Ports and Harbours of the State have been re-arranged to meet the new conditions.

The complete revision of other Regulations under the Explosives Act has also become necessary, and I hope that this will be accomplished very shortly.

IMPORTATION.

The enormous importation of explosives into this State still continues.

As far as quantities are concerned, the importations show a slight increase on the previous year, but in value they show a decrease.

This variable relation between quantity and value is very difficult to explain, and probably arises from a combination of different factors.

The following tables show the importation for the last 10 years, in comparison :—

Table.

	1894.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.
	£	£	£	£	£	£	£	£	£	£
Nitro-Glycerine Compounds	9,926	21,275	45,209	65,930	66,829	77,848	131,012	123,367	157,100	152,071
Blasting Powder	3,459	2,610	5,417	11,096	3,736	1,785	7,181	5,344	5,577	5,113
Sporting Powder	303	463	786	333	118	461	668	283	224	601
Fuse	2,456	3,032	9,768	6,174	6,992	7,309	9,193	11,687	13,439	10,433
Rackarock	...	1,800	125	434	2,282	549	802	...	115	...
Fireworks	74	251	164	386	213	105	167	150	341	...
Cartridges	1,372	1,174	2,069	2,505	2,382	3,254	3,793	5,973	8,593	...
Detonators	...	61	3,986	3,675	2,803	4,812	4,494	4,704	4,358	5,967
N.E.I.	1,633	1,318	18,823	1,666	2	...	6	779	...	4,651
Totals	19,223	31,984	86,437	92,199	85,357	96,123	157,316	152,287	189,747	178,836

I again give analysis of the importation of Nitro-Glycerine Compounds and Gunpowder :—

Name of Explosives.	In 1902.	In 1903.
	No. of lbs.	No. of lbs.
Gelignite	2,199,700	1,966,800
Gelatine Dynamite	401,250	468,750
Blasting Gelatine	530,000	664,250
Dynamite	39,050	30,000
Gunpowder (including Sporting and Blasting Powders)	3,449,994	3,626,278
Total	6,619,994	6,756,078

APPENDIX.

Report to the Secretary of State for the Home Department on Ankylostomiasis in Westphalian Collieries, by J. S. Haldane, M.D., F.R.S., Fellow of New College, Oxford.

SIR,

I have the honour to report that in compliance with your request I proceeded to the Westphalian Colliery District on 21st September to obtain further information as to the prevalence of ankylostomiasis, and the means which are being taken to combat the disease.

Mr. T. R. Mulvany, British Consul-General, and Dr. Koenig, Vice-Consul, to whom I applied at Düsseldorf, gave me extremely valuable help, and Mr. Mulvany not only furnished me with introductions and guidance, but himself accompanied me to some of the collieries. I was received with great courtesy and afforded every facility by the officials connected with the Government Mines Department at Dortmund, the managers of the various collieries which I visited, and the doctors specially engaged in combating the disease. I am specially indebted for information and assistance to Oberbergrath Bennhold, Prof. Löbker, Medicinalrath Dr. Tenholt, Dr. Bruns, and Mr. Meyer, manager of Shamrock Colliery.

Spread and Extent of the Disease.

Except for an isolated case reported in 1886, the first cases of ankylostomiasis among Westphalian colliers were observed in 1892 by Prof. Löbker, of the celebrated Bergmannsheil Hospital, Bochum, and up to the end of 1895 23 cases (two of which ended fatally) were recorded. It was at first believed that only one colliery (Graf Schwerin) was affected. By direction of the Board of Government Inspectors, however, all colliers showing any signs of anæmia were, after 1895, periodically examined for ankylostomiasis. These examinations, which were made by the medical officers of the Knappschafts-Verein under the direction of Dr. Tenholt, showed that scattered cases existed in a number of collieries, the number of cases thus discovered being:—

Year.	Number of Cases.	Number of Collieries affected.
1896	107	16
1897	113	32
1898	99	24
1899	94	27
1900	275	42
1901	1,030	65
1902	1,355 (till the end of October)	69

It should be understood that very few of these men were seriously ill, although they were all more or less anæmic. Dr. Tenholt informs me that only five deaths due to ankylostomiasis alone are known to have occurred during the last ten years, and none during the last two years, when every case was treated at an early stage. All the cases discovered were at once treated. It will thus be seen that the disease never attained to anything like the intensity observed in the case of the workers in the St. Gothard tunnel, several hundred of whom died before the nature of the illness and the appropriate treatment were discovered. So far as I am able to judge, the disease was probably also less serious in any of the affected collieries than was the case several years ago at Dolcoath, in Cornwall, and also less serious than in many Hungarian and Belgian mines.

The marked increase in the number of cases from the year 1900 began coincidentally with the introduction of a compulsory system of watering in dry collieries, and is attributed to the watering, which makes the ground sufficiently moist for the development of the ova to encapsulated larvæ.

At the end of 1902, in consequence of the alarm produced by the increase of the disease, several colliery companies made arrangements for the examination of samples of fæces from the whole of the men employed underground to ascertain how many carried the infection, and a representative committee was also formed for devising measures to combat the disease. The result of this systematic investigation, carried out in nine large collieries, was that, whereas according to the statistics already quoted, only 958 of the men employed were affected in health, the actual number of those infected ("worm carriers") was 6,190. It may thus be inferred at the beginning of the present year some 8,000 men were infected out of a total of about 200,000 men employed underground in the various collieries. The percentage of underground workers infected at the various collieries varied from 80 downwards. It must be clearly understood that out of the large number infected comparatively few were appreciably affected in health, the great majority being to all appearance perfectly well.

Source of the Infection of the Westphalian District.

There appears to be little doubt that the district was originally infected chiefly by men coming from Hungary. Owing to scarcity of labour in the district, many men have been attracted from Poland, Hungary, and elsewhere. Native Westphalian miners seemed to be in the minority in, at any rate, many parts of the district. Ankylostomiasis has existed for about 20 years in the neighbouring Belgian coalfields, but it appears that underground workers do not come from there to Westphalia. On the other

hand, the influx from Hungarian mines has been considerable. Thus, during nine months in 1897, it was ascertained that 372 miners had come from Hungary. A number of Hungarian collieries and metalliferous mines are known to have been for long infected with ankylostomiasis. The Brennburg Colliery has, for instance, been very seriously infected for some 30 years, and in a recent paper by Dr. Iberer, containing observations on the prevalence of ankylostomiasis in the colliery district in the South of Hungary, the author shows that not only is the disease widespread in mines, but that a considerable number of the ordinary inhabitants, who have never worked underground, or been near mines, are infected. As this is known to be the case in Italy also, including the northern parts, it seems probable that ankylostomiasis in a very mild form is endemic all over the South of Europe.

At the end of 1897 a Government regulation was made, providing that all foreign men applying for work in the mines should be examined for ankylostomiasis, and excluded if they were infected; and in 1900 a regulation for the total exclusion of Belgian and Hungarian miners was passed. By this time, however, the infection was already widespread within the district, so that these measures were of little or no use.

Conditions affecting the spread of Ankylostomiasis in mines.

The observations made in Westphalia during the last few years have greatly added to our definite knowledge of the conditions determining the spread of ankylostomiasis in mines. For the spread of the disease, three conditions are necessary: (1) pollution of the ground by human fæces containing ankylostoma ova; (2) a certain range of temperature in the mines; and (3) moisture of the ground. In dealing with the disease, attention to these three conditions is of the utmost importance.

To make the subject clearer, I may first recapitulate certain points as to the life-history of the worm. The adult worm (male and female) lives in the human small intestine, and nowhere else so far as is known. The female worm produces ova in enormous numbers, but these are all discharged in an undeveloped state at early stages of segmentation. The worm thus cannot multiply within the body, so that ankylostomiasis is sharply distinguished from ordinary infective diseases, the germs of which, when once introduced, are capable of multiplying indefinitely. Direct infection from person to person is also impossible.* The ova present in the discharged fæces at once begin to develop even at comparatively moderate temperatures when supplied with oxygen by exposure to the air. My own observations show that even at a temperature as low as 15° C. (59° F.) the eggs will hatch within a week, producing free larvæ. It has, however, been proved experimentally that neither the ova nor the free *unripe* larvæ are capable, when swallowed, of developing into the adult worm. The larvæ must first reach a more mature stage in which they have grown considerably and become provided with a distinct external envelope (encapsulated state). Direct infection from person to person is thus impossible. Laboratory observations show that the larvæ are unable to reach the encysted stage except at a temperature above 20°. Dr. Bruns of the Bacteriological Laboratory, Gelsenkirchen, who has made most careful investigations, informed me that 20° to 21° (69° F.) was the lowest limit of temperature at which he had been able to observe any larvæ develop to the encapsulated stage, and that at so low a temperature hardly any developed. The most favourable temperature, according to all observers, is from 25° to 30° (77° to 86° F.). He had observed that the larvæ will live for at least six months. Once formed, they are not killed by ordinary cold, and are very resistant to antiseptics. Deprivation of oxygen kills them in about three days. Exposure to ordinary daylight also kills them slowly. In ordinary water they live for long periods, but all observers are agreed that drying kills them at once. The newly hatched larvæ are far more susceptible to antiseptics than the encapsulated larvæ or the eggs. The encapsulated worms develop to the adult stage when swallowed. It has also been clearly proved by Professor Looss of Cairo, that they are capable of penetrating the skin and producing a temporary skin eruption in doing so. The same observer has recently published experiments, which appear to show that the larvæ which penetrate the skin are capable of reaching the intestine and so producing the disease. This point is still under discussion.

As to pollution of the ground in the mines by fæces, it appears that until recently such pollution was about as common in the Westphalian mines as it is in this country and elsewhere, although a certain number of boxes were provided underground for the use of the men. Hence the disease was easily spread in warm and moist mines as soon as infected men from Hungary or elsewhere were taken into employment underground.

The observations on the spread of the Westphalian epidemic fully bear out laboratory experiments as to the influence of temperature and moisture on the growth of the larvæ. The following table, which I have compiled from figures given by Dr. Tenholt, Chief Medical Officer of the "Knappschafts-Verein" for the Westphalian Colliery District, shows clearly the influence of temperature on the spread of the disease :—

Temperatures about working face.	Number of Collieries, 1901.	Number of men employed underground, 1901.	Number of cases of Ankylosto-miasis observed in 1901.	Cases per 1,000 men employed underground.
Below 17° (63° F.)	67	36,033	20	0·6
17°–20 (63°–68° F.)	84	68,604	25	0·4
20°–22° (68°–73° F.)	45	43,710	118	2·5
22°–25° (73°–77° F.)	33	39,836	466	11·7
Over 25° (77° F.)	12	9,853	392	39·9
Total	241	198,036	1,021	5·1

* A number of the wives and children of infected miners in Westphalia were examined for ankylostomiasis, but always with negative result. One case of apparent infection of a woman and two children at Brennberg in Hungary is probably explained by the fact that, as recently discovered, ankylostomiasis exists among the general population there.

Dr. Tenholt further remarks that the cases found in mines with a temperature of less than about 22° (71·6 F.) appear all to be among men who had come from mines with a higher temperature and were doubtless infected there. The following figures show the occupations of the affected men, up to 1902:—

Hewers	1,318	=	79 per cent.
Others employed underground ...	355	=	11 „
Total ...	1,673		

As the proportion of hewers to the total employed underground is about 50 to 55 per cent. in Westphalia, hewers are evidently much more liable to ankylostomiasis than other classes of underground workers. This is certainly attributable to the higher temperature at the working face.

The figures already quoted, as to the marked influence produced by watering on the spread of the disease, show clearly enough the influence of moisture. Dr. Tenholt also instances cases of dry collieries where the disease has not spread in spite of abundant opportunities of infection, and a high temperature.

Measures taken to combat the Disease.

About 1895, when the repeated discovery of cases of ankylostomiasis by Professor Löebker, and his publication of a report on the subject first attracted notice, special measures began to be taken for preventing the spread of the disease, and dealing sufficiently early with cases of illness; and increasing attention has since then been given to the subject. But for this the outbreak would certainly have had more serious results.

It was in the first place arranged that periodic medical inspections should be made on pay days of all the colliers employed in the district, so that those presenting any appearance of anæmia could be picked out for further examination. All those found to be suffering from ankylostomiasis were taken to a hospital and treated. The statistics obtained by this means are given above. The examinations were carried out by the regular medical officers of the "Knappschafts-Verein."* A regulation was also made that Belgian brickmakers or miners (who at that time were believed to be the source of infection) should be medically examined before being engaged. This regulation was shortly afterwards (in 1897) extended to Hungarian and other foreign miners; and in 1900 the engagement of foreign miners was prohibited. At Graf Schwerin Colliery, which up to 1896 was believed to be almost the only centre of infection, sanitary reforms were introduced in 1896. The use of a certain number of boxes or privies underground was prescribed, and pollution of the ground by the men forbidden. The large tank in which the men washed at the surface was also abolished, and shower-baths substituted.† This regulation was then extended to certain other collieries, and when it had become clear two or three years later that in reality many collieries were infected, special sanitary regulations were made by the Government Mines Department for all the collieries. These regulations were to the effect: (1) That there should be a suitable changing house, provided with shower baths, at every shaft regularly used by the men; (2) that portable water-tight receptacles for the use of men underground should be provided at every level from which coal is wound in a shaft, in the main haulage roads at junctions, in every working district, and also at any further points determined by the Inspector; the boxes to be emptied above ground and kept clean, and so far as possible odourless, disinfectants being used if there is any infectious illness; (3) that pollution of the ground by fæces was forbidden. So far as I could ascertain the number of boxes provided was at first not sufficient to prevent extensive pollution of the ground still continuing. The number has recently been greatly increased in the infected collieries, and I was informed that as a result the amount of fæcal material brought to the surface has also greatly increased, which seems to show that the provision made at first was in reality quite insufficient.

A few months before the regulations just mentioned were published the present system of watering, to prevent dust explosions, came into use throughout the district, in accordance with a regulation made in 1898. As already mentioned, the watering appears to have been the cause of the great increase in the number of cases of ankylostomiasis since 1899, as for several years before the watering was introduced there had apparently been no increase. The regulations prescribe that in every part of a mine which is in work, including all haulage roads and air-ways, as well as the whole working face, the dust shall be kept moist by watering, unless it is naturally moist, or for some reason special exemption has been made. I had an opportunity of seeing at several large collieries the system of watering carried out. Water-pipes are carried along all the roads right up to the working face, with cocks at short intervals for the attachment of the rubber hose used for watering the floor and sides. Except at certain places, where the watering had been temporarily stopped for the purpose of ascertaining whether by this means the spread of ankylostomiasis could be checked, all the roads which I saw were so thoroughly damped that a dust explosion was quite impossible. I was informed that the cost of installing the water-pipes at one large colliery which I visited had been about £25,000. The air at most parts seemed to be nearly or completely saturated with moisture. Owing to the great disturbance of the strata the seams are for the most part inclined to very steep angles, and are often almost vertical. Communication between the levels is

* The "Knappschafts-Verein" is a compulsory insurance organisation, dating in its original form from the 18th Century. Its funds are derived from money deducted partly from the wages of the men, and partly from the profits of the mine-owners. It provides medical attendance and allowances in case of accidents or sickness, and pensions in cases of incapacity for work; also funeral allowances, widows and orphans' allowances, etc. It has its own special medical officers. The business of the Knappschafts-Verein is managed under Government supervision by a Board elected partly by the men and partly by the mine-owners. The income for all purposes of the Knappschafts-Verein for the whole district is about £1,500,000, and the accumulated capital about £3,000,000, the number of members being about 250,000 for the Sick Fund, and 200,000 for the Pension Fund.

† In the Westphalian mines (as in Cornwall) the men wash and change their clothes in a specially artificially warmed building near the pit-head. The washing arrangements are on one side of the building, and consisted until recently of a large tank used in common by the men of each shift. The warm water in this tank naturally got dirty, and was considered to be a possible source of infection. Shower-baths have therefore been substituted during the last two or three years, and this arrangement is much cleaner and more convenient. Each man's clothes are suspended by a hook from a pully at the ceiling, the string being fixed to a numbered attachment to the side of the room. The room is kept warm and well-ventilated, so that the suspended clothes dry rapidly. Plenty of baths are also provided for the colliery officials and for visitors. These arrangements are greatly superior to anything I have met with at English mines.

frequently by ladders, as in a metalliferous mine. The workings are ventilated from below, so that the air passes upwards, and this circumstance contributes somewhat towards producing a saturated atmosphere at the working face, as the air tends to cool and condense moisture as it expands in rising, just as occurs in an up-cast shaft. The air in nearly all parts felt moist, and the floors, timbers, etc., were more or less moist, although actual pools of water were not specially frequent. It seemed pretty evident that the watering was calculated to greatly increase the chances of ankylostoma larvæ developing, provided that infected fæces were present.

The great increase of the disease led to several colliery companies, on the advice of Dr. Bruns of the Gelsenkirchen Bacteriological Laboratory, taking measures for having samples examined of the fæces of the whole of the men employed. The result, as already mentioned, was to show that far more were infected than exhibited any sign of illness. The alarm produced led to the formation in 1902 of a representative committee for the purpose of combating the disease; and in several collieries it was arranged that every man employed should be examined, and, if infected, treated at a special hospital erected for the purpose. Finally, a conference representing all concerned was held on April 4th at Berlin under the presidency of the Minister for Commerce. The official report of this conference contains a large amount of carefully collected information. As a result of the conference arrangements were made for obtaining complete information as to the real extent of the infection, and the effects of the measures taken. Further official regulations were made, of which the main provisions were as follows:—

That in every colliery (unless a similar examination had already been made) at least 20 per cent. of each class of men employed underground were to be picked out in presence of a doctor specially instructed in the recognition of ankylostomiasis, and that the fæces of these men were to be microscopically examined on at least three occasions by the doctor. The results of the examination were to be communicated to the Chief Inspector of Mines. Any man found to be infected was to be completely freed from the worms by treatment before he resumed work. The Chief Inspector was to decide whether any further measures were to be taken at the mine. It was further provided that no new man could be engaged for work underground without a medical certificate that his fæces were free from ankylostoma ova. The men were required to submit themselves to the necessary examination.

In the event of the examination of 20 per cent. of the men employed showing the mine to be a source of infection, additional measures were to be taken. The whole of the men employed underground were to be examined, and, if necessary, treated—at least 200 being examined per week, and the results of the investigation to be sent weekly to the Chief Inspector. Every man treated was to be re-examined monthly for three months. The examinations of the men employed were to be repeated and continued as long as required. The sanitary receptacles used by the men underground were required to be of metal, with a water-tight lid, and to be disinfected with steam after each emptying. A disinfectant (usually milk of lime, made of one part of lime to four of water) was to be poured into each box daily, and the surrounding ground also disinfected. The use of water from the sump for watering the dust was prohibited.

At the time of my visit to Germany the complete results of the examination of the men in the various collieries were not yet available. In the infected collieries the examination and treatment of infected men was still in progress. In a number of these collieries the whole of the men employed had been examined more than once, and many men had been repeatedly treated. The arrangements for obtaining samples of the fæces and making the microscopic examinations were usually very complete. A special room was provided, with an attendant, and apparatus for receiving each sample and preserving a portion for microscopic examination. Usually three preparations were examined from every sample, and samples were obtained on three days from each person. The treatment was carried out in a special hospital erected for the purpose on the colliery grounds. Special doctors and hospitals were provided by the Knappschafts-Verein.* The doctors had all received special previous instruction at the laboratory of Dr. Tenholt, of the Knappschafts-Verein, or of Dr. Bruns, of the Gelsenkirchen Bacteriological Institute. Each man was entitled to receive sickness allowance from the Knappschafts-Verein during the treatment, unless he had no dependents, in which case he was not entitled by the rules to sickness allowance.† The loss of pay had evidently been a very serious hardship to many of the men, as the treatment and subsequent examinations to ascertain the results required a considerable time. Much friction had arisen throughout the district in connection with this point. The hospitals which I saw were comfortably fitted up, and the men seemed to be well cared for in every way.

The underground sanitary receptacles in use at the different collieries are of several patterns. Except, I believe, in some of the uninfected collieries, they are all cylindrical vessels of galvanised iron and provided with a lid. Each is furnished with a seat, usually of wood. The latter is apt to become damp and sodden if the lid closes over it, and in some of the newer forms there are two wooden supports, fixed at the sides outside, instead of a circular wooden seat over which the lid closes.‡ This seemed a better arrangement. In other new forms the seat was of metal. The capacity of each receptacle was about 12 to 18 gallons. The disinfectant generally used was milk of lime. This had what seemed to me the very important disadvantage that there was a most offensive smell, which was often carried for

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* A special grant of £10,000 from the funds of the Knappschafts-Verein was voted for this purpose.

† The sickness allowance of the Knappschafts-Verein is half the regular pay, but a man who is in hospital is only entitled to half this allowance if he has dependents, and to nothing if he has no dependents. Most of the collieries now make up the allowance to full half-pay.

‡ For the following details as to the arrangements adopted at Shamrock Colliery, I am indebted to the manager, Mr. G. A. Meyer:—

"The receptacles are of galvanised iron, the lids having conical water-tight valves. In the older form there is a movable circular wooden seat inside the lid. The newer form has a wooden support on each side outside. The larger form (for main haulage roads, crosscuts, etc.) has a capacity of 18 gallons, and the smaller form (for the working face) of 12 gallons. Each receptacle has a number and district number. The distance from any working place to the nearest receptacle must not exceed 300 yards in a horizontal direction or 100 feet in a vertical or steeply inclined direction. At the pit bottoms there are several receptacles. On an average there is one receptacle to four men in the largest shift. At the surface there are 32 privies, of which at present only nine are for the use of the underground men, who number 2,100 in all. A number of water-closets in addition are to be provided.

"The privies above and below ground are inspected and put in order daily. In every district there is a man whose duty it is to see that the seats, etc., are clean, and that a disinfectant is added. Beside each receptacle there is a cask of milk of lime (1 to 4) for disinfection purposes. The receptacles are emptied into a cemented cesspool on the surface, cleaned with hot water, and then disinfected by placing them for a few minutes in an old boiler, which is filled with steam."

considerable distances, and would tend to deter men from using the receptacles. Another plan which I saw in operation was to have some water in each receptacle, and floating on the top of this a liquid disinfectant in the form of an oil, so that the fæces were always covered, and settled down under the water. This plan prevented all odour, and seemed to answer well.

The privies above-ground were often somewhat evil-smelling. Better arrangements, are, however, now being introduced. At Erin Colliery, for instance, excellent water-closets of simple construction, in a well-lighted and ventilated building, have been introduced, with the result that the men use them in preference to the receptacles underground, and there is far less trouble with the latter.

In several collieries efforts have been made to disinfect the mine generally. These efforts seem to have partly been due to the idea, for which satisfactory evidence was lacking, that numerous rhabdite forms of worm, found on damp timbers, etc., were ankylostoma larvæ. Various antiseptics were tried, and abandoned, largely on account of their smell. Milk of lime, pumped through hose from a large iron vessel, has, however, been extensively used, as it is cheap and has been shown to be fairly effective in killing larvæ. It is applied to the floors and lower parts of the timbers. Efforts at general disinfection have now been to a large extent abandoned, as the task seemed to be endless, and the action of the disinfectant at least only temporary and superficial, as the ova and encapsulated larvæ are very difficult to kill with ordinary antiseptics. Dr. Bruns informed me, for instance, that encapsulated larvæ immersed in 1 in 500 corrosive sublimate solution continue to move about for 24 hours, and that a saturated solution of phenol takes half-an-hour to kill them. Common salt in very strong solution is fairly effective; but the ova will hatch in salt solutions up to 2 per cent. The newly-hatched larvæ are far more sensitive to antiseptics than the ova or encapsulated larvæ; and even a 0·2 per cent. solution of phenol will kill them. This is an important matter in connection with the use of disinfectants in sanitary receptacles, as, if the larvæ are killed on hatching, no danger of infection can arise from the contents of the receptacles. An antiseptic which will without fail kill the newly-hatched larvæ is all that is needed.

Results of the Measures taken.

Complete statistical information as to the results of the measures taken will not be available for some time; but, through the courtesy of the officials of the Government Mines Department, I was informed as to the exact figures for several collieries, and as to the general tendency of the figures hitherto obtained. There has been a very marked general diminution during the last three or four months in the number of men infected with the worm, and probably a far greater diminution in the number visibly affected in health. Indeed, among many men whom I saw under treatment there was not a single case of marked illness. In the case of six large collieries, at which three rounds of medical examination and treatment of the whole hands employed had been made, the average number found to be infected was 30 per cent. at the first round of examination, and 8·7 per cent. at the third. The men who had been treated were sometimes re-infected in the mine, while in a certain number of other cases the treatment had apparently not been completely effective. Thus, in one series of observations 20 per cent. of the men who at the first examination had been found infected, and 12 per cent. of those found free, were discovered to be infected on a second examination a few weeks later. It was, of course, impossible to treat at one time the whole of the infected men at any colliery, so that the risk of re-infection was necessarily considerable. The most striking result had been obtained at Erin Colliery, where the percentage of infected men had been reduced from 80 to 15. At only one colliery had no distinct diminution been produced in the percentage infected. It must be remembered, however, that a diminution in the percentage of infected cases gives but an imperfect measure of the improvement. The number of worms present per person may be greatly reduced without a corresponding diminution in the number of men infected.

The system of constant medical examination (and treatment where needed) of the whole of the men employed at a colliery is, of course, only a temporary measure, designed to rapidly reduce to within manageable proportions the spread of the disease.

It is hoped that the sanitary regulations underground will suffice by themselves to prevent appreciable risk of the disease again becoming troublesome. To entirely eradicate the infection seems scarcely possible, but it seems quite practicable to reduce the infection to within such narrow limits that no cases of ill-health from ankylostomiasis can occur.

Treatment of the Disease.

The medicine which is universally used in Westphalia for treating ankylostomiasis is ethereal extract of male fern. As the doctors engaged in treating the disease are nearly all under the direction of Dr. Tenholt, the Chief Medical Officer of the Knappschafts-Verein, the procedure employed is fairly uniform. Dr. Tenholt informed me that, as a general rule, the following plan is adopted:—

On the first day, the patient, who is kept within the hospital, receives in the evening a purgative, consisting of 0·3 gramme (5 grains) of calomel. Next morning he takes no food, and is given eight to 10 or 12 grammes (two to three drachms) of extract of male fern, the taste being usually concealed by the addition of syrup of senna and a little chloroform. In the afternoon a further dose of 0·3 gramme of calomel is given. The patient is only kept in bed if he is weak. On the third day no medicine is given, except a further dose of calomel in the evening, if required. On the fourth day the dose of male fern is repeated in the morning, and the calomel in the afternoon. On the 5th, 6th, and 7th days the fæces are examined for ova, and if on three successive days no ova are found the patient is discharged. If ova are found the whole course is repeated from the beginning, and at the end of another five days the examination is repeated. If the result is again positive, there is another week of treatment and examination. If at the end of this time ova are still present, the patient is discharged for the time, as further treatment would be unwise. He cannot, however, return to work underground.

Such energetic treatment is, of course, not without its risks; but although several thousand men have been treated, no deaths are known to have been caused by the treatment. There have, however, been two cases of permanent blindness, several cases of temporary affection of vision, and several cases of alarming collapse. Dr. Tenholt remarks that some of the cases in which very few ova were present in the fæces have been most resistant to the medicine. Statistics are now being collected as to the number of doses required, the occurrence of bad effects, etc.

The opinion of both Dr. Tenholt and Prof. Loebker is that extract of male fern is preferable to thymol, provided that care is taken that the extract employed is fairly fresh. Experience with thymol did not seem, however, to have been very extended, and an alcoholic solution which is regarded by English authorities as somewhat dangerous, as the thymol is more apt to be absorbed into the circulation, had been, in some cases at least, employed.

The procedure adopted in Cornwall was to give a purgative of calomel in the afternoon, and next morning (usually a Sunday morning if the man was at work) to give three successive doses of 30 grains each (2 grammes) of thymol, as emulsion or in capsules, at intervals of two hours. The patient was kept in bed, and instructed to take no food except tea or coffee, and no alcohol. After the last dose another purgative was given, castor oil being, however, avoided. No unpleasant effects were observed. This treatment had often to be repeated later, but sometimes sufficed to free the fæces from ova. The patients were all treated at home, so that the results could not be so well observed as if they had been in hospital. All the men treated were anæmic and more or less ill, and the improvement following the treatment was very striking, although in one case the improvement was only slow, in spite of the fact that ova had completely disappeared from the fæces.

It is clear enough that both extract of male fern and thymol are very effective remedies, and there is little doubt that one or the other will continue to be preferred by different doctors. Thymol has, however, the advantage that it can always be obtained in good condition.

Prevention of Ankylostomiasis in English Mines.

From the account given above of the measures taken to combat ankylostomiasis in the Westphalian district, it is evident that the disease has been met and fought with great energy and thoroughness. I was particularly impressed with the combination of knowledge and vigorous initiative displayed by the management of the leading colliery companies as soon as the disease began to spread to an alarming extent. The experience already gained in Germany will, I think, be most valuable in connection with measures to prevent the spread of ankylostomiasis in England.

In devising such measures we are, unfortunately, still in the dark as to the extent to which sources of infection—*i.e.*, men infected with the worm—are already present throughout the colliery districts. It seems probable that, at any rate, not many cases of actual anæmia have occurred, as no outbreak has yet been reported in England, except in Cornwall, although the probability of the disease occurring has been generally known since the Cornish outbreak was discovered.

On the other hand, it seems not unlikely that men infected with the worm, but otherwise quite healthy, are working in collieries and spreading the infection in many parts of the country.

In the first place, many men who have worked in Cornish mines (most of which are probably infected) have gone to other mines, including collieries, in various parts of the country.

As the infection has existed for the last ten years in Cornwall, these men may well have spread infection. Some have been engaged in shaft-sinking, others at ironstone mines, in neither of which cases they would be likely to spread the disease; but others may have gone to work in deep and warm collieries, particularly in Wales. A further probable source of infection is the return from Africa, India, South America, and other tropical countries of men who have been infected there. It appears that a good many North of England miners have been in South Africa, where the disease is probably common among natives employed in the mines, though there is no published record of Europeans being infected, except at Kimberley. Men, other than miners, who have returned from tropical countries may also spread the disease; and a case of ankylostomiasis in a soldier who had served in India, and afterwards returned to underground work at a Scotch colliery, has recently been recorded by Professor Stockman, of Glasgow. Finally, the infection might be introduced by foreigners or others who have previously worked in infected Continental mines, or who came from countries in which infection is common among the general population (Italy, Hungary, and probably other South European countries).

Experience as to the infected mining districts on the Continent seems to indicate that invasion by the disease is very slow and insidious. Thus, in Belgium and Germany the first insolated cases were observed in 1884 and 1886 respectively, and it was about ten years before any serious general prevalence was noticed. It is, therefore, possible that at present a similar slow spread of infection is occurring among English collieries, and that should actual cases of anæmia begin to occur it will be found that infection is already spread broadcast.

The preventative measures possible are (1) exclusion of infected men from underground work, and (2) sanitary improvements underground.

Exclusion of infected men.

As regards (1), it must be clearly borne in mind that the exclusion of infected men is an extremely troublesome and difficult matter. To pick out and exclude until after treatment men who are actually anæmic from ankylostomiasis is comparatively easy, but of limited use from the point of view of prevention, since for one infected man suffering in health there will probably be ten who are also infected, though in a less degree, and yet are perfectly well. A careful microscopic examination of the fæces, or of a blood-film, would be needed for the purpose of discovering the infected men; and such an examination, to be effective, would need to be carried out by a doctor familiar with microscopic work. There are probably not many

doctors in colliery districts who would care to undertake the examination without previous experience; but arrangements might easily be made by which blood-films or samples of fæces could be sent by the doctor to a laboratory for examination. The limited experience gained by Drs. Boycott and Scott in Cornwall seemed to indicate that the blood-film method of detecting cases of ankylostomiasis is fairly reliable.* If so, this method would afford great advantages in the way of convenience, as unless special arrangements are made at a mine for obtaining samples of fæces, delay and the risk of fraud must result. More extended experience of the reliability of the blood-film method would, however, be needed before it could be definitely recommended. It is somewhat remarkable that very little attention seems to have been hitherto paid in Westphalia to either the changes in the blood, or several other equally important points in the pathology of ankylostomiasis.

There is nothing to point to the desirability at present of any general system of medical examination of men working in English collieries; but the question arises whether men, who have previously worked in infected mines or lived in infected countries, ought not to be excluded from warm mines until medical evidence is available that they are free from infection.

The men most likely to be infected are (1) men who have been employed recently (within, say, five years) in tropical, sub-tropical, or South European countries; (2) men who have worked in mines outside Great Britain, in countries to the South; (3) men who have worked in Cornish mines. The mines which would be liable to infection are those with a temperature of over 70 degrees.

Men who show evident symptoms of ankylostomiasis are a manifest source of danger to their comrades in a mine, and ought to be excluded unless they undergo treatment.

Sanitary Measures in the Mines.

In view of the probability of ankylostomiasis spreading in English mines, I think that their present condition, as regards sanitation, is a matter which urgently requires dealing with. So far as I am aware, there are, with rare exceptions, at present no arrangements in English mines for preventing pollution of the ground by human fæces. There are usually no underground sanitary receptacles of any kind, and the men are in the habit of relieving themselves at any convenient place. The consequence is that the ground is extensively polluted, and in warm mines which are not too dry the conditions are exactly those under which ankylostomiasis readily spreads. It is probable, also, that other infectious diseases may easily spread; and in German colliery districts the spread of enteric fever, dysentery, and cholera has been traced to insanitary conditions underground.

If things are left as they are, I think it is practically certain that ankylostomiasis will become prevalent throughout the deep collieries in Great Britain. Exclusion of infected men can, at the best, be only imperfectly carried out, except at great inconvenience and expense; so that, with the ground so polluted that infection can readily occur, the general spread of the disease is almost inevitable. There is thus, I think, very urgent necessity for the adoption of means by which pollution of the ground may be avoided.

The provision of good closets above-ground is, I think, a most important matter. The underground arrangements, to be effective, must also be carefully organised and supervised. Imperfect arrangements would inevitably fail. A disinfectant which would prevent all risk or fear of infection would need to be provided. The receptacles could be emptied above-ground, and the contents disposed of as manure, burned, or buried.

While I am aware that there is general anxiety on the part of the representatives of both mine-owners and employees to do all that is possible to avert an invasion of ankylostomiasis, I think that there are strong reasons for making some compulsory regulations; but since there appears to be little or no risk of ankylostomiasis infection in mines with a temperature not exceeding 70°, the regulations might, in the meantime at least, be limited to mines with a temperature of over 70° in the workings. This would exclude a large number of smaller mines, in which the regulations might be troublesome to enforce.

Need for further Information.

In conclusion, I should like to point out the desirability of obtaining further information as to the pathology of the disease itself, the mode of infection, the conditions under which the larvæ develop, the best disinfectants, and the simplest methods of diagnosis; also as to the best forms of sanitary receptacles for use underground; and, finally, as to the organisation of satisfactory means for the examination of suspected cases of infection with the worm.

I am, Sir,

Your obedient Servant,

J. S. HALDANE.

To The Right Honourable Aretas Akers-Douglas,
Secretary of State for the Home Department.

* Journal of Hygiene, Vol. III., 1903, page 95.

Western Australia.

MINING STATISTICS TO 31ST DECEMBER, 1903.

LETTER OF TRANSMITTAL.

Department of Mines,
Statist's Office,
Perth, 31st July, 1904.

The Secretary for Mines.

SIR,

I have the honour to transmit herewith, for the information of the Honourable the Minister for Mines, the Mining Statistics of 1903, which follow on the same lines as those of 1902.

GOLD.

At the end of the year 1903, the area covered by the nineteen goldfields of the State was 315,089 square miles, and the number of leases in force 2,328, extending over 30,415 acres. The gold produced was 2,335,425 ounces, containing 1,979,300 ounces of fine gold, of a sterling value of £8,407,531, being an increase in value of £679,601 over that of the preceding year.

The average fineness of gold produced during the year was ·8379, of a sterling value of £3 11s. 2¼d. per ounce—a falling-off from the year 1902 of 5½d. an ounce. In estimating the value of the *monthly* output of gold, these figures have been taken to the nearest shilling, viz., £3 11s. an ounce.

The gross weight of gold bullion received at the Perth Branch of the Royal Mint, together with that exported, *upon which the gold output of the State is calculated* was 2,436,311 ounces, equivalent to 2,064,801 ounces of fine gold, of a sterling value of £8,770,719.

MINERALS OTHER THAN GOLD.

In addition to the nineteen goldfields, there were four mineral fields, having an area of 1,532 square miles; in which 244 leases, comprising 33,083 acres, were in existence on the 31st December, 1903. The produce was principally coal, copper, and tin. The total value amounted to £181,825.

MEN EMPLOYED.

The number of men employed in **gold-mining** above ground was 7,980, and underground 9,349, or a total of 17,329; and in mining for **minerals other than gold** 890. There were also 3,387 diggers and fossickers on alluvial, making a total of 21,606 men engaged in mining pursuits.

Accidents.

There were 206 accidents, in which 43 men were killed and 179 injured. The number of fatalities was four more than in the preceding year.

Mining Machinery.

The estimated value of the mining machinery erected at the end of 1903 was £4,532,737, showing an increase of £228,340 over that of 1902.

General.

A comparative return for the year of the value of the mineral production of the Commonwealth and New Zealand is appended.

I have the honour to be,
Sir,
Your obedient servant,
JAMES WALLACE,
Statist.

Mineral Products.	Western Australia.	New South Wales.	Queensland.	Victoria.	Tasmania.	South Australia and Northern Territory.	New Zealand.
	£	£	£	£	£	£	£
Gold	8,770,719	1,080,029	2,839,813	3,259,483	254,403	90,031	2,037,832
Other Minerals ...	201,218	4,979,457	846,283	67,037	1,212,311	482,929	1,003,634
Value, all Minerals	8,971,937	6,059,486	3,686,096	3,326,520	1,466,714	572,960	3,041,466

MINING STATISTICS

TO 31ST DECEMBER, 1903.

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PART II.—MINERALS OTHER THAN GOLD.

PART III.—ALL MINES.

APPENDIX.

EXPLANATIONS OF SIGNS AND ABBREVIATIONS.

cy.	Cyanide process.	T.A.	Tailings Area.
con.	Concentrates.	W.R.	Water Right.
sl.	Slimes.	Ftd.	Forfeited
pl.	Plates.	Surr.	Surrendered.
¶	Extras (magnettings, skimmings, etc.).	V.N.R.	Void for Non-payment of Rent.
		Wdn.	Withdrawn.
R.C.	Reward Claim	Gf.	Goldfield
M.L.	Mineral Lease.	D.	District.
P.P.L.	Private Property Lease.	M.D.	Mining District.
M.A.	Machinery Area.		

SUMMARY OF MINERAL PRODUCTS.

GOLD and OTHER MINERALS produced during 1903, and the estimated Value thereof, together with a comparison for previous years, and the Total Production to date.

Description of Mineral.	1903.		1902.		1901.		1900.		Previous to 1900.		Total to date.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
		£		£		£		£		£		£
Antimony ... ... (Exported) statute tons	22	230	...	...	...	...	...	...	...	...	22	230
Gold (Exported and [1]†Minted) fine ounces	2,064,801	8,770,719	1,871,037	7,947.662	1,703,417	7,235,653	1,414,311	6,007,611	3,879,575	16,479,386	10,933,141	46,441,031
Black Tin ... ... (Raised) statute tons	817	55,890	620	39,783	734	40,000	823	56,702	2,001	95,797	4,995	288,172
Copper Ore ... ... (Raised) do	20,526	56,541	2,262	8,090	9,960	69,900	6,183	43,673	9,982	91,208	48,914	269,412
Ironstone ... ... (Raised) do	220	88	4,800	2,040	20,569	13,246	12,251	9,258	12,952	9,239	50,792	33,871
Lead — Ore ... ... (Exported) do	...	...	...	...	...	...	27	242	33,617	364,514	33,644	364,756
Lead — Silver Lead Ore (Raised) do	...	...	36	277	21	152	...	...	...	...	57	429
Lead — Pig ... ... (Exported) do	...	...	...	...	...	...	...	...	684	13,306	684	13,306
Silver ... ... (Exported) fine ounces	168,113	19,153	83,293	9,190	60,869	7,609	28,749	3,594	...	...	341,024	39,546
Asbestos ... ... (Exported) statute tons	[4]†	10	...	...	...	...	...	...	[2]†	1	...	11
Coal ... . (Raised) do	133,427	69,128	140,884	86,188	117,836	68,561	118,410	54,835	57,844	27,712	568,401	306,424
Cobalt Ore ... (Exported) do	...	...	2	41	...	...	...	...	...	...	2	41
Limestone ... (Raised) do	1,280	178	5,080	1,340	18,210	4,348	15,927	3,594	17,953	2,838	58,090	12,298
Mica ... ... (Exported) do	...	...	...	...	...	...	[2]†	3	[2]†	291	...	294
Plumbago Ore ... (Exported) do	...	...	1	6	...	...	...	...	...	...	1	6
Precious Stones (Exported) carats	...	...	...	...	[2]†	1,000	[3]†	24	...	...	...	1,024
Total Values	...	£8,971,937	...	£8,094,617	...	£7,440,469	...	£6,179,536	...	£17,084,292	...	£47,770,851

[1]† Since May, 1899. [2]† Weight not stated. [3]† 25 small diamonds raised, weight not stated. [4]† 4cwts.

AUSTRALASIAN MINERAL PRODUCTION.

COMPARATIVE TABLE showing the Output of all Mineral Products from the several States of Australia and the Colony of New Zealand during 1903.

Description of Mineral.	Western Australia.		New South Wales.		Queensland.		Victoria.		Tasmania.		*South Australia.		New Zealand.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
		£		£		£		£		£		£		£
Gold ... ... fine ounces	2,064,801	8,770,719	254,157	1,080,029	668,546	2,839,813	767,347	3,259,483	59,892	254,403	21,195	90,031	479,746	2,037,832
Copper ... ... statute tons	...	...	5,631	431,186	4,916	285,122	...	...	[1]†10,411	652,928	6,490	417,037	...	...
Copper Ore ... ... do	20,526	56,541	3,570		...	...	25	500	102	790	7,069	54,922	6	123
Lead ... ... do	...	...	3,505	38,586	3,795	43,639	...	...	...	...	720	8,799	[2]†21	170
Manganese ... ... do	...	...	74	254	1,320	5,332	...	...	...	...	10	19	70	210
Platinum ... ... fine ounces	...	...	530	1,061	...	...	...	...	...	...	...	...	...	...
Silver ... ... do	168,113	19,153	1,099,373	1,501,403	642,125	65,538	28,800	2,880	...	...	7,086	804	911,914	91,497
Silver Ore ... ... statute tons	...	...	330,581		...	...	...	...	...	...	211	1,267	...	...
Silver-Lead Ore ... do	...	...	18,483		...	...	...	...	4,242	192,492			...	...
Tin ... ... do	...	...	752	124,893	3,709	243,149	...	...	2,376	300,098	...	...	...	...
Black Tin ... ... do	817	55,890	...		...	...	33	2,165	...	...	...	...	...	...
Tin Ore ... ... do	...	...	547		...	...	...	...	306	10,822	...	...	2	180
Wolfram ... ... do	...	...	...	...	197	7,870	...	...	...	...	...	...	...	...
Zinc Spelter ... ... do	...	...	20,754	86,587	...	...	...	...	1,247	3,092	...	...	...	...
Antimony ... ... do	22	230	13	135	...	...	5	50	...	...	...	...	...	...
Bismuth ... ... do	...	...	22	9,537	11	2,523	...	...	...	...	...	...	...	...
Alunite ... ... do	...	...	2,485	6,212	...	...	...	...	...	...	...	...	...	...
Coal ... ... do	133,427	69,128	6,354,846	2,319,660	507,801	164,798	64,200	40,818	49,069	41,709	...	...	1,418,294	909,147
Brown Coal ... do	...	...	...	...	...	...	5,661	2,827	...	...	...	...	...	...
Coke ... ... do	...	...	160,592	108,764	...	...	...	..	...	...	...	...	...	...
Shale (Oil) ... ... do	...	...	34,776	28,617	...	...	...	...	...	...	...	...	...	...
Cobalt Ore ... ... do	...	...	153	1,570	...	...	...	...	...	...	...	...	...	...
Gypsum ... ... do	...	...	...	...	...	...	3,590	897	...	...	...	...	...	...
Iron ... ... do	...	...	6,086	85,790	...	...	...	...	...	...	...	...	...	...
Iron Oxide ... ... do	...	...	1,194	1,182	...	...	...	...	...	...	...	...	...	...
Ironstone ... ... do	220	88	22,120	15,834	9,808	3,852	...	...	5,980	2,905	...	...	...	...
Lime ... ... do	...	...	23,579	17,213	13,612	8,060	...	...	...	...	...	...	24	92
Limestone ... ... do	1,280	178	23,824	14,221	...	...	...	...	...	...	...	...	...	...
Molybdenite ... ... do	...	...	29	4,458	[3]†24	2,100	...	...	...	...	...	...	...	...
Plumbago Ore ... do	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Precious Stones ... carats	...	...	...	[4]†109,987	...	[5]†14,300	...	...	...	...	...	...	...	...
Unenumerated	...	10	...	72,307	...	...	...	16,900	[6]†	7,475	...	81	...	2,215
Total Values ...	...	8,971,937	...	6,059,486	...	3,686,096	...	3,326,520	...	1,466,714	...	572,960	...	3,041,466

* Including Northern Territory. [1]† Includes Blister Copper, 6,684 tons, valued at £569,304. [2]† Lead Ore. [3]† Includes some Bismuth and Wolfram.
[4]† Diamonds, 12,239 carats, valued at £9,987, and opal valued at £100,000. [5]† Includes opal, valued at £7,300. [6]† Flux.

PART I.—GOLD.

TABLE I.

MONTHLY GOLD PRODUCTION.

Return of Gold reported Monthly to the Mines Department from the respective Goldfields and Districts during 1903.

Goldfield.	District.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
		ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.
Kimberley	...	30·00	...	279·00	...	30·00	337·00	10·00	...	14·00	10·00	10·00	20·00	740·00
Pilbarra	Marble Bar	231·47	801·21	568·74	146·89	290·66	221·61	506·03	38·13	415·03	589·60	1,131·67	1,328·40	6,269·44
Do	Nullagine ...	124·57	317·92	68·45	1,309·19	236·04	279·47	445·88	296·26	354·44	1,152·58	316·53	159·35	5,060·68
West Pilbarra	...	507·50	565·51	1,096·40	598·23	...	738·51	8·25	923·75	653·59	21·26	799·93	23·38	5,936·31
Ashburton	...	120·00	60·00	70·00	90·00	...	160·00	70·00	...	60·00	60·00	...	270·00	960·00
Gascoyne	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Peak Hill	...	3,133·40	2,753·48	2,951·65	3,021·80	3,383·20	2,814·80	2,730·80	2,718·00	2,972·00	3,107·84	3,063·75	3,005·36	35,656·08
East Murchison ...	...	8,342·76	7,190·92	12,909·73	7,030·88	9,381·26	10,238·88	8,323·76	7,261·03	8,788·62	7,495·22	8,961·68	6,971·52	102,896·26
Murchison	Cue ...	1,612·73	1,517·70	1,586·05	1,094·15	2,553·79	1,429·67	2,157·10	1,664·95	1,601·70	2,626·60	1,700·85	2,453·35	21,998·64
Do	Nannine ...	2,617·55	1,967·62	1,918·40	1,439·81	942·80	3,031·08	2,406·90	1,687·70	2,110·57	1,814·40	1,707·30	1,827·00	23,471·13
Do	Day Dawn	14,275·42	13,008·63	13,074·14	13,505·94	14,320·80	13,607·77	13,898·32	14,279·53	13,876·42	13,692·74	13,941·40	14,447·91	165,929·02
Do	Mt. Magnet	1,019·63	1,449·50	3,390·71	4,864·17	2,371·57	2,634·76	3,390·82	3,228·12	2,179·88	2,441·46	2,017·23	1,404·75	30,392·60
Yalgoo	...	...	...	815·24	125·22	7·25	1,144·40	55·17	28·50	628·92	113·95	207·64	715·46	3,841·75
Mt. Margaret	Mt. Morgans	5,411·40	5,402·10	4,444·85	4,867·70	5,041·75	6,470·11	5,795·80	5,933·75	5,651·50	5,563·70	6,358·60	10,825·87	71,767·13
Do	Mt. Malcolm	6,969·14	7,256·94	7,786·36	7,590·08	7,742·97	8,302·77	7,889·12	7,528·75	8,519·36	7,525·69	8,424·93	8,426·88	93,962·99
Do	Mt. Margaret	4,112·90	3,528·12	3,961·70	3,571·86	5,029·75	3,133·82	4,436·71	5,206·95	3,251·59	4,202·14	3,088·82	3,236·12	46,760·48
North Coolgardie ...	Menzies ...	4,382·75	4,662·77	7,565·21	4,979·80	7,123·16	5,694·95	7,852·69	5,506·31	4,890·90	4,503·37	4,336·34	5,759·36	67,257·61
Do	Ularring ...	632·45	691·35	2,928·34	1,465·75	1,022·05	2,135·98	2,250·37	3,452·28	1,599·16	1,908·19	1,958·69	1,998·09	22,042·70
Do	Niagara ...	5,454·12	7,634·13	7,797·92	7,612·24	7,510·68	7,149·88	7,871·26	7,441·12	7,734·00	7,867·05	7,890·72	8,729·10	90,692·22
Do	Yerilla ...	106·70	898·10	508·35	654·41	741·85	1,189·03	1,822·12	2,908·80	1,169·85	1,193·35	1,623·40	2,617·93	15,433·89
Broad Arrow	...	1,209·20	2,171·74	1,912·12	2,207·19	2,980·65	2,996·33	2,651·43	2,890·30	3,059·83	3,086·61	2,633·54	2,170·19	29,969·13
North-East Coolgardie	Kanowna ...	3,264·49	3,114·11	3,893·53	4,055·45	4,638·60	4,899·01	4,245·30	3,995·75	3,759·16	3,814·27	3,968·99	3,942·30	47,590·96
Do	Bulong ...	1,444·93	999·21	983·90	2,682·13	864·02	1,119·20	683·17	1,154·28	817·06	905·41	1,155·89	1,682 22	14,491·42
Do	Kurnalpi ...	166·50	32·00	50·85	43·16	40·80	62·75	32·00	74·35	67·45	70·50	17·00	180·00	837·36
East Coolgardie ...	...	106,518·87	111,069·07	102,898·17	120,037·86	91,717·57	133,310·30	100,683·08	95,745·96	100,209·90	103,123·83	102,850·51	107,462·70	1,275,627·82
Coolgardie	Coolgardie	5,402·46	5,150·07	5,923·97	5,091·68	4,475·79	5,317·99	6,305·44	4,925·56	6,951·31	6,258·92	6,916·55	6,220·38	68,940·12
Do	Kunanalling	1,410·93	970·39	1,196·62	1,029·42	1,352·69	1,216 17	1,786·07	734·44	1,173·08	1,400·04	1,320·62	1,772·88	15,363·15
Yilgarn	...	780·24	2,356·58	1,734·65	1,179·02	2,160·54	2,121·22	2,039·18	2,171·64	1,581·03	1,639·26	1,907·26	3,944·62	23,615·24
Dundas	...	2,598·46	2,866·00	4,453·72	2,881·40	3,552·43	3,735·79	3,324·16	3,670·94	3,389·65	3,230·64	2,645·74	3,824·67	40,173·60
Phillips River	...	1,423·88	517·00	586·90	583·37	552·50	670 60	578·55	584 90	497·75	474·90	518·65	700·37	7,689·37
Donnybrook	...	31·50	17·05	6·50	...	3·00	...	...	...	...	...	...	...	58·05
Goldfields generally	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Total ...	183,335·95	188,969·22	197,362·17	203,758·80	180,068·17	226,163·85	194,249·48	186,052·05	187,977·75	189,893·52	191,474·23	206,119·96	2,335,425·15

TABLE II.

YEARLY GOLD PRODUCTION.

Return of Gold reported Annually to the Mines Department from the respective Goldfields and Districts to 31st December, 1903.

Goldfield.	District.	1903.	1902.	1901.	1900.	1899.	1898.	1897.	Previous to 1897.	Total to date.
		ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.
Kimberley	... ...	740·00	346·40	297·06	571·15	917·15	440·17	229·30	12,734·00	16,275·23
Pilbarra	Marble Bar	6,269·44	5,794·25	4,491·51	12,087·05	13,381·49	10,746·99	5,933·99	27,068·31	85,773·03
Do.	Nullagine	5,060·68	6,376·21	5,772·81	4,529·80	5,910·49	3,666·80	891·27	1,402·25	33,610·31
West Pilbarra	... ...	5,936·31	2,223,09	231·29	953·65	1,934·80	326·70	860·06	337·91	12,803·81
Ashburton	... ...	960·00	978·00	992·00	1,704·00	1,659·10	500·63	302·95	...	7,096·68
Gascoyne	... ...	...	...	90·00	74·00	333·77	13·50	13·55	...	524·82
Peak Hill	... ...	35,656·08	37,487·05	20,255·47	26,571·63	31,953·65	14,969·32	10,883·23	11,070·16	188,846·59
East Murchison	... ...	102,896·26	91,308·85	76,236·10	64,698·03	45,038·90	37,080·32	20,995·07	2,576·00	440,829·53
Murchison	Cue	21,998·64	23,038·49	20,769·60	20,148·81	24,480·33	24,278·32	22,443·77	23,012·18	180,170·14
Do.	Nannine	23,471·13	22,724·41	20,586·32	30,157·27	19,232·21	23,223·00	10,774·61	24,297·00	174,465·95
Do.	Day Dawn	165,929·02	132,068·54	71,767·53	14,646·86	12,999·41	13,906·17	16,827·67	57,968·05	486,113·25
Do.	Mt. Magnet	30,392·60	32,982·42	33,468·48	40,769·37	23,836·76	17,848·90	12,270·14	35,155·05	226,723·72
Yalgoo	... ...	3,841·75	5,853·37	9,238·25	10,101·86	12,135·94	3,298·95	3,455·79	7,227·00	55,152·91
Mt. Margaret	Mt. Morgans	71,767·13	59,091·55	46,933·84	36,595·18	16,775·01	9,940·42	3,779·42	330·00	245,212·55
Do.	Mt. Malcolm	93,962·99	88,842·92	95,061·27	88,702·20	52,841·97	35,586·16	18,049·81	4,362·10	477,409·42
Do.	Mt. Margaret	46,760·48	63,374·30	48,037·04	20,391·37	10,306·74	4,191·19	762·86	300·00	194,123·98
North Coolgardie	Menzies	67,257·61	64,551·60	66,107·60	56,655·56	69,729·71	54,348·45	57,855·34	21,883·88	458,389·75
Do.	Ularring	22,042·70	29,068·18	19,881·06	13,402·47	10,969·69	4,084·42	695·27	64·20	100,207·99
Do.	Niagara	90,692·22	81,178·21	50,205·64	28,064·69	26,041·40	9,581·91	595·87	206 00	286,565·94
Do.	Yerilla	15,433 89	10,218·59	12,110·70	8,651·25	10,227·34	4,864·10	2,216·34	4,808·77	68,530 98
Broad Arrow	... ...	29,969·13	19,675·20	34,675·44	52,433·32	48,194·38	27,726·43	14,464·54	9,129·25	236,267·69
North-East Coolgardie	Kanowna	47,590·96	46,965·27	40,870·27	47,382·66	78,074·01	152,645·47	30,823·97	8,327·95	452,680·56
Do. do.	Bulong	14,491·42	18,570·67	19,383·18	19,139·07	30,427·75	15,755·55	9,263·00	548·00	127,578·64
Do. do.	Kurnalpi	837·36	1,572·66	3,398·25	4,224·13	4,323·69	2,040·71	366·13	100·00	16,862·93
East Coolgardie	... ...	1,275,627·82	1,118,615·71	991,378·20	737,970·98	860,371·72	422,391·86	296,764·11	143,828·70	5,846,949·10
Coolgardie	Coolgardie	68,940·12	75,916·51	68,974·46	81,238·46	101,803·98	76,394·58	45,579·51	67,121·24	585,968·86
Do.	Kunanalling	15,363·15	11,943·18	15,769·97	21,174·55	24,486·06	23,278·26	19,211·97	7,060·52	138,287·66
Yilgarn	... ...	23,615·24	23,129·69	26,587·41	29,155·42	16,371·78	11,769·40	17,072·82	94,194·60	241,896·36
Dundas	... ...	40,173·60	34,750·60	37,084·09	41,083 63	44,213·30	36,798·48	19,283·52	3,979·90	257,367·12
Phillips River	... ...	7,689·37	8,494·36	712·84	39·00	...	...	...	...	16,935·57
Donnybrook	... ...	58·05	100·73	3·86	453·10	511·49	14·65	...	...	1,141·88
Goldfields generally	... ...	...	...	126·78	146·56	1,278·90	...	...	...	1,552·24
	Total ...	2,335,425·15	2,117,241·01	1,841,498·32	1,513,917·08	1,600,762·92	1,041,711·81	642,665·88	569,093·02	11,662,315·19

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, Alluvial, Dollied and Specimen Gold, and Ore treated, with Gold Yield, as reported to the Mines Department, to the 31st December, 1903.

Geographical Division.	Goldfield.	District.	Warden's Office.	Date of Proclamation of Goldfield.				Area in Square Miles.		Leases in Force.		Particulars of Plant.				Average Number of Men employed.	
				Proclamation gazetted.	To take effect from	Latest Amendment of Boundaries gazetted.	To take effect from	Goldfield.	District.	No.	Area in Acres.	Milling.		Cyaniding.		Above Ground.	Under Ground.
												Stamps.	Other Mills.	Leaching Vats.	Filter Presses.		
Northern Goldfields	Kimberley	... ...	Hall's Creek ...	20-5-86	20-5-86	31-10-02	1-11-02	33,000	...	3	19	25	...	...	...	3	...
	Pilbarra	Marble Bar	Marble Bar ...	1-10-88	1-10-88	20-9-95	1-11-95	34,880	25,205	27	258	55	4	8	...	30	46
	Do	Nullagine							9,675	20	244	50	...	4	...	47	66
	West Pilbarra	... ...	Roebourne ...	20-9-95	1-11-95	...	...	9,480	...	6	66	20	2	4	...	31	...
	Ashburton	... ...	Onslow ...	11-12-90	11-12-90	18-10-01	14-10-01	14,252	...	...	...	...	...	...	...	...	...
	Gascoyne	... ...	Carnarvon ...	25-6-97	15-4-97	...	...	5,061	...	2	36	...	...	...	...	...	...
Central Goldfields	Peak Hill	... ...	Peak Hill ...	19-3-97	1-4-97	...	...	12,194	...	59	693	50	1	8	9	195	168
	East Murchison ...	... ...	Lawlers ...	28-6-95	28-6-95	28-3-02	2-4-02	28,144	...	192	2,746	250	5	41	...	579	571
	Murchison	Cue ...							7,981	89	810	110	1	31	...	117	126
	Do	Nannine	Cue	24-9-91	24-9-91	8-2-95	23-1-95	20,513	7,716	93	1,114	199	1	42	...	119	120
	Do	Day Dawn							728	112	1,209	140	1	29	3	299	320
	Do	Mt. Magnet							4,088	94	834	100	1	31	...	214	243
	Yalgoo	... ...	Yalgoo ...	8-2-95	23-1-95	...	...	18,921	...	28	365	80	4	13	...	45	29
	Mt. Margaret	Mt. Morgans							1,323	33	614	90	...	44	3	202	303
	Do	Mt. Malcolm	Mt. Morgans ...	12-3-97	1-4-97	28-3-02	2-4-02	42,252	2,483	103	1,836	206	3	54	1	288	510
	Do	Mt. Margaret							38,446	132	2,089	195	3	66	...	288	390
	North Coolgardie ...	Menzies							10,342	129	1,508	160	2	62	5	271	381
	Do	Ularring							5,182	81	937	60	...	23	...	117	165
	Do	Niagara	Menzies ...	28-6-95	28-6-95	12-3-97	1-4-97	30,609	779	121	1,455	135	1	56	2	251	432
	Do	Yerilla							14,306	96	1,539	45	1	24	...	118	182
Eastern Goldfields	Broad Arrow	... ...	Broad Arrow ...	17-11-96	20-11-96	...	...	590	...	86	1,098	210	2	52	3	163	223
	North-East Coolgardie	Kanowna							1,099	89	1,118	200	11	65	...	238	389
	Do	Bulong ...	Kanowna ...	20-3-96	15-4-96	13-11-96	20-11-96	21,542	991	67	909	30	1	5	...	56	82
	Do	Kurnalpi							19,452	...	...	5	1	...	...	3	4
	East Coolgardie ...	... ...	Kalgoorlie ...	21-9-94	1-10-94	20-3-96	15-4-96	632	...	231	3,469	590	80	217	104	3,004	3,115
	Coolgardie	Coolgardie	Coolgardie ...	6-4-94	6-4-94	20-3-96	15-4-96	11,974	9,221	170	2,076	376	5	121	4	571	734
	Do	Kunanalling							2,753	73	908	135	4	37	...	200	228
	Yilgarn	... ...	Southern Cross	1-10-88	1-10-88	20-3-96	15-4-96	15,593	...	74	985	200	6	94	...	209	171
	Dundas	... ...	Norseman ...	31-8-93	31-8-93	22-8-02	1-9-02	11,500	...	72	793	130	3	43	3	177	252
	Phillips River	... ...	Ravensthorpe	21-9-00	14-9-00	22-8-02	1-9-02	3,850	...	17	298	40	1	...	...	53	72
	Donnybrook	... ...	Greenbushes ...	17-11-99	27-11-99	...	...	102	...	24	329	5	...	...	...	17	27
	Goldfields generally	... ...	... ...	...	...	...	...	...	...	5	60	60	6	5	...	75	...
			Total ...	...	...	...	...	315,089	...	2,328	30,415	3,951	150	1,179	137	7,980	9,349

TABLE III.—*Return showing, for the respective Goldfields and Districts, etc.*—continued.

Geographical Division.	Goldfield.	District.	Total for 1903.					Total previous to 1903.				
			Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	Ounces from unknown tons.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.
			Ozs.	Ozs.	Tons.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Tons.	Ozs.
Northern Goldfields	Kimberley	... ...	197·00	...	890·00	543·00	·61	...	1,373·00	...	15,663·50	14,162·23
	Pilbarra	Marble Bar ...	892·18	741·97	3,009·25	4,635·29	1·54	2,082·00	4,886·95	1,262·17	35,771·66	71,272·47
	Do	Nullagine ...	288·30	...	2,576·40	4,772·38	1·85	...	2,978·48	79·36	13,526·64	25,491·79
	West Pilbarra	... ...	372·16	...	4,673·00	5,564·15	1·19	...	2,136·48	3·63	3,859·15	4,727·39
	Ashburton	... ...	960·00	...	...	...	...	...	5,796·68	340·00	...	..
	Gascoyne	... ...	...	...	...	...	...	...	283·43	20·30	236·70	221·09
Central Goldfields	Peak Hill	... ...	...	...	66,072·50	35,656·08	·54	4,551·60	...	1,271·30	116,609·54	147,367·61
	East Murchison ...	... ...	640·98	641·50	154,954·22	101,613·78	·66	...	4,218·08	5,750·14	367,023·94	327,965·05
	Murchison	Cue	23·60	6·50	22,480·50	21,968·54	·98	1,072·00	348·81	1,340·86	150,057·60	155,409·83
	Do	Nannine ...	1,238·00	260·02	22,141·35	21,973·11	·99	...	2,031·60	3,938·91	142,842·86	145,024·31
	Do	Day Dawn ...	7·00	407·42	106,502·75	165,514·60	1·55	...	81·31	2,124·80	215,109·10	317,978·12
	Do	Mt. Magnet ...	192·25	189·81	28,820·53	30,010·54	1·04	...	683·33	4,585·52	196,898·88	191,062·27
	Yalgoo	... ...	...	...	2,412·00	3,841·75	1·59	...	25·08	310·40	61,218·98	50,975·68
	Mt. Margaret	Mt. Morgans ...	...	10·00	94,543·75	71,788·78	·76	...	24·55	1,949·89	139,448·95	171,470·98
	Do	Mt. Malcolm ...	73·21	114·16	116,141·25	93,775·62	·81	...	1,606·60	3,173·65	429,585·96	378,666·18
	Do	Mt. Margaret ...	126·75	10·89	60,112·33	46,591·19	·78	...	878·82	1,022·35	211,230·55	145,462·33
	North Coolgardie ...	Menzies ...	50·17	529·37	55,861·13	66,678·07	1·19	...	870·20	633·10	248,656·71	389,628·84
	Do	Ularring ...	....	1·50	16,278·20	22,041·20	1·35	...	5·12	332·97	49,243·91	77,827·20
	Do	Niagara ...	182·81	308·62	124,823·45	90,200·79	·72	...	172·43	587·61	206,099·95	195,113·68
	Do	Yerilla	...	1,364·85	13,813·50	14,069·04	1·02	275·00	1,122·44	6,301·41	33,685·43	45,398·24
Eastern Goldfields	Broad Arrow	... ...	2,940·43	68·50	35,826·15	26,960·20	·75	250·00	5,282·01	1,087·54	255,071·11	199,679·01
	North-East Coolgardie	Kanowna quartz	...	403·85	56,862·15	43,823·56	·77	...	...	4,508·47	196,857·30	173,839·45
		Kanowna cement	1,832·43	...	3,553·00	1,531·12	·43	...	111,735·99	1·00	109,233·43	115,004·69
	Do	Bulong	2,146·31	1,562·20	10,408·40	10,782·91	1·04	...	24,371·22	8,048·34	67,203·55	80,667·66
	Do	Kurnalpi ...	344·80	134·85	125·50	357·71	2·85	...	10,929·89	1,733·34	3,618·80	3,362·34
	East Coolgardie ...	... ...	752·94	1,013·45	966,793·51	1,273,861·43	1·32	500·00	12,194·15	10,393·23	2,923,520·25	4,548,233·90
	Coolgardie	Coolgardie ...	727·85	1,268·96	91,536·00	66,943·31	·73	...	4,883·73	2,811·67	557,455·10	509,333·34
	Do	Kunanalling ...	31·48	474·65	14,289·58	14,857·02	1·04	...	281·89	2,908·11	143,714·85	119,734·51
	Yilgarn	... ...	·50	211·00	50,623·50	23,403·74	·46	...	8·30	767·36	394,274·13	217,505·46
	Dundas	... ...	503·74	793·94	25,953·00	38,875·92	1·50	...	1,368·02	1,555·24	223,721·88	214,270·26
	Phillips River	... ...	227·00	38·21	8,179·75	7,424·16	·91	...	44·00	531·11	9,582·25	8,671·09
	Donnybrook	... ...	...	...	400·00	58·05	·15	...	32·10	...	1,253·30	1,051·73
	Goldfields generally...	... ...	...	...	...	...	...	...	142·33	176·01	...	1,233·90
		Total ...	**14,751·89**	**10,556·22**	**2,160,656·65**	**2,310,117·04**	**1·07**	**8,730·60**	**200,797·02**	**69,549·79**	**7,522,275·96**	**9,047,812·63**

TABLE III.—*Return showing, for the respective Goldfields and Districts, etc.*—continued.

Geographical Division.	Goldfield.	District.	Total Gold Production.						Quantity of Gold Exported and Received at Mint.					
			Ounces from unknown tons.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	During 1903.	Previous to 1903.	Total.	§ Value.		
			Ozs.	Ozs.	Ozs.	Tons.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	£	s.	d.
Northern Goldfields	Kimberley		...	1,570·00	...	16,553·50	14,705·23	·89	511·75	27,119·75	27,631·50	104,864	5	6
	Pilbarra	Marble Bar	2,082·00	5,779·13	2,004·14	38,780·91	75,907·76	1·96	14,220·20	194,590·19	208,810·39	789,595	11	1
	Do	Nullagine	...	3,266·78	79·36	16,103·04	30,264·17	1·88						
	West Pilbarra		...	2,508·64	3·63	8,532·15	10,291·54	1·21	6,481·58	[1]† 8,470·69	14,952·27	55,053	14	9
	Ashburton		...	6,756·68	340·00	...	...	...	135·30	5,400·00	5,535·30	21,465	19	6
	Gascoyne		...	283·43	20·30	236·70	221·09	·93	36·29	[2]† 655·51	691·80	2,148	8	2
Central Goldfields	Peak Hill		4,551·60	...	1,271·30	182,682·04	183,023·69	1·00	34,924·50	[3]† 133,856·69	168,781·19	630,553	8	4
	East Murchison		...	4,859·06	6,391·64	521,978·16	429,578·83	·82	102,903·76	[3]† 318,536·81	421,440·57	1,570,977	4	6
	Murchison	Cue	1,072·00	372·41	1,347·36	172,538·10	177,378·37	1·03	245,850·83	973,375·44	1,219,226·27	4,559,238	16	1
	Do	Nannine	...	3,269·60	4,198·93	164,984·21	166,997·42	1·01						
	Do	Day Dawn	...	88·31	2,532·22	321,611·85	483,492·72	1·45						
	Do	Mt. Magnet	...	875·58	4,775·33	225,719·41	221,072·81	·98						
	Yalgoo		...	25·08	310·40	63,630·98	54,817·43	·86	1,743·54	[4]† 40,916·68	42,660·22	161,368	2	10
Eastern Goldfields	Mt. Margaret	Mt. Morgans	...	24·55	1,959·89	233,992·70	243,259·76	1·04	225,192·57	[3]† 690,737·33	915,929·90	3,412,939	18	5
	Do	Mt. Malcolm	...	1,679·81	3,287·81	545,727·21	472,441·80	·86						
	Do	Mt. Margaret	...	1,005·57	1,033·24	271,342·88	192,053·52	·71						
	North Coolgardie	Menzies	...	920·37	1,162·47	304,517·84	456,306·91	1·50	198,820·49	[5]† 704,294·98	903,115·47	3,371,123	14	2
	Do	Ularring	...	5·12	334·47	65,522·11	99,868·40	1·52						
	Do	Niagara	...	355·24	896·23	330,923·40	285,314·47	·86						
	Do	Yerilla	275·00	1,122·44	7,666·26	47,498·93	59,467·28	1·25						
	Broad Arrow		250·00	8,222·44	1,156·04	290,897·26	226,639·21	·78	27,665·13	[6]† 168,660·84	196,325·97	739,203	15	1
	North East Coolgardie	Kanowna (quartz)	...	...	4,912·32	253,719·45	217,663·01	·86	47,733·54	[5]† 400,656·89	448,390·43	1,688,683	14	1
		Kanowna (cement)	...	113,568·42	1·00	112,786·43	116,535·81	1·03						
	Do	Bulong	...	26,517·53	9,610·54	77,611·95	91,450·57	1·18						
	Do	Kurnalpi	...	11,274·69	1,868·19	3,744·30	3,720·05	·99						
	East Coolgardie		500·00	12,947·09	11,406·68	3,890,313·76	5,822,095·33	1·50	1,358,374·81	[5]† 4,776,235·53	6,134,610·34	22,915,667	0	11
	Coolgardie	Coolgardie	...	5,611·58	4,080·63	648,991·10	576,276·65	·89	90,854·23	[7]† 978,133·66	1,068,987·89	4,033,791	11	8
	Do	Kunanalling	...	313·37	3,382·76	158,004·43	134,591·53	·85						
	Yilgarn		...	8·80	978·36	444,897·63	240,909·20	·54	26,856·28	313,013·62	339,869·90	1,283,727	2	0
	Dundas		...	1,871·76	2,349·18	249,674·88	253,146·18	1·01	41,553·90	[8]† 217,170·94	258,724·84	971,351	15	6
	Phillips River		...	271·00	569·32	17,762·00	16,095·25	·91	8,941·21	[9]† 8,575·86	17,517·07	63,490	4	10
	Donnybrook		...	32·10	...	1,653·30	1,109·78	·67	97·52	[10]† 849·13	946·65	3,567	1	5
	Goldfields generally		...	142·33	176·01	...	1,233·90	...	3,413·37	13,212·27	16,625·64	62,219	8	2
		Total	8,730·60	215,548·91	80,106·01	9,682,932·61	11,357,929·67	1·17	2,436,310·80	9,974,462·81	12,410,773·61	46,441,030	17	0

§ To 1900 at £3 16s. per oz.; 1901, at £3 17s. per oz.; 1902, at £3 13s. per oz.; 1903, at £3 12s. per oz. [1]† Prior to 1st May, 1898, included with Pilbarra. [2]† Prior to 1st March, 1899, included with Ashburton. [3]† From 1st August, 1897. [4]† Prior to 1st April, 1897, included with Murchison. [5]† Prior to 1st May, 1896, included with Coolgardie. [6]† From 1st September, 1897. [7]† Declared 5th April, 1894, to which date included with Yilgarn. [8]† Prior to 1893 included with Yilgarn. [9]† Prior to 1902 included in Goldfields generally. [10]† From 1st March 1899.

TABLE IV.

Production of GOLD FROM ALL SOURCES, as reported to the Mines Department, showing the Output from Mines yielding Gold during 1903, and the Total Production to date.

Kimberley Goldfield.

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£ s. d.
Hall's Creek ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	423·00	520·58	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	...	94·55	68·30	...	
Mt. Dockrell ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	44·00	475·00	...	
				a. r. p.											
Ruby Creek ...	61	Ruby Queen	... ...	6 2 0	...	...	890·00	543·00	·61	...	...	8,634·00	6,011·11	·70	3 14 0
Do ...	46	St. Lawrence	... ...	5 3 36	...	...	...	...	...	...	...	1,486·00	1,673·58	1·12	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	1,469·50	1,836·58	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	...	151·00	138·85	...	
The Brockman ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	1,352·75	1,530·47	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	...	2,462·00	2,054·35	...	
The Mary ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	399·00	228·85	...	
The Panton ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	34·70	151·14	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	...	3·00	16·42	...	
		From Goldfield generally—													
	Alluvial			...	197·00	...	...	...	...	1,570·00	...	...	...	...	
			Total ...	...	**197·00**	...	**890·00**	**543·00**	**·61**	**1,570·00**	...	**16,553·50**	**14,705·23**	**·89**	**3 14 0**

Pilbarra Goldfield.

MARBLE BAR DISTRICT.

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£ s. d.
Bamboo Creek ...	161 (193) ...	... ...	(Bamboo Consolidated G.M. Co., Ltd.)	...	...	...	...	...	...	...	...	1,579·50	3,276·00	2·07	
Do ...	161	Bulletin	... ...	6	...	...	180·00	180·00	1·00	...	...	1,750·00	3,086·00	1·76	3 19 0
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	7,202·75	13,580·15	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	64·00	137·85	...	...	...	136·00	438·35	...	
Boodalyerrie ...	617	Bateman and White's Reward	... ...	12	...	...	6·00	93·50	...	...	...	6·00	93·50	...	
Do ...	601	Golden Granite ...	... ...	6	...	...	74·00	418·00	5·65	...	99·00	106·25	728·05	6·85	2 13 0

Do	...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	50·00	...	...	...				
Breen's Find	...	614	Breen Brothers' Reward	... ...	Wdn.	...	...	14·00	87·50	6·25	...	...	14·00	87·50	6·25				
Lallarookh	...	606	Bergamina	... ...	15	...	...	98·00	48·00	·49	...	...	186·00	101·00	·54				
Do	...	569	Kitchener	... ...	6	...	...	...	...	...	...	...	38·50	37·10	·96				
Do	...	R.C. 112 ...	... ...	Lallarookh G.M. Co. ...	...	...	...	1,781·00	1,383·05	·78	...	...	6,277·55	7,414·56	1·18	3	5	8½	
Do	...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	..	...	30·45	50·30	...				
Marble Bar	...	7	(Augusta)	... ...	Surr.	...	...	...	...	...	...	...	72·00	30·96	·43				
Do	...	3, 7, 21... ...	... ...	British Exploration of Australasia, Ltd,	Surr.	...	...	...	...	...	...	...	15·00	26·60	1·77				
Do	...	7 (280) ...	... ...	(Consolidated G.Ms. of W.A. Ltd.)	Surr.	...	...	...	...	...	...	...	1,472·50	‡1,594·97	1·08				
Do	...	613 (579) ...	Homeward Bound ...	... ...	6	...	...	...	...	...	...	...	7·00	22·90	3·27				
Do	...	3, 21 (157, 160)	... ...	(Stray Shot and Excelsior G.Ms. Ltd.)	Surr.	...	...	...	...	...	...	...	4,059·90	10,128·20	2·49				
Do	...	3, 21	(Stray Shot and Excelsior)	... ...	Surr.	...	...	...	...	...	...	...	...	195·00	...				
Do	...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	82·00	2,317·00	3,446·99	...				
Do	...	... ...	Sundry claims ...	... ...	...	...	...	24·00	24·00	...	...	...	443·80	845·94	...				
North Pole	...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	416·00	324·40	...				
North Shaw	...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	8·50	...	351·45	812·65	...				
Do	...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	640·00	...	...	...				
Sharks	...	... ...	Sundry claims ...	... ...	...	190·00	...	...	...	...	190·00	...	6·00	40·75	...				
Shaw River	...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	101·00	62·95	...				
Talga Talga	...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	571·50	1,225·40	...				
Do	...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	...	204·65	652·14	...				
Tambourah	...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	1,404·50	1,966·66	...				
Do	...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	20·00	639·25	911·20	...				
Warrawoona	...	505	Bowbells	British Exploration of Australasia, Ltd.	12	...	...	...	...	...	...	...	483·70	855·69	1·76				
Do	...	483	... ...	British Exploration of Australasia, Ltd.	12	...	...	...	...	...	...	...	161·00	257·50	1·60				
Do	...	483	(Gauntlet)	... ...	...	...	...	...	...	...	...	...	1,128·30	3,436·05	3·04				
Do	...	564	Imperialist	... ...	6	...	...	147·00	181·07	1·23	...	...	695·75	810·58	1·16				
Do	...	473	Klondyke	... ...	6	...	...	...	...	...	...	...	706·75	4,700·76	6·65				
Do	...	604 (476) ...	Klondyke Boulder ...	... ...	12	...	...	198·00	567·00	2·86	...	...	279·05	726·65	2·60				
Do	...	(522) R.C. 94...	Kopcke's Reward Block	... ...	V.N.R.	...	...	71·50	166·25	2·32	...	...	302·55	912·51	3·02	3	10	6	
Do	...	573	Trible Event	... ...	V.N.R.	...	...	...	...	...	...	...	3·25	4·00	1·23				
Do	...	611 (571) ...	Wheel of Fortune ...	... ...	Ftd.	...	...	...	...	...	...	...	67·75	131·60	1·94				
Do	...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	6·00	1,498·61	3,968·40	...				
Do	...	... ...	Sundry claims ...	... ...	...	...	433·30	84·85	332·57	...	50·00	433·30	317·15	634·84	...				
Western Shaw	...	... ...	Voided leases ...	... ...	...	...	...	..	...	...	...	...	1,221·00	1,146·29	...				
Wyman's Well	...	... ...	Sundry claims ...	... ...	...	...	...	33·95	52·25	...	...	...	62·45	128 65	...				
Yandicoogina	...	451	Eastern	... ...	6	...	...	111·00	113·00	1·02	...	...	642·85	748·80	1·16	3	7	6	
Do	...	545	Patrick	... ...	6	...	...	22·50	61·00	2·71	...	...	215·00	572·00	2·66	3	5	6	
Do	...	494	Uncle Tom	... ...	6	...	...	78·00	313·30	4·02	...	...	382·20	1,299·71	3·40				
Do	...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	140·27	949·95	3,324·92	...				
Do	...	... ...	Sundry claims ...	... ...	...	...	284·50	12·00	44·40	...	...	284·50	84·75	100·50	...				
From District generally—																			
Sundry parcels treated at Lady Adelaide Battery						...	...	...	*cy.* 400·00	...	...	...	18·50	411·65	...				
Do do Pilbarra Cyanide Works						...	...	...	...	...	...	...	...	60·16	...				
Do do Salgash Public Crushing Battery						...	...	9·45	32·55	...	...	...	151·80	496·28	...				
Alluvial						130·00	...	...	...	...	4,405·50	...	...	...	...				
Notices of Purchase						572·18	24·17	...	...	...	1,125·13	249·07	...	...	...				
Total						892·18	741·97	3,009·25	4,635·29	1·54	5,779·13	2,004·14	38,780·91	‡75,907·76	1·96	3	5	3	

‡ Also 2,082ozs. from unknown tons.

TABLE IV.—*Production of Gold from all sources, etc.*—continued

Pilbarra Goldfield—*continued.*

NULLAGINE DISTRICT.

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	ons.	ozs.	ozs.	£ s. d.
Elsie ...	86L	Elsie	... ...	V.N.R.	...	...	...	...	...	...	...	408·25	1,413·82	3·46	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	...	20·00	17·90	...	
Mosquito Creek ...	129L	Belle Vue	... ...	V.N.R.	...	...	...	...	...	...	...	34·40	116·50	3·38	
Do ...	109L	Federal	... ...	6	...	...	...	...	...	...	...	48·00	59·20	1·23	
Do ...	79L	Galtee More	... ...	6	...	...	...	...	...	...	...	484·00	1,291·15	2·66	
Do ...	127L (88L) ...	Latest Surprise ...	... ...	6	...	...	108·00	179·10	1·66	...	...	188·00	376·10	2·00	
Do ...	95L	Parnell	... ...	12	...	...	155·00	120·50	·78	...	...	357·35	384·40	1·07	4 2 0
Do ...	102L	Parnell North	... ...	V.N.R.	...	...	...	...	...	...	...	154·85	269·35	1·74	
Do ...	146L	Parnell North	... ...	6	...	...	41·50	41·00	·99	...	...	41·50	41·00	·99	
Do ...	130L (93L) ...	Rattler	... ...	V.N.R.	...	...	...	...	...	...	...	27·00	48·60	1·80	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	170·25	351·55	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	106·05	221·90	...	...	...	1,134·44	1,777·73	...	
Nullagine ...	106L	Barton	... ...	18	...	...	802·00	1,046·20	1·30	...	...	1,881·65	2,428·95	1·29	3 15 9
Do ...	119L, 120L, 121L, 122L	... ...	British Exploration of Australasia, Ltd.	96	...	...	777·00	94·10	·12	...	...	777·00	94·10	·12	
Do ...	122L	(Grant's Hill)	... ...	...	...	...	...	...	...	...	...	1,658·00	743·04	·44	
Do ...	113L	Hopetoun	... ...	Surr.	...	...	...	...	...	...	...	100·00	51·40	·51	
Do ...	108L	Old All Nations ...	... ...	Surr.	...	...	5·00	5·30	1·06	...	...	175·50	279·21	1·59	
Do ...	140L	Onion	... ...	3	...	...	5·75	10·00	1·74	...	...	5·75	10·00	1·74	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	15·00	4,394·25	8,122·82	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	145·90	609·30	...	112·50	51·25	2,954·50	6,776·31	...	
20-Mile Sandy ...	137L	Central	... ...	12	...	...	...	...	...	...	...	20·75	53·05	2·55	
Do ...	139L	Eureka	... ...	Wdn.	...	...	82·20	75·65	·92	...	...	82·20	75·65	·92	
Do ...	136L	Little Wonder	... ...	6	...	...	281·00	1,882·37	6·70	...	...	344·00	2,507·27	7·23	4 2 8½
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	36·00	137·00	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	67·00	107·51	...	...	...	566·90	1,157·39	...	
		From District generally—													
	Sundry parcels treated at Barton Excelsior Battery			...	...	...	...	...	...	...	...	13·50	5·80	...	
	Do do Lady Ray Works			...	...	...	...	...	...	...	...	25·00	20·00	...	
	Do do Lambert's Treatment Works			...	...	...	...	*cy.* 379·45	...	...	...	...	1,638·50	...	
	Do do Royer's Public Crushing Battery			...	...	...	...	...	...	...	...	...	16·38	...	
	Alluvial			...	...	...	...	...	...	1,644·29	...	...	...	...	
	Notices of Purchase			...	288·30	...	...	...	...	1,509·99	13·11	...	...	...	
			Total ...	...	288·30	...	2,576·40	4,772·38	1·85	3,266·78	79·36	16,103·04	30,264·17	1·88	4 2 5¾

West Pilbarra Goldfield.

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£ s. d.
Croydon ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	8·00	6·00	...	
Hong Kong ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	331·00	513·63	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	24·90	·03	9·00	3·85	...	
Lower Nicol ...	122	King's Gold Mine ...	... ...	V.N.R.	...	...	...	...	...	...	...	23·00	25·25	1·09	
Do ...	106, 109 (124)	Ninety-nine leases ...	... ...	12	...	...	...	...	...	...	·45	479·00	230·00	·48	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	7·50	11·95	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	12·15	3·15	10·00	13·40	...	
Mallina ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	103·60	121·22	...	
Pilbarra ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	148·00	330·00	...	
Station Peak ...	117/8	Pilgrim's Rest leases ...	... ...	48	...	...	4,673·00	5,286·73	1·13	...	...	5,453·00	6,369·38	1·17	3 13 0
Towranna ...	129	Yellow Aster	... ...	3	...	...	...	*cy.* 270·00	...	...	...	...	270·00	...	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	1,934·80	2,122·14	...	
Weerianna ...	... ...	Voided Leases ...	... ...	...	...	...	...	...	...	...	...	25·25	267·30	...	
From Goldfield generally—															
Alluvial				...	372·16	...	...	...	...	1,107·23	...	...	...	...	
Notices of Purchase				...	...	...	...	7·42	...	1,364·36	...	...	7·42	...	
			Total ...	...	372·16	...	4,673·00	5,564·15	1·19	2,508·64	3·63	8,532·15	10,291·54	1·21	3 13 0

Ashburton Goldfield.

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£ s. d.
Mt. Mortimer ...	... ...	Sundry Claims ...	... ...	...	...	...	...	...	...	374·00	340·00	...	...	...	
From Goldfield generally—															
Alluvial				...	960·00	...	...	...	...	6,382·68	...	...	...		
			Total ...	...	960·00	...	...	...	...	6,756·68	340·00	...	...	...	4 0 0

TABLE IV.—*Production of Gold from all sources, etc.*—continued.

Gascoyne Goldfield.

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	
Bangemall ...	6	Elderado	... ...	12	...	...	...	...	...	...	...	41·00	41·95	1·02	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	6·80	195·70	179·14	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	13·50	...	...	...	
		From Goldfield generally—													
		Alluvial		...	...	...	...	...	...	265·00	...	...	...	...	
		Notices of Purchase		...	...	...	...	...	...	18·43	...	...	...	...	
			Total	...	...	...	...	...	...	**283·43**	**20·30**	**236·70**	**221·09**	**·93**	

Peak Hill Goldfield.

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£ s. d.
Horseshoe ...	44P	(Brilliant)	... ...	...	...	...	...	...	...	...	297·00	254·58	1,025·87	4·02	
Do ...	45P	(Brilliant Central) ...	... ...	...	...	...	...	...	...	...	343·75	...	20·70	...	
Do ...	49P	(Brilliant Central Extd.)	... ...	...	...	...	...	...	...	...	87·25	·01	33·10	...	
Do	44P/5P, 47P, 49P, 62P. 117P, 131P, 167P	... ...	Horseshoe (Peak Hill) Goldfield, Ltd.	a. r. p. 124 2 6	...	...	136·00	598·05	4·40	...	...	136·00	598·05	4·40	3 19 6
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	5·45	...	...	...	
Peak Hill ...	3P	(Atlantic No. 1 North)	... ...	...	...	...	35·75	15·00	·42	...	...	35·75	15·00	·42	
Do ...	34P	Mt. Fraser	... ...	V.N.R.	...	...	...	...	...	...	...	117·00	119·75	1·02	
Do ...	150P	Mt. Pleasant	... ...	24	...	...	455·00	257·70	·57	...	...	1,949·50	1,489·34	·76	3 15 0
Do ...	151P	Mt. Pleasant Extended	... ...	12	...	...	...	...	...	...	...	66·00	41·49	·62	
Do ...	216P	Mt. Pleasant North ...	... ...	V.N.R.	...	...	...	...	...	...	...	13·50	1·50	·11	
Do ...	1P	(North Star)	... ...	...	...	...	...	...	...	...	169·60	...	...	...	
Do	1P/6P, 8P, 9P, 13P, 15P/6P, 26P/9P, 35P/6P, 43P, 53P/4P, 63P, 146P, 190P, 222P, 274P, R.C. 1P, Q.Cs. 13/4P, T.A. 1P	... ...	Peak Hill Goldfield, Ltd. ...	a. r. p. 178 3 32	Ore		65,059·00	34,532·05	·53	...	200·00	175,948·35	175,118·77	·99	3 15 7
					Cement ...		...	...	...	...	...	1,064·00	‡ 903·20	·84	

Do	...	270P	...	...	Yellow Pup	...	...	...	...	...	...	V.N.R.	...	...	11·50	3·35	·29	...	...	11·50	3·35	·29	
Do	...	...	...	...	Voided leases	...	...	...	...	...	...	...	...	...	...	...	...	...	38·75	605·50	1,080·59	...	
Do	...	...	...	...	Sundry claims	...	...	...	...	...	...	...	...	...	...	...	...	...	104·65	21·00	18·87	...	
Ravelstone	...	273P	...	...	Brittannia	...	...	...	...	...	...	12	...	...	35·00	32·25	·92	...	...	35·00	32·25	·92	3 16 0
Do	...	264P	...	...	Emerald Extended	...	...	...	...	...	...	V.N.R.	...	...	...	...	...	...	...	7·00	11·20	1·60	
Do	...	55P	...	...	Golden Treasure	...	...	...	...	...	...	Ftd.	...	...	36·75	14·83	·40	...	...	296·75	188·18	·63	
Do	...	259P (193P)	...		Golden Treasure Consols	...	...	...	...	...	...	12	...	...	235·50	133·35	·57	...	...	381·50	413·37	1·08	3 18 5
Do	...	56P	...	...	Golden Treasure East	...	...	...	...	...	...	V.N.R.	...	...	...	...	...	...	...	119·75	65·15	·54	
Do	...	59P	...	...	Jubilee ...	...	...	...	...	...	...	12	...	...	17·00	12·55	·74	...	...	1,424·35	1,426·78	1·00	
Do	...	253P (67P)	...		Jubilee North ...	...	...	...	...	...	...	V.N.R.	...	...	...	...	...	...	...	5·00	9·40	1·88	
Do	...	277P	...	...	Ravelstone	...	...	...	...	...	...	12	...	...	51·00	56·95	1·12	...	...	51·00	56·95	1·12	
Do	...	...	...	...	Voided leases	...	...	...	...	...	...	...	...	...	...	...	...	...	...	55·00	74·88	...	
Wilgeena	...	250P (24P)	...		Hit or Miss	...	...	...	...	...	...	18	...	...	...	...	...	...	...	40·00	46·05	1·15	
Do	...	233P	...	...	Wilson's Find	...	...	...	...	...	...	V.N.R.	...	...	...	...	...	...	24·85	14·00	35·65	2·55	
					From Goldfield generally—																		
					Sundry parcels treated at Peak Hill Consols Battery					...	...		...	...	...	...	...	...	...	30·00	194·25	...	
									Total	...	...		...	...	66,072·50	35,656·08	·54	...	1,271·30	182,682·04	‡183,023·69	1·00	3 15 7½

‡ Also, 4,551·60ozs. from unknown tons.

East Murchison Goldfield.

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£ s. d.
Black Range ...	669 (674M) ...	Adelaide	... ...	12	...	8·50	14·00	146·45	...	...	8·50	14·00	146·45	...	
Do ...	687	Bilbie	... ...	6	...	...	24·22	256·80	...	...	...	24·22	256·80	...	
Do ...	671 (676M) ...	Black Range	... ...	15	...	180·00	...	...	...	...	180·00	...	...	...	
Do ...	664	Black Range Main Reef	... ...	24	...	...	15·00	25·20	1·68	...	...	15·00	25·20	1·68	
Do ...	690	Chicago	... ...	12	...	...	·50	1·00	2 00	...	...	·50	1·00	2·00	
Do ...	742	Eureka	... ...	12	...	...	1·00	22 50	...	...	...	1·00	22·50	...	
Do ...	640	Geraldtonia	... ...	24	...	...	27·00	44·00	1·63	...	...	42·00	149·00	3·55	
Do ...	639	Groper	... ...	10	...	...	5·50	5·50	1·00	...	...	7·00	28·90	4·13	
Do ...	741	Queen of the Range ...	... ...	12	...	...	21·00	13·00	·62	...	...	21·00	13·00	·62	
Do ...	737	Wirraminna	... ...	24	...	25·00	...	...	...	...	25·00	...	...	...	
Do ...	... ...	Sundry claims ...	... ...	...	18·90	31·45	26·00	62·20	...	18·90	114·90	282·65	287·69	...	
Cork Tree ...	557	Enterprise	... ...	24	...	...	2,038·00	2,055·72	1·01	...	...	2,322·00	2,648·72	1·14	3 16 6
Do ...	535	Kingston	... ...	24	...	...	219·00	155·66	·71	...	...	680 00	417·26	·61	
Do ...	660	Missing Link	... ...	18	...	35·25	83·00	173·01	2 08	...	35·25	83·00	173·01	2 08	
Do ...	738 (581) ...	Revenue	... ...	6	...	...	28·00	18·60	·66	...	...	28·00	18·60	·66	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	45·00	15·60	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	...	13·00	11·15	...	
Kathleen Valley ...	396	Carysfort	... ...	V.N.R.	...	...	24·00	16·00	·67	...	5·15	310 00	391·92	1·26	
Do ...	607	County of Dublin ...	... ...	V.N.R.	...	...	...	...	...	...	...	26·00	24·72	·95	
Do ...	695	Hidalgo	... ...	6	...	...	106·50	291·95	2·74	...	...	106·50	291·95	2 74	
			Carried forward ...	...	18·90	280·20	2,632·72	3,287·59	...	18·90	368·80	4,020·87	4,923·47	...	

TABLE IV.—*Production of Gold from all sources, etc.*—continued.

East Murchison Goldfield—*continued.*

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
			Brought forward ...	...	ozs. 18·90	ozs. 280·20	tons. 2,632·72	ozs. 3,287·59	ozs. ...	ozs. 18·90	ozs. 368·80	tons. 4,020·87	ozs. 4,923·47	ozs. ...	£ s. d.
Kathleen Valley	667	Highlander	... ...	Surr.	...	...	136·00	105·00	·77	...	...	136·00	105·00	·77	3 14 6
Do ...	705 (63) ...	Kathleen Consols ...	... ...	12	...	3·00	...	...	...	...	3·00	...	...	...	
Do ...	113	Nil Desperandum ...	... ...	24	...	...	4,783·00	2,309·30	·48	...	...	9,353·00	4,984·78	·53	3 15 0
Do ...	575, 596/7 ...	Pascoe leases	... ...	V.N.R.	...	...	20·00	9 00	·45	...	. .	255·00	135·14	·53	
Do ...	360	Pascoe Pride	... ...	6	...	...	...	...	...	...	15·00	32·00	67·70	2 11	
Do ...	604	Reminder	... ...	V.N.R.	...	...	30·00	13·20	·44	...	...	30 00	13·20	·44	
Do ...	382	Yellow Aster	... ...	18	...	...	9,190·00	5,607·05	·61	...	...	29,790·00	27,356·22	·92	3 10 11
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	232·00	214·08	...	
Do ...	... ...	Sundry claims ...	... ...	...	..	281·25	685·00	411·63	...	...	298·85	960·75	640·42	...	
Lake Darlôt ...	182	Amazon	... ...	12	...	...	598·50	1,668·45	2·79	...	9·00	1,870·00	4,266·94	2·28	3 12 3
Do ...	93	Ballangarry	... ...	18	...	...	281·00	89·40	·32	...	...	2,240·00	1,484·38	·66	
Do ...	628	Balmoral	... ...	V.N.R.	...	...	6·00	7·15	1·19	...	...	22·00	22·80	1·03	
Do ...	2	British King No. 1 West	... ...	V.N.R.	...	...	...	...	...	...	...	470·50	689·24	1·46	
Do ...	479	British King North ...	... ...	V.N.R.	...	...	18·00	14·45	·80	...	...	18·00	14·45	·80	
Do ...	619	East End	... ...	6	...	...	73·00	83·40	1·14	...	...	113·00	205·80	1·82	
Do ...	1	... ...	Fingall Reefs Extended, Ltd.	Surr.	...	...	...	*pl.* 25·02	...	...	...	12,248·00	8,850·35	·72	
Do ...	626	Filbandint	... ...	10	...	...	141·50	207·40	1·46	...	...	248·50	480·10	1·93	
Do ...	754	King of the East ...	... ...	6	...	...	472·50	393·15	·83	...	...	472·50	393·15	·83	
Do ...	375	King of the Hills ...	... ...	12	...	...	76·50	88·05	1·15	...	90·64	175·50	250·60	1·43	
Do ...	648	Monte Cristo	... ...	12	...	...	198·50	139·65	·70	...	...	215·50	169·15	·78	
Do ...	544	Morning Light... ...	... ...	6	...	...	105·00	151·00	1·44	...	...	168·00	230·58	1·37	3 14 0
Do ...	685	Mystery	... ...	10	...	...	8·00	21·75	2·72	...	...	8·00	21·75	2·72	
Do ...	329	Rise and Shine	... ...	12	...	59·45	...	...	...	...	700·57	42·00	61·65	1·47	
Do ...	689	Rose	... ...	6	...	...	44·00	40·20	·91	...	...	44·00	40·20	·91	
Do ...	273	St. George	... ...	12	...	..	145·50	5,342·25	...	...	3,237·45	446·00	7,044·06	...	3 18 1½
Do ...	363	Waikato	... ...	6	...	...	766·50	1,096·10	1·43	...	10·90	1,566·00	2,263·24	1·44	3 12 0
Do ...	673	Wee Jim	... ...	6	...	...	120·50	81·65	·68	...	...	120·50	81·65	·68	
Do ...	633	Zangbar	... ...	12	...	...	91·00	40·95	·45	...	...	91·00	40·95	·45	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	175 27	1,352·70	1,664·09	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	368·50	364·45	...	1·35	267·11	874·44	729·52	...	
Lake Way ...	170	(Black Swan)	... ...	...	...	...	...	...	...	...	...	77·00	225·54	2·92	
Do ...	332	(Black Swan North) ...	... ...	...	...	...	...	...	...	...	...	14·50	24·60	1·69	
Do ...	143	Brothers	... ...	18	...	...	44·00	66·00	1·50	...	...	871·00	913·50	1·05	
Do ...	161	(Caledonia)	... ...	...	...	...	...	...	...	...	...	294 00	318·42	1·08	
Do ...	169	(Dark Horse)	... ...	...	...	...	...	...	...	...	...	274·15	635·92	2·31	
Do ...	149	(Derwent)	... ...	...	...	...	...	...	...	...	...	164·30	404·61	2·46	
Do ...	316	(Essex)	... ...	...	...	...	...	...	...	...	...	337·00	473 40	1·40	
Do ...	312	(Ethelstone)	... ...	...	...	...	...	...	...	...	...	18·00	9·25	·51	
Do ...	140	... ...	(Golden Age, Lake Way, Ltd.)	...	...	...	...	...	...	...	...	12,899·00	8,895·39	·69	
Do	140, 144, 162/3 (164), 241 (242), 243, 318, 380 (422), 441, 477 (494/9) (501), W.R. 33	... ...	Golden Age Consolidated, Ltd.	a. r. p. 141 1 38	...	...	19,274·00	9,032·33	·47	...	...	33,675·00	20,490·46	·61	3 5 6

Do	...	380	(Golden Age South) ...	... ...	...	...	...	...	...	...	...	...	...	133 00	308·00	2·31		
Do	...	316 (516/7, 524, 540/1), 542 (545, 546, 549), 550 (501), 547/8	... ...	Gwalia Consolidated, Ltd. ...	108	...	...	3,843·00	1,675·20	·43	...	...	14,917·00	6,673·05	·45	3 19 3		
Do	...	589 (444) ...	Lake Way Extended ...	... ...	V.N.R.	...	...	...	...	...	...	...	100·00	125·00	1·25			
Do	...	149, 161, 169, 170, 184, 312, 332/3, 358, 378/9, 472/3, 513/4	... ...	Lake Way Goldfield, 1899, Ltd.	204	...	...	...	...	...	...	...	5,962·00	5,335·98	·89			
Do	...	314	Lawless	... ...	12	...	...	...	...	...	...	553·90	38·00	18·00	·47			
Do	...	413	Little Wonder	... ...	12	...	...	...	...	...	...	...	30·00	17·75	·59			
Do	...	333	(Monarch and Derwent United)	... ...	...	...	...	...	...	...	...	...	10·00	3·35	·33			
Do	...	137, 442 ...	... ...	Monarch of the East G.M. Co., N.L.	a. r. p. 40 3 23	...	...	655·00	815·40	1·24	...	...	10,533·00	10,376·19	·98			
Do	...	326	Weelona	... ...	24	...	...	...	...	...	...	17·17	261·00	567·86	2·17			
Do	...	162	... ...	(W.A. Goldfields, Ltd) ...	...	...	...	...	...	...	...	...	2,786·00	1,573·94	·56			
Do	...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	46·50	1,196·30	1,083·70	...			
Do	...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	...	744·65	632·22	...			
Lawlers	...	19, 414 ...	Bounty leases	... ...	12	...	...	67·00	110·00	1·64	...	...	783·35	1,134·55	1·45			
Do	...	532	Brilliant	... ...	24	...	...	3,198·00	2,289·80	·71	...	...	3,648·00	3,C11·90	·82			
Do	...	714 (634) ...	British American Alliance	... ...	12	...	...	90·00	29·00	·32	...	...	90·00	29·00	·32			
Do	...	627 (578) ...	Caroline	... ...	12	...	...	58·00	35·60	·61	...	...	181·00	93·50	·52			
Do	...	645 (M.A. 16)...	Cinderella	... ...	5	...	...	144·00	76·22	·53	...	...	342·00	181·77	·53			
Do	...	376	(Donegal)	(London and W.A. Exploration Co., Ltd.	...	...	...	...	...	...	...	...	38·00	79·80	2·10			
Do	...	377	(Eastern United Extended)	... ...	...	...	...	...	...	...	...	...	106·00	79·46	·74			
Do	...	37, 58, 70, 155/8, 376/7, 381, 385, 399, 426/7, 459, 474, 500, 508/12, 552, 573	... ...	East Murchison United, Ltd.	a. r. p. 462 1 3	...	...	50,512·00	20,434·34	·40	...	...	195,866·00	148,840·39	·76	3 13 6		
Do	...	599	Esmeralda	... ...	6	...	...	123·00	75·45	·61	...	...	303·00	141·70	·47			
Do	...	115	Glasgow Lass	... ...	12	...	...	...	...	...	...	...	1,851·0C	1,885·18	1·02			
Do	...	22	Gorrie's May Be ...	... ...	6	...	...	...	...	...	...	...	282·00	307·71	1·09			
Do	...	460	Kanmuntoo	... ...	Surr.	...	...	...	...	...	...	18·95	66·50	122·57	1·84			
Do	...	641	King Edward	... ...	3	...	...	..	...	...	...	...	35·00	36·70	1·05			
Do	...	721	Kiora	... ...	5	...	...	67·00	37·79	·56	...	...	67·00	37·79	·56			
Do	...	15	Leinster	... ...	18	...	...	4,976·00	12,401·45	2·49	...	...	8,621·50	22,757·56	2·64	3 13 0½		
Do	...	467	Leinster North... ...	... ...	6	...	...	...	...	...	...	...	14·00	35·50	2·53			
Do	...	(1) 58	... ...	(London and W.A. Exploration Co., Ltd.)	...	...	...	...	...	...	...	...	2,438·50	3,064·58	1·25			
Do	...	606	Melbourne	... ...	12	...	8·00	70·00	63·85	·91	...	8·00	70·00	63·85	·91			
Do	...	733	Mark Twain	... ...	12	...	...	52·00	14·10	·27	...	...	52·00	14·10	·27			
Do	...	381	(Never Can Tell) ...	... ...	...	...	...	...	...	...	...	...	610·00	954·70	1·56			
Do	...	373	New Holland	... ...	12	...	...	1,361·00	573·30	·42	...	...	3,447·25	1,999·25	·58			
Do	...	665	New Holland South ...	... ...	10	...	...	64·00	25·95	·40	...	...	64·00	25·95	·40			
Do	...	78, 320... ...	New Woman leases ...	... ...	24	...	...	96·00	37·00	·38	...	...	896·30	1,116·42	1·24			
Do	...	650	Puzzler	... ...	V.N.R.	...	7·00	9·00	9·20	1·02	...	7·00	34·00	22·55	·66			
Do	...	459	(Quartzite King) ...	... ...	...	...	...	...	...	...	...	...	119·50	104·00	·87			
Do	...	385	(Queen)	... ...	...	...	...	...	...	...	...	...	1,252·00	723·35	·58			
Do	...	397	Right Bower	... ...	12	...	2·60	100·00	48·15	·48	...	2·60	284·25	221·10	·78			
				Carried forward ...	...	18·90	641·50	105,794·22	69,447·37	...	20·25	5,830·71	374,512·81	313,635·72	...			

TABLE IV.—*Production of Gold from all sources, etc.*—continued.

East Murchison Goldfield—*continued.*

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
			Brought forward ...	...	ozs. 18·90	ozs. 641·50	tons. 105,794·22	ozs 69,447·37	ozs. ...	ozs. 20·25	ozs. 5,830·71	tons. 374,512·81	ozs. 313,635·72	ozs. ...	£ s. d.
Lawlers ...	415	Right Bower Extended	... ...	12	...	...	174·00	127·45	·73	...	200·00	716·00	656·87	·92	
Do ...	519	Surprise	... ...	V.N.R.	...	...	...	...	...	...	...	615·00	279·54	·45	
Do ...	521	(Vivien)	... ...	...	...	...	...	...	...	...	...	45·50	25·30	·55	
Do ...	521, 574, 624/5, 719	... ...	Vivien G.M. Co., Ltd. ...	88	...	...	6,515·00	3,635·35	·56	...	...	6,515·00	3,635·35	·56	3 17 4
Do ...	603 (482) ...	Woroonga North ...	... ...	5	...	...	60·00	18·10	·30	...	...	156·00	111·50	·71	
Do ...	62, 562/3 ...	Woronga South leases	... ...	62	...	...	17,379·00	5,203·75	·30	...	...	42,150·00	16,311·96	·39	3 12 5
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	93·51	10,311·40	10,506·22	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	108·00	71·02	...	17·22	49·25	2,076·85	1,817·92	...	
Mt. Clifford ...	463	Emancipator	... ...	12	...	...	276·00	116·55	·42	...	...	373·00	549·81	1·47	
Do ...	670	Emancipator Consols ...	... ...	5	...	...	87·00	153·48	1·76	...	...	87·00	153·48	1·76	
Do ...	560	Emancipator North ...	... ...	V.N.R.	...	...	25·00	8·05	·32	...	...	25·00	8·05	·32	
Do ...	522	Emancipator South ...	... ...	V.N.R.	...	...	50·00	14·50	·29	...	3·00	50·00	14·50	·29	
Do ...	668	Victory No. 1	... ...	24	...	...	93·00	1,468·30	...	...	...	93·00	1,468·30	...	4 0 0
Do ...	749	Victory No. 2	... ...	12	...	...	10·00	28·35	2·83	...	...	10·00	28·35	2·83	
Do ...	682	White Flag Consols ...	... ...	12	...	...	26·00	27·45	1·05	...	...	26·00	27·45	1·05	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	10·00	6·00	38·60	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	108·50	86·44	...	...	...	108·50	86·44	...	
Mt. Sir Samuel	21, 24, 35, 38, 308, 310, 368/9, 439, 615	... ...	Bellevue Proprietary, Ltd....	a. r. p. 125 1 9	...	...	22,675·00	18,772·99	·83	...	...	71,797·00	69,454·33	·97	3 8 6
Do ...	489	Isidore	... ...	24	...	...	397·00	389·60	·98	...	...	1,135·00	1,197·24	1·05	3 8 6
Do ...	339	Vanguard	... ...	12	...	...	998·00	413·35	·41	...	...	4,419·00	1,993·23	·45	3 9 0
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	1,934·00	1,376·30	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	59·00	28·75	...	...	17·97	1,124·50	1,220·05	...	
New England ...	117	Glennis	... ...	V.N.R.	...	...	...	...	...	...	...	803·00	777·35	·96	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	66·35	...	...	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	3·00	554·50	532·38	...	
Wilson's Creek ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	113·00	1,775·60	1,073·37	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	4·85	5·00	21·75	...	
Wilson's Patch ...	666	Celtic	... ...	V.N.R.	...	...	25·50	52·59	2·06	...	...	25·50	52·59	2·06	
Do ...	598, 642, 697/8	... ...	Lorna's Luck, Ltd. ...	42	...	...	20·00	16·65	·83	...	...	20·00	16·65	·83	
Do ...	520	Sons of Lawlers ...	... ...	12	...	...	...	...	...	...	...	285·00	188·85	·66	
Do ...	598	(Teutonic)	... ...	...	...	...	5·00	2·90	·58	...	...	5·00	2·90	·58	
Do ...	651	Teutonic Extended ..	... ...	V.N.R.	...	...	6·50	4·97	·76	...	...	6·50	4·97	·76	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	7·00	12·02	...	...	...	119·00	76·02	...	

From Goldfield generally—																
Sundry parcels treated at Christensen's Works														47·25		
Do	do	Condor Battery								cy. 107·35				107·35		
Do	do	Darlôt Public Battery											37·00	16·79		
Do	do	Lawlers Public Battery								cy. 681·70				681·70		
Do	do	Monarch of the East Battery						55·50	25·95				55·50	25·95		
Do	do	State Battery, Lake Darlôt							cy. 324·80					324·80		
Do	do	Tazewell's Works							cy. 374·00					1,031·65		
Alluvial							622·08				4,601·54					
Notices of Purchase											220·05					
				Total			640·98	641·50	154,954·22	101,613·78	·66	4,859·06	6,391·64	521,978·16	429,578·83	·82	3 11 8

Murchison Goldfield.

CUE DISTRICT.

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£ s. d.
Cuddingwarra	634, 736, 1042		Fingall Proprietary, Ltd.	33			172·00	132·20	·77			4,690·50	4,795·19	1·02	
Do	1392	Paton's Coodhardy Reward Lease		24			31·00	61·00	1·97			31·00	61·00	1·97	
Do	1376	Royal Mint		12			141·00	113·05	·80			141·00	113·05	·80	
Do	1364	South Victory		Wdn.		6·50	58·00	50·65	·87		6·50	58·00	50·65	·87	
Do	595 (671, 1104), 1122		Victory United G.M. Co., N.L.	27			140·00	500 80	3·58			8,028·00	19,862·03	2·47	
Do		Voided leases									15·85	5,254·75	5,345·48		
Do		Sundry claims					32·00	42·50				231·00	199 95		
Cue	(483, 1046) 1047		(Agamemnon, Ltd.)									7,053·50	5,108·01	·72	
Do	1047	Agamemnon		21			275·00	219·50	·80			2,276·33	1,685·95	·75	
Do	1328	Argus		12			352·00	239·40	·68			494·00	350·40	·71	
Do	1366	Bedford		12			10·00	322·85				10·00	352·85		
Do	1115		(Brilliant G.Ms. (Cue), N.L.)				15·00	9·50	·63			46·00	15·65	·34	
Do	1068 (1100/1)	Caledonian Hill		V.N.R.							40·00	100·00	71·50	71	
Do	1324	Comfor er		Ref.								93·00	45·15	·48	
Do	1271	Ca'alpa		12								519·50	207·85	·40	
Do	1212	(Countess)		Ftd.								10·00	8·50	·85	
Do	1212, 1320		Countess G.M. Co., N.L.	V.N.R.								164·00	87·90	·53	
Do	1312	Cue Fingal		Ftd.								26·00	9·15	·35	
Do	(60, 170) 203 (674), 1143		(Cue Consolidated G.Ms., Ltd.)									23,427·50	20,035·79	·85	
Do	203	Cue No. 1		12			1,812·50	3,894·25	2·15			6,298·50	9,411·50	1·49	4 0 6
Do	1174	Cue Victory		18	16 90		268·00	742·25	2·77	16·90		268·00	742·25	2·77	
Do	1174		(Cue Victory G.Ms., Ltd.)									6,528·00	4,093·93	·62	
Do	1115	(Deceiver)										854·00	1,606·27	1·88	
Do	1115	Deceiver		9			325·00	537·85	1·65			325·00	537·85	1·65	3 12 0
			Carried forward		16·90	6 50	3,631·50	6,865·80		16·90	62·35	66,927·58	74,767·85		

TABLE IV.—*Production of Gold from all sources, etc.*—continued.

Murchison Goldfield—continued.

CUE DISTRICT—*continued.*

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
			Brought forward ...	...	ozs. 16·90	ozs. 6·50	tons. 3,631·50	ozs. 6,865·80	ozs. ...	ozs. 16·90	ozs. 62·35	tons. 66,927·58	ozs. 74,767·85	ozs. ...	£ s. d.
Cue ...	1213	Deceiver North ...	... ...	6	...	...	...	...	...	...	...	168·00	372·15	2·21	
Do ...	1281	Duchess	... ...	Wdn.	...	...	...	...	...	...	...	30·00	10·70	·36	
Do ...	1275	Duke of York	... ...	5	...	...	1,143·00	1,058·25	·92	...	...	1,694·00	1,493·02	·88	4 0 6
Do ...	1287	Duke of York Extended	... ...	5	...	...	174·00	116·00	·67	...	...	174·00	116·00	·67	
Do ...	1375	Easter Monday... ...	... ...	Ftd.	...	...	36·00	7·70	·21	...	...	36·00	7·70	·21	
Do ...	1020	Gem of Cue, Extended	... ...	5	...	...	20·00	750·55	...	...	...	20·00	750·55	...	4 0 0
Do ...	(523), 1020, 1044, 1127, 1152	... .	(Gem of Cue, Ltd.)	...	...	...	...	...	...	...	...	11,724·00	7,587·70	...	4 0 0
Do ...	1336	Golden Stream Extended	... ...	Ftd.	...	...	169·00	70·50	·42	...	...	169·00	70·50	·42	3 19 11
Do ...	1359 (1336) ...	Golden Stream Extended	... ...	6	...	...	305·00	251·25	·82	...	...	305·00	251·25	·82	3 19 11
Do ...	1306 (672) ...	Kangaroo	... ...	12	...	...	294·50	196·90	·67	...	...	454·50	315·78	·69	
Do ...	183	Leviathan	... ...	Ftd.	...	...	...	...	...	...	...	1,148·50	936·53	·81	
Do ...	1148 (964) ...	Light of Asia	... ...	12	...	...	1,374·00	1,371·44	...	...	...	4,921·00	3,786·57	...	4 0 0
Do ...	1339 (1175) ...	Mafeking	... ...	V.N.R.	...	...	17·00	1·75	·10	...	...	88·00	23·80	·27	
Do ...	1277	... ...	Murchison Associated G.Ms., Ltd.	6	...	...	33·50	57·00	1·70	...	...	33·50	57·00	1·70	
Do ...	1311	New Arcadia	... ...	11	...	...	190·50	220·75	1·16	...	...	387·50	294·80	·76	
Do ...	1390	New Leviathan... ...	... ...	6	...	...	259·00	100·55	·39	...	...	259·00	100·55	·39	
Do ...	1135	New Volunteer... ...	... ...	9	...	...	347·00	141·15	·41	...	...	3,718·00	3,411·25	·92	
Do ...	1259	New Volunteer Extended	... ...	6	...	...	229·00	163·95	·71	...	...	229·00	163·95	·71	
Do ...	1143	Normanby	... ...	V.N.R.	...	...	15·00	12·05	·80	...	...	542·50	623·79	1·15	
Do ...	1395	Pension	... ...	10	...	...	16·00	51·55	3·22	...	...	16·00	51·55	3·22	
Do ...	1329	Perseverance	... ...	V.N.R.	...	...	...	...	...	...	...	24·00	29·90	1·24	
Do ...	1277	(Polar Star)	... ...	...	...	...	47·50	61·00	1·28	...	...	47·50	61·00	1·28	
Do ...	1150, 1178 ...	Princess leases	... ...	15	...	...	487·00	213·05	·44	...	...	1,739·00	1,455·55	·84	
Do ...	222, 653 (784), 1016, 1048, 1114	... ...	Princess (Murchison) Consolidated, Ltd.	a. r. p. 35 3 7	...	...	...	...	...	...	...	6,276·50	6,170·80	·98	
Do ...	1151	Queen of the May ...	... ...	12	...	...	228·00	176·65	·77	...	...	2,440·50	2,113·78	·86	
Do ...	1333	Research	... ...	Ftd.	...	...	...	...	...	...	...	24·00	16·35	·68	
Do ...	1338	Retreat	... ...	V.N.R.	...	...	25·50	11·42	·45	...	...	45·00	24·87	·55	
Do ...	1248	Rising Sun	... ...	12	...	...	...	...	...	...	...	1,198·00	890·45	·74	
Do ...	1295	Royal Secret	... ...	Ftd.	...	...	...	...	...	...	27·00	419·50	364·05	·86	
Do ...	1046	Salisbury	... ...	Surr.	...	...	22·00	10·60	·48	...	...	2,095·00	1,461·58	·70	
Do ...	1374 (1046) ...	Salisbury	... ...	12	...	...	104·00	58·80	·56	...	...	104·00	58·80	·56	
Do ...	1044	South Volunteer ...	... ...	6	...	...	3,634·00	2,072·79	...	...	...	4,110·00	2,327·29	...	4 0 0
Do ...	1325	Starlight	... ...	a. r. p. 10 1 28	...	...	548·00	609·95	1·11	...	...	653·00	700·00	1·07	
Do ...	774	Twilight	... ...	6	...	...	568·00	216·00	·38	...	...	2,241·00	1,865·24	·83	
Do ...	1354	Victory	... ...	5	...	...	249·50	142·10	·57	...	...	249·50	142·10	·57	
Do ...	1323	Volunteer Deeps ...	... ...	V.N.R.	...	...	...	...	...	...	...	20·00	2·20	·11	
Do ...	1350	Volunteer North ...	... ...	5	...	...	40·00	10·70	·28	...	...	40·00	10·70	·28	

Do	...	1145, 1214, 1231	Volunteer South Extended leases ...	...	...	...	...	...	15	3	3	...	...	5,246·00	2,835·07	·54	...	...	11,381·50	8,137·50	·71	4	0	0
Do	...	1172	West Australian ...	...	...	...	...	...	6			...	...	...	...	...	...	...	100·00	10·40	·10			
Do	...	... ...	Voided leases ...	...	...	...	...	...	...			...	...	...	...	...	...	152·40	20,186·50	16,450·92	...			
Do	...	... ...	Sundry claims ...	...	...	...	...	...	...			...	...	90·00	44·90	...	·15	289·80	3,925·35	3,151·91	...			
Reedy's Find	...	... ...	Voided leases ...	...	...	...	...	...	...			...	...	...	...	...	...	35·00	29·00	16·05	...			
Do	...	... ...	Sundry claims ...	...	...	...	...	...	...			2·70	...	10·00	6·35	...	137·02	·95	60·05	53·40	...			
Tuckanarra	...	1182, 1190, 1197, 1203/5	... ...	Anchor Consolidated G.Ms (W.A.), Ltd.					66			...	...	40·00	80·25	2·01	...	...	6,788·00	5,855·52	·86			
Do	...	1190	(Blue Anchor)	...	...	...	...	...	...			...	...	...	...	...	...	...	43·00	21·50	·50			
Do	...	1396	Bright Smile	...	...	...	...	...	10			...	...	23·00	10·50	·46	...	...	23·00	10·50	·46			
Do	...	1199	Cable	...	...	...	...	...	6			...	...	1,312·00	802·27	·61	...	...	1,893·60	1,305·19	·69			
Do	...	1242	Dyke	...	...	...	...	...	6			...	...	83·50	18·80	·23	...	...	83·50	18·80	·23			
Do	...	1349	Federal	...	...	...	...	...	12			...	...	119·00	14·60	·12	...	...	119·00	14·60	·12			
Do	...	1378	Just in Time	...	...	...	...	...	10			...	...	15·00	3·65	·24	...	...	15·00	3·65	·24			
Do	...	1363	May Bell	...	...	...	...	...	5			...	...	181·00	41·20	·23	...	...	181·00	41·20	·23			
Do	...	1337	Nemesis	...	...	...	...	...	5			...	...	236·00	775·03	3·28	...	...	276·00	830·53	3·01	4	0	8
Do	...	1182	(Trilby)	...	...	...	...	...	...			...	...	...	...	...	...	...	240·50	302·05	1·25			
Do	...	1196	Trilby No. 1	...	...	...	...	...	V.N.R.			...	...	20·00	7·85	·39	...	...	48·50	10·75	·22			
Do	...	... ...	Voided leases ...	...	...	...	...	...	...			...	...	...	...	...	...	736·77	806·00	711·93	...			
Do	...	... ...	Sundry claims ...	...	...	...	...	...	...			4·00	...	115·00	193·15	...	4·00	34·65	1,138·00	4,826·45	...			
Weld Range	...	... ...	Voided leases ...	...	...	...	...	...	...			...	...	...	...	...	...	...	5,191·50	3,305·03	...			
Do	...	... ...	Sundry claims ...	...	...	...	...	...	...			...	...	...	...	...	...	...	18·00	17·40	...			
			From District generally—																					
			Sundry parcels treated at Cue Gold Recovery Works	...	...	...	...					...	...	...	...	...	...	...	...	4,369·45	...			
			Do do Cue No. 1 Works ...	...	...	...	...					...	...	573·00	281·35	...	...	...	1,280·50	508·74	...			
			Do do Cue Public Battery	...	...	...	...					...	...	...	...	...	...	...	2,576·00	1,287·73	...			
			Do do Cue Victory Works	...	...	...	...					...	...	209·50	206·50	...	...	...	912·02	3,774·93	...			
			Do do Eureka No. 5 Battery	...	...	...	...					...	...	...	...	...	...	...	15·00	4·80	...			
			Do do Gem of Cue Works	...	...	...	...					...	...	...	*cy.* 826·72	...	...	...	18·00	4,786·83	...			
			Do do Lady Mary Cyanide Works	...	...	...	...					...	...	...	...	...	...	...	...	3,180·40	...			
			Do do State Battery, Tuckanarra	...	...	...	...					...	...	...	*cy.* 800·15	...	...	...	401·50	1,055·66	...			
			Do do Victory United Works ...	...	...	...	...					...	...	...	...	...	...	...	16·50	93·15	...			
			Do do Weld Range Cyanide Works	...	...	...	...					...	...	...	...	...	...	...	...	333·75	...			
			Notices of Purchase	...	...	...	...					...	...	...	...	...	214·34	8·44	...	...	...			
			Total									23·60	6·50	22,480·50	21,968·54	·98	372·41	1,347·36	172,538·10	‡177,378·37	1·03	3	19	11¼

‡ Also ounces from unknown tons, Black Swan ... ... 128·00
Do. do. Kallarra ... ... 36·00
Do. do. Maori Chief ... ... 59·00
Do. do. Victoria ... ... 277·00
Do. do. Sundry claims ... ... 572·00
Total ... ... 1,072·00

NANNINE DISTRICT.

								ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£	s.	d.
Abbotts	...	382N	Cashman's Reward ...	...	...	...	...	V.N.R.	...	...	...	...	...	...	128·50	184·60	1·43			
Do	...	171N	Mt. Vranizan	...	...	...	...	12	...	...	3,228·00	1,982·70	·61	...	...	13,306·00	13,415·40	1·01	3	16	3
Do	...	172N, 247/8N ...	... ...	New Murchison King G.Ms.				42	...	...	2,445·00	1,461·75	·59	...	...	15,901·50	21,364·05	1·34	3	16	3
Do	...	...	Voided leases ...	...	...	...	...	...	...	...	...	...	..	...	...	58·50	65·00	...			
Do	...	...	Sundry claims ...	...	...	...	...	...	...	...	...	...	...	...	...	7·50	9·95	...			
			Carried forward ...					...	...	...	5,673·00	3,444·45	...	...	...	29,402·00	35,039·00	...			

TABLE IV.—*Production of Gold from all sources, etc.*—continued.

Murchison Goldfield—*continued.*

NANNINE DISTRICT—*continued.*

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£ s. d.
			Brought forward ...	...	...	...	5,673·00	3,444·45	...	...	...	29,402·00	35,039·00	...	
Burnakura ...	238N	Alliance	... ...	12	...	...	160·00	553·20	3·46	...	...	1,758·00	2,548·60	1·45	3 7 4
Do ...	408N (250N) ...	New Alliance	... ...	18	...	...	1,234·00	2,656·60	2·15	...	...	2,176·00	5,436·10	2·50	3 3 7
Do ...	...	Voided leases ...	... ...	...	...	...	...	...	...	...	3,507·45	588·50	1,474·37	...	
Do ...	...	Sundry claims ...	... ...	...	...	...	...	...	...	...	...	25·00	22·30	...	
Chesterfield ...	368N	Adelaide Ethel	... ...	Ftd.	...	...	...	...	...	...	4·00	85·00	47·05	·55	
Do ...	435N	Billybong	... ...	V.N.R.	...	...	...	...	...	...	...	35·00	20·50	·58	
Do ...	423N (375N) ...	Christmas Gift ...	... ...	V.N.R.	...	...	...	...	...	...	...	59·00	43·50	·74	
Do ...	357N	Dorothy	... ...	12	...	...	120·00	375·10	3·12	...	...	1,311·75	1,891·85	1·44	3 13 0
Do ...	365N	Dorothy North	... ...	12	...	...	62·00	124·60	2·01	...	...	272·50	446·58	1 64	3 18 6
Do ...	472N	Lass of Gowrie	... ...	12	...	...	27·50	36·50	1·33	...	...	27·50	36·50	1·33	
Do ...	352N	Maranoa	... ...	24	...	...	29·00	38·00	1·31	...	...	29·00	38·00	1·31	
Do ...	361N	Margueritta	... ...	12	...	...	1,784 00	1,525·00	·85	...	120·40	2,314·50	2,471·30	1 07	3 11 9
Do ...	369N	... ...	New Murchison King G.M. Co.	18	...	...	...	...	...	...	...	50·00	70·00	1·40	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	17·60	36·50	39·55	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	...	65·50	48·06	...	
Gabanintha ...	443N	Canterbury	... ...	V.N.R.	...	...	23·00	11·65	·51	...	...	23·00	11·65	·51	
Do ...	409N (268N) ...	Freetrade	... ...	Surr.	...	...	...	...	...	...	...	25·00	27·50	1·10	
Do ...	461N	Golden Hope	... ...	6	...	...	86·00	115·00	1·34	...	...	86·00	115·00	1·34	3 17 8
Do ...	449N	Mount Bungar	... ...	6	...	...	121·00	80·30	·66	...	...	121·00	80·30	·66	
Do ...	379N	Mountain View ...	... ...	6	...	...	366·00	337·95	·92	...	...	463·00	423·35	·91	3 10 0
Do ...	32N, 46N ...	... ...	Nannine Goldfields, Ltd. ...	12	...	...	697·00	565·60	·81	...	...	3,555·00	1,736·05	·49	
Do ...	431N	Sovereign	... ...	12	...	...	137·00	90·85	·66	...	...	137·00	90·85	·66	
Do ...	32N	(Tumbulgum)	... ...	...	...	...	...	...	...	...	...	670·50	307·12	·45	
Do ...	46N	(Tumbulgum Extended)	... ...	...	...	...	...	...	...	...	...	63·00	97·95	1·55	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	3,085·50	3,486 92	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	15·00	33·85	...	...	...	206·00	213·68	...	
Garden Gully ...	27N	Crown	... ...	9	...	...	...	...	...	...	...	260 00	646 80	2·48	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	...	12·00	48·10	...	
Gum Creek ...	... ...	Sundry claims ...	... ...	...	...	...	19·00	28·60	...	...	...	19 00	28·60	...	
Jillawarra ...	311N	Jillawarra	... ...	Surr.	...	...	...	...	...	...	...	50·00	128·15	2·56	
Do ...	455N (311N) ...	Jillawarra	... ...	12	...	...	43·00	155·15	3·61	...	...	43·00	155·15	3·61	
Meekatharra ...	450N	Calliope	... ...	V.N.R.	...	...	26·50	15·75	·59	...	...	26·50	15·75	·59	
Do ...	283/4N ...	Commodore leases ...	... ...	32	...	...	613·50	385·30	·63	...	...	1,256·00	2,374·55	1·89	4 0 0
Do ...	425N (337N) ...	Democrat	... ...	12	...	...	423·50	116·70	·27	...	...	565·50	244·50	·43	
Do ...	313N	Halcyon	... ...	12	...	...	462·25	190·70	·41	...	2·45	971 00	699·25	·72	
Do ...	279N	Havelock South ...	... ...	12	...	...	563·25	203·65	·36	...	...	1,145·25	649·15	·57	
Do ...	236N	Haveluck	... ...	12	...	...	711·50	504·65	·71	...	...	1,675·25	1,340·45	·80	
Do ...	363N	Ingliston	... ...	12	...	...	50·50	43·00	·81	...	...	347·00	500 45	1·44	3 17 6
Do ...	475N	Ingliston Consols Extended	... ...	12	...	...	59·25	267·65	·45	...	...	59·25	267·65	·45	
Do ...	398N	Ingliston Extended ...	... ...	12	...	...	854·25	644·90	·75	...	...	1,161·25	1,012·00	·87	4 0 4
Do ...	488N	Lost Cop	... ...	12	...	...	56·00	21·75	·39	...	...	56·00	21·75	·39	

Do ...	422N (257N) ...	Lone Hand	... ...	Ftd.	...	...	104·00	25·10	·24	...	...	404·50	174·55	·43					
Do ...	93N	N93	... ...	12	...	...	593·50	189·45	·32	...	...	2,161·50	1,536·20	·71					
Do ...	416N	Phantom	... ...	18	...	...	243·00	227·65	·94	...	...	243·00	227·65	·94	4	1	5		
Do ...	402N	Phœnix No. 1	... ...	12	...	...	50 00	31·40	·63	...	...	134·33	135·13	1·00					
Do ...	372N	Pioneer	... ...	12	...	...	1,124·50	1,993·35	1·77	...	...	2,296·25	3,241·10	1·41	3	13	6		
Do ...	426N	Pioneer South	... ...	12	...	...	47·00	49·18	1·05	...	...	47·00	49·18	1·05					
Do ...	246N	Sirdar	... ...	12	...	...	28·75	31·55	1·10	...	64·01	147·00	143·50	·98					
Do ...	323N	St. George	... ...	12	...	...	142·75	70·55	·49	...	...	366·75	208·25	·57					
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	626·00	548·12	...					
Do ...	... ...	Sundry claims ...	... ...	...	...	...	45·50	23·75	...	...	...	217·00	240·80	...					
Munara Gully ...	230/1N (265/6N, 314N, 322N)	After Many Years leases	... ...	Ftd.	...	...	12·75	15·00	1·18	...	...	11,501·75	6,006·53	·52					
Do ...	445N	Victorian	... ...	12	...	...	199·25	115·62	·58	...	...	199·25	115·62	·58	3	15	0		
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	1,236·75	1,637·85	...					
Nannine ...	273N	Caledonian	... ...	6	...	...	419·00	275·00	·66	...	...	887 00	1,438·65	1·62	3	10	4		
Do ...	8N	Caledonian Extended ...	... ...	6	...	...	61·50	54·50	·89	...	...	413·50	2,113·77	5·11					
Do ...	10N, 11N, 13N, 17N (37N, 43N)	... ...	Champion Reef (Nannine, W.A.) G.M. Co., Ltd.	24	...	...	876·00	3,162·75	3·61	...	...	23,448·00	14,725·63	·63					
Do ...	457N	Daisy	... ...	18	...	...	57·00	206·00	3·61	...	...	57·00	206·00	3·61	3	14	6		
Do ...	429N (267N) ...	Dunaustral	... ...	V.N.R.	...	...	...	...	...	40·00	...	...	...	...					
Do ...	463N	Golden Gate	... ...	Wdn.	...	73·85	...	...	...	...	73·85	...	...	...					
Do ...	421N	Granite King	... ...	18	...	...	33·00	28·25	·86	...	...	33·00	28·25	·86					
Do ...	7N (15N, 42N, 44/5N, 47N, 67N)	... ...	Mt. Yagahong Exploration Co., Ltd.	12	...	...	56 00	48·10	·86	...	...	14,000·00	11,590·01	·83					
Do ...	16N, 25N, 166N	Nannine leases	... ...	33	...	...	1,475·60	1,833·31	1·24	...	...	6,998·60	12,993·26	1·86	3	11	0		
Do ...	264N	New Caledonian ...	... ...	6	...	...	...	...	...	...	...	136·00	223·55	1·64					
Do ...	249N	... ...	Mt. Yagahong G.M. and Exploration Co., Ltd.	24	...	...	...	...	...	...	...	2,597·50	1,484·35	·57					
Do ...	438N	Old New Year	... ...	12	...	...	111·00	80·35	·72	...	...	111·00	80·35	·72					
Do ...	25N	(Royalist Consolidated)	... ...	...	...	...	...	...	...	...	22·50	762·53	4,098·45	5·37					
Do ...	415N	(Wanganui)	... ...	24	...	...	...	...	...	...	...	265 00	100·40	·37					
Do ...	415N	... ...	(Wanganui G.M. Co., Ltd.)	...	...	...	1,137·00	337·00	·30	...	...	1,657·00	574·70	·35					
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	62·85	9,787·50	7,670·32	...					
Do ...	... ...	Sundry claims ...	... ...	...	...	...	84·00	92·20	...	...	...	738·50	1,175·25	...					
Quinns ...	465N	Cornstalk	... ...	6	...	...	81·00	62·15	·77	...	...	81·00	62·15	·77					
Do ...	469N	Joe Chamberlain ...	... ...	Wdn.	...	...	20·00	8·40	·42	...	...	20·00	8·40	·42					
Do ...	420N	Nowthanna	... ...	Ftd.	...	...	...	...	...	...	17·25	43·00	48·65	1·13					
Do ...	478N	Princess Dagmar ...	... ...	5	...	...	58·50	42·10	·72	...	...	58·50	42·10	·72					
Do ...	453N	Two Jacks	... ...	24	...	22·02	215·00	190·75	·89	...	22·02	215·00	190·75	·89	3	13	0		
Do ...	479N	Yorkshire Lass... ...	... ...	5	...	...	17·50	3·15	·18	...	...	17·50	3·15	·18					
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	17·37	524·00	451·65	...					
Do ...	... ...	Sundry claims ...	... ...	...	...	164·15	12·00	3·95	...	...	267·18	12·00	3·95	...					
Stake Well ...	342N	Commonwealth	... ...	12	...	...	291·00	71·10	·24	...	...	838·00	672·35	·80					
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	92·00	35·62	...					
Star of the East...	174N	... ...	Star of the East, Ltd. ...	25	...	...	90·00	30·85	·34	...	...	27,019·00	27,760·15	1·03					
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	225·00	222·24	...					
		From District generally—																	
		Sundry parcels treated at Canterbury Battery		...	...	...	25·00	17·80	...	...	...	25·00	17·80	...					
		Do do Gore's Battery		...	...	...	13·25	9·65	...	...	...	13·25	9·65	...					
		Do do Nannine Cyanide Works		...	...	...	...	...	...	...	...	...	202·76	...					
		Do do Queen of the Lake Battery		...	...	...	...	...	...	...	...	10·00	26·00	...					
		Do do State Battery, Meekatharra		...	...	...	...	*cy.* 76·70	...	...	...	...	76·70	...					
		Alluvial		1,238·00	...	...	...	...	...	3,227·70	...	...	...	...					
		Notices of Purchase		...	...	...	...	...	...	1·90	...	...	...	...					
			Total	1,238·00	260·02	22,141·35	21,973·11	·99	3,269·60	4,198·93	164,984·21	166,997·42	1·01	3	11	11¾			

TABLE IV.—*Production of Gold from all sources, etc.*—continued.

Murchison Goldfield—*continued.*

DAY DAWN DISTRICT.

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£ s. d.
Day Dawn ...	278D	Ada Mary	... ...	Ftd.	...	...	...	...	...	...	...	66·00	44·12	·67	
Do ...	330D	Crême d'Or	... ...	9	...	...	20·00	7·25	·36	...	...	20·00	7·25	·36	
Do ...	14D (71D) ...	Crœsus	... ...	6	...	...	...	...	...	...	...	1,138·00	1,788·81	1·57	
Do	179D, 232/3D, 237/8D, 240D, 242/4D, 251/2D, 269/72D, 290/1D, 300D, 311D	... ...	Cue Gold Mining and Exploration Co., Ltd.	a. r. p. 205 3 25	...	...	1,773·00	721·05	·41	...	...	1,773·00	721·05	·41	
Do ...	214D	Edward VII.	... ...	Surr.	...	...	...	...	...	10·00	45·00	30·00	44·00	1·46	
Do ...	15D, 176D ...	.. ..	Emperor G.Ms., Ltd. ...	18	...	...	72·00	28·00	·39	...	...	1,838 70	2,936·03	1·60	
Do ...	26D	Eureka No. 5	... ...	12	...	...	...	...	...	...	...	1,280·25	1,413·62	1·10	
Do	1D, 2D, 86D, 119D, 129D, 170D, 185/7D, 189/91D, 210D, 224D	... ...	Great Fingall Consolidated, Ltd.	a. r. p. 158 1 26	...	...	98,200·00	157,272·80	1·60	...	...	258,452·00	388,910·93	1·50	3 9 10
Do ...	322D	King Edward VII. ...	... ...	6	...	...	54·00	51·15	·95	...	...	54·00	51·15	·95	
Do ...	179D	(Kinsella)	... ...	...	...	...	...	...	...	...	3·50	106·50	186·38	1·75	
Do ...	312D	Klondyke	... ...	V.N.R.	...	...	28·50	11·70	·41	...	...	93·50	40·10	·43	
Do ...	327D	Ivy May	... ...	12	...	...	23·00	1·62	·07	...	...	23·00	1·62	·07	
Do ...	273D	Mount Fingall	... ...	Surr.	...	...	...	...	...	...	...	74·00	43·00	·58	
Do ...	320D, (273D) ...	Mount Fingall	... ...	12	...	...	14·00	10·40	·74	...	...	14·00	10·40	·74	
Do ...	138D, 166/7D ...	... ...	Murchison Associated G.Ms., Ltd.	18	...	...	227·00	150·17	·66	...	...	2,129·50	1,424·71	·67	
Do ...	331D	New Fingall	... ...	12	...	...	21·00	7·45	·35	...	...	21·00	7·45	·35	
Do ...	181D	Royal Charter	... ...	12	...	...	32·00	24·50	·76	...	36·80	147·00	217·38	1·48	
Do ...	119D	(St. Albans)	... ...	12	...	...	...	...	...	...	...	43·00	16·80	·39	
Do ...	227D	Trenton	... ...	12	...	...	460·00	220·00	·48	...	...	460·00	220·00	·48	
Do ...	267D	Try Again	... ...	V.N.R.	...	...	...	...	...	...	...	6·00	7 50	1·25	
Do ...	307D	Welcome	... ...	V.N.R.	...	...	33·00	13·60	·41	...	...	33·00	13·60	·41	
Do ...	268D	White Horse Extended	... ...	V.N.R.	...	...	...	...	...	...	...	5·00	6·65	1·33	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	1·70	222·33	18,015·75	13,483·94	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	72·00	71·15	...	...	29·19	441·50	670·64	...	
Island ...	9D	(Eureka)	... ...	...	...	...	...	...	...	...	...	143·20	529·00	3·69	
Do ...	35D	(Evening Star)... ...	... ...	...	...	...	...	...	...	...	...	1,253·00	429·00	·34	
Do	35D, 42D, 68/9D, 70D, 74D, 79D, 143D, 234D	... ...	Golconda Mines, Ltd. ...	a. r. p. 101 3 9	7·00	110·80	237·00	1,269·31	5·35	7·00	110·80	10,089·00	20,942·35	2·07	3 12[illegible]0
Do ...	5D, 9D, 142D, 230D	... ...	Island Eureka G.M. Co., N.L.	24	...	...	4,320·00	4,245·18	·98	...	...	13,095·20	18,665·39	1·42	3 16 ·6
Do ...	281D	... ...	Island Eureka South G.M. Co., N.L.	24	...	...	31·00	31·00	1·00	...	...	31 00	31·00	1·00	
Do ...	155D	(New Orient)	... ...	...	...	...	...	...	...	...	...	731·50	3,433·03	4·69	
Do ...	155D	... ...	New Orient G.M. Co., Ltd. ...	6	...	...	32·00	8 80	·27	...	...	32·00	8·80	·27	

Do ...	11D	Von Moltke	... ...	4	...	...	...	...	...	33·00	61·91	...	...	...	
Do ...	... ...	Voided leases ...	... ...	...	...	..	...	...	...	...	63·68	1,960·10	1,429·66	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	9·00	...	...	...	...	
Mainland ...	313D (204D) ...	Comet	... ...	Surr.	...	235·62	...	...	...	...	238·00	...	...	...	
Do ...	6D, 60/1D ...	... ...	(Mainland Consols, Ltd.) ...	...	...	...	...	...	...	...	...	5,848·15	20,781·67	3·55	
Do ...	6D, 60/1D ...	... ...	(New Standard Exploration Co., Ltd.)	48	...	...	741·00	1,051·80	1·42	...	...	741·00	1,051·80	1·42	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	1,551·89	418·25	1,597·23	..	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	22·00	72·00	...	...	...	22·00	72·00	...	
Webb's Patch ...	318D	Hill End	... ...	6	...	61·00	45·00	193·80	4·31	...	61·00	45·00	193·80	4·31	
Do ...	346D	Little Fingall	... ...	5	...	...	6·00	11·85	1·97	...	...	6·00	11·85	1·97	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	9·00	24·25	...	...	84·05	13·00	296·85	...	
From District generally—															
Sundry parcels treated at Cue Victory Battery			... ...	...	...	...	...	...	...	...	21·50	...	...	...	
Do do Day Dawn Public Battery			... ...	...	...	...	...	...	...	...	...	125 00	1,049·22	...	
Do do Day Dawn South No. 1 Battery			... ...	...	...	...	...	...	...	...	...	380·00	505·50	...	
Do do Emperor Battery ...			... ...	...	...	...	30·25	15·77	...	...	...	30·25	15·77	...	
Do do Eureka No. 5 Battery			... ...	...	...	...	...	...	...	...	...	264·50	128·67	...	
Do do Island Lake Austin Battery			... ...	...	...	...	...	...	...	...	...	119·00	53·00	...	
Notices of Purchase			... ...	...	...	...	...	...	...	27·61	2·57	...	...	...	
			Total ...	...	7·00	407·42	106,502·75	165,514·60	1·55	88·31	2,532·22	321,611·85	483,492·72	1·45	3 10 0½

MOUNT MAGNET DISTRICT.

					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£ s. d.
Boogardie ...	361M	... ...	Australian Gold Recovery Co., Ltd.	10	...	...	148·50	375·85	2·53	...	...	1,745·50	2,510·42	1·44	
Do ...	594M	Bobs	... ...	Ftd.	...	...	...	...	...	...	9·90	65·00	56·15	·86	
Do ...	522M	Boomer	... ...	V.N.R.	...	...	17·50	1·75	·10	...	...	226·50	41·62	·18	
Do ...	507M	Bronzewing	... ...	6	...	...	...	...	...	...	47·75	...	...	...	
Do ...	689M (550M) ...	Bunbury	... ...	12	..	...	273·00	105·05	·38	...	...	273·00	105·05	·38	
Do ...	489M	Comet	... ...	6	...	...	9·00	2·90	·32	...	4·00	74·00	54·37	·73	
Do ...	490M	Cushie Doo	... ...	6	...	...	62·00	16·75	·27	...	87·80	166·00	301·90	1·82	
Do ...	699M (640M) ...	Eclipse	... ...	12	...	...	11·00	2·90	·26	...	...	11·00	2·90	·26	
Do ...	264M	Eclipse Extended ...	... ...	12	...	...	83·80	175·15	2·09	...	...	998 55	2,005·74	2·01	
Do ...	648M	Golden Belle	... ...	10	...	...	217·00	47·55	·22	...	...	217·00	47·55	·22	
Do ...	502M	Havelock	... ...	10	...	...	427·00	160·00	·37	...	55·00	965 00	497·78	·51	3 19 6
Do ...	651M	Hesperus	... ...	V.N.R.	...	...	6·50	2·85	·44	...	...	6·50	2·85	·44	
Do ...	463M (386M) ...	Hesperus Dawn ...	... ...	10	...	...	...	...	...	...	...	521 98	1,860·95	3·56	
Do ...	635M	Iron Dyke	... ...	V.N.R.	...	...	...	...	...	...	2·00	6·50	3·63	·55	
Do ...	190M	Jupiter No. 1	... ...	Ftd.	...	...	95·30	66·55	·70	18·03	·80	1,725·45	1,318·63	·76	
Do ...	701M (190M) ...	Jupiter No. 1	... ...	18	...	...	81·00	24·65	·30	...	...	81·00	24·65	·30	
Do ...	657M (220M) ...	Marsite	... ...	V.N.R.	...	...	32·00	3·05	·09	...	...	40·00	6·70	·17	
Do ...	445M (173M) ...	Neptune	... ...	12	...	95·35	226·16	394·15	1·74	...	653·15	678·16	1,555·30	2·29	3 14 6
Do ...	673M	Nulli Secundus	... ...	10	...	...	149·00	71·65	·48	...	...	149·00	71·65	·48	
Do ...	671M	Pride of the Hill ...	... ...	5	...	2·80	67·50	129·90	1·92	...	2·80	67·50	129·90	1·92	3 14 6
Do ...	677M (171M) ...	Puzzle	... ...	12	...	...	23·00	12·50	·54	...	...	23·00	12·50	·54	
Do ...	667M	Result	... ...	6	...	...	179·00	158·50	·88	...	...	179·00	158·50	·88	
Do ...	538M (462M) ...	Saturn	... ...	6	...	...	286·00	99·30	·35	...	...	384·00	137·15	·36	
Do ...	571M (504M) ...	Sirdar	... ...	V.N.R.	...	...	157·50	60·35	·38	...	...	686·50	304·65	·44	
Do ...	696M (571M) ...	Sirdar	... ...	12	...	...	36·00	12·80	·35	...	...	36·00	12·80	·35	
Do ...	479M	Venus	... ...	6	...	...	39·00	9·25	·24	...	...	39·00	9 25	·24	
			Carried forward ...		...	98·15	2,626·76	1,933·40	...	18·03	863·20	9,365·14	11,232·59	...	

TABLE IV.—*Production of Gold from all sources, etc.*—continued.

Murchison Goldfield—*continued.*

MOUNT MAGNET DISTRICT—*continued.*

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
			Brought forward ...	...	ozs. ...	ozs. 98·15	tons. 2,626·76	ozs. 1,933·40	ozs. ...	ozs. 18·03	ozs. 863·20	tons. 9,365·14	ozs. 11,232·59	ozs. ...	£ s. d.
Boogardie ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	281·22	5,236·95	6,546·13	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	207·50	82·97	...	...	5·86	4,050·00	1,725·67	...	
Lennonville ...	613M	Ardpatrick	... ...	12	...	...	885·00	566·17	·64	...	...	1,207·00	831·67	·69	4 0 0
Do ...	639M	... ...	Australian Prospecting Syndicate, Ltd.	Ftd.	...	...	29·00	20·60	·71	...	...	29·00	20·60	·71	
Do ...	604M (395M) ...	Baxter's Reward ...	... ...	Surr.	...	...	...	...	...	...	...	139·00	26·55	·19	
Do ...	698M (593M) ...	Boshter	... ...	6	...	...	73·17	14·27	·19	...	...	73·17	14·27	·19	
Do ...	48M	Brilliant	... ...	9	...	...	52·90	23·16	·44	...	...	579·90	587·31	1·01	
Do ...	602M	Briton	... ...	V.N.R.	...	...	5·00	5·50	1·10	...	...	33·00	12·13	·37	
Do ...	327M (346M) 368M (466M)	Burra Burra leases ...	... ...	a. r. p. 19 3 6	...	...	...	*cy.* 189·97	...	...	...	1,133·50	3,658·92	3·23	
Do ...	714M	Cambridgeshire ...	... ...	5	...	...	10·00	1·46	·15	...	...	10·00	1·46	·15	
Do ...	587M (458M) ...	Canterbury	... ...	6	...	...	14·00	12·00	·86	...	...	132·00	102·81	·78	
Do ...	700M	Crown and Anchor ...	... ...	Wdn.	...	...	12·20	5·95	·49	...	...	12·20	5·95	·49	
Do ...	593M (480M) ...	Day Spring	... ...	V.N.R.	...	...	...	...	...	...	...	41·50	45·35	1·09	
Do ...	654M (549M) ...	Eldorado	... ...	6	...	...	26·00	43·60	1·68	...	...	26·00	43·60	1·68	
Do ...	333M	Fair Play	... ...	6	...	...	55·00	86·40	1·57	...	...	466·00	859·42	1·84	
Do ...	535M (399M) ...	Gambier	... ...	6	...	...	10·70	10·55	·98	...	...	136·20	134·75	·99	
Do ...	554M	Gambier Extended ...	... ...	6	...	...	10·00	3·50	·35	...	...	10·00	3·50	·35	
Do ...	567M (425M) ...	Golden Giant West ...	... ...	Surr.	...	...	...	...	...	...	...	40·00	58·50	1·46	
Do ...	619M (511M) ...	Golden Hill	... ...	V.N.R.	...	...	30·00	4·25	·14	...	...	90·00	17·61	·19	
Do ...	41M, 52M, 508M	Golden Treasure leases	... ...	a. r. p. 17 3 20	...	29·46	667·45	335·40	·50	...	29·46	2,100·45	1,320·76	·63	
Do ...	650M	Grand Gorge East ...	... ...	Wdn.	...	...	6·00	1·30	·22	...	...	6·00	1·30	·22	
Do ...	628M	Haeremai	... ...	24	...	...	166·60	147·87	·89	...	...	220·60	238·12	1·08	
Do ...	494M	Helm	... ...	5	...	...	...	...	...	...	...	20·00	16·85	·84	
Do ...	679M (598M) ...	Kitchener	... ...	a. r. p. 8 3 5	...	...	120·40	38·50	·32	...	...	120·40	38·50	·32	
Do ...	512M (484M) ...	Lennonville	... ...	12	...	...	404·61	378·98	·93	...	...	799·61	1,203·78	1·50	3 16 6
Do ...	617M (458M) ...	Lennonville Giant ...	... ...	Ftd.	...	...	36·00	2·15	·06	...	...	101·00	20·68	·20	
Do ...	30/1M, 39M, 247M, 433M	... ...	(Long Reef G.M. Co., Ltd.)	51	...	...	10·00	20·80	2·08	...	...	54,776·25	37,931·99	·69	3 14 0
Do ...	621M (542M) ...	Long Reef Central ...	... ...	V.N.R.	...	...	16·60	6·50	·40	...	...	30·60	11·65	·38	
Do ...	632M (556M) ...	Matterhorn	... ...	V.N.R.	...	...	...	...	...	...	...	12·00	3·80	·31	
Do ...	661M	Mount Success ...	... ...	V.N.R.	...	...	100·25	18·60	·18	...	...	100·25	18·60	·18	
Do ...	660M	Perseverance	... ...	12	...	...	86·22	122·20	1·42	...	...	86·22	122·20	1·42	
Do ...	639M (566M) ...	Piedmont	... ...	Ftd.	...	...	21·12	15·25	·72	...	...	21·12	15·25	·72	
Do ...	693M (639M) ...	Piedmont	... ...	12	...	...	70·00	29·97	·43	...	...	70·00	29·97	·43	
Do ...	687M	Rock of Ages	... ...	5	...	...	30·05	43·65	1·45	...	...	30·05	43·65	1·45	
Do ...	713M (66M) ...	Saturday	... ...	12	...	...	6·00	4·90	·82	...	...	6·00	4·90	·82	

Do	586M	Simmer and Jack		12			226·20	96·85	·43			376·20	161·74	·43			
Do	436M	Speedwell		Ftd.			9·00	9·20	1·02		9·66	30·00	44·85	1·49			
Do	421M (334M)	Splendour		6			50·00	43·00	·86			568·25	542·32	·95	3	12	3
Do	405M	Sullivan's Dunlop		V.N.R.			38·25	33·25	·87			647·25	619·90	·96			
Do	590M (453M)	Tarcoola		V.N.R.			18·50	19·95	1·08			72·50	58·10	·80			
Do	57M	Welcome		12			48·00	44·07	·92		2,550·20	1,908·00	3,753·06	1·97			
Do	606M	Werriwe		V.N.R.								22·00	37·37	1·69			
Do	708M (621M)	Wheel of Fortune East		5			9·50	6·70	·70			9·50	6·70	·70			
Do	103M, 373M, 574M	Wheel of Fortune leases		24			12,197·00	15,374·00	1·26			15,320·00	24,670·17	1·61	3	14	0
Do	585M	Wheel of Fortune North Extended		V.N.R.			19·00	5·00	·26			102·00	56·02	·55			
Do	447M (380M)	Wheel of Fortune Proprietary		6			72·00	89·81	1·25			72·00	89·81	1·25			
Do	151M	Wheel of Fortune South Block		6			596·50	1,362·90	2·28			1,523·15	4,764·18	3·13	3	13	3½
Do	706M	Whe l North Extended		8			33·00	13·20	·40			33·00	13·20	·40			
Do		Voided leases									·62	9,799·95	7,837·48				
Do		Sundry claims										439·25	319·16				
Mt. Magnet	317M	(Birthday)										184·50	30·92	·16			
Do	545M	Brittannia		12	12·95		109·00	63·45	·58	12·95		285·00	232·22	·81			
Do	607M	Caledonia		9								15·00	2·35	·15			
Do	457M	Iguana		12			74·40	71·90	·97			422·10	499·10	1·18			
Do	562M	Kapai		V.N.R.			20·00	3·45	·17			81·00	36·44	·45			
Do	653M	Magnet		Surr.			18·00	12·20	·68			18·00	12·20	·68			
Do	685M	Magnet Mine		6			326·50	184·52	·56			326·50	184·52	·56			
Do	665M (448M)	Mayflower		9			84·75	291·80	3·44			96·75	336·87	3·48	4	0	0
Do	314M, 317M, 320M	(Morning Star leases)										63,938·00	39,001·51	·61			
				a. r. p.													
Do	314M, 317M, 320M		Morning Star Quartz Co., N.L.	23 3 37			7,538·00	5,976·54	·79			13,568·00	11,742·99	·86	3	16	5
Do	656M (476M)	Paris		V.N.R.			8·00	4·25	·53			48·00	14·55	·30			
Do	572M (565M)	Revenue		Surr.								182·00	65·00	·36			
Do	120M, 339M		Western Syndicate, Ltd.	24							6·04	876·00	1,430·88	1·63			
Do		Voided leases										18,133·60	33,102·45				
Do		Sundry claims					136·50	96·05			23·07	2,081·10	2,622·00				
Mt. Magnet East	415M	Havela		V.N.R.							261·06	303·50	294·30	·97			
Do	658M (460M)	Killarney		V.N.R.								73·00	32·10	·44			
Do	416M	Lady Maud		V.N.R.							5·00	165·50	197·83	1·19			
Do	558M	Maori Chief		V.N.R.								79·00	81·55	1·03			
Do	599M (382M)	South Australian		V.N.R.								7·50	2·50	·33			
Do	340M	(Windsor Castle)		V.N.R.							2·05	4·70	13·85	2·94			
Do	340M, 352M (451M, 468M)		Windsor Consolidated (W.A.) G.Ms., Ltd.	V.N.R.								3,666·00	1,077·50	·29			
Do	672M	You and Me		V.N.R.			5·00	49·00	9·80			5·00	49·00	9·80			
Do		Voided leases								69·50	553·39	1,202·05	1,363·39				
Do		Sundry claims									40·30	209·50	155·14				
Moyagee	629M	Little Boulder		Surr.			70·00	51·75	·74			70·00	51·75	·74			
Do	690M (629M)	Little Boulder		3			19·00	13·70	·72			19·00	13·70	·72			
Do	686M, 688M		Louise G.M. Co., N.L.	24			15·00	73·00	4·87			15·00	73·00	4·87			
Do		Voided leases										317·50	328·56				
Do		Sundry claims										5·00	·50				
Warringee	573M (559M)	Brooklyn		6			73·75	158·72	2·15			142·75	270·17	1·89	3	17	6
Do	680M	Brooklyn Extended		Wdn.			5·00	6·16	1·23			5·00	6·16	1·23			
Do	666M	Brooklyn West		12			637·30	182·85	·29			637·30	182·85	·29			
Do	644M	Bushman		V.N.R.								19·00	13·00	·68			
				a. r. p.													
Do	465M, 503M, 544M	Empress leases		19 0 32			101·00	362·65	3·59			1,436·00	3,087·26	2·15			
Do	343M	Galtee Moore		12			294·00	203·90	·69			3,381·00	2,051·65	·61			
		Carried forward			12·95	127·61	28,640·68	29,073·64		100·48	4,631·13	224,253·31	208,584·61				

TABLE IV.—*Production of Gold from all sources, etc.*—continued.

Murchison Goldfield—*continued.*

MOUNT MAGNET DISTRICT—*continued.*

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903. Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Total Gold Production. Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	Estimated Value of Gold per oz., 1903
			Brought forward ...	...	ozs. 12·95	ozs. 127·61	tons. 28,640·68	ozs. 29,073·64	ozs. ...	ozs. 100·48	ozs. 4,631·13	tons. 224,253·31	ozs. 208,584·61	ozs. ...	£ s. d.
Warringee ...	201M	Golden Gem	... ...	6	...	62·20	...	...	...	...	97·40	550·50	1,371·80	2·49	
Do ...	611M	Union Jack	... ...	12	...	...	31·85	2·75	·09	...	...	31·85	2·75	·09	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	33·30	556·75	786·42	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	148·00	93·40	...	...	13·50	302·00	234·96	...	
		From District generally—													
	Sundry parcels treated at Australian Gold Recovery Works			...	...	...	...	...	...	...	...	25·00	5,009·40	...	
	Do do	Murchison New Chum Works		...	...	...	...	...	...	...	...	...	1,382·75	...	
	Do do	State Battery, Lennonville		...	...	...	*cy.* 741·45	...	...	...	...	...	3,600·82	...	
	Do do	State Battery, Mt. Magnet East...		...	...	...	*cy.* 99·30	...	...	...	...	...	99·30	...	
	Alluvial			...	179·30	...	...	...	...	775·10	...	...	...	...	
			Total	...	192·25	189·81	28,820·53	30,010·54	1·04	875·58	4,775·33	225,719·41	221,072·61	·98	3 14 10

Yalgoo Goldfield.

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903. Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Total Gold Production. Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	Estimated Value of Gold per oz., 1903.
					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	s. d.
Bilberatha ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	554·00	221·52	...	
Carlaminda ...	478/9 ...	(Murchison Reliance leases)	... ...	18	...	...	27·00	21·50	·80	...	...	38·50	35·85	·93	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	625·32	402·58	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	...	114·00	82·62	..	
Field's Find ...	441/3	... ...	Field's Find G.Ms., Ltd. ...	60	...	...	...	...	...	...	...	30,336·00	23,247·47	·76	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	42·00	118·25	102·72	...	
Gullewa ...	170/1, 174 ...	... ...	(Monarch G.M. Syndicate)	...	...	...	...	...	...	...	...	12·00	9·60	·80	
Do ...	170/1, 174 ...	Monarch leases ...	... ...	18	...	...	901·00	191·76	·21	...	...	901·00	191·76	·21	4 0 0
Do ...	34, 53/4, 445	... ...	Phœnix G.Ms., Ltd. ...	48	...	...	...	*cy.* 2,376·50	...	...	...	6,626·50	8,764·71	1·32	3 5 0
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	474·00	351·25	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	...	30·00	8·70	...	
Kirkalucka ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	...	8·80	4·60	...	
Melville ...	(439), 440, Q.C. 30	Victoria United ...	... ...	V.N.R.	...	...	...	...	...	...	...	519·00	277·92	·53	
(Noongal) ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	16·50	2,197·50	1,324·95	...	

Do ...	... ...	Sundry claims ...	... ...	...	...	...	25·00	12·65	...	13·00	...	238·00	181·36	...				
Nynghan ...	482	Gladstone	... ...	V.N.R.	...	...	...	...	...	...	...	52·00	35·05	·67				
Do ...	446/7 (448)	... ...	Pinyalling Discovery G.Ms., Ltd.	V.N.R.	...	...	...	...	...	...	250·00	344·00	190·38	·55				
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	1·00	7·00	...				
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	...	18·00	26·30	...				
Pinyalling ...	392	Golden Eagle	... ...	12	...	...	124·00	77·64	·63	...	1·50	341·50	216·49	·63				
Do ...	496	Vera Gold Mine ...	... ...	24	...	...	71·00	10·28	·14	...	...	71·00	10·28	·14				
Rothesay	(14, 147/9, 192, 193, 209, 210, 213, 220, 244, 251, 400, R.C. 4)	... ...	Woodley's G.Ms., Ltd. ...	V.N.R.	...	...	...	...		...	...	8,966·00	3,822·01	·42				
Wadgingarra ...	462	Commonwealth ...	... ...	Ftd.	...	...	...	...	...	...	...	75·10	368·63	4·91				
Do ...	499	Consuelo	... ...	12	...	...	39·00	19·73	·50	...	...	39·00	19·73	·50				
Do ...	485	Morning Star	... ...	V.N.R.	...	...	...	...	...	...	...	26·95	16·15	·59				
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	325·06	236·55	...				
Do ...	... ...	Sundry claims ...	... ...	...	...	...	71·50	46·77	...	...	...	71·50	46·77	...				
Yalgoo ...	129	Emerald Reward Consolidated	... ...	25	...	...	71·50	19·75	·28	...	...	677·50	419·70	·62				
Do ...	468	May Be	... ...	V.N.R.	...	...	30·00	6·81	·23	...	...	300·00	95·51	·32				
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	·40	3,639·50	10,074·32	...				
Do ...	... ...	Sundry claims ...	... ...	...	...	...	29·00	17·25	...	...	...	116·00	64·84	...				
Yuin ...	409 (427, 430), 469, 470	Royal Standard leases	... ...	15	...	...	1,023·00	1,041·11	1·02	...	...	5,110·00	3,221·41	·63	3	17	6	
		From Goldfield generally—																
		Sundry parcels treated at State Battery, Carlaminda		...	...	...	...	...	...	...	...	609·00	719·00	...				
		Do do Victoria United Battery		...	...	...	...	...	...	...	...	55·00	19·70	...				
		Notices of Purchase		...	...	...	...	...	...	12·08								
			Total	...	...	...	2,412·00	3,841·75	1·59	25·08	310·40	63,630·98	54,817·43	·86	3	8	10¾	

Mount Margaret Goldfield.

MOUNT MORGANS DISTRICT.

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£ s. d.
Korong ...	75F	Horse Shoe	... ...	V.N.R.	...	...	17·00	45·10	2·65	...	9·10	165·50	204·40	1·23	
Do ...	103F (75F) ...	Horse Shoe	... ...	12	...	..	25·00	32·50	1·30	...	...	25·00	32·50	1·30	
Do ...	9F	Korong No. 461 ...	... ...	V.N.R.	...	...	...	...	...	20·55	...	115·00	376·21	3·27	
Do ...	81F	Pot Boiler	... ...	V.N.R.	...	...	...	...	...	...	...	27·00	216·00	8·00	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	96·50	169·18	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	5·00	14·00	...	...	34·35	13·00	17·55	...	
Mt. Flora ...	105F (T.A.2F)	Fardy's Australia United	... ...	5	...	...	6·00	9·00	1·50	...	...	6·00	9·00	1·50	
			Carried forward ...	...	...	...	53·00	100·60	...	20·55	43·45	448·00	1,024·84	...	

Mount Margaret Goldfield—*continued.*

MOUNT MORGANS DISTRICT—*continued.*

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
			Brought forward ...	...	ozs. ...	ozs. ...	tons. 53·00	ozs. 100·60	ozs. ...	ozs. 20·55	ozs. 43·45	tons. 448·00	ozs. 1,024·84	ozs. ...	£
Flora ...	102F	Golden Ball	... ...	6	...	...	49·00	169·00	3·45	...	...	49·00	169·00	3·45	
Do ...	95F	Lurline	... ...	12	...	...	28·00	324·00	...	...	...	28·00	324·00	...	
Do ...	1F	Princess Iris	... ...	12	...	...	155·00	493·00	3·18	...	3·65	352·00	913·00	2·59	3 15 0
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	1,822·79	10,166·50	18,950·21	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	226·00	809·51	...	...	80·00	376·50	1,181·09	...	
Mt. Margaret ...	66F	Mt. Morven	... ...	a. r. p. 19 1 15	...	...	347·00	386·60	1·11	...	...	453·50	535·50	1·18	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	1,424·00	1,006·63	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	...	10·00	18·25	...	
Mt. Morgans ...	110F	Birrell's United ...	... ...	24	...	...	17·00	5·00	·29	...	...	17·00	5·00	·29	
Do ...	101F	Golden Queen	... ...	20	...	...	28·00	65·90	2·35	...	...	28·00	65·90	2·35	
Do ...	96F	Great Northern ...	... ...	24	...	...	22·00	5·00	·23	...	...	22·00	5·00	·23	
Do ...	98F	Mafeking	... ...	5	...	...	12·00	8·50	·71	...	...	12·00	8·50	·71	
Do ...	8F, 50F (69F) ...	... ...	Millionaire, Ltd.	48	...	...	5,516·00	2,024·32	·37	...	...	5,745·00	2,208·07	·38	3 14 3
Do ...	94F	Moonstone	... ...	Wdn.	...	...	12·00	14·50	1·21	...	...	12·00	14·50	1·21	
Do ...	70F	Mount MacKenzie North	... ...	a. r. p. 3 1 25	...	...	13·00	4·00	·31	...	...	13·00	4·00	·31	
Do ...	12F	Mount Morgans Consols	... ...	24	...	...	128·00	20·10	·16	...	...	128·00	20·10	·16	
Do ...	93F	Pretoria	... ...	V.N.R.	...	...	...	...	...	...	...	12·50	10·00	·80	
Do ...	31F	Sons of Gowrie ...	... ...	24	...	...	134·00	361·75	2·70	...	...	576·00	1,300·55	2·26	3 14 0
Do ...	114F	Sweet Nell	... ...	15	...	...	17·00	16·00	·94	...	...	17·00	16·00	·94	
Do ...	29F, 30F ...	Transvaal leases ...	... ...	48	...	...	680·00	1,494·40	2·20	...	...	1,411·00	2,932·97	2·08	
Do ...	100F	Turn of the Tide ...	... ...	24	...	...	30·00	15·00	·50	...	...	30·00	15·00	·50	
Do ...	5F, 10F, 19F, 22F, 32F 72F, 73F	... ...	Westralia Mount Morgans G.Ms. Co., Ltd.	137	...	...	86,780·00	64,945·85	·75	...	...	191,515·00	199,876·08	1·04	3 10 3
Do ...	7F, 20/1F ...	... ...	Westralia Mount Morgans G.Ms. Co., Ltd.	a. r. p. 69 0 29	...	...	...	...	...	...	...	18,261·00	9,227·65	·50	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	258·00	281·48	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	137·75	101·20	...	...	...	213·75	157·15	...	
Redcastle ...	77F	Coronation	... ...	Ftd.	...	...	...	...	...	...	...	26·00	13·00	·50	
Do ...	39F	Major	... ...	V.N.R.	...	...	...	...	...	...	...	44·00	44·75	1·01	
Do ...	83F	Queen Alexandra ...	... ...	12	...	10·00	128·00	124·75	·97	...	10·00	189·00	163·50	·86	
Do ...	15/8F	Redcastle leases ...	... ...	V.N.R.	...	...	21·00	19·15	·91	4·00	...	1,882·00	2,038·90	1·08	
Do ...	(63F) (1248T) ...	Try Again	... ...	V.N.R.	...	...	10·00	31·65	3·16	...	...	10·00	31·65	3·16	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	252·95	156·16	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	...	10·00	5·00	...	
		From District generally— Sundry parcels treated at Mt. Morgans Public Battery		...	...	...	...	*cy.* 249·00	...	...	...	...	536·33	...	
			Total	...	10·00	94,543·75	71,788·78	·76	24·55	1,959·89	233,992·70	243,259·76	1·04	3 10 6½	

						ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£ s. d.
Diorite King ...	934c	Bluemantle	... ...	V.N.R.	...	...	27·00	30·70	1·14	...	...	98·50	84·65	·86	
Do ...	335c, 528c, 574c, 583c	... ...	King of the Hills G.M. Co., Ltd.	Ftd.	...	...	1,421·00	966·07	·68	...	355·00	13,935·75	9,048·62	·65	
Do ...	960c	Lady Mac	... ...	V.N.R.	...	...	6·50	20·55	3·16	...	...	28·50	51·55	1·81	
Do ...	958c (777c) ...	Meteor	... ...	Ftd.	...	...	...	...	...	...	...	23·00	10·41	·45	
Do	441/2c, 865/6c, 881/2c	Mt. Stirling leases ...	... ...	V.N.R.	...	...	...	pl. 50·50 cy. 1,134·37	...	...	...	2,508·00	5,250·20	2·09	
Do ...	... .	Voided leases ...	... ...	...	...	...	...	...	...	...	332·88	3,113·73	8,922·05	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	67·31	293·50	341·08	...	...	67·31	856·50	1,293·84	...	
Dodger's Well ...	961c	Junction	... ...	V.N.R.	...	...	17·00	15·25	·90	...	...	17·00	15·25	·90	
Do ...	973c	Myrtle	... ...	12	...	...	145·00	238·89	1·65	...	...	145·00	238·89	1·65	3 11 6
Do ...	989c	Myrtle South	... ...	3	...	...	12·00	46·85	3·90	...	...	12·00	46·85	3·90	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	60·00	167·50	243·51	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	57·50	55·86	...	...	...	57·50	55·86	...	
Leonora ...	886c	All Nations	... ...	V.N.R.	...	...	...	...	...	...	...	60·00	33·50	·56	
Do ...	679c	Ashley's United ...	... ...	6	...	...	11·00	33·90	3·08	...	...	343·00	421·61	1·23	
Do ...	908c	Clarence	... ...	Ftd.	...	...	36·00	47·79	1·33	...	...	217·00	423·44	1·95	
Do ...	997c (908c) ...	Clarence	... ...	12	...	...	17·50	30·67	1·75	...	...	17·50	30·67	1·75	
Do	954c (711c) ...	Commonwealth ...	... ...	Ftd.	...	...	23·00	16·00	·69	...	...	106·00	50·84	·48	
Do ...	198c	Eastern	... ...	15	...	...	267·00	239·77	·90	...	...	302·00	363·17	1·20	
Do ...	210c, 253c ...	(Forest leases)	... ...	42	...	...	...	...	...	...	66·25	843·00	1,231·33	1·46	
Do ...	984c	Lady Muriel	... ...	12	...	...	208·00	59·30	·28	...	...	208·00	59·30	·28	
Do ...	990c	Last Chance	... ...	Wdn.	...	...	44·00	6·57	·15	...	...	44·00	6·57	·15	
Do ...	195/6c... ...	Leonora Gold Blocks ...	... ...	36	...	...	1,590·00	1,760·47	1·11	...	...	6,144·00	9,740·53	1·58	
Do ...	992c	Little Dorothy	... ...	12	...	...	38·00	43·91	1·15	...	...	38·00	43·91	1·15	
Do ...	218c, 219c ...	... ...	Octagon Explorers, Ltd. ...	48	...	...	823·00	280·20	·34	...	...	3,597·00	1,192·05	·33	
Do ...	618c	(Pride of Leonora) ...	... ...	12	...	...	192·00	148·46	·77	...	...	1,195·00	1,135·01	·95	3 14 3
Do ...	649c	(Pride of Leonora North)	... ...	12	...	...	18 00	17·85	·99	...	...	36·00	24·30	·67	
Do ...	931c	Royal Flush	... ...	V.N.R.	...	...	...	...	...	...	78·44	12·00	38·20	3·18	
Do ...	190c, 207c, 353c	... ...	Sons of Gwalia, Ltd. ...	72	...	...	94,756 00	70,199·70	·74	...	...	389,081·00	299,226·07	·77	3 16 0½
Do ...	952c	St. Helliers	... ...	V.N.R.	...	...	5·50	9·30	1·69	...	...	20·50	16·95	·83	
Do ...	263c (482c) ...	Trump	... ...	18	...	...	3,215·00	1,301·72	·40	...	...	11,989·35	11,296·28	·94	3 8 3
Do ...	835c	Victor	... ...	V.N.R.	...	...	...	...	...	...	225·34	64·50	82·14	1·27	
Do ...	1008c	Warragamba	... ...	5	...	...	69·00	36·95	·53	...	...	69·00	36·95	·53	
Do ...	1006c	Westralia Broken Hill...	... ...	12	...	...	36·00	8·02	·22	...	...	36·00	8·02	·22	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	..	...	...	152·19	5,005·65	4,388·09	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	438·00	399·39	...	...	...	1,381·50	1,484·44	...	
Malcolm ...	722c	(Dumbarton)	... ...	Ftd.	...	...	...	...	...	...	...	218·00	230·02	1·05	
Do ...	722c	... ...	Dumbarton G.Ms., Ltd. ...	Ftd.	...	...	107·00	8·90	·08	...	...	107·00	8·90	·08	
Do ...	1011c	F.E.B.E.G.	... ...	24	...	10·00	22·00	11·00	·50	...	10·00	22·00	11·00	·50	
Do ...	994c	Flying Pig	... ...	1	...	...	50·00	29·55	·59	...	...	50·00	29·55	·59	
Do ...	756c	(Golden Crown) ...	... ...	...	...	...	...	...	...	...	...	299·00	352·15	1·17	
Do ...	(637c) 756c, 781c, 970c	... ...	Golden Crown and Midas United G.M. Co., N.L.	42	...	...	438·00	579·14	1·32	...	...	1,302·00	1,472·94	·96	3 18 0
Do ...	969c	Harriston	... ...	12	...	...	499·50	2,673·38	5·35	...	...	499·50	2,673·38	5·35	3 16 6
Do ...	946c	Knark	... ...	V.N.R.	...	...	...	...	...	...	...	27·00	10·18	·37	
Do ...	637c	(Midas)	... ...	Surr.	...	...	...	...	...	...	...	803·80	1,202·31	1·49	
Do ...	2c, 3c, 26c ...	... ...	North Star G.Ms., Ltd. ...	Ftd.	...	...	158·00	670·83	4·24	...	...	14,036·75	15,327·86	1·09	3 11 6
Do ...	988c	Oliver Twist	... ...	4	...	...	35·00	25·68	·73	...	...	35·00	25·68	·73	
Do ...	995c	Orphan	... ...	5	...	...	25·00	28·13	1·12	...	...	25·00	28·13	1·12	
Do ...	991c	Richmond Gem ...	... ...	24	...	...	566 00	506·40	·89	...	...	566·00	506·40	·89	
Do ...	12c (634c) ...	... ...	Richmond Gem G.M. Co., N.L.	Ftd.	...	...	804·00	688·91	·86	...	...	3,387·00	3,965·50	1·17	3 12 6
Do ...	596c	South Star	... ...	Ftd.	...	...	...	...	...	...	...	133·00	146·10	1·09	
			Carried forward ...	...	...	77·31	106,471·00	82,762·01	...	...	1,347·41	463,284·03	382,585·15	...	

Mount Margaret Goldfield—*continued.*

MOUNT MALCOLM DISTRICT—*continued.*

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£ s. d.
			Brought forward ...	...	...	77·31	106,471·00	82,762·01	...	...	1,347·41	463,284·03	382,585·15	...	
Malcolm ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	2,038·12	2,801·07	...	
Do ...		Sundry claims ...	... ...	...	...	...	498·50	495·14	...	...	...	1,170·00	1,181·39	...	
Mertondale ...	929c	Gift	... ...	Ftd.	...	...	...	...	...	...	...	64·00	153·85	2·40	
Do ...	645c	(Merton's Consols) ...	... ...	...	...	...	...	...	...	...	...	23·00	77·75	3·38	
Do ...	638c, 644/5c, 653c, R.C.1c		Merton's Reward G.M. Co., Ltd.	66	...	...	...	...	...	...	...	2,678·00	3,315·70	1·24	
Do ...	638c, R.C.1c ...	(Merton's Reward North)	... ...	...	...	...	...	...	...	...	...	11,396·50	22,093·90	1·94	
Do ...	648c	(Merton's Reward No. 1 North)	... ...	24	...	...	...	...	...	...	...	122·00	102·63	·84	
Do ...	955c ...	Triumvirate	... ...	Ftd.	...	...	27·00	22·10	·82	...	...	49·50	54·56	1·10	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	232·50	182·40	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	81·25	83·99	...	...	...	113·75	117·66	...	
Murrin Murrin ...	845c	Elbe	... ...	5	...	...	246·00	351·90	1·43	...	...	306·00	483·90	1·58	
Do ...	947c	Folly	... ...	V.N.R.	...	...	...	...	...	...	...	·65	295·90	...	
Do ...	938c	Hardcase	... ...	6	11·73	...	...	...	...	11·73	71·00	10·00	32·10	3·21	
Do ...	11c, 36c, 38/9c, (42c, 90c), 99c	... ...	Mount Malcolm Mines, Ltd.	108	...	...	881·00	2,167·19	2·46	...	...	40,137·50	29,919·70	·74	3 9 2
Do ...	699c	Murrin Murrin Proprietary	... ...	24	...	...	2,013·00	3,015·45	1·50	...	...	2,747·00	3,799·95	1·38	
Do ...	851c	Perseverance	... ...	5	...	...	20·00	20·00	1·00	...	...	374·50	396·35	1·06	
Do ...	959c	Princess Alix	... ...	18	...	...	158·00	563·70	3·57	...	...	158·00	563·70	3·57	3 17 6
Do ...	532c	Proprietary Extended...	... ...	12	...	...	...	...	...	...	...	604·50	482·65	·80	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	104·50	3,127·42	4,883·61	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	...	120·25	165·11	...	
Randwick ...	993c	Cardinia	... ...	15	...	...	15·00	18·50	1·23	...	...	15·00	18·50	1·23	
Do ...	227c	East Lynne	... ...	24	...	...	76·00	160·65	2·11	...	59·60	538·04	1,462·13	2·72	3 10 0
Do ...	928c	English and Scottish North	... ...	V.N.R.	...	...	6·00	20·75	3·46	...	...	6·00	20·75	3·46	
Do ...	788c	Nevertire	... ...	V.N.R.	...	...	...	...	...	...	1,271·00	4·00	145·60	...	
Do ...	978c	Randwick	... ...	12	...	...	219·00	304·45	1·39	...	...	219·00	304·45	1·39	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	325·00	2,917·90	4,961·90	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	24·00	21·79	...	...	...	180·00	134·34	...	
Websters ...	65c, 66c, 115c...	... ...	Perseverance G.Ms., Ltd. ...	44	...	...	4,405·00	2,630·80	·60	...	...	4,405·00	2,630·80	·60	3 12 6
Do ...	935c	Prince of Wales ...	... ...	Ftd.	...	...	5·00	18·95	3·79	...	...	12·00	1,342·95	...	
Do ...	65c, 66c, 115c...	... ...	(Webster's G.M. Co., Ltd.)...	...	...	...	930·00	1,048·45	1·13	...	...	7,879·00	5,884·29	·75	3 12 6
Do ...	1000c	Webster's New Find ...	... ...	6	...	...	25·00	11·40	·46	...	...	25·00	11·40	·46	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	207 55	203·41	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	17·70	40·50	58·40	...	...	17·70	409·50	339·60	...	

From District generally—										
Sundry parcels treated at Diorite King Consols Works	...	...	...	...	...	...	...	...	1,198·25	...
Do do Midas Battery	...	...	...	...	...	...	...	120·00	48·40	...
Do do Rata Battery	...	...	...	...	...	...	...	32·00	46·00	...
Alluvial	54·00	...	...	...	...	1,318·09	...	...	...	...
Notices of Purchase	7·48	19·15	...	...	...	349·99	91·60	...	...	...
Total	73·21	114·16	116,141·25	93,775·62	·81	1,679·81	3,287·81	545,727·21	472,441·80	·86	3 15 4½

MOUNT MARGARET DISTRICT.

					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£ s. d.
British Flag ...	1180T	Alma Mater	... ...	12	...	4·70	188·00	196·35	1·04	...	97·95	376·00	496·18	1·32	
Do ...	1431T (1396T)	British Empire... ...	... ...	V.N.R.	...	...	78·50	39·35	·50	...	...	99·50	96·42	·97	
Do ...	592T	... ...	Craiggiemore Proprietary, Ltd.	24	...	...	13,700·00	5,783·85	·42	...	...	52,395·00	21,784·38	·41	3 4 4½
Do ...	1042T	Cock of the North ...	... ...	V.N.R.	...	...	33·00	17·40	·53	...	...	70·00	117·70	1·68	
Do ...	1439T	Corio	... ...	Wdn.	...	...	7·00	4·80	·68	...	...	7·00	4·80	·68	
Do ...	825T	Dream	... ...	Ftd.	...	...	23·00	11·00	·48	...	272·90	210·00	382·53	1·82	
Do ...	1486T	Emerald...	... ...	5	...	...	11·00	22·85	2·00	...	...	11·00	22·85	2·00	
Do ...	1453T	Enniskillen	... ...	18	...	...	80·00	10·40	·13	...	...	80·00	10·40	·13	
Do ...	838T	(General Wabash) ...	... ...	...	...	...	...	...	...	...	...	100·00	330·75	3·30	
Do ...	1372T	Golden Pinnacle ...	... ...	Ftd.	...	...	...	...	...	...	...	15·00	7·00	·47	
Do ...	371T (764T, 777T), 1249T	... ...	Golden Rhine G.Ms. (W.A.), Ltd.	38	...	...	850·00	507·00	·60	...	...	15,497·50	12,724·16	·82	
Do ...	829T	(Ida H.)	... ...	...	...	...	...	...	...	...	...	111·00	320·62	2·88	
Do ...	829T, 838T, 846T, 1219T, 1310T	... ...	Ida H. G.M. Co., Ltd. ...	102	...	...	13,017·00	14,003·31	1·07	...	...	26,194·00	29,333·52	1·12	3 18 0
Do ...	1289T	Ida H. North Extended	... ...	12	...	...	226·50	216·25	·95	...	...	337·50	397·73	1·18	
Do ...	1394	Ida H. West	... ...	Surr.	...	...	268·00	218·97	·82	...	...	386·00	341·32	·88	3 19 10
Do ...	902T	Kiora	... ...	V.N.R.	...	...	...	...	...	...	...	280·00	283·55	1·01	
Do ...	806T	... ...	Lancefield G.M. Co., Ltd. ...	24	...	...	21,928·00	8,702·65	·40	...	...	77,025·00	34,103·37	·44	3 9 0
Do ...	1490T	Laverton	... ...	6	...	...	39·00	13·75	·35	...	...	39·00	13·75	·35	
Do ...	1339T	Lights of Home ...	... ...	V.N.R.	...	...	25·50	51·90	2·03	...	...	171·00	239·22	1·40	
Do ...	1506T	Little Queen	... ...	5	...	...	18·00	54·20	3·01	...	...	18·00	54·20	3·01	
Do ...	1095T	Lord Hopetoun... ...	... ...	V.N.R.	...	...	...	...	...	...	...	25·00	3·15	·12	
Do ...	1161T	Maryboro'	... ...	Ftd.	...	...	...	...	...	...	...	20·50	19·20	·93	
Do ...	1067T	Mystery	... ...	V.N.R.	...	...	...	...	...	...	...	145·00	160·52	1·10	
Do ...	1214T	Nous Verrons	... ...	V.N.R.	...	...	37·00	27·00	·73	...	...	176·50	174·97	·99	
Do ...	1468T	Rats Find	... ...	5	...	...	10·00	25·85	2·58	...	...	10·00	25·85	2·58	
Do ...	1518T	Rescue	... ...	5	...	...	10·00	4·00	·40	...	...	10·00	4·00	·40	
Do ...	1373T	Rose	... ...	12	...	...	234·00	223·85	·96	...	...	421·50	464·95	1·10	3 16 6
Do ...	1253T	Scotland Yet	... ...	Ftd.	...	...	...	...	...	...	...	115·00	52·55	·45	
Do ...	1309T	Sons of Toil	... ...	V.N.R.	...	...	37·00	14·20	·38	...	...	138·00	103·55	·75	
Do ...	1479T	St. Albans	... ...	5	...	...	154·00	93·00	·60	...	...	154·00	93·00	·60	
Do ...	1426T	Toby	... ...	Wdn.	...	...	9·50	49·50	5·21	...	...	9·50	49·50	5·21	
Do ...	1424T (1159T)	Warrior	... ...	Wdn.	...	...	...	...	...	...	...	30·00	37·80	1·26	
Do ...	1476T	Westella	... ...	18	...	6·05	30·00	47·50	1·58	...	6·05	30·00	47·50	1·58	
Do ...	854T	White Horse	... ...	12	...	...	61·50	41·50	·67	...	...	128·50	82·21	·64	
Do ...	1368T	Woolloomooloo	... ...	V.N.R.	...	...	...	...	...	...	...	17·00	76·05	4·47	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	325·00	1,116·00	1,071·31	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	104·25	74·25	...	...	...	496·50	513·30	...	
Burtville ...	1041T	Away from Home ...	... ...	14	...	...	215·00	289·05	1·34	...	80·45	570·50	2,101·81	3·68	3 7 6
Do ...	1397T	Banker	... ...	11	...	...	116·00	256·85	2·21	...	...	138·00	296·85	2·15	3 15 0
Do ...	940T	(Black Swan)	... ...	24	...	...	...	...	...	...	...	364·00	643·35	1·76	
			Carried forward ...	...	...	10·75	51,510·75	31,000·58	...	...	782·35	177,538·00	107,085·87	...	

TABLE IV.—*Production of Gold from all sources, etc.*—continued.

Mount Margaret Goldfield—*continued.*

MOUNT MARGARET DISTRICT—*continued.*

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£ s. d.
			Brought forward ...	...	...	10·75	51,510·75	31,000·58	...	...	782·35	177,538·00	107,085·87	...	
Burtville ...	940T	... ...	(Black Swan Proprietary G.M. Co., N.L.)	...	...	...	234·00	219·80	·94	...	...	673·50	717·65	1·07	3 16 3
Do ...	1019T	Bond's Find	... ...	18	...	...	278·00	477·30	1·72	...	...	589·00	1,632·62	2·77	3 7 3
Do ...	1054T	Brothers	... ...	20	...	...	108·00	184·52	1·71	...	...	478·50	1,003·43	2·09	
Do ...	944T	(Carib)	... ...	12	...	...	60·00	55·00	·92	...	...	382·00	386·30	1·01	
Do ...	1369T	Climax	... ...	V.N.R.	...	...	8·00	2·90	·36	...	...	8·00	2·90	·36	
Do ...	1350T (1108T)	Double Handed ...	... ...	6	...	...	65·50	573·85	8·76	...	5·00	101·00	825·45	8·17	3 18 9
Do ...	809T	Edinboro' Castle South	... ...	V.N.R.	...	...	...	...	...	...	...	31·00	200·25	6·46	
Do ...	841T	Edith Hope	... ...	V.N.R.	...	...	...	...	...	...	...	565·00	348·52	·61	
Do ...	1112T	Eldorado	... ...	V.N.R.	...	...	18·25	18·50	1 01	...	...	47·25	49·00	1·04	
Do ...	1423T	Eureka	... ...	V.N.R.	...	...	...	...	...	...	...	14·25	5·70	·40	
Do ...	1345T	Exchequer	... ...	V.N.R.	...	...	186·00	44·85	·24	...	...	343·00	123·60	·36	
Do ...	1104T	Golden Flat	... ...	V.N.R.	...	...	7·00	4·70	·67	...	...	50·65	228·65	4·51	
Do ...	1398T	Golden Orbit	... ...	12	1·20	·14	149·50	149·05	1·00	1·20	·14	149·50	149·05	1·00	
Do ...	801T	Golden Ring	... ...	V.N.R.	...	...	...	...	...	...	...	796·00	2,154·07	2·71	
Do ...	1010T	Karridale	... ...	12	...	...	687·33	910·75	1·32	...	...	1,055·33	2,099·55	1·99	3 6 5
Do ...	1400T	Karridale South ...	... ...	Ftd.	...	...	...	...	...	...	...	13·00	13·00	1·00	
Do ...	1048T	Maori Chief	... ...	12	...	...	99·60	867·00	8·70	...	...	173·60	1,339·60	7·72	3 6 3½
Do ...	1114T	Maori Chief Extended	... ...	V.N.R.	...	...	5·00	27·10	5·42	...	7·90	118·00	556·70	4·72	
Do ...	1384T (1287T)	Maxim	... ...	12	...	...	76·90	72·25	·94	...	...	130·90	119·25	·91	
Do ...	1404T	Maxim North	... ...	V.N.R	...	...	10·05	4·25	·42	...	...	15·05	10·25	·68	
Do ...	943T	Mikado	... ...	24	...	...	135·00	108·70	·80	...	...	342·00	252·90	·74	3 0 0
Do ...	1434T	Mon Ami	... ...	12	...	...	82·00	242·65	2·96	...	...	128·00	358·65	2·80	
Do ...	1265T	Mt. Brown	... ...	V.N.R.	...	...	...	...	...	...	...	31·50	28·30	·89	
Do ...	1105T	Mt. Weld Consols ...	... ...	12	...	...	104·00	25·00	·24	...	...	265·50	135·70	·51	
Do ...	1044T	Nil Desperandum ...	... ...	24	...	...	167 00	486·75	2·91	...	...	290·00	1,123·42	3·87	3 10 0
Do ...	1286T	Nil Desperandum North	... ...	Ftd.	...	...	...	...	...	...	...	90·30	321·75	3·56	
Do ...	1436T	Nonpariel	... ...	V.N.R.	...	...	22 00	26·00	1·18	...	...	22·00	26·00	1·18	
Do ...	1292T	Oldfield	... ...	Surr.	...	...	54·00	149·15	2·76	...	...	76·40	181·63	2·38	
Do ...	1217T	Ophir	... ...	V.N.R.	...	...	41·00	28·95	·70	...	...	41·00	28·95	·70	
Do ...	1389T (1110T)	Ophir No. 2	... ...	Ftd.	...	...	31·00	34·45	1·11	...	...	60·35	49·20	·81	
Do ...	1307T	Pluck Up...	... ...	V.N.R.	...	...	...	...	...	...	...	13·50	22·45	1·66	
Do ...	1331T	Red Rover	... ...	V.N.R.	...	...	...	...	...	...	...	30·50	12·80	·42	
Do ...	1057T	Riddle	... ...	12	...	...	115·50	332·50	2·88	...	...	288·25	883·05	3·06	3 9 6
Do ...	1337T (1034T)	Rise Again	... ...	V.N.R.	...	...	...	...	...	...	...	8·40	12·00	1·43	
Do ...	1338T	Rock of Ages	... ...	24	...	...	293·50	797·55	2·72	...	...	342·50	964·15	2·81	3 16 0
Do ...	1417T (1164T)	Roscommon	... ...	12	...	...	224·00	203·20	·91	...	...	292·00	276·90	·95	3 8 3
Do ...	781T	Sailor Prince	... ...	12	...	...	783·00	798·73	1 02	...	...	3,406·00	4,743·01	1·39	3 14 0
Do ...	1089T	Savage Captain ...	... ...	16	...	...	394·70	1,881·15	4·77	...	...	612·70	2,710·70	4·42	
Do ...	934T	Sons of Westralia ...	... ...	24	...	...	103·00	477·15	4·63	...	...	1,219·00	4,261·72	3·46	3 15 3
Do ...	1461T	Surprise...	... ...	12	...	...	36·00	99·70	2·77	...	...	36·00	99·70	2·77	

Do	...	1068T	Tempus	... ...	12	...	...	235·00	720·02	3·06	...	...	547·50	2,199·44	4·02				
Do	...	1024T	Tired Feeling	... ...	V.N.R.	...	...	25·00	76·80	3·07	...	...	125·00	190·05	1·52				
Do	...	1325T	Tower Hill	... ...	Ftd.	...	...	8·00	12·50	1·56	...	...	8·00	12·50	1·56				
Do	...	1412T	Try Again South ...	... ...	V.N.R.	...	...	5·00	25·10	5·02	...	...	33·00	174·15	5·28				
Do	...	1116T	Waihine	... ...	Ftd	...	...	10·50	13·10	1·26	...	...	10·50	13·10	1·26				
Do	...	1011T	Wanderer	... ...	15	...	...	420·90	1,210·30	2·87	...	...	808·65	2,173·55	2·69	3	5	10½	
Do	...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	21·20	1,813·75	3,545·79	...				
Do	...	... ...	Sundry claims ...	... ...	...	...	...	128·35	102·00	...	...	...	344·15	324·62	...				
Eagle's Nest	...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	166·50	331·00	1,380·52	...				
Do	...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	...	55·00	47·27	...				
Erlistoun	...	720T, 725T, 1313T	(Baneygo leases) ...	... ...	60	...	...	...	...	...	...	...	2,283·00	3,562·97	1·53				
Do	...	1409T	Battlers	... ...	5	...	...	192·00	473·31	2·46	...	...	212·00	530·31	2·50				
Do	...	1300T	Caledonia	... ...	24	...	...	280·00	215·55	·77	...	...	340·00	275·90	·81	3	15	5	
Do	...	1322T	Caledonia North ...	... ...	12	...	...	110·00	81·50	·74	...	...	372·00	419·35	1·13				
Do	...	795T (796T), (1185T)	... ...	Erlstoun Proprietary G.M. Co., N.L.	V.N.R.	...	...	...	...	...	...	...	1,138·00	749·25	·66				
Do	...	1046T	Golden Spinnifex ...	... ...	24	...	...	776·00	564·15	·73	...	...	886·00	791·15	·89	3	14	6	
Do	...	1533T	Golden Star	... ...	24	...	...	10·00	2·65	·26	...	...	10·00	2·65	·26				
Do	...	1460T	Lady Bella	... ...	24	...	...	35·00	35·00	1·00	...	...	35·00	35·00	1·00				
Do	...	1355T	Lady Ethel	... ...	5	...	...	30·00	25·10	·84	...	...	53·00	64·65	1·22				
Do	...	1049T	Lauriston	... ...	12	...	...	225·00	495·00	2·20	...	...	300·00	570·00	1·90	3	14	6	
Do	...	771T	Little Doris	... ...	24	...	...	160·00	282·30	1·76	...	...	464·00	860·87	1·85				
Do	...	795T	(Mistake North) ...	... ...	V.N.R.	...	...	...	...	...	...	...	593·00	420·28	·70				
Do	...	1236T	Morialta	... ...	24	...	...	300·00	312·58	1·04	...	...	300·00	312·58	1·04	3	15	0	
Do	..	1432T	Mount Maiden Reward	... ...	24	...	...	55·00	36·65	·66	...	...	55·00	36·65	·66				
Do	...	1447T	Rose of Persia	... ...	12	...	...	133·00	233·75	1·76	...	...	133·00	233·75	1·76				
Do	...	1444T	Sydney Mint	... ...	12	...	...	18·00	33·75	1·87	...	...	18·00	33·75	1·87				
Do	...	1451T	Watermelon	... ...	12	...	...	105·00	81·20	·77	...	...	105·00	81·20	·77	3	15	0	
Do	...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	50·15	1,525·25	1,772·71	...				
Do	...	... ...	Sundry claims ...	... ...	...	125·55	...	19·00	29·15	...	987·40	...	166·90	224·77	...				
Euro	...	1335T	Alberton	... ...	V.N.R.	...	...	...	...	...	...	...	31·00	43·82	1·41				
Do	...	761T	(Childe Harold) ...	... ...	...	...	...	...	...	...	...	...	4·25	2·20	·51				
Do	...	761T, 1069T, 1070T	... ...	Childe Harold G.M. Co., Ltd.	72	...	...	...	...	...	...	...	29,629·00	10,862·85	·37				
Do	...	785T, 807T (822T)	... ...	Euro G.Ms., Ltd.	12	...	...	636·00	215·30	·34	...	...	36,581·00	21,558·17	·59				
Do	...	779T	Euro South Central ...	... ...	V.N.R.	...	...	...	...	...	...	...	118·00	171·15	1·45				
Do	...	1363T	Lights of London ...	... ...	V.N.R.	...	...	66·00	104·95	1·59	...	...	191·00	158·00	·83				
Do	...	1540T	Little Maggie	... ...	6	...	...	21·00	40·80	1·94	...	...	21·00	40·80	1·94				
Do	...	1403T	Sons of Wales	... ...	V.N.R.	...	...	...	...	...	...	...	30·00	11·41	·38				
Do	...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	42·50	12·03	...				
Do	...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	...	32·00	11·42	...				
Mt. Barnicoat	...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	652·00	399·78	...				
Do	...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	...	23·00	25·50	...				
Quartz Hill	...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	10·00	4·32	...				
			From District generally—																
			Sundry parcels treated at Burtville Ore Reduction Works			...	...	6·00	490·75	...	...	...	6·00	757·25	...				
			Do do State Battery, Laverton			...	...	13·00	373·90	...	...	...	38·00	396·75	...				
			Do do Trig Hill Cyanide Works			...	...	...	...	...	...	...	...	1,074·90	...				
			Notices of Purchase			...	...	...	...	...	16·97	...	...	...	...				
				Total		126·75	10·89	60,112·33	46,591·19	·78	1,005·57	1,033·24	271,342·88	192,053·52	·71	3	12	2¼	

TABLE IV.—*Production of Gold from all sources, etc.*—continued.

North Coolgardie Goldfield.

MENZIES DISTRICT.

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£ s. d.
Comet Vale ...	5123z	Air Motor	... ...	6	...	...	18·50	14·35	·77	...	...	18·50	14 35	·77	
Do ...	5091z	Block 5091	... ...	12	...	279·00	68·00	123·75	1·82	...	279·00	68·00	123·75	1·82	
Do ...	4988z	Coonega	... ...	V.N.R.	...	...	...	*cy.* 155·00	...	...	...	...	767·95	...	
Do ...	...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	6,993·45	3,518·84	...	
Goongarrie ...	2728z, 3480z ...	Boddington leases ...	... ...	24	...	...	1,433·00	1,085·22	·76	...	...	1,972·00	1,249·22	·63	3 19 6
Do ...	5115z	Garry	... ...	9	...	...	133·00	83·20	·63	...	...	133·00	83·20	·63	3 10 0
Do ...	2728z, 3480z ...	... ...	(Goongarrie Goldfields, Ltd.)	...	...	...	...	...	...	...	...	3,595·00	2,057·37	·57	
Do ...	5048z (4999z) ...	Hicks' United	... ...	V.N.R.	...	...	13·00	10·35	·80	...	2·00	78·00	39·50	·51	
Do ...	5047z	Independence	... ...	V.N.R.	...	...	...	...	...	...	15·00	...	...	...	
Do	2736z (3185z) 3382/3z (3951z) 4869z	... ...	Lady Montefiore United G.Ms., Ltd.	40	...	...	30·00	15·65	·52	...	...	254·00	735·53	2·89	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	297·50	5,881·64	4,406·61	...	
Do ...	... ...	Sundry claims ...	... ...	...	3·60	1·75	8·00	4·85	...	3·60	1·75	27·00	14·65	...	
Menzies ...	4984z	Africander	... ...	V.N.R.	...	...	5·00	20·00	4·00	...	...	47·00	72·27	1·54	
Do ...	5098z	Baden Powell ...	... ...	5	...	...	17·00	23·15	1·36	...	...	17·00	23·15	1·36	
Do ...	5113z	Ballarat Menzies ...	... ...	5	...	...	25·75	15·55	·60	...	...	25·75	15·55	·60	
				a. r. p.											
Do ...	5143z	Battlers' Rest	... ...	4 2 0	...	...	10·00	16·50	1·65	...	...	10·00	16·50	1·65	
Do ...	5114z	Bellenger	... ...	5	...	...	2·00	·35	·17	...	...	2·00	·35	·17	
Do ...	5106z	Black Horse	... ...	6	20·00	9·00	...	...	...	20·00	9·00	...	...	...	
Do ...	4879z, 4900z ...	(Black Jack leases) ...	... ...	10	...	...	10·00	11·65	1·16	...	...	789·00	1,174·14	1·49	
Do ...	5116z	Bristol	... ...	5	...	...	12·00	5·90	·49	...	...	12·00	5·90	·49	
Do ...	5105z	Busy Bee	... ...	5	...	...	46·00	26·55	·58	...	...	46·00	26·55	·58	
Do ...	4992z	Butterfly	... ...	6	...	...	16·00	37·20	2·32	...	...	74·00	200·39	2·71	
Do ...	5016z	Christmas Gift ...	... ...	Surr.	...	...	...	...	...	...	...	93·00	107·90	1·16	
Do ...	5059z	Cock Robin	... ...	12	...	...	25·00	38·10	1·52	...	...	38·00	200·97	5·29	
Do ...	5041z	Coronation	... ...	Surr.	...	...	...	...	...	...	...	10·00	10·80	1·08	
Do ...	5064z (4871z) ...	Coronation Gift ...	... ...	Wdn.	...	...	...	...	...	...	...	29·00	28·63	·99	
Do ...	4912z, 4967z ...	Crown Cross leases ...	... ...	17	...	...	146·00	458·65	3·14	...	4·05	510·00	1,653·96	3·24	3 14 0
Do ...	2823z, 3009z ...	... ...	Crusoe Gold Claims, Ltd. ...	44	...	...	1,562·00	1,279·48	·82	...	...	20,716·00	30,755·09	1·48	
Do ...	5017/8z ...	... ...	Crusoe Gold Claims, Ltd. ...	48	...	...	...	...	...	...	...	...	121·60	...	
Do ...	5050z	Danae	... ...	V.N.R.	...	...	...	...	...	...	...	10·00	5·00	·50	
Do ...	4952z	Dublin Castle	... ...	12	...	...	72·00	99·70	1·38	...	...	256·00	607·02	2·37	
Do ...	5095z	Easter Gift	... ...	Wdn.	...	...	23·00	7·20	·31	...	...	23·00	7·20	·31	
Do ...	5144z	Emu	... ...	6	...	...	35·00	151·00	4·31	...	...	35·00	151·00	4·31	
Do ...	4965/6z ...	(Etrenna and Aurelia)	... ...	...	...	...	...	...	...	...	...	655·25	429 31	·65	
				a. r. p.											
Do ...	2821z	Florence	... ...	18 1 9	...	...	365·00	421·87	1·15	...	...	5,457·00	6,024·37	1·10	3 11 0
Do ...	5089z	Flying Fish	... ...	16 1 27	...	...	180·00	660·75	3·67	...	...	180·00	660·75	3·67	3 10 5¾
Do ...	4982z/4991z ...	Flying Fish leases ...	... ...	Surr.	...	...	46·00	203·15	4·42	...	...	209·50	884·33	4·22	
Do ...	5072z, (5012z)	Four o'clock	... ...	5	...	...	35·00	58·15	1·66	...	...	53·00	84·18	1·59	
Do ...	5092z	Golden Age	... ...	6	...	...	27·00	59·40	2·20	...	...	27·00	59·40	2·20	
Do ...	4855z	Goodenough	... ...	24	...	...	518·00	767·15	1·48	...	...	3,069·95	6,676·91	2·11	
Do ...	5090z	Great Hope	... ...	6	...	...	12·50	27·80	2·22	...	...	12·50	27·80	2·22	
Do ...	3277z	Kensington	... ...	12	...	...	102·00	26·75	·26	...	...	135·00	125·17	·93	3 7 4

Do	5103z	Kensington Easter Gift (late Easter Gift)		5			13·00	25·40	1·95			13·00	25·40	1·95		
Do	5132z	Klondyke		Wdn.			16·00	8·05	·50			16·00	8·05	·50		
Do	4972z, 5003z	Lady Harriet leases		15			112·00	468·60	4·18		41·80	727·00	1,290·96	1·77	3	13 7
Do	5009z	Lady Sarah		V.N.R.			38·00	6·95	·18			138·00	164·35	1·19		
Do	2820z, 3006z		Lady Shenton G.Ms., Ltd.	a. r. p. 36 0 12			16,152·00	16,975·35	1·05			91,070·00	154,710·05	1·70	3	8 0
Do	2835z, 3914z	Lady Sherry leases		36		56·25	221·00	307·90	1·39		56·25	221·00	307·90	1·39		
Do	5069z	Lion		1			84·00	147·45	1·75			84·00	147·45	1·75		
Do	5083z	Little Tom		3			18·00	35·60	1·98			25·00	51·70	2·07		
Do	5139z	Little Wonder		4			14·00	20·30	1·46			14 00	20·30	1·46		
Do	5013z, (3116z, 3118z)		London and Coolgardie Explorers, Ltd.	24			31·50	68·65	2·18			372·00	518·23	1·39		
Do	5007z	Lord Roberts		V.N.R.								69·00	48·87	·71		
Do	5137z	Lucky Hit		5			5·00	12·40	2·48			5·00	12·40	2·48		
Do	5127z	Lucky Prop		5			72·00	22·85	·32			72·00	22·85	·32		
Do	4987z	Maori Chief		12							7·00	164·00	159·50	·97		
Do	4895z, 4944z	Maranora leases		12			272·00	369·25	1·36			1,295·30	1,710·64	1·32	3	7 4
Do	(2826z), 2828/9z, (3050z), 3051z, 3055z, (3056z)		(Menzies, Ltd.)	a. r. p. 51 1 36								308·00	536·78	1·74		
Do	3011z, 3031z		Menzies Alpha Leases, Ltd.	43 1 21			4,746·50	8,242·27	1·74			10,418·50	18,530·96	1·78	3	2 0
Do	4931z, (4932/3z), 4934/6z		Menzies Consolidated G.Ms., Ltd.	96			16,096·00	10,295·37	·64			67,080·00	56,077·14	·83	3	8 10
Do	5017/8z (4938/9z 4970z)		(Menzies Gold Reefs Proprietary, Ltd.)									6,024·00	14,228·92	2·36		
Do	5045z	Menzies Horseshoe		Ftd.								43·00	17·68	·41		
Do	2835z (3806z), 3914z (4064z)		(Menzies Lady Sherry G.M. Co., N.L.)					*cy.* 17·20		14·00		2,208·00	2,856·32	1·29		
Do	5043z (4819z)	Menzies Luxenberg		V.N.R.								6·00	6·46	1·07		
Do	2832z, 2843/4z 3089z, 3098z, 3100z, 3138z, 3151z, 4930z, 4948z, 4965/6z, 4976z, 5011z		Menzies Mining and Exploration Corporation, Ltd.	a. r. p. 197 0 13			1,921·00	2,882·67	1·50			9,836·45	15,141·09	1·54	3	6 8
Do	4953z	Menzies Proprietary		Ftd.								129·25	205·93	1·59		
Do	5140z (4953z)	Menzies Proprietary		6			8·00	21·60	2·70			8·00	21·60	2·70		
Do	(3149z, 3150z), 3151z		(Menzies United Mines, Ltd.)									121·85	137·16	1·12		
Do	4960z	Meriyulah		12			22·00	36·68	1·67		11·13	91·00	157·98	1·74		
Do	5082z	Myrtle		12			56·00	73·70	1·32			56·00	73·70	1·32		
Do	4969z	(Oceanic)										50·00	34·00	·68		
Do	4985z	Picton		12								50·00	23·05	·46		
Do	5126z	Queenslander		5			28·00	20·48	·73			28·00	20·48	·73		
Do	2836z, 4969z		Queensland Menzies G.M. Co., N.L.	a. r. p. 34 3 32			7,249·00	13,771·46	1·90			28,510·00	76,446·36	2·68	3	1 10½
Do	5065z (4980z)	Rescue		5			33 00	74·65	2·26			48·00	103·45	2·15		
Do	5076z	Resurgam		V.N.R.			11·00	26·30	2·39			21·00	37·90	1·80		
Do	5117z (5076z)	Resurgem		10			10·00	5·95	·59			10·00	5·95	·59		
Do	5040z	Rising Sun		V.N.R.								10·00	12·91	1·29		
Do	5109z	Sailor		5	·75					·75						
Do	5080z	Sefton		V.N.R.			8·10	16·10	1·99			8·10	16·10	1·99		
Do	4950z	Springfield		24			115·00	112·95	·98			363·00	378·80	1·04		
Do	5081z	St. Alban's		6		2·87	27·00	22·90	·85		2·87	27·00	22·90	·85		
Do	5010z	Sunday Gift		6			57·00	178·80	3·14			145·00	467·54	3·22		
			Carried forward		24·35	348·87	52,431·85	60,176·20		38·25	727·35	271,447·99	407,926·97			

TABLE IV.—*Production of Gold from all sources, etc.*—continued.

North Coolgardie Goldfield—*continued.*

MENZIES DISTRICT—*continued.*

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
			Brought forward ...	...	ozs. 24·35	ozs. 348·87	tons. 52,431·85	ozs. 60,176·20	ozs. ...	ozs. 38·25	ozs. 727·35	tons. 271,447·99	ozs. 407,926·97	ozs. ...	£ s. d.
Menzies ...	5130z	True Blue	... ...	5	...	...	22·00	53·45	2·43	...	...	22 00	53·45	2·43	
Do ...	5066z(5002z) ...	Victory	... ...	12	...	...	46·00	229·25	4·98	...	...	66·00	271·10	4·11	3 12 0
Do ...	5068z	Victory North	... ...	12	...	...	51·00	128·70	2·52	...	...	63·00	144·70	2·30	3 12 6
Do ...	5038z	Viking	... ...	5	...	10·75	21·00	92·75	4·42	...	23·13	51·00	241·05	4·73	
Do ...	3048z	Warrior	... ...	16	...	...	205·00	261·05	1·27	...	...	205·00	261·05	1·27	
Do ...	3048z (3235z), 3398z	... ...	(Warrior Menzies G.M. Co., N.L.)	...	...	...	23·00	29·20	1·27	...	...	1,165 00	888·92	·76	
Do ...	5034z	Westralian Menzies ...	... ...	12	...	...	·50	113·00	...	...	7·40	·50	113·00	...	3 9 8
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	9·85	23·35	9,410·45	11,727·82	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	100·75	15·00	20·45	...	...	103·75	625·00	738·29	...	
Mt. Ida ...	5121z	Commonwealth ...	... ...	12	...	...	8·00	6·20	·77	...	...	8·00	6·20	·77	
Do ...	5035z	Federation	... ...	12	...	...	277·00	1,463·75	5·28	...	...	399·00	1,709·80	4·28	3 12 6
Do ...	5124z	Federation South ...	... ...	12	...	...	14·00	10·00	·71	...	...	14·00	10·00	·71	
Do ...	5026z	Forrest Belle	... ...	a. r. p. 18 3 0	...	...	401·00	338·95	·84	...	...	2,266·00	2,629·83	1·16	3 13 10
Do ...	5067z	Ida Gem	... ...	V.N.R.	...	...	42·00	24·55	·58	...	...	86·00	78·05	·91	
Do	4525z, 4547z, (4548z), 4549z, 4582/3z, 5027z, 5033z	... ...	Mt. Ida Consols, Ltd. ...	143	...	...	1,518·28	2,569·86	1·69	...	...	7,606·85	15,625·79	2·05	3 17 6½
Do ...	5138z	Mystery	... ...	5	...	...	43·00	47·95	1·11	...	...	43·00	47·95	1·11	
Do ...	5036z	Once More	... ...	V.N.R.	...	...	...	...	...	...	...	141·00	81·90	·58	
Do ...	3578z	(Rio Tinto)	... ...	V.N.R.	...	...	...	...	...	...	...	1,708·00	1,746·92	1·02	
Do ...	3578z	... ...	Rio Tinto G.M. Co., Ltd. ...	V.N.R.	...	...	...	...	...	...	...	1,707·00	1,177·35	·69	
Do ...	5033z	(Try Again)	... ...	...	...	...	...	...	...	...	...	84·00	72·30	·86	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	85·50	5,026·75	6,018·92	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	·55	695·00	680·06	...	
		From District generally—													
	Sundry parcels treated at		Adeline Mill, Boulder	...	...	...	25·00	13·61	...	...	...	25·00	13·61	...	
	Do	do	Boddington Battery	...	...	...	40·00	28·75	...	...	...	40·00	28·75	...	
	Do	do	Crusoe Gold Claims Battery	...	...	...	204·00	282·05	...	...	...	204·00	282·05	...	
	Do	do	Florence Battery	...	...	...	...	...	...	...	...	3·00	30·00	...	
	Do	do	Great Boulder No. 1 Battery	...	...	...	7·00	6·60	...	...	...	7·00	6·60	...	
	Do	do	Hicks' Battery	...	...	...	...	...	...	...	...	34·00	20·75	...	
	Do	do	Lady Shenton Battery	...	...	...	6·50	21·35	...	...	...	14·50	25·85	...	
	Do	do	Menzies Crusoe Battery	...	...	...	...	...	...	...	...	26·00	17·45	...	
	Do	do	Menzies Mining and Exploration Corporation Battery	...	...	...	160·00	207·75	...	...	...	400·50	676·92	...	
	Do	do	Menzies Gold Reefs Proprietary Battery	...	...	...	...	...	...	...	...	71·05	919·53	...	
	Do	do	Ninety-Mile Proprietary Battery	...	...	...	...	...	...	...	...	102·00	77·00	...	
	Do	do	Queensland Menzies Battery	...	...	...	...	...	...	...	...	36·00	43·00	...	

Do	do	Shenton Extended Battery	...	...	...	...	...	...	...	...	...	37·00	26·88	...	
Do	do	State Battery, Mt. Ida ...	...	...	...	...	300·00	552·85	...	...	...	677·25	1,340·50	...	
Do	do	W.A. Cyanide Works, Goongarrie	...	...	...	...	...	...	...	...	...	...	546·60	...	
Alluvial	...	...	...	...	...	...	...	...	...	53·20	...	...	...	...	
Notices of Purchase	...	...	...	...	25·82	69·00	..	...	...	818·97	191·44	...	...	...	
		Total ...		...	50·17	529·37	55,861·13	66,678·07	1·19	920·37	1,162·47	304,517·84	456,306·91	1·50	3 6 7½

ULARRING DISTRICT.

					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£ s. d.
Davyhurst ...	726υ	Brilliant...	... ...	5	...	...	21·00	18·90	·90	...	...	21·00	18·90	·90	
Do ...	720υ	Constance	... ...	12	...	...	57·00	27·65	·48	...	...	57·00	27·65	·48	
Do ...	701υ	Coronation	... ...	Ftd.	...	...	...	...	...	...	...	39·00	16·75	·43	
Do ...	735υ (701υ) ...	Coronation	... ...	6	...	...	25·00	26·36	1·05	...	...	25·00	26·36	1·05	
Do ...	458υ	(Eileen)	... ...	...	...	...	...	...	...	...	9·00	1,867·00	2,435·12	1·30	
Do ...	458υ, 573υ, 576υ, 598υ	Eileen leases	... ...	26	...	...	658·00	631·60	·96	...	...	658·00	631·60	·96	3 18 11
Do ...	641υ	Federal Flag	... ...	24	...	...	24·00	43·95	1·83	...	...	86·00	153·05	1·78	
Do ...	652υ	First Chance	... ...	V.N.R.	...	...	...	...	...	...	...	40·00	11·00	·27	
Do ...	460υ	Forget-me-not	... ...	18	...	...	19·00	91·02	4·79	...	...	195·00	531·26	2·72	
Do ...	711υ	Golden Eagle	... ...	12	...	...	125·30	115·56	·92	...	...	146·30	147·76	1·01	3 18 6
Do ...	691υ	Golden Lode	... ...	V.N.R.	...	...	103·00	31·60	·31	...	...	190·00	115·50	·61	
Do ...	459υ	(Golden Pole)	... ...	...	...	...	...	...	...	...	...	34·00	54·70	1·60	
Do ...	459υ, 468υ, 484υ	... ...	Golden Pole G.Ms., Ltd. ...	36	...	...	1,166·00	2,386·75	2·05	...	...	1,166·00	2,386·75	2·05	3 13 0
Do ...	459υ, 468υ, 484υ	... .	(Golden Pole G.Ms., N.L.) ...	...	...	...	...	...	...	...	...	970·00	2,545·15	2·62	
Do ...	613υ	Great Ophir	... ...	24	...	...	62·00	37·45	·60	...	...	161·00	109·75	·68	
Do ...	564υ	Hanover...	... ...	V.N.R.	...	...	...	...	...	...	...	47·00	40·40	·86	
Do ...	440υ	Homeward	... ...	12	...	...	100·00	260·60	2·61	...	...	257·00	549·40	2·14	
Do ...	441υ	Homeward Bound ...	... ...	V.N.R.	...	...	53·00	107·14	2·02	...	...	204·00	209·29	1·02	
Do ...	740υ, (441υ) ...	Homeward Bound ...	... ...	11	...	...	13·20	3·56	·27	...	...	13·20	3·56	·27	
Do ...	559υ	... ...	Ivanhoe and Boulder Junction Proprietary, N.L.	Ftd.	...	...	63·00	32·45	·51	...	...	179·00	102·35	·57	
Do ...	680υ, (620υ) ...	Jubilee	... ...	V.N.R.	...	1·50	19·00	50·40	2·65	...	1·50	58·00	83·40	1·44	
Do ...	733υ	King Edward	... ...	12	...	...	25·20	18·65	·74	...	...	25·20	18·65	·74	
Do ...	697υ (455υ) ...	Lady Kate	... ...	V.N.R.	...	...	12·00	12·10	1·01	...	...	35·00	44·15	1·26	
Do ...	698υ	Lady Kate Extended ...	... ...	V.N.R.	...	...	24·00	33·50	1·40	...	...	24·00	33·50	1·40	
Do ...	689υ	Madame Berry	... ...	5	...	...	34·00	45·03	1·32	...	1·00	89·50	139·58	1·56	
Do ...	686υ (439υ) ...	Melrose	... ...	24	...	...	35·50	105·05	2·96	...	...	70·50	200·40	2·84	3 14 10
Do ...	11υ, 12υ ...	... ...	Speakman's Mt. Callion, Ltd.	30	...	...	1,006·00	1,103·80	1·10	...	...	4,822·25	4,517·76	·94	3 0 0
Do ...	438υ	(Waihi)	... ...	...	...	...	...	...	...	...	5·00	243·50	945·22	3·88	
Do ...	496υ	Waihi Consol	... ...	a. r. p. 2 3 18	...	...	22·00	8·90	·40	...	...	95·00	177·20	1·86	
Do ...	438υ	... ...	Westralia Waihi G.Ms., N.L.	24	...	...	382·00	367·50	·96	...	...	1,154·00	1,588·75	1·38	3 15 0
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	3·30	87·72	1,360·85	1,620·50	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	521·50	298·20	...	...	1·40	826·55	559·87	...	
Mulline ...	179υ	Bella Maie	... ...	18	...	...	456·00	1,529·60	3·35	...	...	1,381·00	2,673·17	1·93	
Do ...	330υ, 408υ ...	Cooladdie leases ...	... ...	24	...	...	893·00	1,401·21	1·57	...	...	2,966·50	4,598·57	1·55	
Do ...	603υ	Duchess of York ...	... ...	V.N.R.	...	...	...	...	...	...	...	134·00	79·07	·59	
Do ...	761υ	George Frederick ...	... ...	5	...	...	10·50	10·90	1·04	...	...	10·50	10·90	1·04	
Do ...	762υ	Himalaya	... ...	6	...	...	36·00	7·69	·21	...	...	36·00	7·69	·21	
Do ...	765υ	Hit or Miss	... ...	6	...	...	16·50	9·40	·57	...	...	16·50	9·40	·57	
Do ...	403υ	Lady Florence	... ...	18	...	...	358·75	106·84	·30	...	...	990·00	570·82	·58	
			Carried forward ...	...	...	1·50	6,341·45	8,923·36	...	3·30	105·62	20,694·35	27,994·90	...	

TABLE IV.—*Production of Gold from all sources, etc.*—continued.

North Coolgardie Goldfield—*continued.*

ULARRING DISTRICT—*continued.*

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
			Brought forward ...	...	ozs. ...	ozs. 1·50	tons. 6,341·45	ozs. 8,923·36	ozs. ...	ozs. 3·30	ozs. 105·62	tons. 20,694·35	ozs. 27,994·90	ozs. ...	£ s. d.
Mulline ...	139u, 235u, 555u, 670u	... ...	Lady Gladys G.M. Co., N.L.	39	...	...	1,159·50	1,384·22	1·19	...	...	1,159·50	1,384·22	1·19	3 17 9
Do ...	139u, 235u, 555u	(Lady Gladys leases) ...	... ...	...	...	...	1,826·00	2,189·05	1·20	...	186·73	7,741·00	16,350·03	2·11	3 17 9
Do ...	670u (290u) ...	(Lady Gladys Junction)	... ...	...	...	...	...	...	...	...	...	...	59·54	...	
Do ...	719u	Melba	... ...	6	...	...	9·00	8·98	1·00	...	...	9·00	8·98	1·00	
Do ...	2u	Mulline	... ...	15	...	...	765·00	852·82	1·11	...	...	1,664·25	2,237·67	1·34	
Do ...	704u (206u) ...	Mulline Commonwealth	... ...	Surr.	...	...	...	...	...	...	...	51·00	27·61	·54	
Do ...	710u	Mulline Surprise ...	... ...	Wdn.	...	...	...	...	...	...	...	17·50	22·23	1·27	
Do ...	434u	Nil Desperandum ...	... ...	Surr.	...	...	...	...	...	...	...	646·75	889·76	1·37	
Do ...	716u	Reprieve	... ...	Surr.	...	...	28·00	56·35	2·01	...	...	28·00	56·35	2·01	
Do ...	123u (162u) ...	... ...	Riverina G.M. Co., N.L. ...	24	...	...	1,414·00	1,534·94	1·08	...	...	7,368·00	5,603·53	·76	3 13 0
Do ...	545u	Riverina Perseverance	... ...	V.N.R.	...	...	37·00	20·29	·55	...	...	106·00	82·16	·77	
Do ...	324u, 600u ...	Riverina South leases ...	... ...	24	...	...	1,222·50	1,762·92	1·44	...	...	3,745·50	3,967·30	1·06	3 15 5
Do ...	705u (390u) ...	Three Gins	... ...	V.N.R.	...	...	12·00	45·30	3·77	...	...	24·50	79·08	3·23	
Do ...	708u (345u) ...	Yankee Doodle	... ...	V.N.R.	...	...	...	...	...	...	...	29·00	13·65	·47	
Do ...	699u (332u) ...	Young Australian ...	... ...	Surr.	...	...	19·25	20·02	1·04	...	...	39·25	25·89	·66	
Do ...	703u (332u) ...	Young Australian East	... ...	V.N.R.	...	...	16·00	11·80	·74	...	...	23·50	14·84	·63	
Do ...	... ...	Voided leases	... ...	...	...	...	...	...	...	...	15·54	5,139·22	6,650·91	...	
Do ...	... ...	Sundry claims	... ...	...	...	...	18·00	19·53	...	...	·25	588·00	860·45	...	
Mulwarrie ...	734u	Bobby Dazzler	... ...	5	...	...	30·75	29·50	·96	...	...	30·75	29·50	·96	
Do ...	557u	Buninyong	... ...	Ftd.	...	...	134·00	92·50	·69	...	11·00	282·75	388·85	1·37	
Do ...	580u	Discovery	... ...	V.N.R.	...	...	...	...	...	...	...	136·00	63·05	·46	
Do ...	737u	Green Jacket	... ...	6	...	...	88·55	54·45	·61	...	...	88·55	54·45	·61	
Do ...	401u	Killaloe	... ...	12	...	...	60·50	46·59	·77	...	...	60·50	46·59	·77	
Do ...	401u (500u) ...	(Killaloe leases) ...	... ...	...	...	...	...	...	...	...	...	359·50	580·15	1·61	
Do ...	6u	Mt. Higgins Property...	... ...	V.N.R	...	...	67·00	149·80	2·23	...	...	560 00	957·50	1·71	
Do ...	395u	Mullwarrie North ...	... ...	24	...	...	418·00	498·67	1·19	...	...	1,586·00	2,476 02	1·56	3 10 0
Do ...	9u	Mulwarrie	... ...	24	...	...	363·00	453·38	1·25	...	...	2,326·49	6,323·63	2·72	3 17 6
Do ...	494u	Mulwarrie Main Reef ...	... ...	12	...	...	294·00	832·92	2·83	...	...	536·00	1,511·42	2·82	3 13 1
Do ...	522u	Mulwarrie Moonstone ...	... ...	V.N.R.	...	...	23·00	89·78	3·90	...	...	158·00	848·51	5·37	
Do ...	746u	N.T.B.	... ...	5	...	...	25·60	35·37	1·38	...	...	25·60	35·37	1·38	
Do ...	308u, 391u, 442u	Oakley leases	... ...	24	...	...	301·00	502·38	1·67	...	...	1,849·00	3,932·84	2·13	3 12 6
Do ...	729u	Recoup	... ...	6	...	...	41·20	36·90	·89	...	...	41·20	36·90	·89	
Do ...	748u	Scotty's Last Chance ...	... ...	5	...	...	19·00	8·75	·46	...	...	19 00	8·75	·46	
Do ...	674u	Thunderbolt	... ...	12	...	...	139·00	214·52	1·54	...	...	139·00	214·52	1·54	3 14 1
Do ...	644u	Toleado	... ...	18	...	...	148·00	244·89	1·65	...	...	229·00	344·89	1·51	3 10 0
Do ...	724u	Toleado South	... ...	5	...	...	14·00	7·25	·52	...	...	14·00	7·25	·52	
Do ...	(6u), 738u ...	Ularring, Westralia ...	... ...	12	...	...	37·00	84·68	2·29	...	...	37·00	84·68	2·29	3 4 0
Do ...	6u	... ...	(Ularring Westralia G.M. Co., N.L.)	V.N.R.	...	...	...	...	...	...	...	497·25	971·60	1·95	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	12·50	2,036·65	3,112·10	...	...

Do	...	... ...	Sundry claims ...	... ...	...	...	...	57·50	42·50	...	...	...	170·00	156·15	...			
Ularring	...	754U	Dead Finish	... ...	12	...	...	118·25	219·19	1·85	...	...	118·25	219·19	1·85			
Do	...	666U	Derby	... ...	V.N.R.	...	...	18·00	16·18	·90	...	...	119·25	209·46	1·76			
Do	...	89, 92U ...	... ...	London and Coolgardie Explorers, Ltd.	36	...	...	360·45	530·61	1·47	...	...	1,551·60	3,282·39	2·11			
Do	...	338U	Off Chance	... ...	Ftd.	...	...	47·50	27·36	·58	...	...	1,272·00	2,508·49	1·97			
Do	...	759U	Revenue	... ...	5	...	...	7·50	6·40	·85	...	...	7·50	6·40	·85			
Do	...	1U	Shamrock	... ...	20	...	...	306·50	432·57	1·41	...	...	1,315·75	2,055·65	1·56			
Do	...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	2·00	493·50	487·92	...			
Do	...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	...	6·00	2·70	...			
			From District generally—															
			Sundry parcels treated at Riverina G.M. Co., N.L., Battery	... ...	...	...	...	4·00	11·85	...	...	...	4·00	11·85	...			
			Do do State Battery, Mulline	... ...	...	...	...	191·50	479·20	...	...	...	238·50	2,466·95	...			
			Do do State Battery, Mulwarrie	... ...	...	...	...	95·70	63·43	...	...	...	139·20	103·58	...			
			Notices of Purchase	... ...	...	...	...	...	...	...	1·82	·83	...	...	...			
				Total ...	...	...	1·50	16,278·20	22,041·20	1·35	5·12	334·47	65,522·11	99,868·40	1·52	3	14	0½

NIAGARA DISTRICT.

						ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£	s.	d.
Kookynie	...	556G (261G) ...	Aberdour	... ...	Surr.	...	...	31·00	45·80	1·48	...	...	65·00	83·90	1·29			
Do	...	27G, 28G ...	Altona leases	Cosmopolitan Proprietary, Ltd.	24	...	...	116·00	154·15	1·33	...	...	538·00	487·20	·90			
Do	...	31G	Altona No. 1 North ...	Cosmopolitan Proprietary, Ltd.	12	...	...	304·00	303·80	1·00	...	...	304·00	303·80	1·00	3	12	0
Do	...	246G	Altona North-West ...	Cosmopolitan Proprietary, Ltd.	6	...	...	26·00	43·55	1·67	...	...	26·00	43·55	1·67			
Do	...	460G	Altona No. 3 South ...	Cumberland Niagara G.Ms., Ltd.	17	...	...	...	...	...	...	...	50·00	51·70	1·03			
Do	...	468G	April Gift	... ...	V.N.R.	...	...	6·00	6·60	1·10	...	...	75·00	122·15	1·63			
Do	...	308G	Ballarat	... ...	12	...	...	192·00	141·40	·74	...	...	572·00	669·95	1·17			
Do	...	279G	Batavia	Britannia G.M. Co., Ltd. ...	V.N.R.	...	...	146·00	1,486·40	...	...	...	7,902·00	9,566·03	1·21			
Do	...	41G, 268G ...	... ...	Britannia G.M. Co., Ltd. ...	V.N.R.	...	...	...	...	...	...	...	15,951·00	17,219·70	1·08			
Do	...	320G, 335G, 347G	(Champion leases ...	... ...	...	...	...	...	...	...	...	...	2,157·50	2,898·51	1·34			
Do	...	320G, 335G, 347G, 409G	... ...	Champion Proprietary, Ltd.	41	...	...	12,024·00	7,452·75	·62	...	...	19,120·00	12,905·80	·67	3	14	10
Do	...	604G	Comet	... ...	2	...	...	18·75	14·70	·78	...	...	18·75	14·70	·78			
Do	...	20G, 87G, 94G, 338G	... ...	Cumberland Niagara G.Ms., Ltd.	84	...	...	14,411·00	6,224·04	·43	...	...	53,720·00	32,014·39	·59	3	8	3
Do	...	424G	Day Dawn	... ...	V.N.R.	...	...	...	...	...	...	...	39·00	46·60	1·19			
Do	...	194G	(Diamontina)	... ...	...	...	...	...	...	...	...	...	117·05	139·56	1·19			
Do	...	194G	Diamontina	Cosmopolitan Proprietary, Ltd.	24	...	...	16·50	31·95	1·94	...	...	16·50	31·95	1·94			
Do	...	574G	Dolly Grey	... ...	Wdn.	...	...	4·00	6·80	1·70	...	...	4·00	6·80	1·70			
Do	...	615G	Dow's Batavia and Papuan United	... ...	5	...	...	57·00	101·25	1·78	...	...	57·00	101·25	1·78			
Do	...	26G	Englishman	Cosmopolitan Proprietary, Ltd.	12	...	...	88,449·00	62,879·90	·71	...	...	186,449·00	160,008·89	·86	3	12	0
Do	...	542G	Excelsior	... ...	18	...	...	37·00	62·10	1·68	...	...	91·00	166·45	1·83			
Do	...	272G, 392G, 451G	Golden Hope leases ...	... ...	V.N.R.	...	...	...	...	...	...	...	448·00	824·34	1·84			
Do	...	573G (403G) ...	Home Rule	... ...	V.N.R.	...	...	32·00	16·00	·50	...	...	48·00	41·25	·86			
				Carried forward ...	...	...	...	115,870·25	78,971·19	...	...	...	287,768·80	237,748·47	...			

TABLE IV.—*Production of Gold from all sources, etc.*—continued.

North Coolgardie Goldfield—*continued.*

NIAGARA DISTRICT—*continued.*

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
			Brought forward ...	...	ozs. ...	ozs. ...	tons. 115,870·25	ozs. 78,971·19	ozs. ...	ozs. ...	ozs. ...	tons. 287,768·80	ozs. 237,748·47	ozs. ...	£ s. d.
Kookynie ...	550G	Julia	... ...	V.N.R.	...	...	...	...	...	...	...	35·00	10·00	·28	
Do ...	565G	Little Caledonia ...	... ...	Ref.	...	...	18·00	24·40	1·35	...	...	18·00	24·40	1·35	
Do ...	393G	Manxman	Cosmopolitan Proprietary, Ltd.	24	...	...	77·00	42·35	·55	...	...	77·00	42·35	·55	
Do ...	405G	North Batavia	... ...	V.N.R.	...	...	...	...	...	...	...	30·00	28·50	·95	
Do ...	481G	O.D.	... ...	V.N.R.	...	...	...	...	...	...	...	22·00	5·30	·24	
Do ...	596G	Plenty	... ...	12	...	...	7·00	3·95	·56	...	...	7·00	3·95	·56	
Do ...	547G (397G) ...	Pride of Kookynie ...	... ...	Ftd.	...	...	...	...	...	...	...	18·00	14·10	·78	
Do ...	562G	Protection	... ...	V.N.R.	...	...	...	...	...	...	...	7·00	29·85	4·26	
Do ...	255G	Puzzle	... ...	V.N.R.	...	...	...	*cy.* 23·00	...	...	...	...	23·00	...	
Do ...	523G	Rise and Shine	... ...	5	...	...	224·00	229·65	1·02	...	...	328·00	399·74	1·22	
Do ...	519G	Ruby	... ...	V.N.R.	...	...	55·00	36·15	·66	...	...	145·00	94·10	·65	
Do ...	25G	Scotchman	Cosmopolitan Proprietary, Ltd.	12	...	...	...	...	...	...	...	150·00	90·30	·60	
Do ...	394G	Sovereign	... ...	Ftd.	...	...	...	...	...	...	...	249·00	200·30	·80	
Do ...	504G	Standard	... ...	Ftd.	...	...	...	...	...	...	...	390·00	239·45	·61	
Do ...	603G (504G) ...	Standard	... ...	12	...	...	580·00	210·90	·36	...	...	580·00	210·90	·36	
Do ...	593G	Star	... ...	19	...	...	89·00	33·12	·37	...	...	89·00	33·12	·37	
Do ...	512G	Te Ahora	... ...	V.N.R.	...	...	12·00	14·60	1·22	...	...	52·00	46·40	·89	
Do ...	420G, 486G ...	Treasure leases...	... ...	17	...	...	115·00	111·55	·97	...	...	115·00	111·55	·97	
Do ...	420G	(Treasure South) ...	... ...	...	...	...	...	...	...	...	26·60	186·00	254·95	1·37	
Do ...	558G (297G) ...	Trio	... ...	Wdn.	...	...	...	...	...	...	...	19·50	10 40	·53	
Do ...	253G (422G) ...	Victoria	... ...	6	...	...	72·75	92·54	1·27	...	...	295·25	491·84	1·66	3 19 5
Do ...	253G (273G, 300G)	... ...	(Victoria and Day Dawn G.M. Co. W.A., N.L.)	...	...	...	...	...	...	...	...	85·75	181·20	2·11	
Do ...	22G	Welshman	Cosmopolitan Proprietary, Ltd.	12	...	...	111·00	83·40	·75	...	...	111·00	83·40	·75	
Do ...	23G	Welshman No. 1 ...	Cosmopolitan Proprietary, Ltd.	12	...	...	50·50	92·00	1·82	...	...	50·50	92 00	1·82	
Do ...	469G	Whale	... ...	12	...	9·65	293·00	433·15	1·48	...	214·97	925·00	2,358·12	2·55	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	39·00	2,484·85	3,212·34	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	462·25	388·30	...	...	...	583·25	508·05	...	
Niagara ...	485G	B.L.	... ...	V.N.R.	...	...	...	...	...	...	...	17·00	15·90	·93	
Do ...	480G	Brooklet	... ...	6	...	...	53·00	78·55	1·48	...	...	65·00	98·50	1·51	
Do ...	569G	Big Tom	... ...	5	...	...	40·75	28·50	·70	...	...	67·75	71·20	1·05	
Do ...	541G	Bonnie Scotland ...	... ...	V.N.R.	...	...	...	...	...	...	...	20·00	10·95	·55	
Do ...	316G	Canadian	Cosmopolitan Proprietary, Limited	12 a. r. p.	...	...	...	...	...	...	...	41·20	73·30	1·78	
Do ...	586G	Challenge	... ...	20 2 8	...	...	118·00	130·70	1·11	...	...	118·00	130·70	1·11	
Do ...	578G	Christmas	... ...	5	...	...	48·50	42·75	·88	...	..	48·50	42·75	·88	
Do ...	600G	Connecting Rod ...	... ...	6	...	...	26·00	19·30	·74	...	...	26·00	19·30	·74	
Do ...	522G	Coronation	... ...	V.N.R.	...	...	...	...	...	...	...	15·00	14·60	·97	

Do	...	614G	...	...	Curraghmore	...	...	...	...	...	...	...	6	...	...	127·00	56·30	·44	...	...	127·00	56·30	·44			
Do	...	621G	...	...	Eclipse	...	...	...	...	...	...	...	12	...	...	22·00	11·55	·52	...	...	22·00	11·55	·52			
Do	..	570G	...	...	Eureka	...	...	...	...	...	...	...	5	...	...	49·75	18·50	·37	...	...	49·75	18·50	·37			
Do	...	391G	...	..	Euroa Extended			...	...	...	...	...	5	...	...	77·50	82 70	1·07	...	...	77·50	82·70	1·07			
Do	...	391G	(362G)	...	(Euroa leases)			...	...	...	...	...	...	...	...	...	...	...	...	...	279·50	521·20	1·86			
Do	...	543G	(311G)	...	Great Tontine	...	...	...	...	...	...	...	V.N.R.	...	...	...	...	...	...	...	18·00	9·15	·51			
Do	...	602G	...	...	Gem	...	...	...	...	...	...	...	12	...	...	206·00	201·55	·98	...	...	206·00	201·55	·98	3	15	9
Do	...	224G,	225G	...	...	...	...	Hannan's Gold Estates, Ltd.					24	...	...	153·00	208·85	1·37	...	...	3,500·00	5,364·05	1·53			
Do	...	507G	(443G)	...	Heather	...	...	...	...	...	...	...	Surr.	...	...	...	...	...	...	...	157·00	109·65	·70			
Do	...	559G	...	...	Idalium	...	...	...	...	...	...	...	Ftd.	...	...	10·50	11·75	1·12	...	...	10·50	11·75	1·12			
Do	...	588G	...	...	Jarrahdale	...	...	...	...	...	...	...	8	...	...	63·50	34·75	·55	...	...	63·50	34·75	·55			
Do	...	552G	...	...	Kangaroo	...	...	...	...	...	...	...	5	...	2·00	167·10	86·30	·52	...	2·00	201·10	130·35	·65			
Do	...	513G	...	...	Kathleen	...	...	...	...	...	...	...	5	...	...	211·00	249·45	1·18	...	...	303·00	447·85	1·48			
Do	...	510G	...	...	Keep-it-Dark	...	...	...	...	...	...	...	Ftd.	...	...	...	...	...	...	...	32·00	53·20	1·66			
Do	...	544G	...	...	Last Venture	...	...	...	...	...	...	...	Surr.	...	...	59·00	43·50	·74	...	...	71·00	53·25	·75			
Do	...	499G	...	...	Latrobe	...	...	...	...	...	...	...	5	...	...	...	...	...	...	...	16·00	17·75	1·11			
Do	...	314G	...	...	Lily	...	...	...	...	...	...	...	5	...	...	57·75	141·95	2·46	...	11·55	322·50	1,022·06	3·17			
Do	...	618G	...	...	Lucky Hit	...	...	...	...	...	...	...	12	...	...	43·00	14·00	·33	...	...	43·00	14·00	·33			
Do	...	587G	...	...	Marcilla	...	...	...	...	...	...	...	5	...	...	10·50	17·65	1·68	...	...	10·50	17·65	1·68			
Do	...	571G	...	...	May	...	...	...	...	...	...	...	5	...	...	51·00	62·00	1·22	...	...	51·00	62·00	1·22			
Do	...	442G	...	...	Mikado	...	...	...	...	...	...	...	6	...	...	25·00	42·40	1·70	...	...	180·00	298·65	1·66			
Do	...	518G	...	...	Missing Link	...	...	...	...	...	...	...	10	...	...	275·00	392·75	1·43	...	27·80	431·00	630·45	1·46	3	17	7
Do	...	566G	...	...	Moonshine	...	...	...	...	...	...	...	12	...	...	11·25	1·50	·13	...	...	11·25	1·50	·13			
Do	...	540G	...	...	Moonstone	...	...	...	...	...	...	...	12	...	...	57·50	45·40	·79	...	...	79·50	55·95	·70			
Do	...	620G	...	...	Mulga Plum	...	...	...	...	...	...	...	12	...	...	74·00	44·50	·60	...	...	74·00	44·50	·60			
Do	...	503G	...	...	Niagara	...	...	...	...	...	...	...	V.N.R.	...	...	22 25	13·05	·59	...	...	173·25	81·80	·47			
Do	...	521G	(366G)	...	Never Can Tell	...	...	...	...	...	...	...	Ftd.	...	...	...	...	...	...	...	75·00	79·10	1·05			
Do	...	419G	...	...	Opal	...	...	Hannan's Main Reef G.M. Co., Ltd.					12	...	...	119·00	83·60	·70	...	...	119·00	83·60	·70			
Do	...	419G	...	...	(Opal)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	552·50	532·00	·96			
Do	...	461G	...	...	Pearl	...	...	Hannan's Main Reef G.M. Co., Ltd.					12	...	...	355·00	233·90	·66	...	...	355·00	233·90	·66			
Do	...	580G	...	...	Persian	...	...	...	...	...	...	...	Wdn.	...	...	40·00	29·05	·73	...	...	40·00	29·05	·73			
Do	...	452G	...	...	Pine Lodge	...	...	...	...	...	...	...	12	...	...	583·00	1,231·25	2·11	...	...	1,241·00	1,711·45	1·38			
Do	...	592G	...	...	President	...	...	...	...	...	...	...	Surr.	...	...	9·00	7·05	·78	...	...	9·00	7·05	·78			
Do	...	531G	...	..	Rock	...	...	...	...	...	...	...	V.N.R.	...	...	13·00	6·80	·52	...	...	146·00	57·90	·40			
Do	...	553G	366G)	...	Sunrise	...	...	...	...	...	...	...	5	...	1·22	24·00	14·00	·58	...	1·22	40·50	32·25	80			
Do	...	591G	...	...	Thelma	...	...	...	...	...	...	...	5	...	...	136·00	102·15	·75	...	...	136·00	102·15	·75			
Do	...	601G	...	...	Topaz	...	...	...	...	...	...	...	4	...	...	86·00	157·60	1·83	...	...	86·00	157·60	1·83			
Do	...	445G	...	...	Try Again	...	...	...	...	...	...	...	6	...	...	11·50	16·10	1·40	...	...	329·50	364·50	1·10			
Do	...	555G	...	...	Two K's	...	...	...	...	...	...	...	V.N.R.	...	...	...	...	...	...	...	46·00	28·10	·61			
Do	...	610G	...	...	Wandin	...	...	...	...	...	...	...	5	...	...	39 00	18·20	·47	...	...	39·00	18·20	·47			
Do	...	474G	...	...	Wait-a-Bit	...	...	...	...	...	...	...	Ftd.	...	...	...	...	...	...	...	126·00	129·90	1·03			
Do	...	606G	...	...	Waratah	...	...	...	...	...	...	...	5	...	...	32·50	20·85	·64	...	...	32·50	20·85	·64			
Do	...	505G	...	...	W.E.G.	...	...	...	...	...	...	...	5	...	...	1,172·00	1,779·05	1·52	...	...	1,837·00	2,710·75	1·47	3	18	2
Do	...	564G	...	...	Wheel of Fortune			...	...	...	..	...	6	...	...	39·00	39·15	1·00	...	...	39·00	39·15	1·00			
Do	...	608G	...	...	Whistler	...	...	...	...	...	...	...	Surr.	...	...	106·10	34·25	·32	...	...	106·10	34·25	·32			
Do	...	613G	...	...	White Cross	...	...	...	...	...	...	...	5	...	...	18·00	31·45	1·75	...	...	18·00	31·45	1·75			
Do	...	605G	...	...	White Hills	...	...	...	...	...	...	...	6	...	...	77·50	68·10	·88	...	...	77·50	68·10	·88			
Do	...	475G	...	...	York	...	...	...	...	...	...	...	12	...	...	131·00	88·40	·67	...	...	405·00	307·34	·76			
Do	...	...	...	...	Voided leases			...	...	...	...	...	...	...	...	...	...	...	...	...	47·90	7,106·80	5,205·09	...		
Do	...	...	...	...	Sundry claims			...	...	...	...	...	...	...	...	599·00	570·37	...	...	...	27·65	1,795·75	1,758·85	...		
Tampa	...	479G	...	...	Bismarck	...	...	...	...	...	...	...	V.N.R.	...	...	...	...	...	...	...	194 00	157·55	·81			
Do	...	560G	...	...	Banana	...	...	...	...	...	...	...	Wdn.	...	...	7·00	8·80	1·25	...	...	16·00	21·80	1·36			
Do	...	536G	...	...	Blue Bell	...	...	...	...	...	...	...	V.N.R.	...	...	18·00	14·50	·80	...	...	144·00	197·50	1·37			
Do	...	516G	...	...	Clematis	...	...	...	...	...	...	...	V.N.R.	...	...	20·50	36 10	1·76	...	...	28·50	75·00	2·63			
Do	...	622G	(516G)	...	Clematis	...	...	...	...	...	...	...	2	...	...	8·00	25·30	3·16	...	...	8 00	25 30	3·16			
								Carried forward				...	...	...	12·87	123,740·70	87,486·47	...	...	398·69	316,898·85	270,597·12	...		

TABLE IV.—*Production of Gold from all sources, etc.*—continued.

North Coolgardie Goldfield—*continued.*

NIAGARA DISTRICT—*continued.*

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
			Brought forward ...	...	ozs. ...	ozs. 12·87	tons. 123,740·70	ozs. 87,486·47	ozs. ...	ozs. ...	ozs. 398·69	tons. 316,898·85	ozs. 270,597·12	ozs. ...	£ s. d.
Tampa ...	576G	Clingstone	... ...	Surr.	...	...	52·75	34·50	·65	...	...	57·75	53·15	·92	
Do ...	278G	Fortuna	... ...	6	...	...	...	...	...	...	...	109·00	216·45	1·98	
Do ...	349G	Grafter	... ...	12	...	...	419·00	650·70	1·55	...	...	1,751·00	2,915·30	1·09	3 10 6
Do ...	441G	Grafter No. 1 South ...	... ...	5	...	...	59·00	91·20	1·54	...	...	162·00	304·45	1·88	
Do ...	511G	Ophir	... ...	12	...	...	4·50	7·90	1·75	...	...	19·50	27·90	1·43	
Do ...	496G	Oriental	... ...	12	...	...	217·50	253·25	1·16	...	...	492·50	1,463·85	2·97	
Do ...	462G	Pass By	... ...	V.N.R.	...	...	...	...	...	...	...	40·00	29·10	·73	
Do ...	624G (462G) ...	Pass By	... ...	5	...	...	10·00	6·45	·64	...	...	10·00	6·45	·64	
Do ...	352G (369G, 400G)	Perseverance leases ...	... ...	5	...	...	181·00	79·65	·44	...	...	1,072·00	1,182·67	1·10	
Do ...	572G	Reach	... ...	V.N.R.	...	...	...	...	...	...	...	10·00	5·90	·59	
Do ...	568G	Shah	... ...	Wdn.	...	...	...	...	...	...	...	23·00	65·90	2·86	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	19·40	9,468·80	5,200·89	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	139·00	126·20	...	...	...	714·00	561·37	...	
		From District generally—													
		Sundry parcels treated at Britannia Battery		...	...	...	...	...	...	...	...	52·00	37·00	...	
		Do do Golden Hope Battery		...	...	...	...	...	...	...	...	...	303·95	...	
		Do do Holbourn and Summers' Works		...	...	...	...	*cy.* 913·07	...	...	...	...	1,235·72	...	
		Do do Mignonette Battery		...	...	...	...	...	...	...	...	30·00	33·50	...	
		Do do State Battery, Niagara		...	...	...	..	...	...	...	...	13·00	11·80	...	
		Do do Tampa Cyanide Works		...	...	...	...	*cy.* 551·40	...	...	...	...	1,062·00	...	
		Alluvial		...	...	...	...	...	...	71·39	...	...	...	...	
		Notices of Purchase		...	182·81	295·75	...	...	...	283·85	478·14	...	...	...	
			Total ...	...	**182·81**	**308·62**	**124,823·45**	**90,200·79**	**·72**	**355·24**	**896·23**	**330,923·40**	**285,314·47**	**·86**	**3 11 11¾**

YERILLA DISTRICT.

					a. r. p.	ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs	ozs.	£ s. d.
Edjudina ...	681R	Alpha	... ...		23 3 38	...	...	33·50	22·40	·67	...	...	33·50	22·40	·67	
Do ...	640R	Belgrave	... ...		5	...	...	85·00	32·75	·38	...	...	85·00	32·75	·38	
Do ...	609R	Bella	... ...		Surr.	...	...	100·00	113·00	1·13	...	...	100·00	113·00	1·13	3 15 0
Do ...	686R (609R) ...	Bella	... ...		12	...	...	251·50	191·35	·76	...	...	251·50	191·35	·76	
Do ...	610R	Broken Hill	... ...		24	...	...	45·00	34·05	·76	...	...	85·00	69·75	·82	
Do ...	611R	Broken Hill North ...	... ...		24	...	...	17·00	4·86	·29	...	...	17 00	4·86	·29	
Do ...	667R	Bulger	... ...		24	...	...	19·75	12·85	·65	...	...	19·75	12·85	·65	
Do ...	676R	Cheetarra	... ...		V.N.R.	...	...	25·00	2·11	·08	...	...	25·00	2·11	·08	
Do ...	576R	Crow's Nest	... ...		24	...	...	225·00	353·45	1·57	...	...	280·00	416·45	1·49	3 16 8

Do	...	589R	Enterprise	... ...	V.N.R.	...	...	22·00	13·00	·59	...	...	22·00	13·00	·59			
Do	...	604R	Enterprise	... ...	12	...	...	48·00	21·80	·45	...	...	48·00	21·80	·45			
Do	...	678R	Fabian	... ...	V.N.R.	...	...	40·00	29·60	·74	...	...	40·00	29·60	·74			
Do	...	497R	Gawler	... ...	24	...	...	...	...	...	...	...	130·00	206·00	1·58			
Do	...	502R	(Glengarry)	... ...	...	...	...	...	...	...	...	...	359·00	243·50	·68			
Do	...	588R (512R) ...	Golden Girl	... ...	24	...	...	40·00	67·50	1·69	...	...	61·00	89·20	1·46			
Do	...	573R	Highland Mary ...	... ...	5	...	...	84·00	110·90	1·32	...	...	130·00	163·40	1·26	3	12	6
Do	...	502R		London and Coolgardie Explorers, Ltd.	15	...	...	205·00	91·20	·44	...	...	205·00	91·20	·44			
Do	...	677R	Lyon Glen	... ...	12	...	...	146·00	152·30	1·04	...	...	146·00	152·30	1·04			
Do	...	653R	Maid Marion	... ...	12	...	...	...	...	...	...	...	17·00	13·00	·77			
Do	...	401R	Neta	... ...	24	...	...	1,078·00	1,653·05	1·53	...	...	4,280·50	6,571·44	1·54			
Do	...	418R	Neta Extended ...	... ...	24	...	...	...	...	...	...	...	1,182·50	1,663·78	1·40			
Do	...	623R	Old Guard	... ...	Ftd.	...	...	41·00	61·00	1·49	...	...	41·00	61·00	1·49			
Do	...	648R	Orient	... ...	18	...	...	81·50	57·35	·70	...	...	81·50	57·35	·70			
Do	...	613R	Perseverance	... ...	5	...	...	98·00	128·05	1·31	...	...	122·00	168·05	1·38			
Do	...	679R	Rocky Range	... ...	Wdn.	...	...	...	...	...	...	...	8·00	10·30	1·29			
Do	...	566R	Scotchman	... ...	18	...	...	156·00	110·60	·71	...	...	287·00	223·10	·78			
Do	...	701R	Scots Belle	... ...	24	...	...	39·50	53·77	1·36	...	...	39 50	53·77	1·36			
Do	...	539R	Senate	... ...	24	...	...	876·50	2,456·90	2·80	...	...	1,135·50	2,981·80	2·62	3	11	9
Do	...	599R	Three Brothers... ...	... ...	V.N.R.	...	...	93·00	81·25	·87	...	...	93·00	81·25	·87			
					a. r. p.													
Do	...	626R	Trio	... ...	23 3 6	...	...	35·00	12·10	·34	...	...	35·00	12·10	·34			
Do	...	605R	Triumph...	... ...	V.N.R.	...	...	232·00	121·65	·52	...	...	232·00	121·65	·52			
Do	...	665R	Try It	... ...	V.N.R.	...	...	21·00	9·08	·43	...	...	21·00	9·08	·43			
Do	...	658R	Yale Lock	... ...	V.N.R.	...	...	56·00	47·00	·84	...	...	56·00	47·00	·84			
Do	...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	3,531·00	3,594·55	...			
Do	...	... ...	Sundry claims ...	... ...	...	...	...	75·00	64·10	...	...	...	871·00	881·36	...			
Eucalyptus	...	504R, 507R ...	Yando leases	... ...	17	...	345·55	...	...	...	...	1,598·16	39·00	655·60	...			
Do	...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	362·11	1,239·35	1,526·37	...			
Do	...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	410·12	170·50	220·32	...			
Linden	...	685R	Mammoth	... ...	1	...	...	...	*cy.* 122·25	...	...	...	...	122·25	...			
Do	...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	513·36	6,214·40	11,191·74	...			
Do	...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	20·00	238·50	278·20	...			
Mt. Celia	...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	14·00	6·00	...			
Mt. Rema	...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	19·90	528·72	467·06	...			
Do	...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	...	4·00	1·50	...			
Pendinnie	...	562R	A.W.A.	... ...	5	...	...	106·50	324·70	3·05	...	20·00	296·50	1,089·47	3·67			
Do	...	508R	Boer	... ...	6	...	...	95·50	205·93	2·16	...	...	297·00	756·73	2·55			
Do	...	645R	Central	... ...	12	...	...	...	...	...	...	...	15·00	23·86	1·59			
Do	...	699R	Dodger	... ...	12	...	...	11·00	12·95	1·18	...	...	11·00	12·95	1·18			
Do	...	706R	Golden Gate	... ...	5	...	...	9·00	5·58	·62	...	...	9·00	5·58	·62			
Do	...	595R	Granite King	... ...	V.N.R.	...	...	...	...	...	...	...	42·00	15·20	·36			
Do	...	563R	Harlech Castle... ...	... ...	6	...	1,016·80	...	...	...	...	1,016·80						
Do	...	673R	Highland Chief ...	... ...	V.N.R.	...	...	16·00	23·10	1·44	...	...	16·00	23·10	1·44			
Do	...	688R	Just in Time	... ...	18	...	...	21·00	3·20	·15	...	...	21·00	3 20	·15			
Do	...	443R	(Landed at Last) ...	... ...	...	...	...	...	...	...	...	...	60·00	82·05	1·36			
Do	...	443R	Landed at Last ...	(Mt. Margaret Reward, Ltd.)	...	...	...	144·00	62·85	·44	...	...	144·00	62·85	·44			
Do	...	522R	Little Wonder	... ...	12	...	...	...	...	...	...	...	279·00	1,123·86	4·03			
Do	...	443R, 457R, 463R, 493R	... ...	(London and Hamburg Gold Recovery Co., Ltd.)	...	...	...	1,817·00	962·20	·53	...	...	1,942·00	1,119·70	·58	3	11	0
Do	...	541R	Maori Queen	... ...	24	...	...	134·00	313·55	2·34	...	...	494·00	1,021·05	2·07			
Do	...	450R, 456R, 536R	... ...	Mt. Margaret Reward Claim, Ltd.	54	...	...	3,222·00	1,968·35	·61	...	...	10,833·00	8,299·64	·77	3	11	0
Do	...	443R. 457R, 463R, 493R	... ...	(Mt. Margaret Reward, Ltd.)	...	...	...	765·00	524·65	·68	...	...	765·00	524·65	·68	3	11	0
Do	...	450R	(Potosi)	... ...	...	...	...	...	...	...	...	...	76·00	170·00	2·23			
				Carried forward ...	...	...	1,362·35	10,610·25	10,638·33	...	...	3,960·45	37,820·22	47,229·03	...			

TABLE IV.—*Production of Gold from all sources, etc.*—continued.

North Coolgardie Goldfield—*continued.*

YERILLA DISTRICT—*continued.*

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
			Brought forward ...	...	ozs. ...	ozs. 1,362·35	tons. 10,610·25	ozs. 10,638·33	ozs. ...	ozs. ...	ozs. 3,960·45	tons. 37,820·22	ozs. 47,229·03	ozs. ...	£ s. d.
Pendinnie ...	443R, 457R, 463R, 493R	... ...	Potosi Consolidated, Ltd. ...	72	...	...	831·00	586·09	·70	...	...	831·00	586·09	·70	3 11 0
Do ...	514R	Potosi North Extended	... ...	24	...	...	121·00	57·69	·48	...	...	368·00	497·24	1·35	
Do ...	511R	Pretoria	... ...	V.N.R.	...	...	...	...	...	...	...	55·00	56·05	1·02	
Do ...	466R	Queen of the May ...	... ...	24	...	...	425·00	473·10	1·11	...	...	1,100·60	1,131·30	1·03	3 15 0
Do ...	467R	Queen of the May South	... ...	12	...	...	...	...	...	...	...	566·55	1,191·90	2·10	
Do ...	554R	Straight Mates' Tucker Bag	... ...	V.N.R.	...	...	...	...	...	...	50·00	...	...	...	
Do ...	718R	Sweet Nell	... ...	18	...	...	15·00	8·02	·53	...	...	15·00	8·02	·53	
Do ...	549R	Treasure North ...	... ...	V.N.R.	...	...	...	...	...	...	...	72·00	121·74	1·69	
Do ...	594R	Washington	... ...	12	...	...	195·00	50·00	·26	...	...	225·00	98·50	·44	
Do ...	553R	Yundamindera ...	... ...	Surr.	...	...	54·00	42·40	·78	...	...	123·00	109·35	·89	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	13·00	639·10	917·88	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	49·00	41·97	...	...	1·52	443·00	708·25	...	
Pingin ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	142·00	88·25	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	8·30	...	...	...	
Yarrie ...	655R	Aerie	... ...	V.N.R.	...	...	51·00	57·95	1·11	...	...	51·00	57·95	1·11	
Do ...	632R	Beatrice	... ...	12	...	...	36·00	41·31	1·15	...	...	50·00	54·41	1·09	
Do ...	666R	Mia Mia	... ...	V.N.R.	...	...	39·50	27·65	·70	...	...	39·50	27·65	·70	
Do ...	630R	Novitiate	... ...	V.N.R.	...	...	...	...	...	...	19·25	...	...	...	
Do ...	690R	Puzzle	... ...	5	...	...	19·75	139·30	7·05	...	...	19·75	139·30	7·05	
Do ...	585R	Queen's Birthday ...	... ...	12	...	...	45·00	235·40	5·23	...	...	55·00	474·40	8·62	3 16 3
Do ...	614R	Queen's Birthday South	... ...	V.N.R.	...	...	60·00	39·87	·66	...	...	60·00	39·87	·66	
Do ...	587R	Record	... ...	V.N.R.	...	...	16·50	33·31	2·02	...	...	24·50	51·31	2·09	
Do ...	6[illegible]0R	Return	... ...	15	...	...	25·00	16·50	·66	...	...	25·00	16·50	·66	
Do ...	581R	Wallaby	... ...	24	..	2·50	124·50	199·00	1·60	...	2·50	124·50	199·00	1·60	
Do ...	580R	Wallaby Central ...	... ...	24	...	...	595·00	816·70	1·37	...	...	595·00	816·70	1·37	3 14 2
Do ...	579R	Wallaby North ...	... ...	24	...	...	156·00	74·20	·47	...	...	156·00	74·20	·47	
Do ...	635R	Welcome	... ...	24	...	...	56·00	44·80	·80	...	...	56·00	44·80	·80	
Do ...	582R	Wild Dog	... ...	10	...	...	29·00	15·00	·52	...	...	29·00	15·00	·52	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	47·00	39·35	...	...	...	47·00	39·35	...	
Yerilla ...	689R	Melba Proprietary ...	... ...	18	...	...	33·00	29·90	·91	...	...	33·00	29·90	·91	
Do ...	704R	Queen of the Earth ...	... ...	5	...	...	32·50	22·50	·69	...	...	32·50	22·50	·69	
Do ...	684R	Yerilla Central	... ...	5	...	...	77·00	61·05	·79	...	...	77·00	61·05	·79	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	3,439·67	2,999·96	2,175·47	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	12·00	16·95	...	...	...	326·50	235·33	...	
Yilgangi ...	692R	Yilgangie	... ...	24	...	...	42·00	113·60	2·70	...	...	42·00	113·60	2·70	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	94·75	118·32	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	15·00	51·25	...	135·36	5·18	15·00	51·25	...	

From District generally—																							
Sundry parcels treated at Holbourn and Summers' Works	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
Do do Middleton's Works	...	...	...	...	...	...	...	...	...	...	...	...	...	*cy.* 87·00	...	...	...	...	997·00	...			
Do do Moss Rose Battery	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	144·00	71·00	...			
Do do Muir's Works	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	183·87	...			
Do do State Battery, Niagara	...	...	...	...	...	...	...	...	...	...	...	...	1·50	8·85	...	...	...	1·50	8·85	...			
Alluvial	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	516·70	...	...	...	...			
Notices of Purchase	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	470·38	166·39	...	...	...			
Total	...	...	...									...	1,364·85	13,813·50	14,069·04	1·02	1,122·44	7,666·26	47,498·93	‡ 59,467·28	1·25	3	12	3

‡ Also ounces from unknown tons—Bound to Rise ... ... 240·00 ozs.
Do do Lombard ... ... 35·00
Total ... ... 275·00

Broad Arrow Goldfield.

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£ s. d.
Bardoc ...	1076w	... ...	(Bardoc G.Ms., Ltd.) ...	12	...	...	46·00	9·20	·20	...	...	429·83	550·12	1·28	
Do ...	36w	(Eva)	... ...	...	...	...	...	...	...	...	...	11·00	6·00	·54	
Do ...	1186w, 1187w	Excelsior leases ...	... ...	24	...	...	652·00	654·00	1·00	...	...	1,474·00	1,238·40	·84	3 14 6
Do ...	107w, 108w, 109w, 887w, 956w, 1043w	... ...	Half-Mile Reef Mines, Ltd.	a. r. p. 83 3 31	...	...	4,740·00	2,998·25	·63	...	...	21,030·00	13,182 64	·63	3 16 4
Do ...	1193w	King	... ...	12	...	·35	8·00	3·85	·48	...	·35	8·00	3·85	·48	
Do ...	1220w	Marmont	... ...	5	...	...	31·00	17·30	·56	...	...	31·00	17·30	·56	
Do ...	17w	(Mt. Pleasant)	... ...	...	...	...	...	...	...	...	31·46	10·00	31·20	3·12	
Do ...	1198w	Rob Roy	... ...	V.N.R.	...	...	...	...	...	...	...	110·50	65·60	·59	
Do ...	959w, 968w, 970w, 1045w, 1048w	... ...	Slug Hill (Pride of the Hill) G.M. Co., Ltd.	70	...	...	2,752·00	2,581·33	·94	...	7·20	11,424·00	10,302·63	·90	3 13 4
Do ...	1043w	(Struck Oil)	... ...	...	...	...	...	...	...	...	...	139·00	105·05	·75	
Do ...	1207w	Windanya Half-Mile North	... ...	12	...	...	51·00	18·30	·36	...	...	51·00	18·30	·36	
Do ...	1190w	Wycheproof	... ...	24	...	...	230·25	577·35	2·51	...	...	230·25	577·35	2·51	3 18 0
Do ...	17w, 36w, 39w, (1008w), 1023w	... ...	(Zoroastrian Gold Estates, Ltd.)	...	...	...	230·00	467·40	2·03	...	...	5,060·60	3,808·68	·75	
Do ...	17w, 36w, 39w, 1023w, 1144w	... ...	Zoroastrian, Ltd.	a. r. p. 48 1 30	...	...	390·00	533·50	1·37	...	...	390·00	533·50	1·37	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	119·65	4,022·75	2,983·31	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	15·00	90·05	...	...	...	205·25	239·43	...	
Black Flag ...	1212w	Beers	... ...	6	...	...	27·25	30·19	1·11	...	...	27·25	30·19	1·11	
			Carried forward ...	...	...	·35	9,172·50	7,980·72	...	...	158·66	44,654·43	33,693·55	...	

TABLE IV.—*Production of Gold from all sources, etc.*—continued.

Broad Arrow Goldfield—*continued.*

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
			Brought forward		ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£ s. d.
					...	·35	9,172·50	7,980·72	...	...	158·66	44,654·43	33,693·55	...	
Black Flag ...	43w, 52w, 62w, 546w	... ...	Black Flag Proprietary Co., Ltd.	a. r. p. 72 3 16	...	...	1,072·75	257·62	·24	...	...	22,304·75	7,271·40	·33	3 8 2¾
Do ...	1177w	(King Edward)	... ...	...	...	...	...	...	...	...	...	172·00	512·85	2·98	
Do ...	1177w, 1182w	King Edward leases ...	... ...	18	...	...	130·00	605·40	4·66	...	...	130·00	605·40	4·66	
Do ...	47w, 48w, 49w	... ...	Lady Bountiful G.M. Co., N.L.	36	...	...	25·00	824·65	...	...	...	6,945·65	11,777·75	1·69	3 0 0
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	33·00	317·76	4,654·16	3,203·51	...	
Do ...	... ...	Sundry claims ...	... ...	...	50·15	...	77·65	39·70	...	682·08	2·00	1,075·45	1,287·60	...	
Broad Arrow ...	1188w	Britannia	... ...	V.N.R.	...	...	31·00	25·98	·84	...	15·00	106·00	66·38	·63	
Do ...	56w, 75w, (87w, 122w)	... ...	Broad Arrow Consols G.M. Co., N.L.	44	...	...	1,875·00	1,665·59	·89	...	...	2,482·00	1,952·15	·79	3 17 0
Do ...	142w (225/6w)	... ...	Credo G.Ms., Ltd.	a. r. p. 14 1 23	...	61·60	173·00	187·25	1·08	...	167·46	521·85	821·25	1·57	3 19 0
Do ...	1209w	Dixie	... ...	5	...	...	30·00	54·15	1·80	...	...	30·00	54·15	1·80	
Do ...	3w, 138/9w, 173w, 1000w	... ...	Golden Arrow Mine, Ltd. ...	59	...	...	5,698·00	4,123·56	·72	...	...	28,390·75	17,893·49	·63	3 16 3
Do ...	1112w	Grafter	... ...	12	...	...	...	...	...	...	34·35	183·00	93·40	·51	
Do ...	1192w	Hope	... ...	Ftd.	...	...	...	...	...	...	...	28·50	22·60	·79	
Do ...	56w, 75w (122)	(Liberty leases) ...	... ...	...	...	...	...	...	...	...	...	298·90	425·90	1·42	
Do ...	76w	Light of the Swan ...	... ...	Ftd.	...	...	...	...	...	...	...	490·50	331·72	·68	
Do ...	1216w	Nemo	... ...	a. r. p. 5 0 26	...	...	7·50	19·62	·26	...	...	7·50	19·62	·26	
Do ...	2w, 126w, 168w	... ...	New Austral Co., Ltd. ...	20 1 27	...	...	256·00	1,211·33	4·73	...	...	40,065·50	47,421·15	1·18	3 18 0
Do ...	32w, 143w, 715w	... ...	New Standard Exploration Co., Ltd.	V.N.R.	...	...	...	...	...	...	...	174·00	68·75	·39	
Do ...	1210w	Oriental	... ...	18	...	...	85·00	79·50	·94	...	...	85·00	79·50	·94	
Do ...	1185w	South Star	... ...	Ftd.	...	...	...	...	...	...	...	231·00	113·27	·49	
Do ...	1195w (147w)	Surbiton	Mysore United Gold Co., Ltd.	12	...	...	123·00	64·65	·53	...	...	160·00	107·78	·67	3 17 6
Do ...	643w	Victory	... ...	6	...	6·55	55·50	101·80	1·83	...	41·29	75·50	171·82	2·27	
Do ...	1028w	Yellow Jacket	Mysore United Gold Co., Ltd.	12	...	...	247·50	281·90	1·14	...	...	562·00	502·28	·89	3 17 6
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	65·09	130·27	12,229·48	13,992·48	...	
Do ...	... ...	Sundry claims ...	... ...	...	48·83	...	143·75	207·85	...	124·53	152·65	1,899·50	1,240·79	...	
Paddington ...	45w	Mount Corlic	... ...	12	...	...	123·50	76·60	·62	...	...	4,221·75	2,958·15	·70	
Do ...	(1w) 53w, 57w, 60w, 61w, 128w, 1050w, 1063w, 1105w	... ...	New Standard Exploration Co., Ltd.	a. r. p. 110 2 19	...	...	14,952·00	7,639·70	·51	...	...	88,474·00	47,511·90	·54	3 11 2
Do ...	71w, 127w, 1073w, 1110w	... ...	New Standard Exploration Co., Ltd.	V.N.R.	...	...	...	...	...	...	...	195·00	49·35	·25	
Do ...	1142w	Paddington Consols South	... ...	12	...	...	...	...	...	...	...	34·00	4·91	·14	
Do ...	80w	Pakeha	... ...	V.N.R.	...	...	...	...	...	...	...	3,094·40	1,741·87	·56	

Do	1221w (80w)	Pakeha		12			72·50	64·65	·89			72·50	64·65	·89			
Do	1056w	Pakeha South		V.N.R.								25·00	6·80	·27			
Do	1047w	Star of W.A.		18			734·00	512·65	·70		136·60	6,970·00	6,905·18	·99	3	13	3½
Do		Voided leases										1,331·00	834·38				
Do		Sundry claims			93·80		184·00	178·93		105·82		2,174·26	4,077·91				
Smithfield		Voided leases										1,027·00	228·31				
Do		Sundry claims										20·00	10·58				
		From Goldfield generally—															
		Sundry parcels treated at Black Flag Proprietary Battery					153·00	5·45				655·30	276·93				
		Do do Excelsior Battery										22·00	16·04				
		Do do Great Boulder No. 1 Battery										442·50	375·61				
		Do do Half-Mile Reef Battery										119·00	37·37				
		Do do Hannans Proprietary Battery			728·91					728·91							
		Do do Hannans Reward Battery								109·75		748·75	1,235·79				
		Do do Howell's Works											174·95				
		Do do Kalgoorlie Crushing and Cyanide Works										10·50	6·85				
		Do do Lady Bountiful Battery										112·00	156·04				
		Do do Lake View South Battery								563·21		1,245·50	2,014·24				
		Do do Mona Public Battery										6,104·75	5,489·19				
		Do do Nerrin Nerrin Battery										390·50	424·01				
		Do do New Arrow Proprietary Battery			316·00		404·00	238·25		316·00		4,462·08	4,488·81				
		Do do New Austral Works										5·00	22·00				
		Do do Paddington Cyaniding Works						*cy.* 512·70					2,015·98				
		Do do Railway Venture Battery										30·30	409·87				
		Do do Seabrook Battery, Northam								810·63		952·75	933·00				
		Do do Try-it Cyaniding Works											438·00				
		Alluvial			1,702·74					4,683·42							
		Total			2,940·43	68·50	35,826·15	26,960·20	·75	8,222·44	1,156·04	290,897·26	‡ 226,639·21	·78	3	13	5¼

‡ Also 250ozs. from unknown tons.

North-East Coolgardie Goldfield.

KANOWNA DISTRICT.

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£ s. d.
Black Swan		Voided leases										160·00	172·28		
Gambier	434x, 878x, 981x, 898x		Atlas G.Ms., Ltd.	63			6,698·00	3,237·08	·48			6,698·00	3,237·08	·48	3 15 0
Do	898x	(Brilliant)									33·55	48·00	62·00	1·29	
Do	434x	(Camelia)										242·50	386·35	1·59	
Do	1050x	Gambier		V.N.R.								7·00	9·40	1·34	
Do	946x	Gem		12							9·10	47·00	169·95	3·61	
Do		Voided leases										202·00	213·18		
Do		Sundry claims										10·00	4 50		
Gordon	98x, 1006x, 1013x		Advance Australia Prospectors, Ltd.	48			54·00	42·32	·78			340·00	344·50	1·01	
Do	1044x	General Wolseley		Ftd.							5·00				
			Carried forward				6,752·00	3,279·40			47·65	7,754·50	4,599·24		

TABLE IV.—*Production of Gold from all sources, etc.*—continued.

North-East Coolgardie Goldfield—*continued.*

KANOWNA DISTRICT—*continued.*

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
			Brought forward ...	...	ozs. ...	ozs. ...	tons. 6,752·00	ozs. 3,279·40	ozs. ...	ozs. ...	ozs. 47·65	tons. 7,754·50	ozs. 4,599·24	ozs. ...	£ s. d.
Gordon ...	837x, 1000x ...	Koh-i-Noor leases ...	... ...	V.N.R.	...	...	20·00	15·55	·78	...	...	343·80	251·16	·73	
Do ...	891x	Sirdar	... ...	12	...	...	43·00	871·45	...	..	21·00	72·50	1,137·00	...	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	205·00	362·00	337·99	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	55·00	157·50	217·00	...	...	64·00	233·50	373·92	...	
Hayes' New Find	1047x	Eclipse	... ...	6	...	...	126·00	202·55	1·61	...	...	126·00	202·55	1·61	
Do ...	392x, 394x, 396x	... ...	Queen Margaret G.M. Co., Ltd.	60	...	...	2,672·00	3,371·70	1·26	...	...	2,672·00	3,371·70	1·26	3 14 5
Do ...	392x, 394x, 396x	(South Gippsland leases)	... ...	...	...	...	367·00	249·78	·68	...	...	3,697·00	4,389·64	1·19	
Do ...	847x, 964/5x ...	... ...	Vosperton G.Ms., Ltd. ...	36	...	...	60·00	36·60	·61	...	...	190·00	155·25	·82	
Do ...	847x	(Whitehead's Find) ...	... ...	...	...	...	...	...	...	...	22·00	313·00	557·72	1·78	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	1,584·05	1,802·70	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	26·35	16·75	93·07	...	...	697·60	340·75	667·62	...	
Kanowna ...	35x, 64x, 345x	... ...	Ballarat and Prince Oscar Co., Ltd.	40	...	...	237·00	57·74	·24	...	...	237·00	57·74	·24	3 17 6
Do ...	35x, 64x, 345x	... ...	(Ballarat and Prince Oscar Syndicate, Ltd.)	...	...	...	1,449·00	708·75	·49	...	52·50	5,497·00	3,381·30	·61	3 17 6
Do ...	1056x	Battler	... ...	6	...	...	22·00	15·80	·72	...	...	22·00	15·80	·72	
Do ...	1065x	Blue Duck	... ...	V.N.R.	...	...	...	*cy.* 120·00	...	...	...	...	120·00	...	
Do ...	(92x, 96x), 952x, 961x, 963x	... ...	Bonnie Charlie G.M. Co., N.L.	V.N.R.	...	...	...	...	...	...	...	1,230·50	594·82	·48	
Do ...	1052x	Coronation	... ...	V.N.R.	...	...	...	*cy.* 166·14	...	...	...	...	195·04	...	
Do ...	1080x	Currie's Find	... ...	Wdn.	...	...	6·00	6·00	1·00	...	...	6·00	6·00	1·00	
Do ...	982x	Dalmanutha	... ...	12	...	...	17·00	3·75	·21	...	...	17·00	3·75	·21	
Do ...	928x	Eaton's Lode Consolidated	... ...	a. r. p. 3 1 19	...	...	445·50	163·86	·37	...	83·69	2,901·00	1,436·18	·49	
Do ...	952x	(Federal)	... ...	Ftd.	...	...	...	...	...	...	...	176·00	85·17	·48	
Do ...	1079x (952x) ...	Federal	... ...	12	...	...	49·00	40·15	·82	...	...	49·00	40·15	·82	
Do ...	926x	Federal Extended ...	... ...	V.N.R.	...	...	...	...	...	..	...	759·50	370·52	·49	
Do ...	913x	Fitzroy Federated ...	... ...	Ftd.	...	...	78·50	25·84	·33	...	...	2,684·75	1,051·02	·39	
Do ...	1062x	Gentle Polly	... ...	a. r. p. 3 2 0	...	...	22·00	18·80	·85	...	5·00	45·00	73·80	1·64	
Do ...	83x, 180x, 290/1x	... ...	(Golden Cement Claims) ...	..	...	...	...	...	...	...	...	5,848·00	2,841·35	·48	
Do ...	1063x	Golden Find	... ...	V.N.R.	...	·75	10·00	9·00	·90	...	1·25	10·00	9·00	·90	
Do ...	367x (510x, 821x), 1036x, 1042x	... ...	Golden Valley Mines of W.A., Ltd.	a. r. p. 52 3 32	...	...	1,683·00	913·05	·54	...	...	6,962·00	5,093·92	·73	
Do ...	1024x	Havilah	... ...	12	...	3·50	151·00	105·60	·70	...	5·85	271·50	245·90	·90	
Do ...	1019x	Kanowna	... ...	7	...	...	467·00	1,725·95	3·69	...	436·67	782·50	3,654·35	4·67	3 15 0
Do	808x (893x), 894x (905x), 953x, 1031x	... ...	Kanowna Champion Lode G.M. Co., N.L.	V.N.R.	...	...	774·00	210·95	·27	...	...	1,345·00	377·62	·28	
Do ...	153x, 807x ...	... ...	Kanowna Consolidated G.Ms., Ltd.	42	...	...	15·00	263·80	...	...	...	514·00	635·65	1·24	
Do ...	894x	(Kanowna Perseverance)	... ...	V.N.R.	...	...	...	...	...	...	...	20·00	6·15	·30	
Do ...	1055x	Kintore	... ...	12	...	...	33·00	39·50	1·20	...	...	41·00	102·75	2·51	
Do ...	1068x (822x) ...	Lake View	... ...	V.N.R.	...	·30	11·00	11·20	1·02	...	·30	16·00	15·55	·97	

Do	...	52x, 68x, 185x, 213x	... ...	Lake View South G.M. (W.A.), Ltd.	50	...	...	4,082·00	2,882·08	·71	...	...	4,082·00	2,882·08	·71			
Do	...	18x, 19x (314x)	... ...	(Lily Australis G.Ms., Ltd.)	...	...	...	...	...	...	...	...	197·00	130·10	·66			
Do	...	187x, 456x ...	... ...	London and Coolgardie Explorers, Ltd.	29	...	...	6,129·90	1,874·36	·30	...	...	23,899·50	9,879·03	·41	3	9	0
Do	...	1076x	Madame Melba... ...	... ...	5	...	1·70	97·00	146·56	1·51	...	1·70	97·00	146·56	1·51	3	12	0
Do	...	1066x	Missing Link	... ...	V.N.R.	...	...	6·00	4·55	·76	...	1·55	6·00	4·55	·76			
Do	...	(38x) 55x ...	... ...	New Standard Exploration Co., Ltd.	14	...	...	112·00	525·88	4·69	...	13·30	2,024·50	2,985·91	1·47			
Do	...	918x	North Cross Reef ...	... ...	10	...	...	30·00	8·50	·28	...	...	62·00	20·00	·32			
Do	...	942x	North Lead Central ...	... ...	a. r. p. 9 2 2	...	1·50	59·00	11·22	·19	...	7·75	1,228·00	597·08	·49			
Do	...	923x	... ...	North Lead Lode Amalgamated Co., Ltd.	V.N.R.	...	...	...	...	...	...	...	776·00	263·96	·34			
Do	...	3x, 18x, 19x, 46x, 60x, 81x, 938x, 974x (1010x), 1035x (1039x)	... ...	North White Feather G.Ms., Ltd.	a. r. p. 101 3 36	...	...	4,621·00	5,474·75	1·18	...	...	17,394·00	15,773·01	·91	3	15	3
Do	...	1028x	Panfry	... ...	V.N.R.	...	...	23·00	11·20	·49	...	...	162·50	113·35	·70			
Do	...	944x	Pioneer Lode Claim ...	... ...	Ftd.	...	...	...	...	...	...	...	371·00	125·16	·34			
Do	...	1095x	Queen of Beauty ...	... ...	Wdn.	...	...	13·00	5·75	·44	...	...	13·00	5·75	·44			
Do	...	52x, 68x, 185x, 213x	... ...	(Robinson G.Ms., Ltd.) ...	...	...	...	...	...	...	...	...	16,478·75	18,692·56	1·13	3	9	6¾
Do	...	1083x	Scotia	... ...	12	...	...	6·00	1·00	·17	...	...	6·00	1·00	·17			
Do	...	807x	... ...	(Second Kanowna Synd., Ltd.)	...	...	...	...	...	...	...	...	20·00	13·65	·68			
Do	...	194x, 1009x ...	Sunbeam leases ...	... ...	a. r. p. 15 1 34	...	...	511·50	711·80	1·39	...	...	4,602·25	7,437·17	1·61	3	14	0
Do	...	1085x	Sunnyside	... ...	12	...	...	18·00	6·35	·35	...	...	18·00	6·35	·35			
Do	...	1099x	Wakeful	... ...	12	...	3·30	13·00	32·80	2·52	...	3·30	13·00	32·80	2·52			
Do	...	153x	... ...	(Waldon's Find G.M., Ltd.)	...	...	...	...	...	...	...	...	1,076·05	1,008·27	·93			
Do	...	987x	... ...	(Westralian Gold Extracting Co., Ltd.)	Ftd.	...	...	...	...	...	...	...	60·00	21·00	·35			
Do	...	5x (843x) ...	... ...	White Feather Extended, Ltd.	Ftd.	...	...	10·00	14·45	1·44	...	...	514·00	616·48	1·20			
Do	...	12x, 13x, 14x, 15x, 855x, 1001x, 1012x	... ...	White Feather Main Reefs, Ltd.	a. r. p. 79 3 38	...	...	18,548·00	14,376·05	·78	...	...	88,389·00	77,559·21	·88	3	11	3½
Do	...	982x (1022x) ...	... ...	(White Feather Main Reef South G.M. Co., N.L.)	...	...	...	42·00	29·77	·71	...	...	128·00	76·09	·59			
Do	...	9x, 10x, 72x, 83x, 180x, 200/1x, 431x	... ...	White Feather Reward, Ltd.	85	...	...	5,738·00	2,088·18	·36	...	...	28,726·00	21,665·58	·75	3	7	8
Do	...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	358·76	6,673·35	5,542·22	...			
Do	...	... ...	Sundry claims ...	... ...	...	...	28·25	618·50	424·42	...	...	58·82	5,704·20	3,827·24	...			
Mulgarrie	...	1040x	Lady Clara	... ...	V.N.R.	...	...	5·50	5·50	1·00	...	...	31·50	167·90	5·33			
Do	...	74x, 149x, 165x	... ...	Phœnix G.Ms., Ltd. ...	51	...	...	...	...	...	...	1,078·96	2,392·00	1,442·80	·60			
Do	...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	110·00	52·02	...			
Do	...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	...	96·00	179·20	...			
Six-Mile	...	1025x	Caledonia	... ...	12	...	65·75	12·00	3·42	·29	...	280·42	28·00	51·12	1·82			
Do	...	931x	Home Signal	... ...	V.N.R.	...	...	...	...	...	...	735·80	126·50	239·55	1·89			
Do	...	1015x	Home Signal No. 1 ...	... ...	V.N.R.	...	...	...	...	...	...	115·80	92·00	96·25	1·04			
Do	...	932x (994x) ...	Signal Consols leases ...	... ...	V.N.R.	...	...	...	...	...	...	136·08	87·50	208·45	2·38			
Do	...	1018x	Signal Junction ...	... ...	12	...	6·05	12·00	16·45	1·37	...	118 15	37·00	51·70	1·40			
Do	...	1053x	William Tell	... ...	10	...	211·40	36·00	75·90	2·11	...	313·07	56·00	143·65	2·56			
Do	...	... ...	Voided leases ...	... ...	...	...	...	..	...	...	...	9·25	96·50	65·11	...			
Do	...	... ...	Sundry claims ...	... ...	...	...	...	26·50	18·45	...	...	37·10	98·50	86·65	...			
				Carried forward ...	...	...	403·85	56,454·15	41,692·37	...	...	4,912·32	253,096·45	210,470·58	...			

TABLE IV.—*Production of Gold from all sources, etc.*—continued.

North-East Coolgardie Goldfield—*continued.*

KANOWNA DISTRICT—*continued.*

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
			Brought forward		ozs. ...	ozs. 403·85	tons. 56,454·15	ozs. 41,692·37	ozs. ...	ozs. ...	ozs. 4,912·32	tons. 253,096·45	ozs. 210,470·58	ozs. ...	£ s. d.
			From District generally—												
Sundry parcels treated at		Albert Herbert Works			...	...	...	...	...	...	...	...	5·00	...	
Do	do	Bonnie Charlie Works, T.A. 6x			...	...	...	*cy.* 112·49	...	...	...	...	112·49	...	
Do	do	Golden Puzzle Works			...	...	...	¶ 19·00	...	...	...	49·50	325·60	...	
Do	do	Haacksville Works			...	...	...	...	...	...	...	26·00	380·15	...	
Do	do	Kalgoorlie Gold Recovery Works			...	...	...	*sl.* 971·25	...	...	...	...	4,246·82	...	
Do	do	Kanowna Carbine Works			...	...	...	...	...	...	...	14·00	182·00	...	
Do	do	Machinery Area 19x (Old Cement Works)			...	...	...	*cy.* 331·40	...	...	...	...	709·80	...	
Do	do	Machinery Area 25x			...	...	...	...	...	...	...	...	122·42	...	
Do	do	Machinery Area 38x (Moore's Works)...			...	...	...	*cy.* 191·00	...	...	...	...	191·00	...	
Do	do	Nemesis Works			...	...	...	...	...	...	...	77·50	90·25	...	
Do	do	Quartz Claim 57x (Norton's Works)			...	...	157·00	405·45	...	...	...	196·50	712·70	...	
Do	do	Quartz Claim 61x (Campbell's Works)			...	...	251·00	100·60	...	...	...	251·00	100·60	...	
Do	do	Shamrock Works			...	...	...	...	...	...	...	8·50	13·60	...	
		Total for Leases and Quartz Claims ...			...	403·85	56,862·15	43,823·56	·771	...	4,912·32	253,719·45	217,663·01	·86	
		Cement from Alluvial Claims.													
Reported by owners					...	...	...	...	...	262·50	1·00	14,305·15	12,223·33	...	
§ Treated locally (not reported by owners)—															
At Altoona Works					...	...	...	...	...	...	...	155·00	34·32	...	
At Bonnie Charlie Works					...	...	...	...	...	...	...	266·00	196·20	...	
At Golden Crown Works					...	...	...	...	...	...	...	2,350·08	1,566·15	...	
At Golden Star Works					...	...	...	...	...	...	...	259·50	192·16	...	
At Golden Valley Works					...	...	...	...	...	...	...	11,603·20	11,753·68	...	
At Graham's Works					...	...	72·00	16·05	...	...	...	72·00	16·05	...	
At Haacksville Works (W.R. 1x)					...	...	...	...	...	...	...	1,894·50	1,283·71	...	
At Kanowna Carbine Works					...	...	...	...	...	...	...	3,491·70	6,311·40	...	
At Kanowna Champion Lode Works					...	...	144·00	72·10	...	...	...	558·00	203·31	...	
At London and Coolgardie Works					...	...	...	...	...	...	...	305·25	128·23	...	
At Machinery Area 14x (Nemesis Works)					...	...	...	...	...	...	...	2,007·25	2,989·63	...	
At Machinery Area 15x (Sims & Son's Works)					...	...	504·00	238·67	...	...	...	1,875·00	661·29	...	
At Machinery Area 16x					...	...	...	...	...	...	...	84·15	14·11	...	
At Machinery Area 17x (Monmouth Works)					...	...	...	...	...	...	...	1,952·30	2,108·51	...	
At Machinery Area 19x (Old Cement Works)					...	...	71·00	18·80	...	...	...	3,359·00	1,889·52	...	
At Machinery Area 21x					...	...	...	...	...	...	...	48·00	35·00	...	
At Machinery Area 24x					...	...	...	...	...	...	...	18·00	2·80	...	
At Machinery Area 25x					...	...	148·00	48·15	...	...	...	2,183·00	1,047·47	...	
At Machinery Area 29x (Globe Works)					...	...	...	...	...	...	...	362·50	276·80	...	
At Machinery Area 31x					...	...	...	...	...	...	...	152·00	35·85	...	
At Machinery Area 34x					...	...	...	...	...	...	...	528·00	198·28	...	
At Machinery Area 39x (Mudlark Works)					...	...	67·00	19·90	...	...	...	67·00	19·90	...	

	At North Cross Reef											10·00	5·00				15·00	6·75				
	At Quartz Claim 57x (Norton's Works)											2,013·00	849·18				4,512·50	1,953·68				
	At Red Cross Works																30·00	22·35				
	At Red Lake Works																44·00	9·59				
	At Rigg's Works, Red Lake																45·00	4·87				
	At Robinson Works											479·00	244·37				11,184·40	9,421·47				
	At Shamrock Works																17,004·95	16,503·95				
	At Six-Mile Works (W.R. 46x)																114·00	50·10				
	At Waldon's Find Works																1,703·95	1,425·08				
	At White Feather Reward Works											18·00	5·45				2,451·50	2,177·01				
	Treated outside District (not reported by owners)—																					
	At Brookman Bros', Boulder Works, Boulder																1,442·50	1,051·35				
	At Coolgardie Exhibition Works, Coolgardie																5·15	6·95				
	At Cosgrove's Bayley's Works, Coolgardie																1·00	21·25				
	At Crœsus South Works, Kalgoorlie											27·00	13·45				27·00	13·45				
	At Flagstaff Works, Coolgardie																424·00	250·51				
	At Great Boulder No. 1 Works, Boulder																6,284·00	6,469·08				
	At Hannans Reward Works, Kalgoorlie																5,287·10	9,622·82				
	At Haycroft Gold Reduction Works, Kalgoorlie																272·50	730·13				
	At Kalgoorlie Mint and Iron King Works, Boulder																529·00	849·31				
	At Lake View South Works, Boulder																8,254·45	17,111·68				
	At Leviathan Filter Press and Cyanide Works, Kalgoorlie																1,139·85	1,823·27				
	At Seabrook Works, Northam																4,118·00	3,725·46				
	Alluvial										1,832·43					113,172·82						
	Notices of Purchase															133·10		98·00				
						Total				1,832·43	403·85	60,415·15	45,354·68	·75	113,568·42	4,913·32	366,505·88	334,198·82	·91	3	12	9½

§ Does not represent the total treatments at these works.

BULONG DISTRICT.

							ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£	s.	d.
Balagundi	890Y	Ironbound		18			28·10	10·00	19·67	1·97		28·10	10·00	19·67	1·97			
Do	748Y	Mt. Bellew		24			80·07					1,326·15	144·00	532·85	3·70			
Do		Voided leases										5·00	144·50	194·35				
Do		Sundry claims											26·50	9·16				
				a. r. p.														
Bulong	884Y	Bulong Surprise		1 2 0				42·00	69·38	1·65			42·00	69·38	1·65			
Do	781Y	Castle Comer		12				76·00	168·00	2·21			108·00	224·80	2·08	3	17	1
				a. r. p.														
Do	802Y	Don		4 3 3				4·40	15·12	3·44			14·40	35·72	2·48			
Do	90Y	Furness Abbey		12			8·75	10·00	12·65	1·26		8·75	10·00	12·65	1·26			
Do	906Y	Gascoyne		6			63·35	15·00	64·26	4·28		63·35	15·00	64·26	4·28			
Do	913Y	Golden Celt		18				9·00	53·30	5·92			9·00	53·30	5·92			
Do	889Y	Golden Eagle		4				49·00	33·62	·69			49·00	33·62	·69			
				a. r. p.														
Do	772Y	Golden Hope		2 2 39				2·00	4·70	2·35			12·00	7·25	·60			
Do	862Y	G lden West		12				111·50	193·57	1·74			149·50	221·99	1·48	3	16	1
Do	835Y	Green Harp		12			11·46	80·00	41·96	·52		11·46	318·00	230·23	·72			
Do	751Y	(I.O.U.)											53·00	19·31	·36			
Do	687Y	Last Chance		Ftd.							6·20		242·00	218 36	·90			
Do	11Y, 36Y		(Melbourne United G.M. Co., N.L.)										236 20	230·73	·97			
			Carried forward				191·73	408·90	676·23		6·20	1,442·81	1,583·10	2,177·63				

North-East Coolgardie Goldfield—*continued.*

BULONG DISTRICT—*continued.*

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£ s. d.
			Brought forward ...	...	...	191·73	408·90	676·23	...	6·20	1,442·81	1,583·10	2,177·63	...	
Bulong ...	921Y	Ninety Eight	... ...	6	...	...	35·00	16·01	·46	...	...	35·00	16·01	·46	
Do ...	683Y, 688Y, 698Y	Ninety Eight leases ...	... ...	V.N.R.	...	16·90	...	...	...	...	138·90	584·75	820·78	1·40	
Do ...	751Y, 793Y, 797Y	Perseverance leases ...	... ...	18	...	...	180·50	83·77	·46	...	...	230·50	99·53	·43	
Do ...	74Y, 564Y ...	... ...	Princess Margaret G.M. Co., N.L.	30	...	...	...	...	...	...	...	632·00	1,097·75	1·73	
Do ...	90Y	... ...	(Queen Margaret Central G.M. Co., N.L.)	...	...	...	63·00	77·75	1·23	...	...	363·00	451·65	1·24	3 15 0
Do ...	9Y, 11Y, 36Y, 142Y, 692/3Y, 697Y (763Y)	... ...	Queen Margaret G.M. Co., Ltd.	102	...	519·23	7,520·00	5,487·24	·73	...	519·23	52,853·00	54,387·21	1·03	3 16 8
Do ...	205Y	... ...	(Queen Margaret No. 1 South G.M. Co., N.L.)	12	...	...	...	...	...	...	...	106·00	880·00	8·30	
Do ...	95Y, 631Y ...	... ...	(Queen Margaret South G.M. Co., N.L.)	48	...	735·00	117·00	808·55	6·91	6·40	1,855·00	566·00	2,335·08	4·13	3 19 10
Do ...	681Y	(Slug Hill)	... ...	...	...	...	...	...	...	...	...	557·00	660·14	1·18	
Do ...	681Y	... ...	(Slug Hill Proprietary G.Ms. Co., N.L.)	...	...	...	...	...	...	20·88	...	195·00	89·15	·45	
Do ...	681Y	Slug Hill	... ...	24	12·47	...	...	...	...	12·47	...	...	...	...	
Do ...	873Y	Stawell	... ...	12	...	...	10·00	33·32	3·33	...	...	22·00	115·34	5·24	
Do ...	832Y (792Y) ...	Toby Barton	... ...	V.N.R.	...	...	...	...	...	...	36·00	70·00	50·13	·71	
Do ...	844Y	Triumph	... ...	12	...	..	10·00	4·51	·45	...	...	10·00	4·51	·45	
Do ...	850Y	Trump	... ...	12	...	...	278·00	545·14	1·96	...	...	345·00	818·67	2·37	
Do ...	851Y	Vulcan	... ...	V.N.R.	...	...	...	...	...	...	...	8·00	6·30	·79	
Do ...	871Y	Wakeful	... ...	Ftd.	...	...	12·00	49·60	4·13	...	...	17·00	70·90	4 17	
Do ...	14Y	(White Horse)	... ...	...	...	...	...	...	...	...	801·05	336·50	821·77	2·44	
Do ...	14Y	White Horse	Queen Margaret G.M. Co., Ltd.	12	...	...	42·00	29·62	·70	...	...	2,230·00	1,799·12	·81	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	72·35	637·65	2,298·50	1,291·23	...	
Do ...	... ...	Sundry claims ...	... ...	...	130·81	26·70	746·50	1,764·30	...	1,664·93	999·20	5,116·90	14,984·70	...	
Mt. Monger ...	809Y	Black Hills	... ...	V.N.R.	...	...	...	...	...	...	50·00	4·25	36·25	8·53	
Do ...	898Y	Britannia	... ...	18	...	4·00	5·00	25·75	5·15	...	4·00	5·00	25·75	5·15	
Do ...	834Y	Hibernian	... ...	V.N.R.	...	...	...	...	...	...	...	15·10	11·95	·79	
Do ...	740Y	Hogan's Flat	... ...	Ftd.	...	...	...	...	...	...	40·00	30·00	31·00	1·03	
Do ...	75Y, 678Y ...	... ...	Majestic G.Ms., Ltd. ...	V.N.R.	...	...	13·00	26·26	2·02	...	...	296·75	361·93	1·22	
Do ...	826Y	Mighty Rumble ...	... ...	24	...	9·30	...	...	...	...	9·30	14·50	21·95	1·51	
Do ...	737Y	Mount Monger	... ...	6	...	22·40	226·00	151·07	·67	...	941·15	269·50	225·18	·84	
Do ...	849Y, 860Y ...	... ...	Mount Monger G.M. Co., N.L.	24	...	...	435·00	31·50	·07	...	...	435·00	31·50	·07	
Do ...	805Y, 892Y ...	... ...	Santa Claus G.M. Co., Ltd.	48	...	...	50·00	44·03	·88	...	...	50·00	44·03	·88	3 19 8
Do ...	841Y	Stanley	... ...	V.N.R.	...	...	...	...	...	...	...	161·50	147·35	·91	
Do ...	846Y	Struck Oil	... ...	12	...	...	4·00	9·10	2·27	...	62·00	11·50	62·40	5·43	

Do	...	...	...	...	Voided leases	...	...	...	...	...	...	...	...	...	...	...	...	2,018·28	129·00	386·21	...		
Do	...	...	...	...	Sundry claims	...	...	...	...	...	...	237·05	...	99·50	90·93	...	237·05	...	205·00	159·03	...		
Taurus	...	836T	...	...	La Mascotte	...	...	...	...	...	V.N.R.	...	...	10·00	6·75	·67	...	...	80·00	74·41	·93		
Do	...	...	...	...	Voided leases	...	...	...	...	...	...	...	...	...	...	...	2·30	...	1,561·55	646·21	...		
Do	...	...	...	...	Sundry claims	...	...	...	...	...	...	...	...	123·00	192·84	...	125·73	...	256·00	370·60	...		
					From District generally—																		
					Sundry parcels treated at Down and Clark's Cyanide Works					...	...	...	...	...	*cy.* 108·84	...	...	...	...	108·84	...		
					Do do Gray's Cyanide Works					...	...	...	...	...	*cy.* 277·15	...	...	...	...	277·15	...		
					Do do Holt's Battery					...	...	...	...	...	...	...	...	...	3,648·55	3,337·18	...		
					Do do Middleton's Cyanide Works					...	...	...	...	20·00	242·65	...	...	...	20·00	404·34	...		
					Do do Queen Margaret Battery					...	...	...	...	...	...	...	...	...	35·50	31·11	...		
					Do do State Battery, Bulong					...	...	...	...	...	...	...	...	...	2,224·00	1,678·60	...		
					Alluvial	...	...	...	...	...	...	562·04	...	...	...	...	21,706·25	...	...	...	...		
					Notices of Purchase	...	...	...	...	...	...	1,203·94	36·94	...	...	...	2,662·97	55·97	...	...	...		
									Total	...	...	2,146·31	1,562·20	10,408·40	10,782·91	1·04	26,517·53	9,610·54	77,611·95	91,450·57	1·18	3 17 7¼	

KURNALPI DISTRICT.

											ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs	£ s. d.	
Jubilee	...	254K	...	...	Josephine	...	...	...	...	...	V.N.R.	...	...	...	...	...	...	57·60	6·00	14·00	2·33		
Do	...	220K, (246K)	...		Jubilee Gift South	...	...	...	...	...	V.N.R.	...	...	85·00	37·55	·44	...	...	1,493·00	1,268·48	·85		
Do	...	220K	...	...	...	...	...	...	...	(Mountain Maid and Iron Prince G.Ms., Ltd.)	V.N.R.	...	...	...	...	...	...	...	208·00	229·51	1·10		
Do	...	...	...	...	Voided leases	...	...	...	...	...	...	...	...	...	...	...	...	106·47	103·50	163·95	...		
Do	...	...	...	...	Sundry claims	...	...	...	...	...	...	21·80	...	11·00	24·46	...	21·80	...	46·00	33·96	...		
Kurnalpi	...	280K	...	...	Billy Billy	...	...	...	...	...	6	...	10·00	...	...	...	...	10·00	...	...	...		
Do	...	...	...	...	Voided leases	...	...	...	...	...	...	...	...	...	...	...	...	...	1,710·05	1,019·81	...		
Do	...	...	...	...	Sundry claims	...	...	...	...	...	...	...	...	20·00	33·50	...	280·00	...	45·00	52·14	...		
Mulgabbie	...	260K	...	...	Mulgabbie Perseverance	...	...	...	...	...	24	...	8·00	1·50	53·00	...	...	8·00	1·50	53·00	...		
Do	...	...	...	...	Voided leases	...	...	...	...	...	...	...	...	...	...	...	...	44·60	...	...	...		
Do	...	...	...	...	Sundry claims	...	...	...	...	...	...	...	116·85	8·00	209·20	...	8·50	1,641·52	76·25	670·80	...		
					From District generally—																		
					Sundry parcels treated at Glover's Works					...	...	...	...	...	...	...	...	...	55·00	55·40	...		
					Do do Hempseed's Cyanide Works					...	...	...	...	...	...	...	...	...	...	159·00	...		
					Alluvial	...	...	...	...	...	...	323·00	...	...	...	...	10,804·80	...	...	...	...		
					Notices of Purchase	...	...	...	...	...	...	...	...	...	...	...	159·59	...	...	...	...		
									Total	...	...	344·80	134·85	125·50	357·71	2·85	11,274·69	1,868·19	3,744·30	3,720·05	·99	3 18 8¾	

TABLE IV.—*Production of Gold from all sources, etc.*—continued.

East Coolgardie Goldfield.

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
					ozs.	ozs.	tons.	ozs.	ozs	ozs.	ozs.	tons.	ozs.	ozs.	£ s. d.
Binduli	...	Voided leases	...	...	...	...	...	...	...	...	...	120·00	81·27	...	
Do	...	Sundry claims	...	...	...	...	...	...	...	...	...	25·00	25·95	...	
Boorara	...	2310E, 2312E, 2314E	Golden Ridge Proprietary leases	72	...	...	4,351·00	5,744·90	1·32	...	57·78	6,474·00	7,499·57	1·16	3 15 0
Do	...	2310E, 2312E, (2313E,) 2314E	...	(Golden Ridge W.A. Proprietary, Ltd.)	...	...	...	...	...	...	...	322·78	602·66	1·86	
Do	...	3908E, 3910E, 3912E	Waterfall leases	72	...	...	822·00	1,341·45	1·63	...	...	2,849·00	2,845·45	1·00	
Boulder	...	38E, 71/2E, 101E	...	Associated G.Ms. of W.A., Ltd.	a. r. p. 75 3 24	...	58,008·00	77,228·97	1·33	...	...	305,751·30	380,266·95	1·24	3 11 6½
Do	...	49E, 52/3E, 263E	...	Associated Northern Blocks (W.A.), Ltd.	78	...	392·00	9,387·25	53,117·00	5·66	...	557·10	28,583·92	156,425·72	5·47	4 0 0
Do	...	1194E, 3951E	...	Associated Southern G.Ms., (W.A.), Ltd.	36	...	...	...	*con.* 5·65	...	...	...	...	5·65	...	
Do	...	1006E	...	(Boulder Central G.M. Co., N.L.)	12	...	...	...	...	...	...	...	49·00	4·03	·08	
Do	...	1089E	...	(Boulder Consols No. 1 G.M. Syndicate, N.L.)	a. r. p. 16 1 7	...	...	...	...	...	...	...	124·00	18·10	·14	
Do	...	1112E, 1394E	...	Boulder Half-mile South G.M. Co., N.L.	Ftd.	...	...	...	...	...	...	...	80·00	20·30	·25	
Do	...	261E, 281E	...	(Brookman Bros. Boulder G.M. Co., Ltd.)	...	...	...	...	...	...	...	...	8,655·00	8,993·41	1·04	
Do	...	24E, 888E, 949E, 1168E	...	Central and West Boulder G.Ms., Ltd.	54	...	...	721·00	604·75	·84	...	...	26,302·00	18,133·35	·69	3 17 6
Do	...	352E	...	Chaffer's G.M. Co., Ltd.	12	...	...	270·00	218·50	·81	...	...	270·00	218·50	·81	3 1 1
Do	...	351E, 1085E, 1113E, 1219E, 1326E, 1397E	...	Golden Horseshoe Estates Co., Ltd.	a. r. p. 86 3 24	...	...	156,559·61	222,661·31	1·42	...	...	498,724·00	877,330·26	1·76	3 14 3¼
Do	...	446E, 1069E, 1092E, 2326E	...	(Golden Link Consolidated G.Ms., Ltd.)	57	...	...	...	...	...	...	...	1,525·00	871·49	·57	
Do	...	873E	...	Great Boulder Main Reef, Ltd.	a. r. p. 24 3 0	...	...	19,073·00	13,832·37	·73	...	...	96,296·89	120,747·45	1·25	3 2 9
Do	...	50E	...	Great Boulder No. 1, Ltd.	24	...	...	1,118·00	563·35	·50	...	...	3,363·00	2,902·30	·86	
Do	...	66E	...	Great Boulder Perseverance G.M. Co., Ltd.	24	...	...	132,593·00	205,634·04	1·55	...	...	473,958·23	667,685·66	1·41	3 10 0
Do	...	16E, 51E, 61E, 102E, 280E	...	Great Boulder Proprietary G.Ms., Ltd.	a. r. p. 85 1 0	...	...	109,850·00	173,163·18	1·56	...	...	502,050·00	941,788·14	1·87	3 5 7½
Do	...	902E, 1011E, 1072E, 1124E	...	(Great Boulder South G.M. Co., Ltd.)	63	...	...	...	...	...	...	...	437·00	145·09	·33	
Do	...	3643E	...	Hainault G.Ms., Ltd.	20	...	...	20,822·00	9,421·72	·45	...	...	35,838·20	19,451·02	·54	3 17 10½

Do	1131E	...	...	Hannan's Central Extended G.M. Co., N.L.	24	...	...	1,080·00	247·15	·23	...	...	10,201·00	7,992·82	·78	
Do	1294E ...	...	...	(Hannan's Golden Pike G.M., Ltd.)	...	...	...	...	...	...	...	...	25·00	16·30	·65	
Do	15E, 60E	...	...	Hannan's Star G.Ms., Ltd.	18	...	...	12,753·00	10,513·61	·82	...	...	40,467·75	28,504·13	·70	3 4 9
Do	31E ...	...	...	Ivanhoe Gold Corporation, Ltd.	24	...	...	149,131·00	164,427·46	1·10	...	...	553,065·00	720,340·77	1·30	3 7 2
Do	33E ...	...	...	(Kalgoorlie Bank of England G.M. Co., Ltd.)	...	...	...	...	...	...	...	...	11,775·50	7,492·95	·63	
Do	73E, 74E	...	...	Kalgoorlie Mint and Iron King Gold Estates, Ltd.	42	...	...	613·00	338·45	·55	...	...	613·00	338·45	·55	3 16 8½
Do	73E, 74E	...	...	(Kalgoorlie Mint and Iron King G.Ms., Ltd.)	...	...	...	...	...	...	...	...	3,647·00	8,201·97	2·24	
Do	22E, 34E	...	...	Kalgurli G.Ms., Ltd. ...	18	...	...	48,015·00	45,365·35	·94	...	...	109,631·48	123,388·98	1·12	3 17 10½
Do	25E, 32E	...	...	Lake View Consols, Ltd ...	48	...	...	88,185·00	71,007·46	·81	...	...	478,282·60	833,696·93	1·74	3 7 7½
Do	103E ...	...	...	(Lake View Extended G.M. (W.A.), Ltd.)	Surr.	...	...	...	...	...	...	...	710·00	177·25	·24	
Do	75E (103E)	...	...	Lake View South G.M. (W.A.), Ltd.	20	...	...	1,425·00	1,631·63	1·15	...	...	6,293·98	9,417·63	1·50	
Do	3911E	Last Chance	...	... ...	24	...	...	...	...	...	...	...	30·00	7·20	·24	
Do	33E, 35E, 975E	...	...	North Boulder G.M. Co., Ltd.	31	...	...	...	...	...	...	...	33,549·15	50,081·27	1·49	
Do	261E, 281E, 287E, 444E	...	...	North Kalgurli Co., Ltd. ...	66	60·77	...	3,359·00	5,245·75	1·56	60·77	...	4,052·05	7,880·87	1·94	3 1 6
Do	410E, 448E, 532E, 578E, 698E, 944E, 1395E	...	...	Oroya-Brown Hill Co., Ltd.	a. r. p. 89 3 5	...	...	52,259·00	109,992·31	2·10	...	...	316,713·80	532,295·11	1·68	3 12 0
Do	188E (3800E) ...	Slug Hill	...	... ...	Ftd.	...	...	...	...	...	...	...	36·00	25·15	·70	
Do	1208E, 3612E ...	...	...	South Kalgurli G.Ms., Ltd.	a. r. p. 14 1 27	...	...	13,112·00	14,925·18	1·14	...	...	77,111·00	76,457·01	·99	3 9 9
Do	3031E	...	...	Trafalgar G.M. (W.A.), Ltd.	19 1 3	...	...	...	...	...	...	...	189·95	66 07	·35	
Do	... ...	Voided leases	...	... ...	...	...	...	...	...	...	...	30·50	105·00	136·20	...	
Do	... ...	Sundry claims	...	... ...	...	...	...	...	...	...	...	...	499·00	820·70	...	
Feysville	3770E	Eagle Hawk United	...	... ...	8	...	...	91·00	94·56	1·04	...	23·00	199·00	280·37	1 41	
Do	Block 48	...	...	Hampton Plains Estate, Ltd.	..	...	...	7,486·00	1,214·42	·16	4,913·45	...	20,461·00	2,776·87	·14	
Do	Block 50	...	...	Hampton Properties, Ltd. ...	...	...	...	1,373·00	1,396·14	1·02	...	8·00	4,119·00	3,132·09	·76	
Do	3941E	Levett's Boulder	...	... ...	V.N.R.	...	...	...	...	...	...	26·00	...	...	...	
Do	2684E	Rosina	...	... ...	12	...	...	...	...	...	...	1·10	33·50	17·30	·51	
Do	... ...	Voided leases	...	... ...	...	...	...	...	...	...	...	...	134·85	60·12	...	
Kalgoorlie	392E	(Acrobat) ...	...	(Paringa Consolidated Mines, Ltd.)	24	...	...	...	...	...	...	...	10·25	40·06	3·90	
Do	3935E	Australian Nation	...	... ...	12	...	...	...	...	...	...	...	71·00	47·00	·66	
Do	796E, 1228E ...	Bonnie Lass leases	...	... ...	27	...	68·50	63·00	182·44	2·90	...	68·50	111·00	267·49	2·41	
Do	989E, 1013E, 1170E, 1596E	... ...	...	Brown Hill Central G.Ms., Ltd.	a. r. p. 58 3 9	...	...	...	...	...	...	...	2,764·50	2,196·09	·79	
Do	552E	Brown Hill Consols	...	... ...	12	...	...	102·00	83·82	·82	...	...	137·00	112·97	·83	
Do	558E, 3961E ...	... ...	...	Brown Hill Extended, Ltd.	36	...	...	12,395·00	39,202·45	3·16	...	...	13,232·75	43,774·68	3·31	3 8 10½
Do	1101E, 1111E, (3890E)	... ...	...	(Brown Hill Junction G.M. Co., N.L.)	a. r. p. 15 1 21	...	...	280·00	110·51	·39	...	...	1,122·00	389·02	·35	
Do	552E, (861E), 922E, (999E, 1075E)	... ...	...	(Brown Hill Proprietary G.Ms., Ltd.)	...	...	...	...	...	...	...	...	379·00	533·16	1·41	
Do	3978E	Commonwealth	...	... ...	12	...	79·55	26·50	32·09	1·21	...	79·55	26·50	32·09	1·21	
Do	238E	... ...	...	Crœsus North No. 1, Ltd. ...	9	...	...	...	...	...	...	...	2,830·25	1,558·24	·55	
Do	1621E	... ...	...	(Crœsus Proprietary G.M. Co.)	12	...	...	...	...	...	...	...	79·00	52·33	·66	
				Carried forward ...	...	60·77	540·05	905,323·36	1,229,547·97	...	4,974·22	851·53	3,684,507·18	5,668,669·96	...	

TABLE IV.—*Production of Gold from all sources, etc.*—continued.

East Coolgardie Goldfield—*continued.*

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£ s. d.
			Brought forward ...	...	60·77	540·05	905,323·36	1,229,547·97	...	4,974·22	851·53	3,684,507·18	5,668,669·96	...	
Kalgoorlie ...	13E, 90E, 302E	... ...	Crœsus South G.Ms., Ltd. ...	27	...	...	3,068·50	2,578·52	·84	...	...	25,491·50	11,302·42	·44	3 15 11
Do ...	3880E	Devon Consols	... ...	24	...	...	9,393·00	5,209·61	·55	...	40·22	12,997·00	8,731·99	·67	3 17 8
Do ...	750E	... ...	(Golden Link Consolidated G.Ms., Ltd.)	...	...	...	9,511·00	5,627·69	·59	...	...	10,729·00	6,399·74	·60	4 2 2¾
Do ...	750E	... ...	Golden Links, Ltd.	18	...	...	20,763·00	14,176·62	·68	...	...	20,763·00	14,176·62	·68	4 2¾
Do ...	947E, 1294E, 3469E	... ...	Golden Pike and Lake View East Mines, Ltd.	a. r. p. 37 1 15	...	...	88·00	17·50	·20	...	...	239·00	49·80	·21	
Do ...	1694E	Golden Zone	... ...	22	...	...	408·50	202·02	·49	...	...	1,903·50	1,158·73	·61	3 13 10
Do ...	6E	... ...	(Hannan's Block 45, Ltd.) ...	18	...	...	...	...	...	...	...	2,343·55	3,459·91	1·48	
Do ...	131E, 245E, 269E 743E, 794E, 969E	... ...	(Hannan's Central G.M., Ltd.)	48	...	...	...	...	...	...	...	6,098·00	3,920·37	·64	
Do ...	14CE, 415E, 1163E	... ...	Hannan's Consols, Ltd. ...	21	...	...	1,153·25	577·17	·50	...	...	3,673·00	2,915·80	·79	
Do ...	739E	... ...	(Hannan's Crœsus G.M. Co., Ltd.)	23	...	...	...	...	...	...	...	4,256·75	4,866·97	1·14	
Do ...	755E	... ...	(Hannan's Excelsior G.M., Ltd.)	12	...	...	...	...	...	...	...	103·50	52·94	·51	
Do ...	9E (37E), 42E ...	... ...	Hannan's Find Gold Reefs, Ltd.	Ftd.	...	...	...	...	...	...	...	83·50	31·15	·37	
Do ...	983E (1183E, 1305E, 1393E)	... ...	(Hannan's Golden Group, Ltd.)	...	...	...	...	...	...	...	...	6·00	18·00	3·00	
Do ...	3625E, 3905E ...	... ...	Hannan's Kapai, Ltd. ...	V.N.R.	...	...	75·00	13·80	·18	...	...	148·00	31·05	·21	
Do ...	134E, 924E ...	... ...	Hannan's Main Reef, G.M. Co., Ltd.	V.N.R.	...	...	18·00	9·70	·54	...	...	163·00	72·55	·45	
Do ...	1004E	... ...	(Hannan's North Crœsus G.M. Co., Ltd.)	...	...	...	...	...	...	...	...	50·00	14·22	·28	
Do ...	12E, 229E, 248E, (3938E)	... ...	Hannan's North G.Ms., Ltd.	48	...	...	2,510·00	1,575·26	·63	...	...	11,311·00	8,490·54	·75	3 16 0
Do ...	941E, 942E, 1024E, 1025E (1035E), 1167E	... ...	Hannan's Proprietary Development Co., Ltd.	a. r. p. 91 2 0	...	...	299·00	681·87	2·28	...	...	20,207·50	9,491·52	·47	3 3 7¾
Do ...	97E, 160E, 211/3E (1240E), 1653E	... ...	Hannan's Reward and Mt. Charlotte, Ltd.	94 0 37	...	...	2,459·00	3,962·04	1·61	...	2·83	33,773·10	29,203·39	·86	3 18 0
Do ...	796E, 1228E ...	... ...	(Hannan's Reward North G.M. Co., N.L.)	...	...	...	...	...	...	...	20·05	334·00	276·44	·83	
Do ...	922E	Herlichite	... ...	12	...	...	...	...	...	...	...	90·50	63·27	·70	
Do ...	946E	... ...	Ironsides North G.M. Co., N.L.	a. r. p. 24 3 20	...	...	57·00	4·35	·08	...	...	1,158·00	805·14	·70	3 16 9
Do ...	1004E	Kalgurli Golden Eagle	... ...	12	...	...	20·00	13·69	·68	...	...	45·50	43·21	·95	
Do ...	1260E (1733E, 1734E, 1735E)	... ...	Kalgoorlie Mining Developments Co., Ltd.	Ftd.	...	...	...	...	...	...	9·67	2,640·85	2,866·27	1·08	
Do ...	12E, 229E, (3745E)	... ...	(Kalgurli Star Syndicate, Ltd.)	...	...	...	...	...	...	...	5·67	1,597·29	977·23	·61	

Do	...	790E, 1008E ...	...	...	King of the Hills G.M. Co., Ltd.	27	...	...	7·00	15 50	2·21	...	...	128·00	98·83	·77		
Do	...	2E, 279E ...	...	...	Maritana G.M. Co., N.L. ...	15	...	...	560·50	542·87	·97	...	...	2,318·50	2,263·49	·98	3	17 0
						a. r. p.												
Do	...	21E, 64E ...	...	...	(Monte Christo G.M. Co., N.L.)	17 3 18	...	...	68 00	5·36	·08	5·00	...	379 00	86 42	·23		
Do	...	983E	...	...	New Standard Exploration Co., Ltd.	24	...	...	165·00	62·30	·38	...	...	165·00	62·30	·38		
Do	...	244E	...	...	(North Crœsus G.M. Co., Ltd.)	12	...	...	...	...	...	...	18·26	...	...	...		
Do	...	1556E	...	...	North Mt. Charlotte G.Ms., Ltd.	Ftd.	...	...	41·50	17·91	·43	...	...	1,181·50	650·88	·55		
Do	...	890E, 912E ...	...	...	North-Western Associated G.Ms. (W.A.), Ltd.	42	...	...	...	...	...	...	...	459·00	308·97	·67		
Do	...	535E	...	...	Octagon Explorers, Ltd. ...	12	...	...	257·00	128·41	·50	...	...	905·00	410·61	·45		
Do	...	501E, 1591F, 2988E	...	...	(Paringa Consolidated Mines, Ltd.)	...	...	...	...	...	...	...	...	216 00	175·56	·81		
						a. r. p.												
Do	...	4E, 501E, 1591E, 2988E	...	...	Paringa Mines, Ltd. ...	23 3 ·7	...	...	498·00	845·25	1·70	...	...	2,928·00	5,846·97	2·00	3	18 1
						a. r. p.												
Do	...	225E, 1114E, 3789E	...	...	Reefer's Eureka G.M. Co., N.L.	29 3 9	...	...	...	...	...	...	...	995·40	1,083·77	1·08		
Do	...	3771E	Sons of Gwalia, Kalgoorlie	...	...	12	...	...	158·00	71·96	·46	...	...	451·00	311·96	·69		
Do	...	... ...	Voided leases ...	...	...	...	...	...	...	...	...	...	163·95	850·00	786·72	...		
		From Goldfield generally—																
Sundry parcels treated at Brookman Bros.' Boulder Works							...	...	...	...	...	...	...	1,293·00	2,036·82	...		
Do do Coolgardie Ore Reduction Works							...	...	...	...	...	...	...	10·50	·60	...		
Do do Crœsus South Battery							...	...	5,330·50	2,907·35	...	...	...	6,848·75	3,824·77	...		
Do do Great Boulder No. 1 Works							...	...	384·00	244·55	...	...	...	5,291·25	3,911·96	...		
Do do Hampton Properties Battery							...	...	30·00	30·14	...	...	...	30·00	30·14	...		
Do do Hannan's Central Extended Battery							...	...	20·00	10·40	...	...	..	20·00	10·40	...		
Do do Hannan's North Battery							...	...	637·00	702·75	...	..	...	637·00	702·75	...		
Do do Hannan's Proprietary Works							387·27	...	3,490·25	3,716·38	...	387·27	...	7,938·24	6,468·71	...		
Do do Hannan's Reward Battery							...	...	...	...	...	...	...	6,468·75	6,813·63	...		
Do do Kalgoorlie Gold Recovery Works							...	...	...	...	...	...	...	...	1,325·95	...		
Do do Kalgoorlie Metallurgical Works							...	...	·15	{ *cy.* 6·39 ¶ 6·10 }	...	...	...	·15	12·49	...		
Do do King & Co.'s Smelting and Metallurgical Works... ...							...	...	...	...	...	...	17·00	6·50	152·83	...		
Do do Lake View South Battery							...	...	...	...	...	...	...	5,183·25	4,574·89	...		
Do do Leviathan Filter Press and Cyanide Works							...	...	...	...	...	...	...	60·25	1,197·26	...		
Do do Mt. Charlotte Battery							...	...	...	...	...	...	...	89·50	73·62	...		
Do do North Boulder Works							...	...	...	...	...	...	...	747·00	400·30	...		
Do do North Kalgurli Works							...	...	...	*cy.* 350·00	...	...	...	...	350·00	...		
Do do Wallaroo, South Australia							...	...	...	...	...	...	...	...	32·50	...		
Notices of Purchase							304·90	473·40	...	...	...	7,580·60	10,277·50	...	...	...		
Total							752·94	1,013·45	966,793·51	1,273,861·43	1·32	12,947·09	11,406·68	3,890,313·76	‡5,822,095·33	1·50	3	10 8½

‡ Also 500ozs. from unknown tons.

TABLE IV.—*Production of Gold from all sources, etc.*—continued.

Coolgardie Goldfield.

COOLGARDIE DISTRICT.

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£ s. d.
Bonnievale ...	126, 3711, 3847 3848	... ...	Bendigo and Coolgardie Proprietary Co., N.L.	52 a. r. p.	...	...	30·00	327·09	...	...	...	3,388·00	3,230·02	·95	
Do ...	595, 1405, 1741	Gem leases	... ...	41 3 11	...	...	2,020·00	1,936·85	·96	...	...	2,020·00	2,593 08	1·28	
Do ...	3805	Gentle Annie	... ...	24	...	...	151·00	316·66	2·10	...	...	736·50	1,313·91	1·78	3 14 0
Do ...	1741	(Golden Drop)	... ...	...	...	...	...	...	...	...	...	283·50	269·20	·94	
Do ...	1610	Mt. Burgess Christmas Gift	... ...	V.N.R.	...	...	...	...	...	...	...	427·00	294·55	·69	
Do ..	595, 1405, 1741	... ...	(New Victoria Consols, G.M. Co., N.L.)	...	...	...	...	...	...	...	...	12,725·50	5,775·39	·45	
Do ...	4060	North Burgess	... ...	18	...	...	...	*cy.* 217·50	...	...	...	...	217·50	...	
Do ...	1610	... ...	(North Burgess G.M. Co., Ltd.)	V.N.R.		...	...	...	...	...	...	1,037·00	708·40	·68	
Do ...	1552, 3947 ...	... ...	Vale of Coolgardie G.Ms., Ltd.	40	...	...	9,740·00	4,901·45	·50	...	...	60,917·00	37,505·15	·62	3 13 9
Do ...	144, 1151, 1639, 2146, 2266, 3572, 3575	... ...	Westralia and East Extension Mines, Ltd.	131	...	...	26,981·00	22.887·77	·85	...	...	84,635·65	61,161·38	·72	3 13 7
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	2·47	13,710·20	13,075·93	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	14·00	22·40	...	...	...	158·50	108·90	...	
Bulla Bulling ...	4053	Iron King	... ...	12	...	...	85·00	22·25	·26	...	...	85·00	22·25	·26	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	261·50	262·48	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	14·65	198·00	182·45	...	
Burbanks ...	3931	Bell Bird	... ...	12	...	...	76·00	92·46	1·22	...	...	155·00	266·02	1·72	3 13 10
Do ...	4029	Boshter	... ...	6	...	...	129·00	118·54	·92	...	...	129·00	118·54	·92	
Do ...	134/6, 1527, 1705, 1918/9, 2761	... ...	Burbanks Birthday Gift G.M., Ltd.	83	...	...	26,182·00	17,564·11	·67	...	...	129,839·00	141,449·18	1·09	3 10 2
Do ...	3956	(Burbanks Horseshoe)	... ...	V.N.R.	...	...	...	...	...	...	...	65·00	45·71	·70	
Do ...	4063 (3956) ...	Burbanks Horseshoe ...	... ...	9	...	...	18·75	11·95	·64	...	...	18·75	11·95	·64	
Do ...	3956, 3957, 4001	Burbanks Horseshoe leases	... ...	V.N.R.	...	...	25·00	14·80	·59	...	...	25 00	14·80	·59	
Do ...	4001 (3928) ...	(Burbanks Horseshoe West)	... ...	V.N.R.	...	...	...	...	...	...	...	25·00	14·80	·59	
Do ...	2985/6, 3444 ...	... ...	(Burbanks Main Lode, Ltd.)	...	...	...	1,165·00	681·47	·58	...	...	3,209·00	1,938·42	·60	3 12 7
Do ...	2985/6, 3444 ...	... ...	Burbanks Main Lode (1902), Ltd.	42	...	...	2,216·00	1,200 36	·54	...	...	2,216·00	1,200·36	·54	3 12 7
Do ...	1705	... ...	(Burbanks North G.M., Ltd.)	...	...	...	...	...	...	...	...	22·50	8·80	·39	
Do ...	3935	Commonwealth ...	... ...	12	...	15·90	139·00	232·40	1·67	...	15·90	189·75	300·67	1·58	
Do ...	3959	(Coronation No. 2) ...	... ...	...	...	...	...	...	...	...	...	12·00	6·62	·55	
Do ...	4061	Cumberland	... ...	12	...	...	128·00	70·70	·55	...	...	128·00	70·70	·55	
Do ...	3921	Empress of India ...	... ...	V.N.R.	...	...	...	...	...	...	...	66·00	71·85	1·09	
Do ...	1918	(Glenloth South) ...	... ...	...	...	...	...	...	...	...	...	372·00	515·20	1·38	
Do ...	3979	Goroke	... ...	V.N.R.	...	...	...	...	...	...	...	15·00	2·30	·15	
Do ...	2160	(Lady Robinson) ...	... ...	...	...	...	...	*cy.* 118·00	...	...	...	5,315·40	3,683·29	·69	
Do ...	2160	... ...	Lady Robinson G.M. Co., N.L.	12	...	...	1,622·00	1,722·10	1·06	...	...	1,622·00	1,722·10	1·06	3 6 5½

Do	3809, 3828, 3960	Lord Bobs leases	...	30	...	...	307·00	362·20	1·18	...	...	2,903·50	3,126·37	1·08	
Do	3872	Lord Bobs East	...	V.N.R.	...	...	...	...	...	...	...	34·50	14·00	·40	
Do	3898	Lord Bobs No. 1 East	...	V.N.R.	...	...	...	...	...	...	...	10·00	15·82	1·58	
Do	3845	Lord Bobs No. 1 North	...	5	...	...	176·50	215·45	1·22	...	...	904·50	1,076 86	1·19	3 15 6
Do	4009	Lord Bobs No. 3 North	...	Surr.	...	...	...	...	...	...	...	49·00	9·60	·20	
Do	3969	Mint	...	6	...	...	33·00	17·85	·54	...	...	33·00	17·85	·54	
Do	3939	Shamrock Ale	...	5	...	18·00	112·00	77·36	·69	...	18·00	312·50	184·12	·59	
Do	3920	(Try Again)	...	...	...	...	60·00	45·40	·76	...	...	157·00	372·15	2·37	
Do	3920, 3959	Try Again leases	...	12	...	...	181 00	220·34	1·21	...	...	181·00	220·34	1·21	
Do	3932	Wallsend	...	12	...	...	...	...	...	...	...	248 00	140·65	·57	
Do	...	Voided leases	...	...	...	...	...	...	...	...	54·26	3,309 00	4,200·18	...	
Do	...	Sundry claims	...	...	...	...	65·00	22·47	...	...	3·10	213·25	84·68	...	
Coolgardie	4044	Ada	...	5	...	...	58·00	26·00	·45	...	...	58·00	26·00	·45	
Do	4034	Australasian	...	6	...	...	122·00	76·85	·63	...	...	122·00	76·85	·63	
Do	22	...	Bayley's Consols G.M. Co., N.L.	18	...	...	1,426·00	1,796·38	1·26	...	...	7,591·00	7,910·70	1·04	
Do	471	(Bayley's South Extended)	...	...	...	...	...	...	...	...	...	47·00	8·55	·18	
Do	133, 139, 142, 547	...	Bayley's G.Ms., Ltd.	a. r. p. 94 0 25	40·90	...	719·50	513·13	·71	995·87	104·42	68,488·97	105,453·46	1·54	3 12 8½
Do	3590	Big Blow	Flagstaff G.Ms., Ltd.	24	...	...	313·00	114·50	·37	...	...	5,005·00	2,351· 21	·47	
Do	4047	Boronia	...	5	...	1·16	...	...	...	...	1·16	...	...	...	
Do	3972 (3868)	Brilliant	...	18	...	...	99·00	277·82	2·81	...	...	195·00	548·82	2·81	3 19 0
Do	193 (1624)	...	Briton's United G.M., Ltd.	V.N.R.	...	...	...	...	...	...	...	69·00	46·42	·67	
Do	4005	Canterbury East	...	1	...	...	...	*cy.* 11·30	...	...	...	...	11·30	...	
Do	3918	Coolgardie Redemption	...	18	...	398·80	337·00	293·87	·87	...	398·80	535.00	480·49	·90	
Do	3961	Daisy	...	6	...	...	92·00	50·75	·55	...	...	148·00	102·97	·70	
Do	4014	Duke of York	...	V.N.R.	...	...	...	...	...	...	...	8·00	6·30	·79	
Do	3997	Edwenia	...	12	...	...	150·00	8·00	·05	...	...	150·00	8·00	·05	
Do	1865	...	(Empress of Coolgardie (1896), Ltd.)	...	...	...	...	...	...	...	...	2,868·00	1,084·49	·37	
Do	3871	Family	...	Ftd. a. r. p.	...	...	...	...	...	...	...	114·00	130·29	1·14	
Do	1604/5, 2753 (3658, 3672)	...	Flagstaff, G.Ms., Ltd.	28 2 17	...	...	39·00	12·90	·33	...	...	10,324·50	5,005·02	·48	
Do	284, 745	...	(Forrest King of Coolgardie, Limited)	...	...	...	...	...	...	...	...	857·50	582·03	·67	
Do	3827	Garfield	...	12	...	92·10	32·00	144·45	4·51	...	92·10	219·00	503·88	2·30	3 17 3½
Do	3790	Gleeson's Success	...	V.N.R.	...	...	22·00	8·50	·39	...	...	22·00	8·50	·39	
Do	717 (3790)	...	(Gleeson's Success G.Ms., Ltd.)	...	...	...	...	...	...	...	...	1,132·00	1,367·54	1·20	
Do	20, 188A	...	(Golden Bar G.M. Co., N.L.)	15	...	...	...	...	...	...	...	11,977·00	9,267·70	·77	
Do	1559, 3792	...	Golden Queen G.M. Co., N.L.	V.N.R.	...	...	136·00	69·15	·51	...	...	1,338·25	1,114·45	·83	
Do	400	Great Coolgardie	...	a. r. p. 11 3 16	...	...	...	...	...	...	...	215·00	16·10	·07	
Do	1902	Griffiths	...	12	...	...	1,315·00	523·65	·40	...	...	7,389·00	6,579·08	·89	
Do	Block 53	...	Hampton Plains Estate, Ltd.	...	...	421·00	...	...	...	...	421·00	67·00	128·55	1·91	
Do	Block 59	...	Hampton Plains Estate, Ltd.	..	...	...	...	...	...	...	...	581·00	230·98	·40	
Do	226, 3527	(Killarney and Kyjak)	...	...	...	...	...	...	...	...	...	157·00	61·15	·38	
Do	471, 3530	King's Cross leases	...	a. r. p. 19 0 7	...	...	88·00	158·40	1·80	...	...	88·00	158·40	1·80	
Do	18, 82, 226, 376, 1385, 3527, 3598	...	King Solomon's G.Ms., Ltd.	77 1 2	...	...	890·00	680·70	·76	28·02	...	25,043·75	17,176·08	·69	3 12 6
Do	666 (1384, 2216, 2357, 2419, 2826), 3549, 3818	...	Lady Charlotte G.Ms., Ltd.	34 1 2	...	...	15·00	31·00	2·07	...	...	9,704·00	7,339·68	·76	
			Carried forward ...	...	40·90	946·96	77,509·75	58,217·28	...	1,023·89	1,125·86	486,876·97	455,409·51	...	

TABLE IV.—*Production of Gold from all sources, etc.*—continued.

Coolgardie Goldfield—*continued.*

COOLGARDIE DISTRICT—*continued.*

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
			Brought forward ...	...	ozs. 40·90	ozs. 946·96	tons. 77,509·75	ozs. 58,217·28	ozs. ...	ozs. 1,023·89	ozs. 1,125·86	tons. 486,876·97	ozs. 455,409·51	ozs. ...	£ s. d.
Coolgardie ...	284, 336, 745, 1583, 3654	... ...	(Lady Loch G.Ms., Ltd.) ...	...	...	...	...	...	...	...	...	24,711·00	22,830·48	·92	
Do ...	284, 336, 745, 1583, 3654	... ...	Lady Loch Mines, Ltd. ...	60	...	...	2,639·00	2,011·67	·76	...	...	2,639·00	2,011·67	·76	3 14 5
Do ...	3993	Lady Mary	... ...	12	...	1·62	...	...	...	...	1·62	...	...	...	
Do ...	3973	Lady Theresa	... ...	V.N.R.	...	...	...	...	...	...	...	16·00	8·00	·50	
Do ...	3530	... ...	(Lanarkshire G.Ms. of Australia, Ltd.)	...	...	...	...	...	...	66·05	16·50	504·00	308·75	·61	
...	3556	Lily	... ...	6	...	...	...	...	...	...	...	342·75	242·63	·70	
Do ...	3803/4, 3856/7	... ...	Lindsay's Consolidated Mines, Ltd.	a. r. p. 49 0 21	...	...	4,878·00	830·25	·17	...	...	5,376·00	947·26	·18	3 8 0
Do ...	3967	Maori Chief	... ...	Ftd.	...	...	10·00	12·70	1·27	...	...	10 00	12·70	1·27	
Do ...	3701	Morning Star South ...	... ...	12	...	...	...	...	...	...	...	250 00	35·00	·14	
Do ...	3319, 3624 ...	... ...	New Central Investment Corporation, Ltd.	29	...	...	118·00	60·55	·51	...	...	944·00	661·75	·70	
Do ...	84, 1464, 2831...	... ...	New Clyde G.Ms., Ltd. ...	V.N.R.	...	...	51·00	19·87	·39	45·35	...	5,773·00	1 411·01	·24	
Do ...	3975	Newmarket	... ...	12	10·75	...	...	...	...	10·75	...	...	...	...	
Do ...	3697	Olive	... ...	V.N.R.	...	...	...	...	...	...	...	83·00	11·45	·14	
Do ...	3415/6	... ...	Perseverance G.M., Ltd. (*late* Sherlaw's G.M. Co., Ltd.)	40	...	...	680·00	906·56	1·33	...	...	680·00	906·56	1·33	3 9 6
Do ...	3880	Phœnix	... ...	V.N.R.	...	...	34·00	13·85	·41	...	...	399·50	247·11	·62	
Do ...	(1111) 1865 ...	... ...	Phœnix G.Ms., Ltd. ...	18	...	...	...	...	...	...	...	2,766·50	2,166·17	·78	
Do ...	717	Redleap	... ...	12	...	...	110·00	51·55	·47	...	...	110·00	51·55	·47	
Do ...	(1019)3573, 3609, 3639	... ...	Richmond Consolidated Mining Co., Ltd.	a. r. p. 23 1 39	...	...	61·00	46·25	·76	...	...	1,417·12	2,057·86	1·45	
Do ...	3977	Ritanita	... ...	12	...	...	50·00	12·10	·24	...	...	150·00	38·50	·26	
Do ...	3945	Rose	... ...	Ftd.	...	53·45	8·00	10·30	1·29	...	59·45	59·15	239·86	4·06	
Do ...	226	... ...	(Rosehill United G.M. Co., Ltd.)	...	...	...	...	...	...	...	...	364·00	185·09	·50	
Do ...	1839	Royal Tar	... ...	12	...	...	...	...	...	...	...	295·75	115·25	·39	
Do ...	3537	Shamrock	... ...	12	...	...	...	...	...	3·40	6·80	148·00	19·97	·13	
Do ...	3415/6 ...	... ...	(Sherlaw's G.M. Co., Ltd.) ...	...	...	...	211·00	194·21	·92	...	...	13,305·00	7,346·99	·55	
Do ...	4021	Stanley	... ...	5	...	...	465·00	149·15	·32	...	...	465·00	149·15	·32	
Do ...	73	Star of the South ...	... ...	a. r. p. 9 3 24	...	...	...	...	...	...	...	975·00	846·44	·86	
Do ...	33, 3824, 3830	... ...	Tindal's Coolgardie G.M Co, N.L.	30	...	...	...	...	...	...	...	34,689·00	7,231·78	·21	
Do ...	3936	Tulip's Bayley's No. 1 South	... ...	Ftd.	...	...	...	...	...	...	...	118·50	248·55	2·10	
Do ...	1385	... ...	(Union Jack G.M. Co., N.L.)	...	...	...	...	...	...	...	...	644·50	694·52	1·07	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	60·63	28·64	27,526·25	26,770·44	...	

Do	...	... ...	Sundry claims	...	... ...	...	...	...	...	716·00	265·26	...	...	137·87	3,430·45	1,388·03	...					
Gibraltar	...	1854	De Beers ...	...	... ...	V.N.R.	...	...	...	...	...	...	...	...	202·00	74·56	·37					
Do	...	... ...	Voided leases	...	... ...	...	...	...	...	...	...	...	...	...	10·00	3·05	...					
Do	...	... ...	Sundry claims	...	... ...	...	...	...	...	...	...	...	...	...	12·00	9·23	...					
Gnarlbine	...	4048	Gnarlbine ...	...	... ...	12	...	...	...	40·50	21·55	·53	...	...	40·50	21·55	·53					
Do	...	3980 (3694) ...	Great Tontine ...	...	... ...	V.N.R.	...	...	...	...	...	...	...	...	7·00	7·65	1·09					
Do	...	3838	(Prince of Wales)	...	... ...	...	...	...	...	...	...	...	...	...	345 00	167·08	·48					
Do	...	3838	... ...	...	Prince of Wales G.M. Co., Ltd.	12	...	...	...	905·00	262·52	·29	...	...	905·00	262·52	·29					
Do	...	... ...	Voided leases	...	... ...	...	...	...	...	...	...	...	...	12·50	209·25	632·71	...					
Do	...	... ...	Sundry claims	...	... ...	...	...	...	...	...	...	...	...	1·50	36 00	24·92	...					
Londonderry	...	3834	Cheapside ...	...	... ...	18	...	..	...	333·75	209·57	·63	...	...	795·25	617·94	·78					
Do	...	3958	Gladys ...	...	... ...	V.N.R.	..	...	...	...	...	...	...	...	63·00	10·20	·16					
Do	...	4020 (1889) ...	Grosmont ...	...	... ...	Ftd.	...	...	...	80·00	26·50	·33	...	...	120·00	48 15	40					
Do	...	4062 (4020) ...	Grosmont ...	...	... ...	5	...	...	...	29·00	18·55	·64	...	...	29·00	18·55	·64					
Do	...	575, 809, 1076...	... ...	...	(Londonderry G.M., Ltd.) ...	V.N.R.	...	...	...	...	*cy.* 336·15	...	...	18 30	11,337·00	12,669·36	1·1	3	1	6		
Do	...	4049	... ...	...	Londonderry G.M., Ltd. ...	6	...	...	...	...	*pl.* 7·80	...	...	...	...	7·80	...					
Do	...	... ...	Voided leases	...	... ...	...	...	...	...	...	...	...	...	33·50	1,579 16	1,012·68	...					
Do	...	... ...	Sundry claims	...	... ...	...	...	...	...	...	...	...	...	...	453·85	301·64	...					
Mungari	...	3837	Lucy's Luck ...	...	... ...	24	...	...	...	18·00	29·00	1·61	...	...	110·50	81·92	·74					
Do	...	... ...	Voided leases	...	... ...	...	...	...	...	...	...	...	...	...	14 00	10·45	...					
Red Hill	...	3408	Boomer	...	... ...	12	...	41·50	...	15·00	164·50	...	...	41·50	60·00	310·15	5·17					
Do	...	3404, 3417, 3426	... ...	...	(Red Hill (W.A.) Gold Syndicate, Ltd.)	... a. r. p.	...	...	...	85·00	241·77	2·84	...	1,558·08	6,470·00	10,625·25	1·64	3	18	6		
Do	...	3404, 3417, 3426	... ...	...	Redhill Westralia G.Ms., Ltd (*late* Red Hill (W.A.) Gold Syndicate, Ltd.)	45 1 13	...	...	...	1,095·00	1,866·59	1·70	...	...	1,095·00	1,866·59	1·70	3	18	6		
Do	...	... ...	Voided leases	...	... ...	...	...	...	...	...	...	...	...	3·40	963·25	441·69	...					
Do	...	... ...	Sundry claims	...	... ...	...	...	...	...	...	...	...	...	·57	110·00	7·23	...					
Widgiemooltha	...	4016	Alliance	...	... ...	24	...	...	...	200·00	117·60	·59	...	...	238·00	139·70	·59					
Do	...	4064	Clarence... ...	..	... ...	18	...	...	...	90·00	59·15	·66	...	...	90 00	59·15	·66					
Do	...	3548	Flinders	...	.. ..	Ftd.	...	...	...	...	...	...	...	28·26	397·60	338·84	·85					
Do	...	4028 (3548) ...	Flinders	...	... ...	12	...	...	...	43·00	135 05	3·14	...	...	43·00	135·05	3·14					
Do	...	3903	Imperial... ...	...	... ...	V.N.R.	...	...	...	...	...	...	...	...	1,853·00	283·65	·15					
Do	...	4070	Pom Poms Bungiwee ...	...	... ...	12	...	...	...	21·00	35·40	1·69	...	...	21·00	35·40	1·69					
Do	...	3906	Yorkshire Lass... ...	...	... ...	8	...	...	...	194·00	54·20	·28	...	...	338·00	214·91	·64	3	10	0		
Do	...	... ...	Voided leases	...	... ...	...	...	...	...	...	...	...	...	384·93	2,449·70	944·20	...					
Do	...	... ...	Sundry claims	...	... ...	...	...	...	...	...	...	...	1·40	3·30	511·85	292·91	...					
			From District generally—																			
Sundry parcels treated at			Bayley's United Works			...	...	...	...	...	...	...	...	...	27·00	3·00	...					
Do		do	Bendigo and Coolgardie Proprietary Battery ...			...	...	...	...	...	...	...	...	...	61·00	56·07	...					
Do		do	Big Blow Battery			...	...	...	...	...	...	...	...	...	364·00	281·75	...					
Do		do	Burbanks Main Lode Works			...	...	...	...	118·00	96·69	...	...	...	522·00	556·23	...					
Do		do	Coolgardie Ore Reduction and Cyanide Works			...	...	...	...	...	...	...	...	...	..	2,592·66	...					
Do		do	De Beers Battery			...	...	...	...	...	...	...	...	...	37·00	11·91	...					
Do		do	Golden Bar Works			...	...	...	...	231·00	113·27	...	...	...	471·75	264·09	...					
Do		do	Highgate Works			...	...	...	...	10 00	23·00	...	...	...	78·00	44·15	...					
Do		do	Hope Lease Battery			...	...	...	...	65·00	23·00	...	...	...	65·00	23·00	...					
Do		do	Kalgoorlie Gold Recovery Works			...	...	...	...	...	...	...	...	...	...	1,070·10	...					
Do		do	King's Cross Cyanide Works			...	...	...	...	...	...	...	...	...	...	69·40	...					
Do		do	King Solomon's Works			...	...	...	...	350·50	265·95	...	...	...	378·50	272·90	...					
Do		do	Lady Charlotte Works			...	...	...	...	...	...	...	...	...	254·50	81·44	...					
Do		do	Lindsay's Consolidated Works			...	...	...	...	...	...	...	...	...	404·50	218·23	...					
Do		do	Londonderry Works			...	...	...	...	61·50	29·10	...	...	...	162·50	54·21	...					
Do		do	Mt. Burgess Cyanide Works			...	...	...	...	...	...	...	...	...	...	4,308·82	...					
Do		do	Red Hill Battery			...	...	...	...	...	...	...	...	...	29·00	42·13	...					
Do		do	State Battery, Widgiemooltha			...	...	...	...	10·00	4·85	...	4·80	...	158·00	55·85	...					
Alluvial	...	... ...	... ...			...	...	...	...	...	...	...	521·21	...	...	...	...					
Notices of Purchase			... ...			...	676·20	225·43	...	...	...	...	3,874·10	618·05	...	...	...					
					Total	... ...	727·85	1,268·96	91,536·00	66,943·31	·73	5,611·58	4,080·63	648,991·10	576,276·65	·89	3	12	1¼			

TABLE IV.—*Production of Gold from all sources, etc.*—continued.

Coolgardie Goldfield—*continued.*

KUNANALLING DISTRICT.

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£ s. d.
Balgarrie ...	687s	Abundance	... ...	13	...	...	36·00	10·00	·28	...	...	36·00	10·00	·28	
Do ...	622s	... ...	Balgarrie G.M. Co., N.L. ...	6	...	2·00	140·00	72·49	·52	...	2·00	340·00	100·16	·29	
Do ...	695s	Bullion Vault	... ...	6	13·35	...	13·00	5·70	·44	13·35	...	13·00	5·70	·44	
Do ...	654s (605s) ...	Spirit of the West ...	... ...	V.N.R.	...	...	6·10	153·77	...	...	17·00	12·10	462·52	...	
Do ...	622s	(United Australia) ...	... ...	...	...	...	...	...	...	...	...	30·00	12·31	·41	
Do ...	565s	Zuleika	... ...	12	...	...	30·00	20·10	·67	...	...	375·50	1,614·47	4·30	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	61·85	2,563·15	2,081·38	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	42·00	46·63	...	...	20·38	752 25	327 37	...	
				a. r. p.											
Carbine ...	33s	Carbine	... ...	22 1 10	...	...	1,215·00	618·99	·51	...	11·90	1,523·00	848·26	·56	3 14 3
Do ...	667s	Grafter	... ...	17	...	...	27·00	16·45	·61	...	...	72·00	66·45	·92	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	1,256·00	1,908·87	...	
Carnage ...	2s (349s) ...	... ...	(Glenrock Consolidated, Ltd.)	...	...	...	...	...	...	...	...	1,079·50	566·80	·52	
Do ...	2s	(Perry's Reef) ...	... ...	...	...	...	...	...	...	...	...	171·50	249·00	1·45	
Do ...	2s	Perry's Reef	... ...	20	...	...	91·00	82·83	·91	...	...	91·00	82·83	·91	
Do ...	2s (453s, 548s)	(Perry's Reef leases) ...	... ...	...	...	...	...	...	...	...	...	220·00	325·86	1·48	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	195·00	756·43	732·00	1,201·56	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	61·00	33·55	...	...	...	61·00	33·55	...	
Cashman's ...	607s	Denver City	... ...	12	...	13·00	...	...	...	...	345·50	...	...	...	
Do ...	3s	... ...	Fingall Proprietary, Ltd. ...	24	...	...	140·00	367·31	2·62	...	...	174·00	501·81	2·88	
Do ...	3s	(Lady Eveline)	... ...	...	...	...	...	...	...	...	...	259·00	276·45	1·06	
Do ...	3s	... ...	(Lady Evelyn G.Ms., Ltd.) ...	...	...	...	...	...	...	...	...	2,511·40	2,248·32	·89	
Do ...	456s	Virgin	... ...	12	...	279·00	14·00	85·72	6·12	51·82	345·75	35·00	224·18	6·46	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	219·03	3,414·00	3,932·66	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	6·75	116·00	74·44	...	
Dunnsville ...	686s	Great Kangaroo ...	... ...	Wdn.	...	...	9·00	8·25	·92	...	...	9·00	8·25	·92	
Do ...	530s	Jourdie	... ...	12	...	...	33·00	14·23	·43	...	...	115·00	69·52	·60	
Do ...	582s	Jourdie Hills Boulder ...	... ...	12	...	...	259·00	162·65	·63	...	...	307·00	185·54	·60	
Do ...	369s, 661s ...	... ...	Jourdie Hills G.M. Co., Ltd.	24	...	...	4,252·00	3,391·44	·80	...	...	4,538·00	3,634·59	·80	
Do ...	514s	Pride of Jaudie North	... ...	12	...	...	227·00	173·46	·76	...	...	335·50	274·31	·82	
Do ...	369s	(Pride of the Jourdies)	... ...	...	...	...	...	...	...	...	...	410·74	530·41	1·29	
Do ...	17s (82s, 83s) ...	... ...	(New Standard Exploration Co., Ltd.)	...	...	...	...	...	...	...	...	13,681·00	6,596·94	·48	
Do ...	17s	Wealth of Nations ...	... ...	24	...	...	434·00	257·96	·59	...	...	434·00	257·96	·59	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	197·38	604·50	491·54	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	43·33	46·00	...	...	...	72·33	68·80	...	
Kandana (Barker's Find)	688s	Mary Beatrice	... ...	12	...	...	280·00	50·15	·18	...	...	280·00	50·15	·18	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	185·00	30·00	...	
Kintore ...	64s (65s) ...	... ...	(City of London G.Ms., Ltd.)	...	...	...	...	...	...	...	36·00	2,528·60	1,868·32	·74	

Do	...	77s, 93s, 99s, 100s, 105s, 138s	... ...	Great Cement Proprietary, Ltd.	a. r. p. 104 2 0	...	...	15·00	1,743·60	...	...	...	15,166·00	5,416·87	·36	3	8	8
Do	...	93s, 99s (135s, 137s), 138s (139s)	... ...	(Great Dyke and Orizaba Cement Claims, Ltd.)	...	...	...	...	...	...	...	...	3,537·00	1,156·48	·32			
Do	...	61/2s	... ...	(Hands Across the Sea G.M. Co., Ltd.)	...	...	...	...	...	...	...	...	2,963·25	2,288·64	·77			
Do	...	61/2s	Hands Across the Sea leases	... ...	a. r. p. 21 2 36	...	...	13·00	12·31	·95	...	...	689·00	695·73	1·01	3	17	0
Do	...	482s	Kintore North	... ...	3	...	...	...	...	...	...	...	56·00	100·85	1·80			
Do	...	64s	London	... ...	a. r. p. 19 2 33	...	...	126·00	267·85	2·13	...	...	126·00	267·85	2·13	3	16	3
Do	...	77s	(Ormuz)	... ...	...	...	...	...	...	...	...	...	4,519·75	4,931·08	1·09			
Do	...	658s (612s) ...	Rajah Brooke	... ...	V.N.R.	...	...	...	...	...	...	...	25·00	26·65	1·07			
Do	...	671s	Stockdale's Consols ...	... ...	6	...	·60	...	...	...	...	·60	...	...	...			
Do	...	409s	Sugarloaf	Great Cement Proprietary, Ltd.	a. r. p. 13 2 12	...	...	169·00	112·85	·67	...	...	341·00	325·80	·95			
Do	...	603s	Sydney Mint	... ...	12	...	...	7·00	10·50	1·50	...	24·65	222·75	282·27	1·27			
Do	...	(114s, 132s, 161s) 409s	... ...	(Sugarloaf, 25-Mile, Cement Leases, Ltd.)	...	...	...	...	...	...	...	...	452·50	1,273·60	2·81			
Do	...	100s, 105s ...	... ...	(W.A. Proprietary Cement Leases, Ltd.	...	...	...	...	...	...	...	32·74	4,575·75	7,938·00	1·73			
Do	...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	97·58	4,487·46	5,603·01	...			
Do	...	... ...	Sundry claims ...	... ...	...	...	...	17·00	92·50	...	...	...	90·50	259·84	...			
Siberia	...	633s	Ardfinaig	... ...	10	...	...	...	...	...	...	...	100·00	39·90	·39			
Do	...	479s	Fair Adelaide	... ...	12	...	...	...	...	...	...	...	126·00	115·00	·91			
Do	...	674s	Golden	... ...	12	...	37·37	...	...	...	...	37·37	...	...	...			
Do	...	643s	Horseshoe	... ...	18	...	53·63	...	...	...	...	206·13	...	...	...			
Do	...	519s	Invincible	... ...	12	...	...	100·00	151·00	1·51	...	203·74	132·00	304·30	2·30	4	1	0
Do	...	106s	Mexico	... ...	13	...	...	...	...	...	...	...	3,076·50	5,316·89	1·73			
Do	...	418s	Mexico West	... ...	12	...	...	...	...	...	...	...	77·00	25·10	·33			
Do	...	299s	Pole	... ...	V.N.R.	...	...	...	...	...	...	...	1,100·00	1,594·72	1·45			
Do	...	655s	Silksworth	... ...	12	...	...	...	...	...	...	...	42·00	18·00	·43			
Do	...	124s	Waverley	... ...	9	...	15·00	87·00	241·00	2·77	...	370·00	1,018·80	1,402·48	1·38	4	0	3
Do	...	... ...	Voided leases ...	.. ..	...	...	...	...	...	...	1·17	146·60	655·65	1,269·62	...			
Do	...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	33·90	...	74·00	59·96	...			
25-Mile	...	522s, 646/9s ...	... ...	Amalgamated G.Ms., Ltd.	45	...	...	1,150·65	941·65	·82	...	...	1,544·65	1,533·73	·99	3	11	6
Do	...	696s	Blue Bell	... ...	5	...	...	137·00	155·90	1·34	...	...	137·00	155·90	1·34			
Do	...	(511/3s) 522s ...	... ...	(Catherwood G.Ms. (1898), Ltd.)	...	...	...	...	...	...	...	...	38·00	13·00	·34			
Do	...	74s	(Consolation)	... ...	...	...	...	...	...	...	...	...	69·00	126·10	1·82			
Do	...	660s	Ellinor	... ...	V.N.R.	...	...	...	...	...	...	...	11·00	13·50	1·23			
Do	...	111s	(Emu)	... ...	...	...	...	...	..	...	...	...	143·00	179·92	1·25			
Do	...	568s	Fremantle Extended ...	... ...	18	...	...	80·00	11·27	·14	...	...	80·00	11·27	·14			
Do	...	568s (652s) ...	... ...	(Golden Fremantle Co., N.L.)	...	...	...	128·00	50·55	·39	...	...	442·00	174·55	·40			
Do	...	691s	Mary Anne	... ...	12	...	...	33·00	18·10	·55	...	...	33·00	18·10	·55			
Do	...	243s	Pearce's Find	... ...	V.N.R.	...	...	...	...	...	...	...	33·00	71·87	2·17			
Do	...	524s	... ...	Pearce's Kunanalling Co., N.L.	V.N.R.	...	...	...	...	...	...	...	56·00	·35	...			
Do	...	70s, 74s, 79s, 111s (278s), 436s	... ...	Premier G.M. Co., N.L. ...	a. r. p. 80 3 33	...	...	3,371·50	3,984·80	1·18	...	...	59,805·50	49,856·50	·83	3	5	2
Do	...	74s	... ...	(Premier South G.M. Co., N.L.)	...	...	...	...	...	...	...	...	925·00	416·93	·45			
Do	...	539s	... ...	Premier South G.M. Co., N.L.	V.N.R.	...	...	...	...	...	...	...	357·00	382·85	1·07			
Do	...	586s, 602s ...	Shamrock leases ...	... ...	18	...	74·05	196·00	382·70	1·95	...	133·05	898·00	1,128·55	1·27	3	16	4
				Carried forward ...	...	13·35	474·65	12,982·58	13,794·26	...	295·24	3,272·43	147,564·13	126,017·04	...			

TABLE IV.—*Production of Gold from all sources, etc.*—continued.

Coolgardie Goldfield—*continued.*

KUNANALLING DISTRICT—*continued.*

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
			Brought forward ...	...	ozs. 13·35	ozs. 474·65	tons. 12,982·58	ozs. 13,794·26	ozs. ...	ozs. 295·24	ozs. 3,272·43	tons. 147,564·13	ozs. 126,017·04	ozs. ...	£ s. d.
25-Mile ...	645s, (609s) ...	Star of Fremantle ...	... ...	5	...	...	722·00	667·66	·92	...	...	1,257·00	1,150·21	·92	3 18 0
Do ...	676s	Troedyrhiw	... ...	Ftd.	...	...	...	...	...	...	...	19·00	229·00	...	
Do ...	616s	Waratah	... ...	V.N.R.	...	...	...	...	...	...	...	96·00	128·40	1·34	
Do ...	669s	White Funnel Main Reef	... ...	V.N.R.	...	...	...	...	...	...	...	29·00	18·56	·64	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	16·03	7,845·20	6,162·17	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	..	...	94·30	221·35	215·66	...	
		From District generally—													
	Sundry parcels treated at	Glenrock Consolidated Battery			...	...	...	...	...	...	...	21·50	21·80	...	
	Do do	Great Cement Proprietary Works			...	...	...	...	...	...	...	44·00	25·00	...	
	Do do	Hands Across the Sea Battery			...	...	48·00	97·12	...	...	...	153·50	184·85	...	
	Do do	Jourdie Hills Battery			...	...	118·00	38·15	...	...	...	118·00	38·15	...	
	Do do	Pole Works			...	...	...	...	...	...	...	59·00	38·15	...	
	Do do	Premier Works			...	...	223·00	203·70	...	...	...	282·75	253·26	...	
	Do do	Stanley Battery			18·13	...	196·00	56·13	...	18·13	...	294·00	109·28	...	
			Total		31·48	474·65	14,289·58	14,857·02	1·04	313·37	3,382·76	158,004·43	134 591·53	·85	3 9 3¾

Yilgarn Goldfield.

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£ s. d
Blackbourne ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	84·00	52·52	...	
Golden Valley ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	130·00	271·85	...	
Greenmount ...	603	Excelsior	... ...	12	...	...	18·00	6·00	·33	...	...	18·00	6·00	·33	
Do ...	566	Little Wonder	... ...	6	...	...	71·00	24·40	·34	...	...	71·00	24·40	·34	
Do ...	599	Port Royal	... ...	12	...	...	60·00	13·46	·22	...	...	60·00	13·46	·22	
Do ...	590	Rand	... ...	12	...	...	119·00	28·90	·24	...	...	119·00	28·90	·24	
Do ...	565	Royal George	... ...	13	...	...	367·00	189·00	·51	...	...	367·00	189·00	·51	3 1 0
Do ...	564	St. George	... ...	5	...	...	97·00	38·95	·40	...	...	97·00	38·95	·40	

Do ...	550	Sunbeam	... ...	8	...	...	240·00	84·74	·35	...	...	240·00	84·74	·35	3	4	2
Do ...	536	Transvaal	... ...	24	...	...	459·00	152·20	·33	...	...	459·00	152·20	·33	2	18	7
Do ...	503	United Australia ...	... ...	18	...	...	60·00	45·00	·75	...	...	410·00	142·20	·35	3	15	6
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	1,077·00	333·18	...			
Hope's Hill ...	19, 52, 288 (360) 480	... ...	Hope's Hill G.M. Co., Ltd.	63	...	...	28,212·00	7,214·60	·26	...	...	88,776·00	28,561·62	·32	3	15	6
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	60·00	8·15	...			
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	...	23·00	5·00	...			
Jaccoletti ...	490, 517 ...	Turnbull's leases ...	... ...	10	...	...	1,211·00	1,024·96	·85	...	...	2,143·00	1,888·76	·88	3	5	0
Kenney's ...	570	Great Leviathan ...	... ...	24	...	...	218·00	640·75	2·94	...	...	218·00	640·75	2·94			
Mt. Jackson ...	246, 450/1, 459, 460, 494	... ...	Associated Mt. Jackson G.Ms. (W.A.), Ltd.	a. r. p. 114 3 0	...	...	...	...	...	...	...	801·50	277·51	·35			
Do ...	212, 217, 233, 397, 462	... ...	Mt. Jackson G.Ms., Ltd. ...	55 2 30	...	...	...	*cy.* 191·00	...	...	...	...	191·00	...			
Do ...	212, 217, 233, 397, 462	... ...	(Mt. Jackson G.Ms., Ltd., 1897)	...	...	...	...	*cy.* 360·11	...	...	...	9,537·00	7,806·85	·82			
Mt. Rankin ...	525	Mt. Rankin	... ...	a. r. p. 10 1 16	·50	...	99·00	25·90	·26	4·50	6·00	99·00	25·90	·26	3	3	0
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	56·00	26·65	...			
Parker's Range ...	508	Australia	... ...	18	...	...	206·00	216·50	1·05	...	...	496·00	384·65	·78			
Do ...	520 (515) ...	Blue Hill	... ...	18	...	...	227·00	592·05	2·61	...	...	230·00	607·05	2·20	3	13	9
Do ...	524	Blue Hill No. 1 North...	... ...	V.N.R.	...	...	20·00	9·30	·47	...	...	20·00	9·30	·47			
Do ...	594	Golden Cube	... ...	24	...	...	80·00	152·00	1·90	...	...	80·00	152·00	1·90			
Do ...	528 (491) ...	Gordon Highlander ...	... ...	Surr.	...	...	72·00	60·00	·83	...	...	116·00	110·00	·95			
Do ...	547	Havelock	... ...	6	...	...	30·00	15·00	·50	...	...	30·00	15·00	·50			
Do ...	574	Lucky Hit	... ...	Wdn.	...	...	101·00	115·85	1·15	...	...	101·00	115·85	1·15			
Do ...	518	... ...	McIntosh G.M. Co., Ltd. ...	V.N.R.	...	...	...	...	...	...	...	29·00	17·17	·59			
Do ...	532	Triumph...	... ...	V.N.R.	...	...	248·00	94·55	·38	...	...	248·00	94·55	·38			
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	23·18	1,266·00	1,436·98	...			
Southern Cross ...	579	Auraria	... ...	6	...	...	15·00	5·45	·36	...	...	15·00	5·45	·36			
Do ...	13, 29, 279, 505/6 (509)	... ...	British and Foreign Development Syndicate, Ltd.	122	...	...	1,759·50	5,048·70	2·87	...	...	38,607·50	35,916·86	93	2	19	7½
Do ...	279	(Central)	... ...	...	...	...	...	...	...	...	...	44,958·00	27,148·81	·60			
Do ...	521 (467) ...	Comet	... ...	Ftd.	...	...	...	...	...	...	...	3,161·00	657·15	·21			
Do ...	456	... ...	Day Dawn G.M. Co., N.L. ...	Ftd.	...	...	...	...	...	...	...	72·50	9·99	·13			
Do ...	556	Eureka Boulder ...	... ...	6	...	...	30·00	8·84	·29	...	...	30·00	8·84	·29			
Do ...	13	... ...	(Fraser's G.M. Co., N.L.) ...	...	...	...	...	...	...	...	...	151,771·00	78,659·19	·52			
Do ...	29	... ...	(Fraser's South G.M. Co., N.L.)	...	...	...	...	...	...	...	...	48,233·00	26,157·67	·54			
Do ...	256 (496), 554	... ...	Fraser South Extended G.M. Co , Ltd.	44	...	...	15,626·00	6,131·97	·39	...	...	33,166·18	17,218·57	·52	3	11	0
Do ...	576	Golden Pig North ...	... ...	9	...	...	40·00	19·35	·48	...	...	40·00	19·35	·48			
Do ...	552	Haddon	... ...	12	...	...	55·00	15·30	·28	...	...	55·00	15·30	·28			
Do ...	526	Irene	... ...	Wdn.	...	...	...	...	...	...	...	196·00	50·02	·25			
Do ...	613	Lord Cardigan	... ...	12	...	...	70·00	20·41	·29	...	...	70 00	20·41	·29			
Do ...	561	Northern Star	... ...	6	...	...	23·00	14·00	·61	...	...	23·00	14·00	·61			
Do ...	575	Pendrea	... ...	12	...	...	25·00	6·40	·26	...	...	25·00	6·40	·26			
Do ...	529	Reward	... ...	12	...	211·00	712·00	629·90	·88	...	211·00	746·00	715·40	·96			
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	15,762·20	8,435·55	...			
Do ...	... ...	Sundry claims ...	... ...	...	...	...	23·00	13·45	...	4·30	738·18	468·75	137·35	...			
		From Goldfield generally—															
		Sundry parcels treated at André's Cyanide Works		...	...	...	...	*cy.* 58·05	...	...	...	...	58·05	...			
		Do do	Brimage's Battery	...	...	...	...	*cy.* 130·00	...	...	...	...	130·00	...			
		Do do	Clarke's Battery, Parker's Range	...	...	...	...	...	...	...	...	...	541·00	...			
		Do do	Fraser's Battery	...	...	...	30·00	6·70	...	...	...	30·00	6·70	...			
		Do do	Hatt's Central Cyanide Works	...	...	...	...	...	...	...	...	...	1,258·00	...			
		Do do	Small Horse Battery, Parker's Range ...	...	...	...	...	...	...	...	...	6·00	7·00	...			
			Total ...	...	·50	211·00	50,623·50	23,403·74	·46	8·80	978·36	444,897·63	240,909·20	·54	3	8	10¾

TABLE IV.—*Production of Gold from all sources, etc.*—continued.

Dundas Goldfield.

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£ s. d.
Buldania ...	779	Buldania Bell	... ...	V.N.R.	...	...	...	...	...	...	...	40·00	58·45	1·46	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	400·05	480·25	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	...	...	...	88·00	90·93	...	
Dundas ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	4,425·73	2,599·22	...	
Do ...	... ...	Sundry claims ...	... ...	...	...	114·10	...	...	...	...	409·17	22·00	14·28	...	
Killaloe ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	...	20·65	7·75	...	
Norseman ...	882	Ajax	... ...	6	...	...	22·50	28·58	1·27	...	...	22·50	28·58	1·27	
Do ...	583	Albemarle	... ...	Surr. a. r. p. 24 1 39	...	...	...	...	...	...	...	430·50	866·00	2·01	
Do ...	39, 97	... ...	(All Nations G.Ms., Ltd.) ...	24	...	...	...	...	...	...	...	200·00	67·60	·33	
Do ...	571	Break-o'-Day	... ...	a. r. p. 68 1 8	...	...	51·00	343·70	6·74	...	...	7,805·00	12,317·95	1·58	3 18 11
Do ...	42, 43, 53, 579, 690 (700)	... ...	Cumberland G.M. Co., N.L.		...	...	...	*cy.* 153·89	...	...	...	3,086·10	4,313·81	1·40	
Do ...	848	Desirable	... ...	5	...	...	87·00	48·49	·56	...	...	137·00	72·24	·53	
Do ...	802	Federation	... ...	12	...	...	34·50	69·78	2·02	...	...	242·00	458·80	1·90	
Do ...	877	Four Jolly Smiths ...	... ...	3	...	...	23·50	5·52	·23	...	...	23·50	5·52	·23	
Do ...	863 (837) ...	Hit or Miss	... ...	3	...	...	31·00	10·51	·34	...	...	52·00	20·63	·40	
Do ...	53	(John Bull)	... ...	...	...	...	...	...	...	...	...	314·00	315·15	1·00	
Do ...	871	King William	... ...	5	...	...	30·00	49·10	1·64	...	...	30·00	49·10	1·64	3 13 6½
Do ...	52, 71	... ...	Kirkpatrick's Consolidated G.M. Co., N.L.	V.N.R.	...	...	...	...	...	...	...	1,138·50	1,165·33	1·02	
Do ...	614	... ...	Kirkpatrick Mt. Benson G.M. Co., N.L.	V.N.R.	...	...	...	...		...	...	76·00	29·32	·38	
Do ...	857	La Mascotte	... ...	V.N.R.	...	...	...	...	...	...	212·85	...	...	...	
Do ...	757, 800 ...	Lady Jean leases ...	... ...	18	...	...	260·00	409·15	1·57	...	6·00	1,351·00	2,209·76	1·64	3 13 9
Do ...	49, 99, 635/6 ...	Lady Mary leases ...	... ...	54	...	...	805·00	693·61	·86	...	...	17,419·50	20,270·63	1·16	3 13
Do ...	762 ...	Lady Mary Extended ...	... ...	V.N.R.	...	...	25·00	9·00	·36	...	...	257·00	114·24	·44	
Do ...	868, (770) ...	Lady Miller	... ...	Ref.	...	...	...	...	...	...	22·19	...	...	...	
Do ...	876	Lady Miller Extended	... ...	5	...	...	84·00	54·70	·65	...	...	84·00	54·70	·65	
Do ...	858 (839) ...	Lord Hopetoun... ...	... ...	5	...	...	160·00	82·44	·52	...	...	207·00	123·14	·59	3 10 0
Do ...	856	Lucky Call	... ...	a. r. p. 4 2 23	...	431·05	36·00	64·83	1·80	...	612·00	45·25	282·93	6·25	3 17 0
Do ...	852	Mararoa	... ...	12	...	...	430·00	131·97	·31	...	...	430·00	131·97	·31	3 7 6
Do ...	53	... ...	(Midas G.M. Co., N.L.) ...	...	...	...	...	...	...	...	...	416·00	237·14	·57	
Do ...	42/3, 681 ...	... ...	(Mt. Benson G.M. Co., N.L.)	...	...	...	...	...	...	...	...	4,797·40	4,772·64	·99	
Do ...	873	Nellie May	... ...	10	...	16·00	76·00	1,392·05	...	...	16·00	76·00	1,392·05	...	3 17 10½
Do ..	16 (482, 685) ...	... ...	(No. 1 North Norseman G.M. Co., N.L.)	...	...	...	...	...	...	...	...	2,574·00	1,524·00	·59	
Do ..	18/9,20/2,24/6, 48, 116, 138, 611	... ...	Norseman G.Ms., Ltd. ...	a. r. p. 101 0 15	...	...	1,355·50	2137·34	1·58	...	...	75,831·50	48,714·19	·64	2 17 8
Do ...	16	Norseman No. 1 North	... ...	12	...	7·55	179·00	202·85	1·13	...	7·55	926·50	745·41	·80	3 5 0
Do ...	821	Northern Star	... ...	12	...	86·80	177·50	324·75	1·83	...	277·45	439·00	591·60	1·35	3 5 0
Do ...	106, 187, 587 ...	... ...	Princess Royal G.M. Co., N.L.	a. r. p. 51 3 12	...	...	20,357·00	28,901·45	1·42	...	...	89,768·50	112,791·53	1·26	3 11 10¼

Do	634, 653	...	...	Princess Royal North Co., N.L.	G.M.	24	...	...	...	...	...	...	...	20·00	32·80	1·64	
Do	187	(Princess Royal South)	...			...	...	...	...	...	...	...	...	358·00	640·00	1·78	
Do	681	Recoupe	...			5	...	...	150·00	323·95	2·16	...	...	150·00	323·95	2·16	3 16 8½
Do	875	Rescue	...			Wdn.	...	...	13·00	5·28	·41	...	...	13·00	5·28	·41	
Do	71	Rising Sun	...			V.N.R.	...	31·00	13·00	12·34	·95	...	44·25	41·50	136·54	3·29	
Do	849, (695)	St. Patrick	...			6	...	26·20	129·50	236·80	1·83	...	150·81	353·50	704·72	1·99	3 14 6
Do	881	Two Williams	...			5	...	...	33·00	16·35	·50	...	...	33·00	16·35	·50	
Do	812	Union Jack	...			V.N.R.	...	...	...	...	...	...	...	493·00	547·60	1·11	
Do	22, 24 (239)	...	...	(United Scotchman Co., N.L.)	G.M.	...	...	...	...	...	...	...	...	3,322·00	3,134·70	·94	
Do	838	Vale	...			5	...	...	123·00	97 09	·79	...	...	253·00	284·59	1·12	3 10 0
Do	831	Valkyrie	...			5	...	33·42	21·00	148·55	7·07	...	176·06	158·00	403·68	2·55	3 13 6
Do	887	Venture	...			6	...	...	70·00	66·50	·95	...	...	70·00	66·50	·95	3 9 6
Do	...	Voided leases	...			...	...	...	...	...	...	5·25	232·65	19,598·10	16,843·32	...	
Do	...	Sundry claims	...			...	243·67	47·82	1,176·00	714·79	...	1,187·39	91·25	3,495·10	2,170·72	...	
Peninsula	(96) 129	...	...	Central Wealth Consolidated Gold Fields, Ltd.		Ftd.	...	...	...	*cy.* 769·60	...	...	23·20	7,426·00	5,421·86	·73	4 1 9
Do	...	Voided leases	...			...	...	...	...	...	...	...	...	338·00	188·23	...	
		From Goldfield generally—															
		Sundry parcels treated at Breakell's Cyanide Works				...	...	...	...	...	...	...	67·75	...	379·00	...	
		Do do Break-o'-Day Battery				...	...	...	...	*sl.* 39·15	...	...	...	...	39·15	...	
		Do do Mararoa Crushing and Cyanide Works				...	...	...	...	*cy.* 526·95	...	...	...	152·50	2,369·58	...	
		Do do Norseman G.Ms. Works				...	...	...	...	...	...	...	...	35·00	10·63	...	
		Do do State Battery, Norseman				...	...	...	...	*cy.* 804·86	...	...	...	189·00	2,510·14	...	
		Alluvial				...	260·07	...	..	...	...	679·12	...	...	...	...	
				Total		...	503·74	793·94	25,953·00	38,875·92	1·50	1,871·76	2,349·18	249,674·88	253,146·18	1·01	3 11 6¼

Phillips River Goldfield.

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.		£ d.
Harbour View	57	Gem		24	...	...	8·00	26·50	3·31	...	...	8·00	26·50	3·31	
Do	58	Gladstone Proprietary		12	...	32·50	...	...	...	...	32·50	...	...	...	
Do	M.L. 52	Harbour View		50	...	...	296·00	177·00	·60	...	403·42	1,788·75	1,171·79	·66	4 0 0
Do	M.L. 132	Omaha		50	...	...	...	...	...	...	...	241·00	87·00	·36	
Do	M.L. 60	Red, White and Blue		50	...	...	...	...	...	...	...	185·50	46·26	·25	
Do	...	Voided leases		...	...	...		...	...	...	...	170·00	109·15	...	
Ironcaps	37	Agnes Reward		24	...	...	...	...	...	...	5·00	...	...	...	
Do	...	Sundry claims		...	...	...	4·75	5·10	...	...	...	4·75	5·10	...	
Mt. Desmond	M.L. 109	Mt. Desmond		52	...	...	...	...	...	...	1·50	...	...	...	
Do	M.L. 108	Mt. Stennett		39	...	...	...	...	...	...	4·00	...	...	...	
Ravensthorpe	48	Coronation		V.N.R.	...	...	...	...	...	...	...	31·00	21·00	·68	
Do	M.L. 13	Cousin's Glory		V.N.R.	...	...	...	...	...	...	...	80·00	37·05	·46	
Do	16	Diamond Jubilee		V.N.R.	...	...	...	...	...	...	...	60·00	30·00	·50	
			Carried forward	...	...	32·50	308·75	208·60	...	...	446·32	2,569·00	1,533·85	...	

TABLE IV.—*Production of Gold from all sources, etc.*—continued.

Phillips River Goldfield—*continued.*

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
			Brought forward ...	...	ozs. ...	ozs. 32·50	tons. 308·75	ozs. 208·60	ozs. ...	ozs. ...	ozs. 446·32	tons. 2,569·00	ozs. 1,533·85	ozs. ...	£ s. d.
Ravensthorpe ...	M.L. 26 ...	Ellendale	... ...	20	...	...	20·00	23·40	1·17	...	...	50·00	36·60	·73	3 15 0
Do ...	45	Floater Proprietary ...	... ...	V.N.R.	...	...	...	...	...	...	...	30·00	17·00	·56	
Do ...	43 (M.L. 21) ...	... ...	Gilbert Gold Mine, Ltd. ...	24	...	...	5,740·00	5,353·99	·93	...	...	9,298·00	9,783·71	1·05	
Do ...	63	Golden Link	... ...	10	...	...	22·00	16·65	·76	...	...	22·00	16·65	·76	
Do ...	17	Grafter	... ...	24	...	...	125·00	209·55	1·68	...	...	191·00	315·05	1·65	
Do ...	26	James Henry	... ...	24	...	...	99·00	155·42	1·57	...	...	331·00	472·75	1·43	3 17 6
Do ...	M.L. 74 ...	Lady Jessie	... ...	V.N.R.	...	...	37·00	36·90	1·00	...	...	77·00	68·90	·89	3 10 0
Do ...	21	Lucy	... ...	24	...	...	151·00	105·00	·70	...	...	219·00	173·00	·79	3 12 6
Do ...	4	Maori Chief	... ...	Ftd.	...	...	7·00	13·60	1·94	...	...	22·00	17·10	·78	
Do ...	M.L. 15 ...	Mt. Cattlin	... ...	50	...	·54	...	...	...	...	·54	...	...	...	
Do ...	1	... ...	Phillips River G.M. Co., N.L.	24	...	...	1,490·00	1,180·40	·79	...	...	4,380·00	3,287·46	·75	3 18 3
Do ...	50	Plantagenet	... ...	12	...	5·17	160·00	109·75	·69	...	5·17	160·00	109·75	·69	3 19 9
Do ...	52	Princess Royal ...	... ...	20	...	...	...	...	...	...	...	59·00	34·00	·58	
Do ...	51	Two Bobs	... ...	Surr.	...	...	...	...	...	...	...	48·00	29·45	·61	
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	...	117·19	275·00	160·08	...	
Do ...	... ...	Sundry claims ...	... ...	...	147·00	...	20·00	10·90	...	147·00	...	31·00	39·90	...	
			From Goldfield generally—												
			Alluvial		80·00	...	...	...	...	124·00	...	...	...	...	
			Total		**227·00**	**38·21**	**8,179·75**	**7,424·16**	**·91**	**271·00**	**569·32**	**17,762·00**	**16,095·25**	**·91**	**3 17 9¼**

Donnybrook Goldfield.

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
				a. r. p.	ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.	ozs.	£ s. d.
Donnybrook ...	6	Ark of Gold	Donnybrook Goldfields, Ltd.	10 2 26	...	...	...	...	...	...	...	7·50	21·50	2·87	
Do ...	P.P.L. 9 ...	Blackwood Venture ...	Donnybrook Goldfields, Ltd.	12	...	...	42·00	6·50	·15	...	...	207·50	24·00	·12	
Do ...	P.P.L. 10 ...	Bullington	Donnybrook Goldfields, Ltd.	a. r. p. 20 1 0	...	...	...	...	...	...	...	187·00	58·55	·31	
Do ...	P.P.L. 2 ...	Donnybrook	Donnybrook Goldfields, Ltd.	12	...	...	...	...	...	32·00	...	51·25	236·73	4·62	
Do ...	P.P.L. 1 ...	Donnybrook No. 1 South	Donnybrook Goldfields, Ltd.	6	...	...	...	...	...	...	...	26·50	39·50	1·49	
Do ...	P.P.L. 11 ...	Hunter's Venture ...	Donnybrook Goldfields, Ltd.	a. r. p. 12 2 0	...	...	328·00	48·55	·15	...	...	793·00	151·20	·19	

Do ...	2	Perseverance	Donnybrook Goldfields, Ltd.	12	...	...	...	...	...	...	...	4·00	·13	·03
				a. r. p.										
Do ...	5	Queen of the South ...	Donnybrook Goldfields, Ltd.	11 3 16	...	...	30·00	3·00	·10	...	...	322·05	572·70	1·78
Do ...	P.P.L. 14 ...	Star of the West ...	... ...	18	...	...	...	...	...	...	...	5·00	1·00	·20
Do ...	... ...	Voided leases ...	... ...	...	...	...	...	...	...	·10	...	9·50	1·97	...
Do ...	... ...	Sundry claims ...	... ...	...	...	...	...	...	..	...	....	40·00	2·50	...
			Total	...	...	...	400·00	58·05	·15	32·10	...	1,653·30	1,109·78	·67

Goldfields Generally.

Mining Centre.	Number of Lease.	Name of Lease.	Registered Name of Company.	Area in Acres.	Total for 1903.					Total Gold Production.					Estimated Value of Gold per oz., 1903.
					Alluvial.	Dollied and Specimens	Ore treated.	Gold therefrom.	Average per ton treated.	Alluvial.	Dollied and Specimens.	Ore treated.	Gold therefrom.	Average per ton treated.	
					ozs.	ozs.	tons.	ozs.	ozs.	ozs.	ozs.	tons.	ozs.		£ s. d.
Sundry parcels treated at Northam Milling and Mining Works					...	...	...	...	...	...	...	...	1,233·90	...	
Notices of Purchase					...	...	...	...	...	142·33	176·01	...	...	...	
			Total		...	...	...	...	...	142·33	176·01	...	1,233·90	...	

Table V.

MILLING and CYANIDING PLANTS erected, in the respective Goldfields and Districts, on the 31st December, 1903.

Lease or Area on which erected.	Name of Company or Works.	Milling.												Cyaniding.			
		Batteries.	Other Mills.														
		Number of Heads of Stampers.	Ball.	Griffin.	Huntington.	Prospecting.	Tremain.	Arrastras.	Crushing Rollers.	Dry Crushers.	Puddlers.	Salford.	Flint.	Leaching Vats.	Agitators and Agitating Vats.	Storage Vats.	Filter Presses.
	Kimberley Goldfield.																
M.A. 8 ...	Mt. Bradley Tunnelling Claim	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
M.A. 9 ...	Ruby Queen	15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Total ...	**25**	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Pilbarra Goldfield.																
	Marble Bar District.																
3, etc. ...	British Exploration of Australasia, Ltd. ...	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
161	Bulletin	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
601	Golden Granite	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
M.A. 18 ...	Klondyke Battery	5	...	...	...	...	...	...	...	...	...	...	...	4	...	1	...
M.A. 26 ...	Lady Adelaide Battery	10	...	...	...	...	...	...	...	...	...	...	...	4	...	...	...
M.A. 23 ...	Lallarookh G.M. Co.	10	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
618	Nelson	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
M.A. 19 ...	Salgash Public Crushing Battery	15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
616	Zephir	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
	Total ...	**55**	...	...	...	**2**	**2**	...	...	...	...	...	...	**8**	...	**1**	...
	Nullagine District.																
106L	Barton	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
M.A. 9L ...	British Exploration of Australasia, Ltd. ...	20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
M.A. 4L ...	Lambert's Treatment Works	...	...	...	...	...	...	...	...	...	...	...	...	4	...	3	...
95L, etc. ...	Parnell	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
M.A. 6L ...	Royer's Public Crushing Battery	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Total ...	**50**	...	...	...	...	...	...	...	...	...	...	...	**4**	...	**3**	...
	West Pilbarra Goldfield.																
106, etc. ...	Ninety-nine leases	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
117	Pilgrim's Rest	20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
(97)	Queen Victoria Mill	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
129	Yellow Aster	...	...	...	...	...	...	...	...	...	...	...	...	4	...	...	...
	Total ...	**20**	...	...	...	**1**	**1**	...	...	...	...	...	...	**4**	...	...	...
	Peak Hill Goldfield.																
M.A. 4P ...	Peak Hill Goldfields, Ltd.	40	...	...	...	1	...	...	...	...	...	...	...	8	3	9	9
	Ravelstone State Battery	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Total ...	**50**	...	...	...	**1**	...	...	...	...	...	...	...	**8**	**3**	**9**	**9**
	East Murchison Goldfield.																
24, etc. ...	Bellevue Proprietary, Ltd.	20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
671	Black Range	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
532	Brilliant	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
645	Cinderella	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
M.A. 18 ...	Clifford Battery	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
M.A. 17 ...	Condor Battery	5	...	...	...	...	...	...	...	...	...	...	...	7	...	3	...
M.A. 20 ...	Earlesville Mill	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...
37, etc. ...	East Murchison United, Ltd....	40	1	...	...	...	...	...	...	...	...	...	...	6	3	...	...
557	Enterprise	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Carried forward ...	100	1	...	...	1	1	...	...	...	...	...	...	13	3	3	...

TABLE V.—*Milling and Cyaniding Plants erected, in the respective Goldfields and Districts, etc.*—continued.

Lease or Area on which erected.	Name of Company or Works.	Milling.												Cyaniding.			
		Batteries.	Other Mills.														
		Number of Heads of Stampers.	Ball.	Griffin.	Huntington.	Prospecting.	Tremain.	Arrastras.	Crushing Rollers.	Dry Crushers.	Puddlers.	Salford.	Flint.	Leaching Vats.	Agitators and Agitating Vats.	Storage Vats.	Filter Presses.
	EAST MURCHISON GOLDFIELD—*continued.*																
	Brought forward ...	100	1	...	...	1	1	...	...	...	...	...	...	13	3	3	...
140, etc. ...	Golden Age Consolidated, Ltd.	20	...	...	...	1	...	...	...	...	...	...	...	5	...	3	...
696	Great Western	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
316, etc. ...	Gwalia Consolidated, Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
535	Kingston	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Lake Darlôt State Battery	10	...	...	...	...	...	...	...	...	...	...	...	4	...	...	...
149, etc. ...	Lake Way Goldfields (1899), Ltd.	30	...	...	...	...	...	...	...	...	...	...	...	4	...	6	...
M.A. 11 ...	Lawlers Public Battery	10	...	...	...	...	...	...	...	...	...	...	...	4	...	3	...
15	Leinster	10	...	...	...	...	...	...	...	...	...	...	...	8	...	...	...
137	Monarch of the East G.M. Co., N.L. ...	10	...	...	...	1	...	...	...	...	...	...	...	3	...	3	...
113	Nil Desperandum	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
M.A. 15 ...	Pascoe Battery	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
521, etc. ...	Vivien G.M. Co., Ltd.	10	...	...	...	...	...	..	...	...	...	...	...	...	...	...	...
382	Yellow Aster	10	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...
	Total ...	**250**	**1**	...	...	**3**	**1**	...	...	...	...	...	...	**41**	**3**	**21**	...
	MURCHISON GOLDFIELD.																
	Cue District.																
1182, etc. ...	Anchor Consolidated G.Ms., W.A., Ltd. ...	10	...	...	...	...	...	...	...	...	...	...	...	3	2	...	...
203	Cue No. 1	20	...	...	...	...	...	...	...	...	...	...	...	8	...	3	...
M.A. 5 ...	Cue Public Battery Co., Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1174	Cue Victory	10	...	...	...	...	...	...	...	...	...	...	...	4	...	2	...
634	Fingall Proprietary, Ltd.	...	1	...	...	...	...	...	...	...	...	...	...	3	...	2	...
1020	Gem of Cue Extended	10	...	...	...	...	...	...	...	...	...	...	...	5	...	3	...
1277	Murchison Associated G.Ms., Ltd.	10	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...
	Tuckanarra State Battery	10	...	...	...	...	...	...	...	...	...	...	...	4	...	2	...
595, etc. ...	Victory United G.M. Co., N.L.	10	...	...	...	...	...	...	...	..	...	...	...	4	...	2	...
M.A. 17 ...	Weld Hercules G.Ms., Ltd.	20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Total ...	**110**	**1**	...	...	...	...	...	...	...	...	...	...	**31**	**2**	**14**	...
	Nannine District.																
(231N) ...	After Many Years Battery	20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
238N	Alliance	5	...	...	...	...	...	...	...	...	...	...	...	4	...	2	...
(443N) ...	Canterbury	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
10N, etc. ...	Champion Reef (Nannine) G.M.Co., Ltd. ...	30	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
495N	Donegal Battery	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
357N	Dorothy	5	...	...	...	...	...	...	...	...	...	...	...	5	...	2	...
	Garden Gully Battery...	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
361N	Margueritta...	10	...	...	...	...	...	...	...	...	...	...	...	4	...	...	...
	Meekatharra State Battery	10	...	...	...	...	...	...	...	...	...	...	...	4	...	3	...
379N	Mountain View	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
16N, etc. ...	Mount Hall, Royalist Consolidated, and Nannine leases	10	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
171N	Mount Vranizan	10	...	...	...	...	...	...	...	...	...	...	...	6	...	...	...
249N, etc. ...	Mt. Yagahong Exploration Co., Ltd. ...	20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
32N	Nannine Goldfields, Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
408N	New Alliance	5	...	...	...	...	...	...	...	...	...	...	...	4	...	2	...
172N, etc. ...	Ophir	10	...	...	...	...	...	...	...	...	...	...	...	5	...	2	...
174N, etc. ...	Star of the East, Ltd.	20	...	...	...	...	...	...	...	...	...	...	...	6	...	...	...
415N	Wanganui	10	...	...	...	...	...	...	...	...	...	...	...	4	...	2	...
	Total ...	**199**	...	...	...	**1**	...	...	...	...	...	...	...	**42**	...	**13**	...
	Day Dawn District.																
179D	Cue Gold Mining and Exploration Co., Ltd.	20	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
26D, etc. ...	East Fingall G.Ms., Ltd.	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
15D, etc. ...	Emperor G.Ms., Ltd.	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
35D, etc. ...	Golconda Mines, Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	6	...	2	...
1D, etc. ...	Great Fingall Consolidated, Ltd.	60	...	...	...	...	...	...	...	...	...	...	...	8	4	5	3
5D, etc. ...	Island Eureka G.M. Co., N.L.	10	...	...	...	...	...	...	...	...	...	...	...	5	...	3	...
138D, etc. ...	Murchison Associated G.Ms., Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	4	...	...	...
M.A. 1D ...	New Standard Exploration Co., Ltd. ...	10	...	...	...	...	...	...	...	...	...	...	...	3	...	2	...
227D	Trenton	10	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...
	Total ...	**140**	...	...	...	**1**	...	...	...	...	...	...	...	**29**	**4**	**12**	**3**

TABLE V.—*Milling and Cyaniding Plants erected, in the respective Goldfields and Districts, etc.*—continued.

Lease or Area on which erected.	Name of Company or Works.	Milling.												Cyaniding.			
		Batteries.	Other Mills.														
		Number of Heads of Stampers.	Ball.	Griffin.	Huntington.	Prospecting.	Tremain.	Arrastras.	Crushing Rollers.	Dry Crushers.	Puddlers.	Salford.	Flint.	Leaching Vats.	Agitators and Agitating Vats.	Storage Vats.	Filter Presses.
	MURCHISON GOLDFIELD—*continued.*																
	Mt. Magnet District.																
	Boogardie State Battery	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
327M	Burra Burra leases	10	...	...	...	...	...	...	...	...	...	...	...	3	...	1	...
(313M) ...	Chums Consolidated, Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
465M, etc. ...	Empress leases	10	...	...	...	...	...	...	...	...	...	...	...	4	...	2	...
	Lennonville State Battery	10	...	...	...	...	...	...	...	...	...	...	...	3	...	4	...
39M, etc. ...	(Long Reef G.M. Co., Ltd.)	20	...	...	...	...	...	...	...	...	...	...	...	10	...	...	...
314M, etc ...	Morning Star Quartz Co., N.L.	10	...	...	...	...	...	...	...	...	...	...	...	6	...	3	...
M.A. 2M ...	New Chum Cyanide Works	...	...	...	...	...	...	...	...	...	...	...	...	5	...	1	...
57M	Welcome	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
340M, etc. ...	Windsor Consolidated (W.A.) G.Ms., Ltd.	20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Total ...	**100**	...	...	...	...	**1**	...	...	...	...	...	...	**31**	...	**11**	...
	YALGOO GOLDFIELD.																
129	Emerald Reward Consolidated	5	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
	Fenton's Mill	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
441, etc. ...	Field's Find G.Ms., Ltd.	20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
392	Golden Eagle	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
170, etc. ...	Monarch leases	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
34, etc. ...	Phœnix G.Ms., Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
M.A. 8 ...	Royal Standard leases	5	...	...	2	...	...	...	...	...	...	...	...	4	...	2	...
440	Victoria United	5	...	...	...	...	...	...	...	...	...	...	...	5	...	1	...
192, etc. ...	Woodley's G.Ms., Ltd.	20	...	...	...	...	...	...	...	...	...	...	...	4	...	2	...
	Total ...	**80**	...	...	**3**	**1**	...	...	...	...	...	...	...	**13**	...	**5**	...
	MT. MARGARET GOLDFIELD.																
	Mt. Morgans District.																
8F, etc. ...	Millionaire, Ltd.	5	...	...	...	...	...	...	...	...	...	...	...	5	...	2	...
M.A. 3F ...	Mt. Morgans Public Battery	5	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...
5F, etc. ...	Westralia Mt. Morgans G.Ms. Co., Ltd. ...	80	...	...	...	...	...	...	...	...	...	...	...	36	3	4	3
	Total ...	**90**	...	...	...	...	...	...	...	...	...	...	...	**44**	**3**	**6**	**3**
	Mt. Malcolm District.																
987C	Anglo-Saxon	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
637C, etc. ...	Golden Crown and Midas United G.M. Co., N.L.	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
W.R. 84C ...	(Hill and party)	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
195C, etc. ...	Leonora Gold Blocks	10	...	...	...	...	...	...	...	...	...	...	...	5	...	2	...
	Leonora State Battery	10	...	...	...	...	...	...	...	...	...	...	...	4	...	2	...
781C	Malcolm King	5	...	...	...	...	...	...	...	...	...	...	...	4	...	2	...
638C, etc. ...	Merton's Reward G.M. Co., Ltd.	30	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
11C, etc. ...	Mt. Malcolm Mines, Ltd.	30	...	...	...	...	...	...	...	...	...	...	...	8	3	5	...
65C, etc. ...	Perseverance G.Ms., Ltd.	15	...	...	...	...	...	...	...	...	...	...	...	8	...	...	...
532C, etc. ...	Proprietary Extended	16	...	...	...	...	...	...	...	...	...	...	...	6	...	4	...
978C	Randwick	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
991C	Richmond Gem	10	...	...	...	...	...	...	...	...	...	...	...	3	...	2	...
190C, etc. ...	Sons of Gwalia, Ltd.	50	...	...	1	...	...	...	...	...	...	...	...	16	3	...	1
263C	Trump	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
(956C) ...	Windsor	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
	Total ...	**206**	...	...	**1**	...	**2**	...	...	...	...	...	...	**54**	**6**	**17**	**1**
	Mt. Margaret District.																
1041T ...	Away from Home	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
720T, etc. ...	Baneygo leases	5	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...
M.A. 11T ...	Burtville Ore Reduction Works	5	...	...	...	...	...	...	...	...	...	...	...	5	...	2	...
	Burtville State Battery	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Carried forward ...	21	...	...	...	...	...	...	...	...	...	...	...	8	...	2	...

TABLE V.—*Milling and Cyaniding Plants erected, in the respective Goldfields and Districts, etc.*—continued.

Lease or Area on which erected.	Name of Company or Works.	Milling.											Cyaniding.			
		Batteries.	Other Mills.													
		Number of Heads of Stampers.	Ball.	Griffin.	Huntington.	Prospecting.	Tremain.	Arrastras.	Crushing Rollers.	Dry Crushers.	Puddlers.	Salford.	Flint.	Leaching Vats.	Agitators and Agitating Vats.	Storage Vats.	Filter Presses.
	Mt. Margaret Goldfield—*continued.*															
	Mt. Margaret District—continued.															
	Brought forward ...	21	...	...	...	...	...	...	...	...	...	...	...	8	...	2	...
1322T ...	Caledonian North	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
761T, etc. ...	Childe Harold G.M. Co., N.L.	20	...	...	...	...	...	...	...	...	...	...	...	5	...	...	...
592T	Craggiemore Proprietary, Ltd.	20	...	...	...	1	...	...	...	...	...	...	...	9	...	2	...
(811T) ...	Edinboro' Castle	8	...	...	...	...	...	...	..	...	...	...	...	...	...	...	...
(795T, etc.) ...	Erlistoun Proprietary G.M. Co., N.L. ...	10	...	...	...	...	...	...	...	...	...	...	...	6	...	4	...
785T, etc. ...	Euro G.Ms., Ltd.	40	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
M.A. 13T ...	Golden Orbit	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
871T	Golden Rhine G.Ms. (W.A.), Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	4	...	1	...
1046T ...	Golden Spinifex	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
829T, etc. ...	Ida H. G.M. Co., Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	5	...	2	...
M.A. 7T ...	Lancefield G.M. Co., Ltd.	20	...	...	...	...	...	...	...	...	...	...	...	16	...	6	...
	Laverton State Battery	10	...	...	...	...	...	...	...	...	...	...	...	4	...	...	...
771T	Little Doris	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
781T	Sailor Prince	5	...	...	...	...	...	...	...	...	...	...	...	4	...	2	...
934T, etc. ...	Sons of Westralia	10	...	...	...	...	...	...	...	...	...	...	...	5	...	...	...
	Total ...	**195**	...	...	...	**2**	...	...	...	**1**	...	...	...	**66**	...	**19**	...
	North Coolgardie Goldfield.																
	Menzies District.																
2728Z, etc. ...	Boddington leases	20	...	...	...	...	...	...	...	...	...	...	...	3	...	1	...
4988Z ...	Coonega	...	...	...	...	...	..	...	...	...	...	...	...	3	...	...	...
2823Z, etc. ...	Crusoe Gold Claims, Ltd.	30	...	...	...	...	...	...	...	...	...	...	...	6	1	4	2
2821Z, etc. ...	Florence	10	...	...	...	...	...	...	...	...	...	...	...	3	...	2	...
4855Z ...	Goodenough	...	...	...	...	1	...	...	...	...	...	...	...	2	...	...	...
2820Z, etc. ...	Lady Shenton G.M., Ltd.	30	...	...	...	1	...	...	...	...	...	...	...	15	3	3	2
4931Z, etc. ...	Menzies Consolidated G.M.s, Ltd.	20	...	...	...	...	...	...	...	...	...	...	...	12	...	3	...
2832Z, etc. ...	Menzies Mining and Exploration Corporation, Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	8	3	8	1
4525Z, etc. ...	Mt. Ida Consols, Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Mt. Ida State Battery	10	...	...	...	...	...	...	...	...	...	...	...	3	...	4	...
2836Z, etc. ...	Queensland Menzies G.M. Co., N.L.	15	...	...	...	...	...	...	...	...	...	...	...	3	...	2	...
3048Z ...	Warrior	5	...	...	...	...	...	...	...	...	...	...	...	4	2	1	...
	Total ...	**160**	...	...	...	**2**	...	...	...	...	...	...	...	**62**	**9**	**28**	**5**
	Ularring District.																
459U, etc. ...	Golden Pole G.Ms., Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	6	2	2	...
	Mulline State Battery...	20	...	...	...	...	..	...	...	...	.	...	...	5	...	...	...
	Mulwarrie State Battery	10	...	...	...	...	...	...	...	...	...	...	...	4	5	...	...
M.A. 4U ...	Riverina G.M. Co., N.L.	10	...	...	...	...	...	...	...	...	...	...	...	4	...	...	...
11U, etc. ...	Speakman's, Mt. Callion, Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	4	...	...	...
	Total ...	**60**	...	...	...	...	...	...	...	...	...	...	...	**23**	**7**	**2**	...
	Niagara District.																
W.R. 72G ...	Britannia G.M. Co., Ltd.	10	...	...	...	...	...	..	...	...	...	..	...	6	...	...	...
M.A. 13G ...	Champion Proprietary, Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	6	...	2	...
M.A. 20G ...	Continental and W.A. Trust, Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	4	...	2	...
26G, etc. ...	Cosmopolitan Proprietary Ltd.	50	...	...	...	...	...	...	...	...	...	...	...	16	3	4	2
20G, etc. ...	Cumberland Niagara G.Ms., Ltd.	20	...	...	...	...	...	...	...	...	...	...	...	10	...	2	...
	Holbourn and Summers' Works	...	...	...	...	...	...	...	...	...	...	...	...	4	...	2	...
M.A. 4G ...	Mignonette Battery	10	...	...	...	...	...	...	...	...	...	...	...	3	...	2	...
	Niagara State Battery...	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
452G	Pine Lodge	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
(255G) ...	Puzzle	...	...	...	...	...	1	...	...	...	...	..	...	...	...	...	...
M.A. 4G ...	Tampa Cyanide Works	...	...	...	...	...	...	...	...	...	...	...	...	3	...	2	...
505G	W.E.G.	10	...	...	...	...	...	...	...	...	...	...	...	4	...	2	...
	Total ...	**135**	...	...	...	...		...	...	...	...	...	...	**56**	**3**	**18**	**2**

TABLE V.—*Milling and Cyaniding Plants erected, in the respective Goldfields and Districts, etc.*—continued.

Lease or Area on which erected.	Name of Company or Works.	Milling.												Cyaniding.			
		Batteries.	Other Mills.														
		Number of Heads of Stampers.	Ball.	Griffin.	Huntington.	Prospecting.	Tremain.	Arrastras.	Crushing Rollers.	Dry Crushers.	Puddlers.	Salford.	Flint.	Leaching Vats.	Agitators and Agitating Vats.	Storage Vats.	Filter Presses.
	North Coolgardie Goldfield—*continued.*																
	Yerilla District.																
502R, etc. ...	London and Coolgardie Explorers, Ltd. ...	10	...	...	...	...	...	...	...	...	...	...	...	6	...	2	...
...	Middleton's Works	...	...	...	...	...	...	...	...	...	...	...	...	5	...	...	...
M.A. 3R ...	Moss Rose Battery	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
401R	Neta	5	...	...	...	...	...	...	...	...	...	...	...	4	...	...	...
M.A. 5R ...	Potosi Consolidated, Ltd.	20	...	...	...	...	...	...	...	...	...	...	...	9	...	2	...
...	Yerilla State Battery	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
	Total ...	**45**	...	...	**1**	...	...	...	...	...	...	...	...	**24**	...	**4**	...
	Broad Arrow Goldfield.																
L.C. 287W ...	(Ashworth and party)	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...
43W, etc. ...	Black Flag Proprietary Co., Ltd.	50	...	...	...	...	...	...	...	...	...	...	...	6	...	4	...
56W, etc. ...	Broad Arrow Consols G.M. Co., N.L. ...	10	...	...	...	...	...	...	...	...	...	...	...	4	...	1	...
1186W, etc. ...	Excelsior leases	5	...	...	...	1	...	...	...	...	...	...	...	1	...	1	...
3W, etc. ...	Golden Arrow Mine, Ltd.	20	...	...	...	...	...	...	...	...	...	...	...	4	...	4	...
1112W ...	Grafter	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
M.A. 1W ...	Half-Mile Reef Mines, Ltd.	20	...	...	...	...	...	...	...	...	...	...	...	5	...	2	...
47W, etc. ...	Lady Bountiful G.M. Co., N.L.	10	...	...	...	...	...	...	...	...	...	...	...	4	...	2	...
45W	Mt. Corlic	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
M.A. 14W ...	New Arrow Proprietary Battery	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2W, etc. ...	New Austral Co., Ltd.	...	1	...	...	...	...	...	...	...	...	...	...	3	...	3	...
53W, etc. ...	New Standard Exploration Co., Ltd. ...	40	...	...	...	...	...	...	...	...	...	...	...	10	4	4	3
T.A. 13W ...	Paddington Cyanide Works	...	...	...	...	...	...	...	...	...	...	...	...	7	...	2	...
968W, etc. ...	Slug Hill (Pride of the Hill) G.M. Co., Ltd.	20	...	...	...	...	...	...	...	...	...	...	...	6	...	2	...
17W, etc. ...	Zoroastrian, Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...
	Total ...	**210**	**1**	...	...	**1**	...	...	...	...	...	...	...	**52**	**4**	**25**	**3**
	North-East Coolgardie Goldfield.																
	Kanowna District.																
M.A. 37X ...	Atlas G.Ms., Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	6	...	2	...
Q.C. 61X ...	Campbell's Works	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...
M.A. 30X ...	Golden Puzzle Works	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
367X, etc. ...	Golden Valley Mines of W.A., Ltd.	10	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
153X, etc. ...	Kanowna Consolidated G.Ms., Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	4	...	4	...
M.A. 42X ...	Koh-i-noor Works	5	...	...	...	...	...	...	...	...	...	...	...	4	...	2	...
52X, etc. ...	Lake View South G.Ms. (W.A.), Ltd. ...	20	...	...	...	...	...	...	...	...	...	...	...	8	...	...	...
187X, etc. ...	London and Coolgardie Explorers, Ltd. ...	20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
M.A. 25X ...	McIlrath and Campbell's Works	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
M.A. 43X ...	Monmouth Works	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
M.A. 39X ...	Mudlark Works	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...
918X	North Cross Reef	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...
3X, etc. ...	North White Feather G.Ms., Ltd.	20	...	...	...	...	...	...	...	...	...	...	...	8	...	2	...
Q.C. 57X ...	Norton's Works	...	...	...	...	1	...	...	...	...	...	1	...	6	...	2	...
M.A. 19X ...	Old Cement Works	5	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...
74X, etc. ...	Phœnix G.Ms., Ltd.	20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1083X ...	Scotia	...	...	...	...	...	...	...	...	...	...	...	...	...	1	4	...
M.A. 15X ...	Sims and Son's Works	...	...	...	...	1	...	...	...	...	2	...	...	...	...	...	...
891X	Sirdar	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
392X, etc. ...	Queen Margaret G.M. Co., Ltd.	15	...	...	...	...	...	...	...	...	...	...	...	6	6	...	...
847X, etc. ...	Vosperton G.Ms., Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
12X, etc. ...	White Feather Main Reefs, Ltd.	20	...	...	...	...	...	...	...	...	...	...	...	8	...	...	...
9X, etc. ...	White Feather Reward, Ltd.	20	...	...	...	...	...	...	...	...	...	...	...	12	...	...	...
	Total ...	**200**	...	...	**3**	**2**	...	...	...	...	**5**	**1**	...	**65**	**7**	**16**	...
	Bulong District.																
835Y	Green Harp	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
M.A. 4Y ...	Middleton Cyanide Works	...	...	...	...	...	...	...	...	...	...	...	...	3	...	2	...
737Y, etc. ...	Mount Monger G.M. Co., N.L.	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
9Y, etc. ...	Queen Margaret G.M. Co., Ltd.	20	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...
	Total ...	**30**	...	...	**1**	...	...	...	...	...	...	...	...	**5**	...	**2**	...

TABLE V.—*Milling and Cyaniding Plants erected, in the respective Goldfields and Districts, etc.*—continued.

Lease or Area on which erected.	Name of Company or Works.	Milling.												Cyaniding.			
		Batteries.	Other Mills.														
		Number of Heads of Stampers.	Ball.	Griffin.	Huntington.	Prospecting.	Tremain.	Arrastras.	Crushing Rollers.	Dry Crushers.	Puddlers.	Salford.	Flint.	Leaching Vats.	Agitators and Agitating Vats.	Storage Vats.	Filter Presses.
	NORTH-EAST COOLGARDIE GOLDFIELD—*continued.*																
	Kurnalpi District.																
M.A. 2K ...	Billy Billy	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
M.A. 3K ...	Glover's Works	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
	Total ...	**5**	...	...	...	**1**	...	...	...	...	...	...	...	...	...	...	...
	EAST COOLGARDIE GOLDFIELD.																
38E, etc. ...	Associated G.Ms. of W.A., Ltd.	...	12	...	...	...	...	...	4	...	...	...	...	13	15	4	7
49E, etc. ...	Associated Northern Blocks (W.A.), Ltd. ...	...	3	...	...	...	...	...	...	...	...	...	...	...	5	4	2
13E, etc. ...	Crœsus South G.Ms., Ltd.	20	...	...	...	...	...	...	...	...	...	...	...	8	...	2	...
3880E ...	Devon Consols	25	...	...	...	...	...	...	...	...	...	...	...	12	...	...	...
351E, etc. ...	Golden Horseshoe Estates Co., Ltd.	100	...	...	...	...	...	...	...	1	...	...	...	24	14	11	20
750E	Golden Links, Ltd.	20	...	...	...	...	...	...	...	...	...	...	...	6	...	7	...
2310E, etc. ...	Golden Ridge Proprietary leases ...	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
873E	Great Boulder Main Reef, Ltd.	...	2	...	...	...	...	...	...	...	...	...	...	...	4	6	6
50E	Great Boulder No. 1, Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	4	...	4	...
66E	Great Boulder Perseverance G.M. Co., Ltd.	...	...	13	...	...	...	...	...	...	...	...	...	...	24	4	13
16E, etc. ...	Great Boulder Proprietary G.Ms., Ltd. ...	...	...	12	...	...	...	...	...	...	...	...	...	...	15	2	12
3643E ...	Hainault G.Ms., Ltd.	20	...	...	...	...	...	...	...	...	...	...	...	15	4	4	1
Block 48 ...	Hampton Plains Estate, Ltd.	20	1	...	...	..	...	...	...	...	...	...	...	6	...	4	1
Block 50 ..	Hampton Properties, Ltd.	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
W.R. 225E ...	Hancock's Mill	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
1131E ...	Hannan's Central Extended G.M. Co., N.L.	...	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...
12E, etc. ...	Hannan's North G.Ms., Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	6	...	4	...
941E, etc. ...	Hannan's Proprietary Development Co., Ltd.	...	...	...	3	...	...	...	...	...	...	...	...	9	...	3	...
M.A. 11E ...	Hannan's Public Crushing, Condensing, and Sawmilling Co. (W.A.), Ltd.	20	...	...	...	...	...	...	...	...	1	...	...	15	...	...	...
97E, etc. ...	Hannan's Reward and Mt. Charlotte, Ltd....	30	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
15E, etc. ...	Hannan's Star G.Ms., Ltd.	...	2	...	...	...	...	...	...	...	...	...	...	...	4	12	2
31E, etc. ...	Ivanhoe Gold Corporation, Ltd.	100	2	...	...	...	...	...	...	...	...	...	...	32	8	...	6
131E, etc. ...	Kalgoorlie Amalgamated, Ltd.	5	...	...	...	...	...	...	...	...	...	...	...	8	...	2	...
M.A. 26E, etc.	Kalgoorlie Gold Recovery Co., Ltd.	...	...	...	...	...	...	...	...	...	...	...	...	18	...	4	2
73E, etc. ...	Kalgoorlie Mint and Iron King Gold Estates, Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
22E, etc. ...	Kalgurli G.Ms., Ltd.	...	6	...	...	...	...	...	1	...	...	...	...	18	5	12	3
25E, etc. ...	Lake View Consols, Ltd.	75	...	...	...	...	...	...	1	...	...	...	...	...	10	4	10
M.A. 35E ...	Lake View South G.M., Ltd.	40	...	...	...	...	...	...	...	...	...	...	...	6	3	9	2
33E, etc. ...	North Boulder G.Ms., Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	8	...	4	...
261E, etc. ...	North Kalgurli Co., Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	6	...	...	...
410E, etc. ...	Oroya-Brown Hill Co., Ltd.	50	...	...	...	...	...	...	...	...	...	...	6	...	13	12	6
1208E ...	South Kalgurli G.Ms., Ltd.	...	...	7	...	...	...	...	2	...	...	...	...	...	9	8	11
	Total ...	**590**	**28**	**32**	**4**	...	...	...	**8**	**1**	**1**	...	**6**	**217**	**133**	**126**	**104**
	COOLGARDIE GOLDFIELD.																
	Coolgardie District.																
M.A. 7 ...	Bayley's Consols G.M. Co., N.L.	10	...	...	...	...	...	...	...	...	...	...	...	8	...	2	...
M.A. 11, etc.	Bayley's G.Ms., Ltd	20	...	...	...	...	...	...	...	...	...	...	...	6	1	12	4
126, etc. ...	Bendigo & Coolgardie Proprietary Co., N.L.	15	...	...	...	...	...	...	...	...	...	...	...	3	...	3	...
134, etc. ...	Burbanks Birthday Gift G.M., Ltd. ...	60	...	...	...	...	...	...	1	...	...	...	...	7	...	2	...
2985, etc. ...	Burbanks Main Lode (1902), Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	4	...	2	...
3918, etc. ...	Coolgardie Redemption	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1854	De Beers	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1604, etc. ...	Flagstaff G.Ms., Ltd.	20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3827, etc. ...	Garfield leases	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
595, etc. ...	Gem leases	25	...	...	...	...	...	...	...	...	...	...	...	6	...	2	...
3805	Gentle Annie	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
20	Golden Bar	15	...	...	...	...	...	...	...	...	...	...	...	4	...	2	...
1902, etc. ...	Griffiths	10	...	...	...	...	...	...	...	...	...	...	...	11	...	...	...
M.A. 22 ...	Highgate Works	...	...	...	...	1	...	...	...	...	...	...	...	2	2	...	...
4033	Hope	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
18, etc. ...	King Solomon's G.Ms., Ltd.	20	...	...	...	...	...	...	...	...	...	...	...	5	...	2	...
284, etc. ...	Lady Loch G.Ms., Ltd.	20	...	...	...	1	...	...	1	...	...	...	...	6	...	2	...
2160, etc. ...	Lady Robinson G.M. Co., N.L.	10	...	...	...	...	...	...	...	...	..	...	...	6	...	2	...
	Carried forward ...	265	...	...	...	2	...	...	2	1	...	...	...	68	3	31	4

TABLE V.—*Milling and Cyaniding Plants erected, in the respective Goldfields and Districts, etc.*—continued.

Lease or Area on which erected.	Name of Company or Works.	Milling.												Cyaniding.			
		Batteries.	Other Mills.														
		Number of Heads of Stampers.	Ball.	Griffin.	Huntington.	Prospecting.	Tremain.	Arrastras.	Crushing Rollers.	Dry Crushers.	Puddlers.	Salford.	Flint.	Leaching Vats.	Agitators and Agitating Vats.	Storage Vats.	Filter Presses.
	COOLGARDIE GOLDFIELD—*continued.*																
	Coolgardie District—continued.																
	Brought forward ...	265	...	...	...	2	...	...	2	1	...	...	...	68	3	31	4
3803, etc. ...	Lindsay Consolidated Mines, Ltd.	11	...	...	...	...	...	...	...	...	...	...	...	6	...	3	...
4049	Londonderry G.Ms., Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	6	...	2	...
M.A. 36 ...	Machinery Area 36	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...
(1610) ...	Mt. Burgess Christmas Gift	...	...	...	...	...	...	...	...	...	...	...	...	4	...	2	...
M.A. 27 ...	Prince of Wales G.M. Co., Ltd.	10	...	...	...	..	...	...	...	...	...	...	...	2	...	...	...
3404, etc. ...	Redhill Westralia G.Ms., Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	4	...	...	...
33, etc. ...	Tindal's Coolgardie G.M. Co., N.L.	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1552, etc. ...	Vale of Coolgardie G.Ms., Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	5	...	2	...
144, etc. ...	Westralia and East Extension Mines, Ltd.	40	...	...	...	...	...	...	...	...	...	...	...	26	...	5	...
	Widgiemooltha State Battery	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Total ...	376	...	...	...	2	...	...	2	1	...	...	...	121	3	47	4
	Kunanalling District.																
646s, etc. ...	Amalgamated G.Ms., Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
33s	Carbine	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
479s	Fair Adelaide	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
568s	Fremantle Extended	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
674s	Golden	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
77s, etc. ...	Great Cement Proprietary, Ltd.	20	...	...	...	...	...	...	...	...	...	...	...	8	...	3	...
61s, etc. ...	Hands Across the Sea	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
369s, etc. ...	Jourdie Hill G.M. Co., Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	6	...	3	...
W.R. 4250 ...	Little Dot Mill	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
688s	Mary Beatrice	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2s	Perry's Reef...	10	...	...	...	...	...	...	...	...	...	...	...	4	...	...	...
299s	Pole	5	...	...	...	...	...	...	...	...	...	...	...	5	...	2	...
70s, etc. ...	Premier G.M. Co., N.L.	25	2	...	...	...	...	...	...	...	...	...	...	14	2	6	...
M.A. 13s ...	Stanley Battery	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
645s	Star of Fremantle	5	...	...	...	...	...	...	...	...	...	...	...	..	...	...	...
17s	Wealth of Nations	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Total ...	135	2	...	...	1	1	...	...	...	...	...	...	37	2	14	...
	YILGARN GOLDFIELD.																
T.A. 13 ...	Andre's Cyanide Works	...	...	...	...	...	...	..	...	...	...	...	...	6	...	2	...
246, etc. ...	Associated Mt. Jackson G.Ms. (W.A.), Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
508	Australia	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
520	Blue Hill	5	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...
T.A. 9 ...	Brimage's Battery	10	...	..	...	...	...	...	...	...	...	...	...	6	...	...	...
13, etc. ...	British and Foreign Development Syndicate, Ltd.	50	...	...	...	...	...	...	...	...	...	...	...	18	...	7	...
T.A. 15 ...	Fraser's South Extended G.M. Co., Ltd. ...	20	...	...	...	...	...	...	...	...	...	...	...	5	...	2	...
567	Hatt's Battery	10	...	...	...	...	...	...	...	...	...	...	...	6	...	...	...
	Hatt's Cyanide Works	...	...	...	...	...	...	...	...	...	...	...	..	20	...	4	...
19, etc. ...	Hope's Hill G.M. Co., Ltd.	70	...	4	...	...	...	...	...	...	...	...	...	12	...	...	...
498	Lass-o'-Gowrie Mill	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
212, etc. ...	Mt. Jackson G.Ms., Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	7	...	1	...
490, etc. ...	Turnbull's leases	...	...	...	...	...	...	...	...	1	...	...	...	8	...	4	...
	Southern Cross State Battery	10	...	...	...	...	...	...	...	...	...	...	...	3	...	2	...
	Total ...	200	...	4	...	1	...	...	...	1	...	...	...	94	...	22	...
	DUNDAS GOLDFIELD.																
M.A. 30 ...	Break-o'-Day Battery	10	...	...	...	...	...	...	...	...	...	...	...	4	...	5	...
129	Central Wealth Consolidated Goldfields, Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	6	...	2	...
42, etc. ...	Cumberland G.M. Co., N.L.	10	...	...	...	...	...	...	...	...	...	...	...	2	...	2	...
49, etc. ...	Lady Mary leases	20	...	...	...	...	...	...	...	...	...	...	...	5	...	2	...
M.A. 18 ...	Mararoa Crushing and Cyaniding Works ...	10	...	...	...	...	...	...	...	...	...	...	...	4	...	4	...
18, etc. ...	Norseman G.Ms., Ltd.	20	2	...	...	...	...	...	...	...	...	...	...	5	3	...	...
	Norseman State Battery	10	...	...	...	...	...	...	...	...	...	...	...	12	1	9	1
M.A. 28 ...	Pathway Battery	...	...	...	..	...	...	...	...	...	...	1	...	...	...	...	...
106, etc. ...	Princess Royal G.M. Co., N.L.	30	...	...	...	...	...	...	...	...	...	...	...	5	3	5	2
634, etc. ...	Princess Royal North G.M. Co., N.L. ...	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Total ...	130	2	...	...	...	...	...	...	...	...	1	...	43	7	29	3

TABLE V.—*Milling and Cyaniding Plants erected, in the respective Goldfields and Districts, etc.*—continued.

Lease or Area on which erected.	Name of Company or Works.	Milling.												Cyaniding.			
		Batteries.	Other Mills.														
		Number of Heads of Stampers.	Ball.	Griffin.	Huntington.	Prospecting.	Tremain.	Arrastras.	Crushing Rollers.	Dry Crushers.	Puddlers.	Salford.	Flint.	Leaching Vats.	Agitators and Agitating Vats.	Storage Vats.	Filter Presses.
	Phillips River Goldfield.																
43	Gilbert Gold Mine, Ltd.	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
17	Grafter	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
M.L. 52 ...	Harbour View	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
21	Lucy	5	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...
1	Phillips River G.M. Co., N.L....	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
60	Red, White, and Blue	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Total ...	**40**	...	...	...	**1**	...	...	...	...	...	...	...	...	...	**2**	...
	Donnybrook Goldfield.																
P.P.L. 9, etc.	Donnybrook Goldfields, Ltd.	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Total ...	**5**	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	State Generally.																
	Fremantle Smelter, Ltd.	...	1	...	...	...	...	...	2	1	...	...	...	...	...	...	...
	Northam Milling and Mining Co., Ltd. ...	60	...	...	...	1	...	...	1	...	...	...	...	5	...	2	...
	Total ...	**60**	**1**	...	...	**1**	...	...	**3**	**1**	...	...	...	**5**	...	**2**	...

TABLE VI.

Average FINENESS and VALUE per ounce of Gold Bullion produced from each District, Goldfield, and the State during 1903.

	Goldfield.	District.	Value per oz. of Metal produced.	Average Fineness of Metal produced.	Gross Yield from Mines supplying data.	Total Fine Gold Contents.	Value per oz. of Metal produced.	Average Fineness of Metal produced.	Gross Yield from Mines supplying data.	Total Fine Gold Contents.	Goldfield.	
			£ s. d.		ozs.	ozs.	£ s. d.		ozs.	ozs.		
1	Kimberley	... ...	...	...	...	...	3 14 0	·8710	543·00	472·95	Kimberley	1
2	Pilbarra	Marble Bar	3 5 3	·7680	2,587·25	1,987·11						
	Do.	Nullagine	4 2 5¾	·9710	3,049·07	2,960·64						
							3 14 7	·8779	5,636·32	4,947·75	Pilbarra	2
3	West Pilbarra	... ...	...	...	...	...	3 13 0	·8592	4,222·65	3,628·10	West Pilbarra	3
4	Ashburton	... ...	...	...	...	...	4 0 0	·9416	960·00	903·94	Ashburton	4
5	Gascoyne	... ...	...	...	...	...	...	...	...	...	Gascoyne	5
6	Peak Hill	... ...	...	...	...	...	3 15 7½	·8901	35,794·80	31,862·25	Peak Hill	6
7	East Murchison	... ...	...	...	...	...	3 11 8	·8436	90,671·87	76,492·59	East Murchison	7
8	Murchison	Cue	3 19 11¼	·9410	15,359·14	14,452·51						
	Do.	Nannine	3 11 11⅝	·8473	17,072·33	14,465·43						
	Do.	Day Dawn	3 10 0½	·8244	163,047·71	134,414·22						
	Do.	Mt. Magnet	3 14 10	·8808	23,604·10	20,791·83						
							3 11 4¾	·8404	219,083·28	184,123·99	Murchison	8
9	Yalgoo	... ...	...	...	...	...	3 8 10¾	·8109	3,313·50	2,686·84	Yalgoo	9
10	Mt. Margaret	Mt. Morgans	3 10 6½	·8304	67,848·02	56,243·31						
	Do.	Mt. Malcolm	3 15 4½	·8872	86,948·71	77,138·78						
	Do.	Mt. Margaret	3 12 2¼	·8496	39,563·35	33,611·56						
							3 13 0	·8592	194,360·08	166,993·65	Mt. Margaret	10
11	North Coolgardie	Menzies	3 6 7½	·7842	60,461·87	47,412·23						
	Do.	Ularring	3 14 0½	·8714	13,697·61	11,936·36						
	Do.	Niagara	3 11 11¾	·8473	79,685·30	67,515·28						
	Do.	Yerilla	3 12 3	·8505	8,098·05	6,887·79						
							3 10 2	·8259	161,942·83	133,751·66	North Coolgardie	11
12	Broad Arrow...	... ...	...	...	...	...	3 13 5¼	·8643	29,282·27	25,307·89	Broad Arrow...	12
13	North-East Coolgardie ...	Kanowna	3 12 9¼	·8565	34,825·37	29,829·67						
	Do.	Bulong	3 17 7¼	·9135	6,365·09	5,814·23						
	Do.	Kurnalpi	3 18 8¾	·9267	300·00	278·01						
							3 13 6¾	·8658	41,490·46	35,921·91	North-East Coolgardie ...	13
14	East Coolgardie	... ...	...	...	...	...	3 10 8¼	·8321	1,257,636·66	1,046,427·54	East Coolgardie	14
15	Coolgardie	Coolgardie	3 12 1¼	·8487	55,892·44	47,437·41						
	Do.	Kunanalling	3 9 3¾	·8159	9,334·08	7,616·00						
							3 13 0	·8593	65,226·52	55,053·41	Coolgardie	15
16	Yilgarn	... ...	...	...	...	...	3 8 10¾	·8109	22,418·47	18,179·94	Yilgarn	16
17	Dundas	... ...	...	...	...	...	3 11 6¼	·8419	36,592·08	30,816·40	Dundas	17
18	Phillips River	... ...	...	...	...	...	3 17 9¼	·9153	1,697·11	1,553·44	Phillips River	18
19	Donnybrook	... ...	...	...	...	...	...	...	...	...	Donnybrook	19
							3 11 2¼	·8379	2,170,871·90	1,819,118·25		

Average Value per ounce, 1903, of Western Australian Gold Bullion, £3 11s. 2¼d.

Estimated Value for 1903, £3 11s.; *i.e.*, it is based on these figures, taken to the nearest shilling.

TABLE VII.

Return of Gold Bullion entered for Export to the 31st December, 1903, showing the Quantity obtained from the respective Goldfields, and the Estimated Value thereof.

Year.	Month.	Kimberley.	Pilbarra.	a West Pilbarra.	Ashburton.	b Gascoyne.	c Peak Hill.	c East Murchison.	Murchison.	d Yalgoo.	c Mt. Margaret.	e North Coolgardie.
		ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.
Previous to 1899		24,215·30	134,897·05	2,028·27	4,290·42	..	18,846·85	49,017·16	413,896·63	5,790·61	51,952·42	162,341·95
1899		814·36	19,996·40	1,955·51	239·50	333·07	15,721·34	37,811·59	68,842·39	5,689·53	64,905·53	60,909·38
1900		32·60	9,646·63	584·35	50·10		10,650·78	26,319·76	60,156·46	517·05	73,774·55	17,505·24
1901		...	40·47	86·48	8·50	7·27	255·80	32,857·16	101,669·21	7·50	72,103·79	7,304·79
1902		1·72	...	...	...	...	100·00	29,618·47	164,942·16	562·47	71,974·02	4,729·73
1903	January	...	2·67	...	...	...	...	2,109·55	18,218·51	...	5,777·70	65·73
	February	...	...	...	...	...	...	2,042·50	16,627·00	...	6,395·81	68·60
	March	...	...	...	...	...	3·56	2,198·00	10,702·84	...	6,046·05	278·90
	April	...	...	...	...	...	...	2,118·45	14,945·18	...	6,188·32	220·95
	May	.	...	..	...	...	...	1,853·60	15,729·74	...	6,610·15	25·17
	June	..	...	...	...	...	...	2,098·20	15,559·07	...	5,841·03	56·78
	July	..	...	...	...	...	...	2,352·30	14,324·54	...	6,006·50	...
	August	...	...	...	...	...	..	2,425·05	15,714·77	55·55	7,790·67	371·15
	September	...	...	...	...		.	2,288·10	14,944·52	...	6,676·54	16·55
	October	...	...	...	...	...	...	2,239·76	15,044·18	..	6,548·97	195·15
	November	...	..	...	...	...	236·67	2,144·15	15,620·74	...	6,743·68	...
	December	...	...	...	..	...	..	1,944·81	14,292·56	...	6,560·66	292·43
	Total	25,063·98	164,583·22	4,654·61	4,588·52	340·34	45,815·00	201,438·61	991,230·50	12,622·71	411,896·39	254,382·50

Year.	Month.	f Broad Arrow.	e North-East Coolgardie.	e East Coolgardie.	g Coolgardie.	Yilgarn.	h Dundas.	Phillips River.	j Donnybrook.	Goldfields generally.	Total. Quantity.	Total. † Value.
		ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	£ s. d.
Previous to 1899		28,790·71	162,259·49	835,636·57	531,104·38	211,424·88	56,311·19	...		...	2,692,303·88	10,232,654 14 10
1899		36,020·79	64,470·28	890,566·37	113,558·84	7,734·34	44,691·32	...	309·94		1,434,570·18	5,451,367 16 6
1900		33,484·49	11,626·00	671,061·18	68,174·20	769·59	9,104·36	...	...	6,309·93	999,767·27	3,799,115 12 6
1901		10,275·65	7,500·90	770,154·89	10,574·47	54·23	5,970·50	...	...	238·21	1,019,109·82	3,923,572 16 2
1902		2,477·05	638·99	535,868·32	3,343·03	3·85	5,122·08	3,429·06	5·75	9·04	822,825·74	3,003,313 19 0
1903	January	56·74	343·20	73,513·72	1,156·80	...	31·70	317·93	...	...	101,594·25	365,739 6 0
	February	...	381·53	53,402·61	1,096·57	...	66·82	163·29	...	...	80,249·73	288,899 0 7
	March	...	384·46	58,086·63	741·16	...	166·15	299·47	...	...	78,907·22	284,065 19 10
	April	702·50	664·33	61,013·82	1,029·72	...	103·79	...	...	...	86,987·06	313,153 8 4
	May	647·05	424·30	67,099·17	4·84	...	7·30	377·94	...	...	92,779·26	334,005 6 9
	June	...	664·70	47,409·67	563·67	...	85·49	...	...	...	72,278·61	260,202 19 11
	July	1,367·35	550·10	64,546·67	742·18	...	...	286 99	...	...	90,176·63	324,635 17 4
	August	704·10	536·25	53,630·70	352·10	...	236·53	448·37	..	..	82,265·24	296,154 17 3
	September	771·45	326·90	44,941·83	1,418·75	...	196·44	...	...	...	71,581·08	257,691 17 9
	October	943·59	462·67	46,763·37	3·96	...	14·81	269·65	...	7·50	72,493·61	260,976 19 11
	November	528·30	345·85	49,135·79	588·80	...	375·41	...	...	55·55	75,774·94	272,789 15 8
	December	415·85	..	53,541·01	936·89	...	263·07	351·78	...	...	78,599·06	282,956 12 4
	Total	117,185·62	251,579·95	4,376,372·32	735,390·36	219,986·89	122,746·96	5,949·48	315·69	6,620·23	7,952,763·88	29,951,297 0 8

† To 1900 at £3 16s. per oz ; 1901 at £3 17s. per oz.; 1902 at £3 13s. per oz.; 1903 at £3 12s. per oz.

a Prior to 1st May, 1898, included with Pilbarra. *b* Prior to 1st March, 1899, included with Ashburton. *c* From 1st August, 1897. *d* Prior to 1st April, 1897, included with Murchison. *e* Prior to 1st May, 1896, included with Coolgardie. *f* From 1st September, 1897. *g* Declared 5th April, 1894, to which date included with Yilgarn. *h* Prior to 1893 included with Yilgarn. *i* Prior to 1902 included in Goldfields generally. *j* From 1st March, 1899.

TABLE VIII.

Return of Gold Bullion received at the Perth Branch of the ROYAL MINT from May, 1899, to the 31st December, 1903, showing the Quantity obtained from the respective Goldfields and other Countries, and the Actual Value thereof.

Year.	Month.	Kimberley.	Pilbarra.	West Pilbarra.	Ashburton.	Gascoyne.	Peak Hill.	East Murchison.	Murchison.	Yalgoo.	Mt. Margaret.	North Coolgardie.	Broad Arrow.	North-East Coolgardie.
		ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.
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	January	...	3,570·86	...	6·64	...	4,944·32	5,309·58	3,677·86	79·66	12,932·09	16,022·76	1,015·86	4,017·48
	February	...	28·46	642·15	...	...	2,034·45	7,270·76	4,056·29	104·11	10,350·05	11,403·72	1,654·63	4,267·58
	March	26·78	...	...	21·71	...	3,117·39	5,122·39	5,594·88	152·68	10,253·97	13,826·94	1,792·15	3,735·87
	April	111·69	33·25	643·38	26·71	...	3,858·68	8,790·61	7,165·88	165·79	11,818·96	19,866·83	1,016·50	4,632·48
	May	22·91	3,520·12	777·20	...	...	2,121·88	5,340·47	5,156·02	12·40	11,203·50	13,325·84	1,583·35	4,790·12
	June	62·57	56·23	23·61	...	...	2,933·96	7,253·23	6,261·85	151·69	11,401·71	19,300·65	2,113·75	3,487·82
	July	108·55	226·56	1,135·70	7·14	...	4,531·56	6,176·00	6,639·88	43·47	11,041·14	17,843·96	2,054·76	3,239·89
	August	...	2,188·93	...	16·70	...	2,801·93	7,140·01	6,360·24	19·25	15,091·56	18,477·59	2,032·51	3,344·34
	September	48·96	72·63	5·27	10·82	...	...	4,706·16	4,296·62	215·08	12,861·01	18,951·21	2,251·69	2,578·23
	October	...	44·57	2,007·96	9·89	36·29	2,665·39	6,020·70	4,947·88	273·44	11,347·46	14,294·88	2,082·29	3,733·80
	November	113·19	2,141·81	22·64	25·41	...	5,674·71	6,102·34	4,904·68	171·27	11,696·23	17,520·72	1,592·70	2,932·08
	December	17·10	2,334·11	1,223·67	10·28	...	...	7,857·04	5,065·10	299·15	18,008·81	16,393·98	2,338·01	1,889·56
	Total	2,567·52	44,227·17	10,297·66	946·78	351·46	122,966·19	220,001·96	227,995·77	30,037·51	504,033·51	648,732·97	79,140·35	196,810·48

Year.	Month.	East Coolgardie.	Coolgardie.	Yilgarn.	Dundas.	* Phillips River.	Donnybrook.	Goldfields generally.	Total. Western Australia. Quantity.	Total. Western Australia. Actual Value.	Total. Other Countries. Quantity.	Total. Other Countries. Actual Value.	Grand Total. Quantity.	Grand Total. Actual Value.
		ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	£ s. d.	ozs.	£ s. d.	ozs.	£ s. d.
1899	... ...	33,051·33	27,611·24	9,070·70	473·63	...	196·17	904·39	209,306·24	762,546 11 6	103·46	336 18 3	209,409·70	762,883 9 9
1900	... ...	139,845·60	51,607·26	28,648·51	31,583·20	...	265·55	1,620·93	581,182·91	2,096,212 14 2	17·49	44 15 7	581,200·40	2,096,257 9 9
1901	... ...	263,514·75	78,026·07	29,433·84	32,825·75	...	4·64	1,667·79	860,280·69	3,033,311 0 4	92·25	297 5 8	860,372·94	3,033,608 6 0
1902	... ...	636,536·52	94,134·17	25,873·68	31,088·91	5,146·80	67·08	2,461·98	1,354,615·78	4,791,303 18 1	16·27	38 10 2	1,354,632·05	4,791,342 8 3
1903	January ...	44,767·32	6,926·03	2,298·51	2,487·90	644·06	39·19	116·45	108,856·57	389,390 1 4	18·72	11 17 6	108,875·29	389,401 18 10
	February ...	56,456·79	6,470·50	1,538·18	4,574·44	643·82	31·78	619·94	112,147·65	396,961 16 3	...	...	112,147·65	396,961 16 3
	March ...	59,173·99	7,043·91	2,074·76	2,818·33	928·20	...	132·22	115,816·17	403,409 2 9	7·90	16 9 5	115,824·07	403,425 12 2
	April ...	49,767·75	7,012·79	2,434·49	4,175·17	7·57	23·54	87·81	121,639·88	431,385 7 9	17·63	44 15 7	121,657·51	431,430 3 4
	May	52,462·10	7,328·98	2,801·44	3,326·48	906·66	...	42·02	114,721·49	406,136 7 3	59·70	127 12 9	114,781·19	406,264 0 0
	June	70,308·62	6,868·48	1,833·01	3,320·15	...	3·01	400·50	135,780·84	478,353 14 9	5·49	21 0 6	135,786·33	478,374 15 3
	July	56,374·03	6,311·58	2,104·26	3,610·49	799·23	...	76·63	122,324·83	436,054 19 4	99·88	292 12 3	122,424·71	436,347 11 7
	August ...	53,623·26	6,842·08	2,296·83	3,445·79	6·48	...	664·53	124,352·03	446,298 1 11	...	...	124,352·03	446,298 1 11
	September ...	69,686·26	6,885·58	2,458·10	3,692·86	864·79	...	238·44	129,823·71	457,627 6 4	28·62	56 17 10	129,852·33	457,684 4 2
	October ...	58,961·86	5,835·98	1,698·47	3,009·54	752·68	...	567·92	118,291·00	423,232 9 1	...	...	118,291·00	423,232 9 1
	November ...	60,032·48	7,134·38	2,265·73	3,012·44	...	...	55·79	125,398·60	435,810 6 3	31·85	42 11 8	125,430·45	435,852 17 11
	December ...	53,675·36	7,558·50	3,052·50	2,532·80	867·30	...	348·07	123,471·34	435,192 18 9	24·99	89 17 4	123,496·33	435,282 16 1
	Total ...	1,758,238·02	333,597·53	119,883·01	135,977·88	11,567·59	630·96	10,005·41	4,458,009·73	15,823,226 15 10	524·25	1,421 4 6	4,458,533·98	15,824,648 0 4

* Prior to 1902 included in Goldfields generally.

TABLE IX.

Return of Gold Bullion entered for EXPORT and received at the Perth Branch of the ROYAL MINT from 1st January, 1886, to 31st December, 1903, showing the Quantity obtained, each Year, from the respective Goldfields, the estimated Fine Contents thereof, and the Total Annual Value.

Year.	Kimberley.		Pilbarra.		a West Pilbarra.		Ashburton.		b Gascoyne.		c Peak Hill.		c East Murchison.		Murchison.		d Yalgoo.		c Mt. Margaret.		c North Coolgardie.	
	Gross Weight.	Fine Contents.	Gross Weight.	Fine Contents.	Gross Weight.	Fine Contents.	Gross Weight.	Fine Contents.	Gross Weight.	Fine Contents.	Gross Weight.	Fine Contents.	Gross Weight.	Fine Contents.	Gross Weight.	Fine Contents.	Gross Weight.	Fine Contents.	Gross Weight.	Fine Contents.	Gross Weight.	Fine Contents.
	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.
1886 ...	302·00	270·17	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1887 ...	4,873·00	4,359·37	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1888 ...	3,493·00	3,124·82	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1889 ...	2,464·00	2,204·28	11,170·00	9,992·63	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1890 ...	4,474·00	4,002·42	16,055·31	14,363·01	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1891 ...	2,699·62	2,415·07	11,875·00	10,623·32	...	...	838·72	750·31	...	...	...	...	...	...	2,064·43	1,846·83	...	...	...	...	...	...
1892 ...	1,088·85	974·08	12,892·80	11,533·84	...	...	·70	·63	...	...	...	...	...	...	24,356·47	21,789·19	...	...	...	...	...	...
1893 ...	1,621·70	1,450·77	11,698·50	10,465·43	...	...	467·74	418·43	...	...	...	...	...	...	21,210·45	18,974·77	...	...	...	...	...	...
1894 ...	588·64	526·59	16,254·50	14,541·20	...	...	285·27	255·20	...	...	...	...	...	...	52,946·32	47,365·54	...	...	...	...	...	...
1895 ...	876·68	784·27	19,522·40	17,464·65	...	...	540·76	483·76	...	...	...	...	...	...	65,477·26	58,575·66	...	...	...	...	...	...
1896 ...	891·86	797·85	11,810·11	10,565·27	...	...	669·17	598·64	...	...	...	...	...	...	71,282·69	63,769·17	...	...	...	...	17,160·51	15,351·71
1897 ...	554·07	495·67	11,955·87	10,695·67	...	...	1,038·18	928·75	...	...	5,110·00	4,571·38	9,453·81	8,457·34	82,891·85	74,154·67	2,034·23	1,819·81	8,685·73	7,770·22	74,556·12	66,697·57
1898 ...	287·88	257·54	11,662·56	10,433·27	2,028·27	1,814·48	449·88	402·46	...	...	13,736·85	12,288·93	39,563·35	35,393·19	93,667·16	83,794·22	3,756·38	3,360·44	43,266·69	38,706·19	70,625·32	63,181·09
1899 ...	1,122·81	1,004·46	20,526·20	18,362·65	1,955·51	1,749·39	521·30	466·36	418·72	374·59	31,995·34	28,622·88	41,569·66	37,188·03	93,518·03	83,660·80	10,879·58	9,732·83	81,817·07	73,193·17	105,688·76	94,548·69
1900 ...	676·62	605·30	17,140·51	15,333·82	721·68	645·61	524·36	469·09	86·10	77·02	28,669·86	25,647·93	58,369·50	52,217·09	108,696·58	97,239·47	9,368·57	8,381·08	141,523·00	126,605·83	106,193·38	95,000·12
1901 ...	663·37	601·26	11,320·40	10,260·43	480·86	435·84	63·92	57·94	25·83	23·41	21,607·47	19,584·29	77,604·04	70,337·70	144,693·86	131,145·66	9,198·51	8,337·22	198,807·70	180,192·63	142,798·10	129,427·40
1902 ...	441·65	379 50	10,706·03	9,199·50	3,284·37	2,822·20	...	...	124·86	107·29	32,737·17	28,130·48	91,976·45	79,033·73	212,570·34	182,657·99	5,679·41	4,880·23	216,637·14	186,152·50	187,272·79	160,920·24
1903 ...	511·75	433·71	14,220·20	12,051·78	6,481·58	5,493·23	135·30	114·67	36·29	30·76	34,924·50	29,598·92	102,903·76	87,212·11	245,850·83	208,361·41	1,743·54	1,477·67	225,192·57	190,853·28	198,820·49	168,502·64
Total	27,631·50	24,687·13	208,810·39	185,886·47	14,952·27	12,960·75	5,535·30	4,946·24	691·80	613·07	168,781·19	148,444·81	421,440·57	369,839·19	1,219,226·27	1,073,335·38	42,660·22	37,989·28	915,929·90	803,478·82	903,115·47	793,629·46

Year.	f Broad Arrow.		c North-East Coolgardie.		c East Coolgardie.		g Coolgardie.		Yilgarn.		h Dundas.		i Phillips River.		j Donnybrook.		Goldfields generally.		GRAND TOTAL.			
	Gross Weight.	Fine Contents.	Gross Weight.	Fine Contents.	Gross Weight.	Fine Contents.	Gross Weight.	Fine Contents.	Gross Weight.	Fine Contents.	Gross Weight.	Fine Contents.	Gross Weight.	Fine Contents.	Gross Weight.	Fine Contents	Gross Weight.	Fine Contents.	Gross Weight.	Fine Contents.	† Value.	
	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	£ s. d.	
1886	...	...	...	...	...	...	...	...	...	..	...	...	...	...	...	...	...	...	302·00	270·17	1,147 12	0
1887	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4,873·00	4,359·37	18,517 8	0
1888	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3,493·00	3,124·82	13,273 8	0
1889	...	...	...	...	...	...	...	...	1,858·50	1,662·61	...	...	...	...	...	...	...	...	15,492·50	13,859·52	58,871 10	0
1890	...	...	...	...	...	...	...	...	2,277·00	2,036·99	...	...	...	...	...	...	...	...	22,806·31	20,402·42	86,663 19	7
1891	...	...	...	...	...	...	...	...	12,833·30	11,480·61	...	...	...	...	...	...	...	...	30,311·07	27,116·14	115,182 1	4
1892	...	...	...	...	...	...	...	...	21,269·49	18,973·91	...	...	...	...	...	...	...	...	59,548·31	53,271·65	226,283 11	7
1893	...	...	...	...	...	...	...	...	75,744·55	67,760·73	147·97	132·37	...	...	...	...	...	...	110,890·91	99,202·50	421,385 9	2
1894	...	...	...	...	...	...	105,329·82	94,227·58	31,498·38	28,178·31	228·38	204·31	...	...	...	...	...	...	207,131·31	185,298·73	787,098 19	6
1895	...	...	...	...	...	...	125,105·94	111,919·21	19,747·75	17,666·25	241·90	216·40	...	...	...	...	...	...	231,512·69	207,110·20	879,748 4	5
1896	...	...	4,113·18	3,679·63	85,287·06	76,297·42	69,135·19	61,848·03	16,565·25	14,819·20	4,350·31	3,891·77	...	...	...	...	...	...	281,265·33	251,618·69	1,068,808 5	1
1897	4,159·27	3,720·87	32,905·82	29,437·40	300,037·24	268,411·95	104,306·37	93,312·00	17,994·43	16,097·78	19,310·81	17,275·36	...	...	...	...	...	...	674,993·85	603,845·44	2,564,976 12	7
1898	24,631·44	22,035·17	125,240·49	112,039·58	450,312·27	402,847·31	127,227·06	113,816·75	11,696·18	10,463·35	32,031·82	28,655·52	...	...	...	...	...	...	1,050,183·60	939,489·49	3,990,697 13	7
1899	44,524·29	39,831·22	81,171·18	72,615·37	923,617·70	826,264·21	141,170·08	126,290·11	16,805·04	15,033·71	45,164·95	40,404·36	...	...	506·11	452·76	904·39	809·07	1,643,878·72	1,470,604·66	6,246,731 10	9
1900	47,860·59	42,815·87	52,129·12	46,634·47	810,906·78	725,433·53	119,781·46	107,155·95	29,418·10	26,317·30	40,687·56	36,398·91	...	...	265·55	237·56	7,930·86	7,094·91	1,580,950·18	1,414,310·86	6,007,610 13	8
1901	29,104·78	26,379·59	50,556·53	45,822·74	1,033,669·64	936,883·49	88,600·54	80,304·56	29,488·07	26,727·00	38,796·25	35,163·62	...	...	4·64	4·20	1,906·00	1.727·54	1,879,390·51	1,703.416·52	7.235.653 9	3
1902	18,380·47	15,794·01	54,540·57	46,865·74	1,172,404·84	1,007,426·94	97,477·20	83,760·46	25,877·53	22,236·11	36,210·99	31,115·47	8,575·86	7,369·09	72·83	62·58	2,471·02	2,123·29	2.177.441·52	1.871.037·35	7.947.661 10	11
1903	27,665·13	23,446·53	47,733·54	40,454·74	1,358,374·81	1,151,238·24	90,854·23	77·000·01	26,856·28	22,761·00	41,553·90	35,217·41	8,941·21	7,577·77	97·52	82·64	3,413·37	2,892·88	2.436.310·80	2.064.801·40	8.770.718 17	7
Total	196,325·97	174,023·26	448,390·43	397,549·67	6,134,610·34	5,394,803·09	1,068,987·89	949,634·66	339,869·90	302,214·86	258,724·84	228·675·50	17,517·07	14,946·86	946·65	839·74	16,625·64	14,647·69	12,410,773·61	10,933,140·93	46,441,030 17	0

a. Prior to 1st May, 1898, included with Pilbarra. *b.* Prior to 1st March, 1899, included with Ashburton. *c.* From 1st August, 1897. *d.* Prior to 1st April, 1897, included with Murchison. *e.* Prior to 1st May, 1896, included with Coolgardie. *f.* From 1st September, 1897. *g.* Declared 5th April, 1894, to which date included with Yilgarn. *h.* Prior to 1893, included with Yilgarn. *i.* Prior to 1902, included in Goldfields generally. *j.* From 1st March, 1899. † To 1900, at £3 16s. per oz.; 1901, at £3 17s. per oz.; 1902, at £3 13s. per oz.; 1903, at £3 12s. per oz.

TABLE X.

Comparative Return of Gold Bullion entered for EXPORT and received at the Perth Branch of the ROYAL MINT, from 1st January, 1901, to 31st December, 1903, showing the Quantity obtained each Month and the Estimated Fine Contents thereof.

Month.	1901.				1902.				1903.			
	Customs.	Royal Mint.	Total.		Customs.	Royal Mint.	Total.		Customs.	Royal Mint.	Total.	
			Gross Weight.	Fine Contents.			Gross Weight.	Fine Contents.			Gross Weight.	Fine Contents.
	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.
January	72,724·63	65,972·24	138,696·87	125,710·19	79,925·53	88,233·50	168,159·03	144,496·11	101,594·25	108,856·57	210,450·82	178,359·49
February	85,912·42	49,584·90	135,497·32	122,810·22	70,353·61	82,338·95	152,692·56	131,206·04	80,249·73	112,147·65	192,397·38	163,058·99
March	75,535·92	52,309·65	127,845·57	115,874·94	84,963·40	92,542·20	177,505·60	152,527·45	78,907·22	115,816·17	194,723·39	165,030·31
1st January to 31st March ...	234,172·97	167,866·79	402,039·76	364,395·35	235,242·54	263,114·65	498,357·19	428,229·60	260,751·20	336,820·39	597,571·59	506,448·79
April	87,420·18	62,598·31	150,018·49	135,971·73	71,940·09	111,591·25	183,531·34	157,705·27	86,987·06	121,639·88	208,626·94	176,813·73
May	86,786·48	57,300·94	144,087·42	130,596·01	61,467·06	102,759·28	164,226·34	141,116·82	92,779·26	114,721·49	207,500·75	175,859·27
June	94,157·13	67,810·32	161,967·45	146,801·86	65,333·01	124,287·50	189,620·51	162,937·58	72,278·61	135,780·84	208,059·45	176,332·77
1st January to 30th June ...	502,536·76	355,576·36	858,113·12	777,764·95	433,982·70	601,752·68	1,035,735·38	889,989·27	512,796·13	708,962·60	1,221,758·73	1,035,454·56
July	68,689·94	91,604·46	160,294·40	145,285·47	59,439·33	124,788·34	184,227·67	158,303·61	90,176·63	122,324·83	212,501·46	180,097·43
August	103,238·77	58,531·76	161,770·53	146,623·38	63,568·56	124,402·99	187,971·55	161,520·66	82,265·24	124,352·03	206,617·27	175,110·51
September	90,893·62	87,402·05	178,295·67	161,601·21	55,812·40	132,355·23	188,167·63	161,689·15	71,581·08	129,823·71	201,404·79	170,692·87
1st January to 30th September ...	765,359·09	593,114·63	1,358,473·72	1,231,275·01	612,802·99	983,299·24	1,596,102·23	1,371,502·69	756,819·08	1,085,463·17	1,842,282·25	1,561,355·37
October...	85,761·38	83,508·72	169,270·10	153,420·74	75,708·97	118,678·45	194,387·42	167,033·70	72,493·61	118,291·00	190,784·61	161,692·15
November	85,324·01	89,157·31	174,481·32	158,144·02	74,077·56	123,119·47	197,197·03	169,447·95	75,774·94	125,398·60	201,173·54	170,496·89
December	82,665·34	94,500·03	177,165·37	160,576·75	60,236·22	129,518·62	189,754·84	163,053·01	78,599·06	123,471·34	202,070·40	171,256·99
Total ...	1,019,109·82	860,280·69	1,879,390·51	**1,703,416·52**	822,825·74	1,354,615·78	2,177,441·52	**1,871,037·35**	983,686·69	1,452,624·11	2,436,310·80	**2,064,801·40**

TABLE XI.

Monthly Returns of GOLD BULLION, GOLD ORES, and FINE GOLD BARS entered for EXPORT during 1903.

Month.	New South Wales.		South Australia.		Victoria.		Belgium.		United Kingdom.		TOTALS OF BULLION AND ORE.			India.
	Bullion.	Ore.	Bullion.	Ore.	Bullion.	Ore.	Bullion.	Ore.	Bullion.	Ore.	Bullion.	Ore.	Total.	* Fine Bars.
1903.	ozs.	Estimated ozs.	ozs.	Estimated ozs.	ozs.	Estimated ozs.	ozs.	Estimated ozs.	ozs.	Estimated ozs.	ozs.	Estimated ozs.	ozs.	ozs.
January	...	19,626·58	...	...	3,952·79	6·85	...	...	77,315·03	693·00	81,267·82	20,326·43	101,594·25	8,287·39
February	...	11,687·03	...	4·30	3,640·74	83·33	...	...	60,630·26	4,204·07	64,271·00	15,978·73	80,249·73	16,580·78
March	...	11,897·35	...	...	3,990·81	...	...	...	60,205·35	2,813·71	64,196·16	14,711·06	78,907·22	11,828·28
April	...	15,951·42	...	...	3,444·57	...	...	...	66,755·07	836·00	70,199·64	16,787·42	86,987·06	4,733·63
May	...	16,147·14	...	...	4,047·48	27·77	...	1,641·57	70,250·30	665·00	74,297·78	18,481·48	92,779·26	14,198·70
June	...	10,962·27	56·78	...	3,049·54	16·67	...	670·26	54,578·64	2,944·45	57,684·96	14,593·65	72,278·61	10,054·53
July	...	17,271·22	...	...	3,987·89	...	...	1,327·28	66,223·90	1,366·34	70,211·79	19,964·84	90,176·63	...
August	...	16,129·35	...	3·00	5,557·21	55·55	...	3,727·65	56,792·48	...	62,349·69	19,915·55	82,265·24	14,219·19
September	...	13,089·77	...	...	3,923·39	...	...	...	47,598·83	6,969·09	51,522·22	20,058·86	71,581·08	4,733·59
October	...	4,660·27	...	...	4,446·04	...	...	...	56,248·36	7,138·94	60,694·40	11,799·21	72,493·61	11,865·56
November	...	4,339·04	...	...	4,289·56	129·11	...	...	66,139·32	877·91	70,428·88	5,346·06	75,774·94	14,219·67
December	...	3,943·92	...	...	3,310·11	...	...	...	70,492·65	852·38	73,802·76	4,796·30	78,599·06	12,028·12
Total	...	145,705·36	56·78	7·30	47,640·13	319·28	...	7,366·76	753,230·19	29,360·89	800,927·10	182,759·59	983,686·69	122,749·44

* When considering the total production of the State these fine bars must be disregarded, as the metal from which they were manufactured is already recorded in the total receipts of gold at the Mint.

PART II.—MINERALS OTHER THAN GOLD.

TABLE XII.

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, Districts, and Mining Districts during 1903 and previous years.

Year.	Month.	BLACK TIN.						COPPER ORE.											
		Greenbushes M.D.		Marble Bar D.		Total.		Day Dawn D.		Mt. Malcolm D.		Northampton M.D.		Phillips River Gf.		West Pilbarra Gf.		Total.	
		Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Previous to 1899	...	tons. 1,590·33	£ 66,108	tons. 75·45	£ 4,419	tons. 1,665·78	£ 70,527	tons. ...	£ ...	tons. ...	£ ...	tons. ...	£ ...	tons. ...	£ ...	tons. 7,018·00	£ 55,270	tons. 7,018·00	£ 55,270
1899	...	277·32	21,658	57·50	3,612	334·82	25,270	...	...	273·00	4,338	136·00	2,122	...	...	2,555·00	29,478	2,964·00	35,938
1900	...	435·62	29,528	387·87	27,174	823·49	56,702	5·15	91	4,539·00	30,718	...	...	34·00	725	1,605·00	12,139	6,183·15	43,673
1901	...	321·34	18,852	412·98	21,148	734·32	40,000	10·50	76	7,660·00	40,738	38·50	277	1,089·14	12,918	1,162·00	15,891	9,960·14	69,900
1902	...	403·21	24,680	216·35	15,103	619·56	39,783	...	...	1,954·00	6,852	...	...	308·25	1,238	...	...	2,262·25	8,090
1903	... January	17·34	1,174	32·05	1,999	49·39	3,173	...	...	...	...	...	...	...	...	...	...	...	...
Do.	... February	26·81	1,856	20·65	1,687	47·46	3,543	...	...	...	...	...	...	...	...	...	...	...	...
Do.	... March	36·25	2,472	18·90	1,359	55·15	3,831	...	...	1,500·00	3,450	...	...	...	...	...	...	1,500·00	3,450
Do.	... April	24·66	1,776	18·90	1,230	43·56	3,006	...	...	2,100·00	5,360	...	...	...	...	...	...	2,100·00	5,360
Do.	... May	35·49	2,426	34·25	2,590	69·74	5,016	...	...	2,530·00	6,240	...	...	...	...	...	...	2,530·00	6,240
Do.	... June	52·80	3,508	23·75	1,780	76·55	5,288	...	...	2,620·00	6,720	...	...	154·00	1,153	...	...	2,774·00	7,873
Do.	... July	46·68	3,039	28·10	2,122	74·78	5,161	...	...	2,100·00	5,760	...	...	...	...	...	...	2,100·00	5,760
Do.	... August	86·63	5,815	33·25	2,678	119·88	8,493	...	...	2,700·00	6,200	...	...	15·00	175	...	...	2,715·00	6,375
Do.	... September	60·43	3,854	29·27	2,315	89·70	6,169	...	...	1,900·00	4,537	...	...	139·27	947	...	...	2,039·27	5,484
Do.	... October	44·05	2,687	33·49	2,344	77·54	5,031	...	...	2,700·00	5,940	...	...	381·22	2,841	...	...	3,081·22	8,781
Do.	... November	38·50	2,310	19·50	1,424	58·00	3,734	...	...	815·00	1,350	...	...	565·89	3,832	...	...	1,380·89	5,182
Do.	... December	55·30	3,445	...	...	55·30	3,445	...	...	...	...	...	...	305·95	2,036	...	...	305·95	2,036
	Total ...	3,552·76	195,188	1,442·26	92,984	4,995·02	288,172	15·65	167	33,391·00	128,203	174·50	2,399	2,992·72	25,865	12,340·00	112,778	48 913·87	269,412

Year.	Month.	IRONSTONE.						LEAD ORE.		SILVER-LEAD ORE.		COAL.		LIMESTONE.						DIAMONDS.	
		West Pilbarra Gf.		State generally.		Total.		Northampton M.D		Ashburton Gf.		Collie River Coal M.D.		Yilgarn Gf.		State generally.		Total.		Nullagine D.	
		Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Previous to 1899	...	tons. 100·00	£ 300	tons. ...	£ ...	tons. 100·00	£ 300	tons. ...	£ ...	tons. ...	£ ...	tons. 3,508·00	£ 1,761	tons. ...	£ ...	tons. ...	£ ...	tons. ...	£ ...	carats. ...	£ ...
1899	...	...	...	12,852·00	8,939	12,852·00	8,939	82·75	912	...	...	54,336·00	25,951	...	...	17,593·00	2,838	17,593·00	2,838	*	24
1900	...	...	...	12,251·00	9,258	12,251·00	9,258	268·00	533	...	...	118,410·10	54,835	269·85	273	15,657·00	3,321	15,926·85	3,594	...	...
1901	...	...	...	20,569·00	13,246	20,569·00	13,246	...	...	21·05	152	117,835·80	68,561	1,642·00	919	16,568·00	3,429	18,210·00	4,348	...	...
1902	...	...	...	4,800·00	2,040	4,800·00	2,040	...	...	35·85	277	140,883·90	86,188	535·00	340	4,545·35	1,000	5,080·35	1,340	...	...
1903	... January	...	...	...	...	...	...	...	...	...	...	11,188·00	6,748	9·00	11	...	...	9·00	11	...	...
Do.	... February	...	...	...	...	...	...	...	...	...	...	9,512·00	5,839	20·00	20	...	...	20·00	20	...	...
Do.	... March	...	...	...	...	...	...	...	...	...	...	9,918·00	6,131	13·00	15	...	...	13·00	15	...	...
Do.	... April	...	...	...	...	...	...	..	...	...	...	4,485·00	2,217	35·00	17	...	...	35·00	17	...	...
Do.	... May	...	...	...	...	...	...	...	...	...	...	9,611·00	4,869	25·00	12	...	...	25·00	12	...	...
Do.	... June	...	...	...	...	...	...	...	...	...	...	11,078·50	5,569	...	...	...	...	...	...	...	...
Do.	... July	...	...	...	...	...	...	...	...	...	...	12,076·00	5,970	...	...	...	...	...	...	...	...
Do.	... August	...	...	...	...	...	...	..	...	...	...	12,045·25	5,839	...	...	...	...	...	...	...	...
Do.	... September	...	...	...	...	...	...	...	...	...	...	12,773·00	6,621	...	...	...	...	...	...	...	...
Do.	... October	...	...	...	...	...	...	...	...	...	...	13,780·92	6,654	...	...	...	...	...	...	...	...
Do.	... November	...	...	...	...	...	...	...	...	...	...	13,688·85	6,401	...	...	...	...	...	...	...	...
Do.	... December	...	...	220·00	88	220·00	88	...	...	...	...	13,270·10	6,270	...	...	1,177·50	103	1,177·50	103	...	...
	Total ...	100·00	300	50,692·00	33,571	50,792·00	33,871	350·75	1,445	56·90	429	568,400·42	306,424	2,548·85	1,607	55,540·85	10,691	58,089·70	12,298	...	24

NOTE.—As the collection of Statistics of Minerals other than Gold commenced during 1899, the total Production from the different localities previous to that date can only be approximately estimated by the Customs Records. * Weight unknown.

TABLE XIII.

Quantity and Value of BLACK TIN reported to the Mines Department during 1903, and the Total Output to date.

Goldfield, District, or Mining District.	Locality.	Number of Lease.	Registerd Name of Company or Mine.	1903.		Total to Date.		Remarks.
				Quantity.	Value.	Quantity.	Value.	
				tons.	£	tons.	£	
Greenbushes M.D.	Greenbushes	(19)	(Redruth)	...	...	5·61	346	
Do ...	do ...	(19, 222, 225)	(Homeward Bound Tin Mining Syndicate, N.L.)	...	...	11·40	811	
Do ...	do ...	35	(Horans)	...	...	188·35	11,605	
Do ...	do ...	35, 169	Westralian Stannaries, Ltd.	42·54	2,832	55·64	3,621	
Do ...	do ...	40	Cornwall	4·93	349	9·07	599	
Do ...	do ...	56	(Amanda)	...	...	·85	52	
Do ...	do ...	56, 217	Amanda leases	10·41	685	22·19	1,435	
Do ...	do ...	73	(Nelson)	...	...	22·40	1,675	
Do ...	do ...	73, 233	Nelson leases	16·52	1,081	25·27	1,593	
Do ...	do ...	147	Haphazard	·51	33	6·70	394	
Do ...	do ...	(154)	(North Junction)	...	...	·45	28	
Do ...	do ...	(156)	(Caledonia Tin Mine, N.L.)	...	...	12·26	685	
Do ...	do ...	(156), 330/1	Ivy and Lady Esther leases	7·00	532	7·00	532	
Do ...	do ...	169	(Horans No. 1 North) ...	...	...	9·50	684	
Do ...	do ...	(182/5,224)	(Westralian Tinfields, Ltd.)	...	...	7·90	434	
Do ...	do ...	217	(Glencoe)	...	...	3·66	201	
Do ...	do ...	218	(W.A. Mount Bischoff) ..	...	...	5·38	342	
Do ...	do ...	218, 228, 272, 287	Westralian Stannaries, Ltd.	...	...	10·04	667	
Do ...	do ...	(222)	(Homeward Bound) ...	...	...	9·41	597	
Do ...	do ...	(225)	(Red Ruth Extended) ...	...	...	·50	30	
Do ...	do ...	(234)	(Glasgow)	...	...	·33	18	
Do ...	do ...	244	Mount Pleasant	4·91	397	13·25	896	
Do ...	do ...	(245,) (246)	(Haphazard Extended) ...	·10	6	3·22	196	
Do ...	do ...	(247, 264/8)	(Homeward Bound Tin Mining Syndicate, N.L.)	...	...	2·00	115	
Do ...	do ...	(257), 273	Dixie Extended	·75	58	12·97	818	
Do ...	do ...	271	Pioneer	...	...	1·84	117	
Do ...	do ...	(281)	(Hokitika)	...	...	·16	10	
Do ...	do ...	(294)	(Stanrighan)	·30	19	·48	28	
Do ...	do ...	296	Central	5·22	376	5·22	376	
Do ...	do ...	(297)	(Dixie)	...	...	·05	3	
Do ...	do ...	300, 315	South Cornwall leases ...	8·60	601	8·60	601	
Do ...	do ...	(302)	(Dixon)	...	...	·25	18	
Do ...	do ...	(303)	(Energetic)	·16	10	1·86	109	
Do ...	do ...	308	Hokitika No. 1	1·35	75	1·35	75	
Do ...	do ..	317	Queen May Consols ...	5·89	374	5·89	374	
Do ...	do ...	318	Perseverance	·75	36	·75	36	
Do ...	do ...	..	Voided leases	...	...	22·27	1,489	
Do ...	do ...	...	Sundry claims... ...	415·00	26,898	3,058·69	163,578	
			Total	524·94	34,362	3,552·76	195,188	
Marble Bar D. ...	Cooglegong ...	...	Sundry claims ...	173·59	12,541	504·88	31,481	
Do ...	Moolyella ...	...	Voided leases	...	...	330·53	21,340	
Do ...	do ...	...	Sundry claims	103·75	7,961	557·98	37,033	
Do ...	Old Shaw ...	...	Voided leases	...	...	6·75	424	
Do ...	do ...	...	Sundry claims	14·02	981	40·37	2,605	
Do ...	Wodgina ...	77	Stanum	...	...	1·00	56	
Do ...	do ...	...	Sundry claims	·75	45	·75	45	
			Total	292·11	21,528	1,442·26	92,984	
			Grand Total ...	**817·05**	**55,890**	**4,995·02**	**288,172**	

TABLE XIV.

Quantity and Value of COPPER ORE reported to the Mines Department during 1903, and the Total Output to date.

Goldfield, District, or Mining District.	Locality.	Number of Lease.	Registered Name of Company or Mine.	1903. Quantity. Ore.	1903. Quantity. Metallic Copper.	1903. Value.	Total to Date. Quantity (Ore).	Total to Date. Value.	Remarks.
				tons.	tons.	£	tons.	£	
Day Dawn D. ...	Day Dawn ...	...	Voided leases ...	...	...	...	15·65	167	
Mt. Malcolm D. ...	Murrin Murrin	6c,10c, etc.	Murrin Copper Mines, Ltd.	18,965·00	790·50	45,557	33,391·00	128,203	
Northampton M.D.	Geraldine ...	(10, 11)	(Geraldine leases) ...	...	...	...	136·50	1,992	
Yandanooka M.D.	Yandanooka	...	Voided leases ...	...	...	...	38·00	407	
Phillips River Gf.	Harbour View	149	Australia	3·29	·66	33	7·79	76	
Do ...	do ...	52	Harbour View ...	6·69	·60	30	511·64	3,728	
Do ...	do ...	60	Red, White, and Blue	7·97	1·52	76	18·72	272	
Do ...	Mt. Desmond	(168)	(Elverton South) ...	14·14	1·56	78	32·84	338	
Do ...	do ...	(139)	(Elverdton Welcome Stranger)	5·31	·85	42	5·31	42	
Do ...	do ...	(104)	(Marnoo)	...	...	...	4·25	58	
Do ...	do ...	(107)	(Mountain View) ...	...	...	...	9·50	194	
Do ...	do ...	109	Mt. Desmond ...	35·47	5·39	268	58·47	618	
Do ...	do ...	(117)	(Mt. Garrity)... ...	...	...	...	12·50	190	
Do ...	do ...	108	(Mt. Stennett) ...	100·10	15·42	771	132·10	1,201	
Do ...	do ...	132	(Omaha)	9·15	1·37	69	9·15	69	
Do ...	do ...	95	Phillips River Options Syndicate, Ltd.	527·88	63·62	3,393	1,084·88	10,259	
Do ...	do ...	169	Welcome Stranger ...	9·85	1·48	74	9·85	74	
Do ...	do ...	...	Voided leases ...	...	...	...	4·00	55	
Do ...	Ravensthorpe	124	Emily Hale	51·40	8·19	435	51·40	435	
Do ...	do ...	154	Great Oversight ...	1·14	·32	16	1·14	16	
Do ...	do ...	(110)	(Grimsby)	4·45	·35	18	5·85	34	
Do ...	do ...	119	Kilmore	31·92	5·41	269	31·92	269	
Do ...	do ...	116	Last Chance	150·71	25·67	1,284	164·21	1,507	
Do ...	do ...	120	Last Chance Proprietary	6·49	·71	36	21·99	173	
Do ...	do ...	16	Marion Martin ...	138·95	20·88	1,044	213·95	1,848	
Do ...	do ...	7	Mary	239·53	31·67	1,601	272·43	2,066	
Do ...	do ...	175	Mt. Benson	106·20	15·07	754	106·20	754	
Do ...	do ...	15	Mt. Cattlin	18·63	2·75	137	21·13	165	
Do ...	do ...	(133)	(Nil Desperandum)	4·26	·34	17	4·26	17	
Do ...	do ...	115	Sunset	65·36	8·40	421	65·36	421	
Do ...	do ...	114	Surprise	...	...	...	5·50	62	
Do ...	do ...	(46)	(Zealandia)	19·11	1·77	88	58·86	538	
Do ...	do ...	...	Voided leases ...	...	...	...	64·19	356	
Do ...	do ...	...	Sundry claims ...	3·33	·59	30	3·33	30	
			Total ...	1,561·33	214·59	10,984	2,992·72	25,865	
West Pilbarra Gf.	Croydon ...	31	British Exploration of Australasia, Ltd.	...	...	...	453·00	5,593	
Do ...	do ...	...	Voided leases ...	...	...	...	40·00	595	
Do ...	Egina ...	3	Balla Balla Copper Mines, Ltd.	...	...	...	530·00	6,571	
Do ...	Roebourne ...	49	Glenderry	...	...	...	22·00	287	
Do ...	do ...	...	Voided leases ...	...	...	...	159·00	2,459	
Do ..	Whim Creek	34	Balla Balla Copper Mines, Ltd.	...	...	...	2,009·00	12,036	
Do ...	do ...	...	Freehold of 100 acres	...	...	...	9,097·00	84,987	
Do ...	do ...	...	Voided leases ...	...	...	...	30·00	250	
			Total ...	...	...	...	12,340·00	112·778	
			Grand Total ...	20,526·33	1,005·09	56,541	48,913·87	269,412	

TABLE XV.

Quantity and Value of IRONSTONE reported to the Mines Department during 1903, and the Total Output to date.

Goldfield, District, or Mining District.	Locality.	Number of Lease.	Registered Name of Company or Mine.	1903.		Total to Date.		Remarks.
				Quantity.	Value.	Quantity.	Value.	
				tons.	£	tons.	£	
West Pilbarra Gf.	Whim Creek	...	Voided leases	...	...	100·00	300	
East Coolgardie Gf.	Boulder ...	...	Voided leases	...	...	450·00	247	
			** From State generally—*					
	Avon			...	...	22,223·00	16,241	
	Clackline			...	...	11,807·00	6,210	
	Coates' Paddock			...	...	4,712·00	3,277	
	Greenbushes			220·00	88	6,900·00	4,396	
	Werribee			...	...	4,600·00	3,200	
			Total	**220·00**	**88**	**50,792·00**	**33,871**	

* Ore flux received by the Fremantle Smelter, Ltd.

TABLE XVI.

Quantity and Value of LEAD ORE reported to the Mines Department during 1903, and the Total Output to date.

Goldfield, District, or Mining District.	Locality.	Number of Lease.	Registered Name of Company or Mine.	1903.		Total to Date.		Remarks.
				Quantity.	Value.	Quantity.	Value.	
				tons.	£	tons.	£	
Northampton M.D.	Narra Tarra	...	*From locality generally* ...	...	...	225·00	185	
Do ...	Northampton	...	Voided leases	...	...	106·75	1,048	
Do ...	Victoria ...	...	Voided leases	...	...	19·00	212	
			Total	...	...	**350·75**	**1,445**	

TABLE XVII.

Quantity and Value of SILVER-LEAD ORE reported to the Mines Department during 1903, and the Total Output to date.

Goldfield, District, or Mining District.	Locality.	Number of Lease.	Registered Name of Company or Mine.	1903.		Total to Date.		Remarks.
				Quantity.	Value.	Quantity.	Value.	
				tons.	£	tons.	£	
Ashburton Gf. ...	Ashburton ...	...	Voided leases	...	...	56·90	429	
			Total	...	...	**56·90**	**429**	

TABLE XVIII.

Quantity and Value of COAL reported to the Mines Department during 1903, and the Total Output to date.

Goldfield, District, or Mining District.	Locality.	Number of Lease.	Registered Name of Company or Mine.	1903.		Total to Date.		Remarks
				Quantity.	Value.	Quantity.	Value.	
				tons.	£	tons.	£	
Collie River Coal M.D.	Collie ...	197, etc.	Cardiff Coal Mining Co., Ltd.	23,548·62	10,325	23,548·62	10,325	
Do ...	do ...	151, etc.	Collie Boulder Coal Co., Ltd.	5,866·00	3,017	5,866·00	3,017	
Do ...	do ...	85-100	Collie Proprietary Coalfields of W.A., Ltd. (No. 2 Pit)	29,782·00	16,844	181,170·40	106,145	
Do ...	do ...	86	Collie Proprietary Coalfields of W.A., Ltd. (No. 1 Pit), *late* Westralian Wallsend Colliery	71,602·00	37,652	332,245·55	174,007	
Do ...	do ...	30, etc.	W.A. Collieries and Fireclay Co., Ltd.	2,628·00	1,290	25,569·85	12,930	
			Total	**133,426·62**	**69,128**	**568,400·42**	**306,424**	

TABLE XIX.

Quantity and Value of LIMESTONE reported to the Mines Department during 1903, and the Total Output to date.

Goldfield, District, or Mining District.	Locality.	Number of Lease.	Registered Name of Company or Mine.	1903.		Total to Date.		Remarks.
				Quantity.	Value.	Quantity.	Value.	
				tons.	£	tons.	£	
Yilgarn Gf. ...	Southern Cross	4	Southern Cross	102·00	75	716·00	677	
Do. ...	do. ...	...	Voided leases	...	...	1,832·85	930	
			** From State generally—*					
	Fremantle			1,117·50	103	55,540·85	10,691	
			Total	1,279·50	178	58,089·70	12,298	

* Ore flux received by the Fremantle Smelter Ltd.

TABLE XX.

Quantity and Value of DIAMONDS reported to the Mines Department during 1903, and the Total Output to date.

Goldfield, District, or Mining District.	Locality.	Number of Lease.	Registered Name of Company or Mine.	1903.		Total to Date.		Remarks.
				Quantity.	Value.	Quantity.	Value.	
				carats.	£	carats.	£	
Nullagine D. ...	Nullagine ...	M.R.C. 6L	(Morgans, A. E.)	...	...	§	24	§ 230 tons conglomerate returned 25 small diamonds (weight unknown) and 77·70 ozs. gold.
			Total	...	...	...	24	

TABLE

Return of Ore and Minerals other than Gold, entered for EXPORT from 1850-1903, inclusive, showing

Year.	METALLIC									
	COPPER ORE.									
	West Pilbarra Gf.		Northampton M.D.		Phillips River Gf.		State generally.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£
1850	...	...	...	...	...	...	...	...	...	...
1	...	...	...	...	...	...	...	...	...	...
2	...	...	...	...	...	...	...	...	...	...
3	.	...	[2]†	7·50	...	...	..	...	...	7·50
4	...	...	...	...	...	...	...	...	...	...
5	...	...	2·05	26·45	...	...	...	...	2·05	26·45
6	...	...	57·00	1,017·90	...	...	...	...	57·00	1,017·90
7	...	...	80·00	1,920·00	...	...	...	...	80·00	1,920·00
8	...	...	433·25	9,531·50	...	...	...	...	433·25	9,531·50
9	...	..	941·50	14,122·50	...	...	...	...	941·50	14,122·50
1860	...	...	517·50	8,021·25	...	...	...	...	517·50	8,021·25
1	...	...	409·00	6,339·50	...	...	...	...	409·00	6,339·50
2	...	...	783·50	12,536·00	...	..	...	...	783·50	12,536·00
3	...	...	763·00	12,208·00	...	...	...	...	763·00	12,208·00
4	...	...	1,076·00	17,216·00	...	...	...	...	1,076·00	17,216·00
5	...	...	886·00	13,290·00	...	...	...	...	886·00	13,290·00
6	...	...	557·50	8,362·50	...	...	...	...	557·50	8,362·50
7	...	...	337·00	5,055·00	...	...	...	...	337·00	5,055·00
8	...	...	83·00	1,245·00	...	...	...	...	83·00	1,245·00
9	...	...	155·00	2,325·00	...	...	...	...	155·00	2,325·00
1870	...	...	6·00	90·00	...	...	...	...	6·00	90·00
1	...	...	...	...	...	...	...	...	...	...
2	...	...	...	...	...	...	...	...	...	...
3	...	...	56·50	847·50	...	...	...	...	56·50	847·50
4	...	..	66·50	997·50	...	...	...	...	66·50	997·50
5	...	...	204·75	3,071·25	...	...	...	...	204·75	3,071·25
6	...	...	279·00	4,185·00	...	...	...	...	279·00	4,185·00
7	...	...	53·50	802·50	...	...	...	...	53·50	802·50
8	...	...	9·00	135·00	...	...	...	...	9·00	135·00
9	...	...	...	...	...	...	...	...	...	...
1880	...	...	8·00	120·00	...	...	...	...	8·00	120·00
1	...	...	...	...	...	...	...	...	...	...
2	...	...	1·50	22·50	...	...	...	...	1·50	22·50
3	...	...	5·00	75·00	...	...	...	...	5·00	75·00
4	...	...	118·00	1,770·00	...	...	...	...	118·00	1,770·00
5	...	...	119·50	1,792·50	...	...	...	...	119·50	1,792·50
6	...	...	249·00	3,735·00	...	...	...	...	249·00	3,735·00
7	...	...	23·00	345·00	...	...	...	...	23·00	345·00
8	...	...	87·50	1,487·50	...	...	...	...	87·50	1,487·50
9	...	...	112·00	1,904·00	...	...	...	...	112·00	1,904·00
1890	...	...	8·00	136·00	...	...	...	...	8·00	136,00
1	262·50	4,462·50	...	...	...	...	..	...	262·50	4,462·50
2	[1]†412·00	6,318·80	155·00	2,377·20	...	...	...	...	567·00	8,696·00
3	50·00	606·00	...	...	...	...	...	...	50·00	606·00
4	...	...	...	...	...	...	...	...	...	...
5	802·00	12,832·00	24·00	120·00	...	...	...	...	826·00	12,952·00
6	6·30	100·00	...	...	...	...	...	...	6·30	100·00
7	64·85	731·25	21·15	302·00	...	...	...	...	86·00	1,033·25
8	*a* 280·87	3,334·00	*b* 74·53	931·50	...	...	...	...	355·40	4,265·50
9	1,404·50	31,978·50	586·55	9,473·25	...	...	...	...	1,991·05	41,451·75
1900	543·55	10,696·00	...	...	105·15	2,411·00	*c* 197·41	3,355·00	*d* 846·11	16,462·00
1	1,058 00	26,464·00	·50	10·00	1,205·00	22,107·00	396·75	6,322·00	2,660·25	54,903·00
2	68·50	1,698·00	20·00	330·00	162·00	2,469·00	33·00	489·00	283·50	4,986·00
3	3·60	180·00	25·05	460·00	301·70	3,538·00	15·45	349·00	345·80	4,527·00
Total	**4,956·67**	**99,401·05**	**9,394·83**	**148,744·30**	**1,773·85**	**30,525·00**	**642·61**	**10,515·00**	**16,767·96**	**289,185·35**

See Woodward's Mining Handbook, Perth; By Authority, 1895; p. 123. [2]† Declared; weight not stated. [3]† Probably the produce of the
c 368 tons 6 cwts. 3 qrs. *f* 265 tons 9 cwts. 3 qrs. *g* 68 tons 2 cwts. 3 qrs. *h* 278 tons 8 cwts. 1 qr.

XXI.

the Quantity obtained from certain Goldfields and Mining Districts, and the declared Value thereof.

MINERALS.

LEAD ORE.		BLACK TIN (Dressed Tin).						Year.
Northampton M.D.		Pilbarra Gf.		Greenbushes M.D.		Total.		
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	
tons.	£	tons.	£	tons.	£	tons.	£	
5·00	55·00	...	...	...	...	...	...	1850
...	...	...	...	...	...	...	...	1
...	...	...	...	...	...	...	...	2
[2]†	4·00	...	...	...	...	...	...	3
...	...	...	...	...	...	...	...	4
25·00	250·00	...	...	...	...	...	...	5
...	...	...	...	...	...	...	...	6
..	...	...	...	...	...	..	...	7
...	...	...	...	...	...	...	...	8
13·50	135·00	...	...	...	...	...	...	9
98·50	985·00	...	...	...	...	...	...	1860
79·00	790·00	...	...	...	...	...	...	1
9·00	90·00	...	...	...	...	...	...	2
230·00	2,300·00	...	...	...	...	...	...	3
80·00	800·00	...	...	...	...	...	...	4
703·00	8,436·00	...	...	...	...	...	...	5
273·50	3,282·00	...	...	...	...	...	...	6
902·00	10,824·00	...	...	...	...	...	...	7
1,100·50	13,206·00	...	...	...	...	...	...	8
699·50	8,394·00	...	...	...	...	...	...	9
1,209·50	14,514·00	...	...	...	...	...	...	1870
420·00	5,040·00	...	...	...	...	...	...	1
364·00	4,368·00	...	...	...	...	...	...	2
965·50	11,586·00	...	..	...	...	...	...	3
2,143·75	25,725·00	...	...	...	..	...	...	4
2,289·00	27,468·00	...	...	...	...	...	...	5
2,191·50	26,298·00	...	...	...	...	...	...	6
3,955·50	47,466·00	...	...	...	...	...	...	7
3,617·50	43,410·00	...	...	...	...	...	...	8
2,775·00	33,300·00	...	...	...	...	...	...	9
1,921·00	15,368·00	...	...	...	...	...	...	1880
1,400·50	11,204·00	...	...	...	...	...	...	1
1,793·50	14,348·00	...	...	...	...	...	...	2
1,038·00	7,266·00	...	...	...	...	...	...	3
696·00	4,872·00	...	...	...	...	...	...	4
465·00	3,255·00	...	...	...	...	...	...	5
611·00	4,277·00	...	...	...	...	...	...	6
471·00	4,710·00	...	...	...	...	...	...	7
532·00	5,320·00	...	...	...	...	...	...	8
250·00	2,500·00	...	...	...	...	[3]†5·00	300·00	9
213·50	2,135·00	...	...	...	...	[3]†67·50	5,400·00	1890
25·00	250·00	...	...	204·00	10,200·00	204·00	10,200·00	1
29·75	150·00	...	...	*f* 265·49	13,843·00	*f* 265·49	13,843·00	2
...	...	56·45	3,470·00	171·50	7,664·00	227·95	11,134·00	3
...	...	19·00	949·00	371·25	14,325·00	390·25	15,274·00	4
...	...	...	...	277·15	9,703·00	277·15	9,703·00	5
...	...	...	...	137·25	4,338·00	137·25	4,338·00	6
[2]†	4·00	...	..	95·55	3,275·00	95·55	3,275·00	7
5·00	33·00	...	...	*g* 68·14	2,760·00	*g* 68·14	2,760·00	8
16·00	96·00	29·55	2,025·00	*h* 278·41	21,138·00	*j* 307·96	23,163·00	9
26·85	242·00	*e* 368·34	30,146·00	*i* 101·94	8,032·00	*k* 470·28	38,178·00	1900
...	...	439·00	34,600·00	67·50	4,895·00	506·50	39,495·00	1
...	...	248·00	19,698·00	31·00	2,870·00	279·00	22,568·00	2
...	...	267·00	20,988·00	24·70	1,868·00	291·70	22,856·00	3
33,643·85	**364,756·00**	**1,427·34**	**111,876·00**	**2,093·88**	**104,911·00**	**3,593·72**	**222,487·00**	

[2] Greenbushes Tinfield. *a* 280 tons 17 cwts. 2qrs. *b* 74 tons 10 cwts. 2 qrs. *c* 197 tons 8 cwts. 1 qr. *d* 846 tons 2 cwts. 1 qr.
i 101 tons 18 cwts. 3½ qrs. *j* 307 tons 19 cwts. 1 qr. *k* 470 tons 5 cwts. 2½ qrs.

TABLE XXI.—*Return of Ore and Minerals, other than Gold,*

YEAR.	NON-METALLIC MINERALS.						ORES NOT OTHERWISE ENUMERATED.		COPPER INGOT.	
	ASBESTOS.		COAL.		MICA.					
	State generally.		Collie River Coal M.D.		State generally.				Mt. Malcolm D.	
	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	...	...	...	...	...	...	...	...	...	...
1890	...	...	...	...	...	...	...	...	...	...
1	...	...	...	...	...	...	...	...	...	...
2	...	...	...	...	[2]†	25·00	...	...	...	...
3	...	...	...	...	[2]†	4·00	...	...	...	...
4	...	...	...	...	...	...	...	...	...	...
5	...	...	...	...	[2]†	3·00	...	...	...	...
6	...	...	...	...	...	...	...	...	...	...
7	...	...	...	...	[2]†	209·00	...	...	...	...
8	...	...	1·00	1·00	...	...	...	...	...	...
9	[2]†	1·00	798·00	772·00	[4]†	50·00	...	...	...	...
1900	...	...	355·00	350·00	[2]†	3·00	5·00	85·00	248·90	17,475·00
1	...	...	970·75	969·00	...	...	[2]†	4·00	439·40	31,062·00
									§441·10	24,804·00
2	...	...	12·00	12·00	...	...	[7]†3·00	47·00	§175·00	7,918·00
3	·20	10·00	...	...	...	...	[8]†22·00	230·00	51·45	3,371·00
									§1,023·80	29,917·00
Total	**·20**	**11·00**	**2,136·75**	**2,104·00**	...	**294·00**	**30·00**	**366·00**	**2,379·65**	**114,547·00**

[2]† Declared; weight not stated. [4]† 13 packages; weight not stated. [5]† Estimated; no tonnage given. [6]† No tonnage given,
¶ Advantage has been taken of the series of years covered by this

entered for EXPORT from 1850–1903, inclusive—continued.

COMMERCIAL PRODUCTS. ¶						PRECIOUS STONES.		YEAR.
SILVER.		TIN INGOT. (White Tin.)		PIG LEAD.				
State generally.		Greenbushes M.D.		State generally.		State generally.		
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	
ozs.	£	tons.	£	tons.	£	carats.	£	
...	...	...	...	...	...	...	...	1850
...	...	...	...	...	...	...	...	1
...	...	...	...	...	...	...	...	2
...	...	...	...	55·00	1,200·00	...	...	3
...	...	...	...	122·00	2,440·00	...	...	4
...	...	...	...	133·75	2,675·00	...	...	5
...	...	...	...	60·00	1,200·00	...	...	6
...	...	...	...	120·50	2,410·00	...	...	7
...	...	...	...	61·00	1,220·00	...	...	8
...	...	...	...	24·75	495·00	...	...	9
...	...	...	...	...	...	...	...	1860
...	...	...	...	...	...	...	...	1
...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	...	...	3
...	...	...	...	...	...	...	...	4
..	...	...	...	...	...	..	...	5
...	...	...	...	...	...	...	...	6
...	...	...	...	[5]†3·00	50·00	...	...	7
...	...	...	...	...	...	...	...	8
...	...	...	...	...	...	...	...	9
...	...	...	...	...	...	...	...	1870
...	...	...	...	...	...	...	...	1
...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	...	...	3
...	...	...	...	...	...	...	...	4
...	...	...	...	4·25	89·25	...	..	5
...	...	...	...	[5]†7·00	155·00	...	...	6
...	...	...	...	[5]†1·00	15·00	...	...	7
...	...	...	...	...	...	...	...	8
...	...	...	...	...	...	...	...	9
...	...	...	...	[5]†5·00	89·00	...	...	1880
...	...	...	...	[5]†1·00	20·00	...	...	1
...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	...	...	3
...	...	...	...	...	...	...	...	4
...	...	...	...	...	...	...	...	5
...	...	...	...	...	...	...	...	6
...	...	...	...	[5]†6·00	120·00	...	...	7
...	...	...	...	[5]†2·00	40·00	...	...	8
...	...	...	...	...	...	...	...	9
...	...	...	...	...	...	...	...	1890
...	...	...	...	...	...	...	...	1
...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	...	...	3
...	...	...	...	...	...	...	...	4
...	...	...	...	...	...	...	...	5
...	...	...	...	...	...	...	...	6
...	...	...	...	[6]†·50	11·00	...	...	7
...	...	...	...	...	...	...	...	8
...	...	...	...	77·00	1,077·00	...	...	9
28,749·00	3,594·00	142·35	18,872·00	...	...	...	...	1900
60,869·00	7,609·00	96·50	12,607·00	...	...	[2]†	1,000·00	1
83,293·00	9,190·00	141·00	16,380·00	...	...	...	...	2
168,113·00	19,153·00	235·35	29,277·00	...	...	...	...	3
341,024·00	**39,546·00**	**615·20**	**77,136·00**	**683·75**	**13,306·25**	...	**1,000·00**	

6 packages estimated at 10 cwts. [7]† 2 tons cobalt ore, value £41; 1 ton plumbago ore, value £6. [8]† 22 tons antimony ore, value £230.
table to show in detail the quantity of Commercial Products exported. § Copper Matte.

PART III.—

TABLE

Quantity and Estimated Value of MINING

Goldfield.	District.	State Batteries.	Motive Plant.									Pumping Plant.	
			Employed in Mining.			Employed in Reduction.							
				Steam Engines.									
			Steam Boilers.	Single Winding Gear.	Double Winding Gear.	Steam Boilers.	Steam Engines.	Portable Boilers and Engines.	Oil Engines.	Air Compressors.	Air Receivers.	Pumps (Cornish Lift or Plunger).	Steam Pumps.
1. Kimberley ...	... ...	... ...	...	...	...	3	2	2	...	...	...	...	1
2. Pilbarra ...	Marble Bar ...	... ...	2	...	3	5	4	5	...	...	...	2	10
	Nullagine ...	... ...	1	1	...	3	1	3	...	...	...	1	5
3. West Pilbarra ...	... ...	... ...	...	...	1	3	2	1	...	...	...	1	...
4. Ashburton	... ...	... ...	...	...	...	...	...	...	...	...	...	...	...
5. Gascoyne	... ...	... ...	...	...	...	...	...	...	...	...	...	...	...
6. Peak Hill	... ...	... ...	3	1	1	7	14	...	...	1	3	9	8
Do.	... ...	Ravelstone ...	...	...	...	1	1	...	...	...	...	...	4
7. East Murchison ...	... ...	... ...	39	16	20	24	26	3	...	5	5	5	92
Do.	... ...	Lake Darlôt ...	...	...	...	2	1	...	...	...	...	...	5
8. Murchison...	Cue	... ...	17	6	12	9	6	...	...	1	1	8	21
	Do. ...	Tuckanarra ...	...	...	...	1	1	...	...	...	...	...	4
	Nannine ...	... ...	23	12	11	16	16	7	1	2	2	17	43
	Do. ...	Meekatharra ...	...	...	...	2	2	...	...	...	...	...	6
	Day Dawn ...	... ...	27	10	10	14	7	...	...	7	7	6	32
	Mt. Magnet ...	... ...	19	2	7	6	5	1	...	1	1	7	21
	Do. ...	Boogardie ...	...	...	...	2	1	...	...	...	...	...	...
	Do. ...	Lennonville ...	...	1	...	1	1	...	...	...	...	...	4
9. Yalgoo	... ...	... ...	11	5	1	7	8	...	...	2	2	3	16
10. Mt. Margaret	Mt. Morgans ...	... ...	11	4	4	5	5	1	...	3	2	1	31
	Mt. Malcolm ...	... ...	39	12	15	7	10	4	...	5	2	3	46
	Do. ...	Leonora ...	...	...	...	1	1	...	...	...	...	...	4
	Mt. Margaret ...	... ...	26	2	11	12	15	4	...	5	4	5	42
	Do. ...	Burtville ...	...	...	...	3	1	...	...	...	...	...	3
	Do. ...	Laverton ...	...	...	...	2	1	...	...	1	...	...	3
11. North Coolgardie	Menzies ...	... ...	28	11	18	22	13	6	1	11	9	4	54
	Do. ...	Mt. Ida ...	...	1	1	2	1	...	...	1	1	...	2
	Ularring ...	... ...	9	4	5	5	3	...	1	3	3	...	11
	Do. ...	Mulline ...	...	...	...	2	1	...	...	...	...	1	4
	Do. ...	Mulwarrie ...	...	...	...	1	1	...	...	...	...	...	3
	Niagara ...	... ...	23	2	10	13	11	5	...	5	5	3	41
	Do. ...	Niagara ...	...	...	...	2	1	...	...	...	...	...	5
	Yerilla ...	... ...	9	2	3	8	6	...	1	1	1	1	8
	Do. ...	Yundamindera ...	...	...	...	...	...	1	...	...	...	...	3
12. Broad Arrow ...	... ...	... ...	17	4	16	23	16	4	..	4	3	10	36
13. N.E. Coolgardie	Kanowna ...	... ...	25	4	19	16	11	4	4	7	8	19	38
	Bulong ...	... ...	5	...	4	2	1	...	2	1	1	3	5
	Kurnalpi ...	... ...	...	...	...	2	2	...	...	...	...	...	1
14. East Coolgardie ...	... ...	... ...	151	15	83	140	81	7	...	57	69	25	181
15. Coolgardie...	Coolgardie ...	... ...	39	4	31	31	26	5	1	15	17	6	109
	Do. ...	Widgiemooltha ...	...	...	...	1	1	...	...	...	...	...	4
	Kunanalling ...	... ...	16	5	8	14	13	10	...	2	5	4	52
16. Yilgarn	... ...	... ...	13	...	8	13	11	5	8	3	4	12	20
Do.	... ...	Southern Cross ...	...	...	...	1	...	1	...	...	...	...	3
17. Dundas	... ...	... ...	15	3	11	14	13	2	1	7	6	4	40
Do.	... ...	Norseman ...	...	...	...	2	1	...	...	1	1	...	5
18. Phillips River ...	... ...	... ...	2	1	1	5	4	1	1	1	1	...	12
19. Donnybrook ...	... ...	... ...	7	...	2	...	...	1	...	1	1	...	11
Goldfields generally	... ...	... ...	...	...	...	7	9	...	...	...	...	1	13
Total Gold-extracting Machinery			577	128	316	462	357	83	21	153	164	161	1,062
Tinfields ...	Greenbushes Mining District		10	2	1	1	3	6	2	...	...	3	19
	Government Tin-dressing Plant ...		...	...	...	...	...	1	...	...	...	...	3
	Marble Bar District		...	...	...	...	...	...	...	...	...	...	...
Copperfield ...	Mt. Malcolm District		2	1	1	2	2	1	...	...	...	1	4
Coalfield ...	Collie River Coal Mining District ...		19	11	...	2	2	...	...	3	...	...	28
Total Machinery other than Gold-extracting			31	14	2	5	7	8	2	3	...	4	54
TOTAL MINING MACHINERY ...			608	142	318	467	364	91	23	156	164	165	1,116

ALL MINES.

XXII.

MACHINERY erected on the 31st December, 1903.

Hauling Plant.				Reduction Plant.																
							Other Mills.													
Whims.	Whips.	Endless Rope Trams.	Hydraulic Lifts.	Stone Breakers.	Ore Feeders.	Batteries: No. of Heads of Stampers.	Ball Mills.	Flint Mills.	Griffin Mills.	Huntington Mills.	Prospecting Mills.	Salford Mills.	Tremain Mills.	Crushing Rollers.	Dry Crushers.	Puddlers.	Tailings Pumps.	Tailings Wheels.	Amalgamating Barrels and Pans.	Berdan Pans.
1	...	...	...	...	...	25	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1	2	...	...	...	...	55	...	...	...	...	2	...	2	...	...	...	...	...	...	4
...	3	...	...	...	...	50	...	...	...	...	...	...	...	...	...	...	2	...	...	2
...	...	...	...	...	...	20	...	...	...	...	1	...	1	...	...	...	...	...	1	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	2	8	40	...	...	...	...	1	...	...	...	...	...	4	...	...	1
...	1	...	...	...	...	10	...	...	...	...	...	...	...	...	...	...	...	...	...	2
...	11	1	...	9	25	240	1	...	...	...	3	...	1	...	...	...	5	7	3	7
...	...	...	...	...	...	10	...	...	...	...	...	...	...	...	...	...	...	1	...	2
1	7	...	...	2	...	100	1	...	...	...	...	...	...	...	...	...	...	1	...	11
...	1	...	...	...	...	10	...	...	...	...	...	...	...	...	...	...	1	...	...	2
...	4	...	...	4	12	189	...	...	...	...	1	...	...	...	...	...	3	5	...	27
...	...	...	...	...	...	10	...	...	...	...	...	...	...	...	...	...	...	...	...	2
1	7	1	...	7	23	140	...	...	...	...	1	...	...	...	...	...	2	1	1	2
1	8	...	...	2	4	80	...	...	...	...	...	...	1	...	...	...	2	2	1	3
...	...	...	...	...	...	10	...	...	...	...	...	...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	10	...	...	...	...	...	...	...	...	...	...	...	...	...	2
...	4	1	...	4	3	80	...	...	...	3	1	...	...	...	...	...	1	...	...	6
...	...	1	...	2	21	90	...	...	...	...	...	...	...	...	...	...	...	...	...	2
...	14	...	...	8	29	196	...	...	...	1	...	...	2	...	...	...	3	2	5	12
...	1	...	...	...	...	10	...	...	...	...	...	...	...	...	...	...	...	1	...	2
1	13	2	...	3	21	175	...	...	...	...	2	...	...	...	1	...	7	6	2	1
...	...	...	...	...	...	10	...	...	...	...	...	...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	19	2	...	8	16	150	...	...	...	...	2	...	...	...	...	...	8	1	5	19
...	...	...	...	...	...	10	...	...	...	...	...	...	...	...	...	...	...	...	...	3
...	9	...	...	1	2	30	...	...	...	...	...	...	...	...	...	...	1	...	...	3
...	...	...	...	...	...	20	...	...	...	...	...	...	...	...	...	...	1	...	...	4
...	...	...	...	...	...	10	...	...	...	...	...	...	...	...	...	...	...	...	...	2
...	4	...	...	5	17	125	...	...	...	...	...	...	1	...	...	...	1	3	...	4
...	...	...	...	...	...	10	...	...	...	...	...	...	...	...	...	...	...	...	...	2
2	...	...	...	3	6	45	...	...	...	...	...	...	...	...	...	...	...	4	...	2
...	...	...	...	1	1	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
3	9	2	...	10	31	210	1	...	...	...	1	...	...	...	...	...	1	4	4	5
...	4	2	...	11	24	200	...	...	...	3	2	1	...	...	...	5	8	5	1	14
...	...	...	...	1	1	30	...	...	...	1	...	...	...	...	...	...	3	1	...	2
...	...	...	...	...	...	5	...	...	...	...	1	...	...	...	...	...	1	...	...	...
1	16	4	...	47	137	590	28	6	32	4	...	...	...	8	1	1	38	7	37	12
4	17	3	...	16	47	366	...	...	...	...	2	...	...	2	1	...	4	5	...	20
...	...	...	...	...	...	10	...	...	...	...	...	...	...	...	...	...	...	...	...	2
4	20	1	...	3	13	135	2	...	...	...	1	...	1	...	...	...	2	...	2	2
...	4	...	...	6	26	190	...	...	4	...	1	...	...	...	1	...	2	2	...	12
...	...	...	...	...	...	10	...	...	...	...	...	...	...	...	...	...	...	...	...	1
1	14	...	...	5	4	120	2	...	...	...	...	1	...	...	...	...	1	2	3	13
...	...	...	...	...	...	10	...	...	...	...	...	...	...	...	...	...	...	...	...	2
...	2	...	...	1	3	40	...	...	...	...	1	...	...	...	...	...	2	...	...	1
...	1	...	...	...	...	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	10	6	16	60	1	...	...	...	1	...	...	3	1	...	2	1	1	...
21	195	20	10	167	490	3,951	36	6	36	13	24	2	9	13	5	6	105	61	66	219
2	2	...	...	3	...	...	...	...	...	...	...	...	...	2	1	7	...	...	...	...
...	...	...	...	...	...	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	..	...	...	2	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2	2	1	...	5	...	5	...	...	...	1	...	...	...	2	1	7	...	...	...	...
23	197	21	10	172	490	3,956	36	6	36	14	24	2	9	15	6	13	105	61	66	219

TABLE XXII.—*Quantity and Estimated Value of MINING*

GOLDFIELD.	DISTRICT.	STATE BATTERIES.	REDUCTION PLANT (*continued*).											
											Cyaniding.			
			Wheeler's Pans.	Settling Tanks.	Percussion and Shaking Tables.	Concentrators.	Classifiers.	Trommels or Revolving Screens.	Spitzkasten.	Vanners.	Leaching Vats.	Agitators and Agitating Vats.	Storage Vats.	Filter Presses.
1. Kimberley ...	... ...	... ...	...	...	...	...	...	...	...	...	...	...	...	...
2. Pilbarra...	Marble Bar	... ...	...	...	...	1	...	...	...	...	8	...	1	...
	Nullagine ...	... ...	...	15	...	...	...	...	...	...	4	...	3	...
3. West Pilbarra...	... ...	... ...	...	2	...	...	...	...	...	...	4	...	...	...
4. Ashburton ...	... ...	... ...	...	...	...	...	...	...	...	...	...	...	...	...
5. Gascoyne ...	... ...	... ...	...	...	...	...	...	...	...	...	...	...	...	...
6. Peak Hill ...	... ...	... ...	...	4	...	...	...	...	...	...	8	3	9	9
Do. ...	... ...	Ravelstone ...	...	...	...	...	...	...	...	...	...	...	...	...
7. East Murchison	... ...	... ...	...	1	...	2	...	...	3	...	37	3	21	...
Do. ...	... ...	Lake Darlôt ...	...	3	...	...	...	...	...	...	4	...	...	...
8. Murchison	Cue	... ...	...	4	2	2	...	...	...	...	27	2	12	...
	Do. ...	Tuckanarra ...	...	...	...	...	...	...	...	...	4	...	2	...
	Nannine ...	... ...	...	2	14	3	...	...	...	...	38	...	10	...
	Do. ...	Meekatharra ...	...	...	...	...	...	...	...	...	4	...	3	...
	Day Dawn ...	... ...	...	2	...	12	...	...	3	...	29	4	12	3
	Mt. Magnet	... ...	...	...	...	...	...	...	...	...	28	...	7	...
	Do. ...	Boogardie ...	...	...	...	...	...	...	...	...	...	...	...	...
	Do. ...	Lennonville ...	...	...	...	...	...	...	...	...	3	...	4	...
9. Yalgoo	... ...	... ...	2	5	...	...	...	...	...	...	13	...	5	...
10. Mt. Margaret	Mt. Morgans	... ...	...	7	...	...	...	...	1	...	44	3	6	3
	Mt. Malcolm	... ...	...	11	...	10	...	...	...	...	50	6	15	1
	Do. ...	Leonora ...	...	2	...	...	...	...	...	...	4	...	2	...
	Mt. Margaret	... ...	2	23	...	...	...	...	4	...	62	...	19	...
	Do. ...	Burtville ...	...	4	...	...	...	...	...	...	...	...	...	...
	Do. ...	Laverton ...	...	...	...	...	...	...	...	...	4	...	...	...
11. North Coolgardie	Menzies ...	... ...	2	31	5	1	2	...	3	6	59	9	24	5
	Do. ...	Mt. Ida ...	...	...	2	...	...	...	...	....	3	...	4	...
	Ularring ...	... ...	...	16	...	...	...	...	...	...	14	2	2	...
	Do. ...	Mulline ...	...	...	...	...	...	...	...	...	5	...	...	...
	Do. ...	Mulwarrie ...	...	...	...	...	...	...	...	2	4	5	...	...
	Niagara ...	... ...	...	8	...	12	1	...	36	...	56	3	18	2
	Do. ...	Niagara ...	...	...	...	...	...	...	...	...	...	...	...	...
	Yerilla ...	... ...	1	22	...	...	...	...	...	...	24	...	4	...
	Do. ..	Yundamindera	...	...	...	...	...	...	...	...	...	...	...	...
12. Broad Arrow ...	... ...	... ...	...	17	...	2	...	...	1	...	52	4	25	3
13. N.E. Coolgardie	Kanowna ...	... ...	1	12	3	3	...	...	1	...	65	7	16	...
	Bulong ...	... ...	...	2	...	...	...	...	...	...	5	...	2	...
	Kurnalpi ...	... ...	...	...	...	...	...	...	...	...	...	...	...	...
14. East Coolgardie	... ...	... ...	98	52	16	73	39	1	195	30	217	133	126	104
15. Coolgardie	Coolgardie ...	... ...	3	33	4	3	4	...	4	...	121	3	47	4
	Do. ...	Widgiemooltha	...	...	..	...	...	...	...	...	...	...	...	...
	Kunanalling	... ...	...	46	...	2	...	...	2	...	37	2	14	...
16. Yilgarn ...	... ...	... ...	...	24	...	1	...	1	...	...	91	...	20	...
Do. ...	... ...	Southern Cross	...	3	...	...	...	...	...	...	3	...	2	...
17. Dundas... ...	... ...	... ...	3	10	4	...	...	...	...	...	31	6	20	2
Do. ...	... ...	Norseman ...	...	...	...	...	...	...	...	...	12	1	9	1
18. Phillips River ...	... ...	... ...	...	6	...	5	...	...	...	...	...	...	2	...
19. Donnybrook ...	... ...	... ...	...	...	...	...	...	...	...	...	...	...	...	...
Goldfields generally ...	... ...	... ...	...	...	...	...	...	1	1	...	5	...	2	...
TOTAL GOLD-EXTRACTING MACHINERY			112	367	50	132	46	3	254	38	1,179	196	468	137
Tinfields ...	Greenbushes Mining District		...	...	...	1	...	1	...	...	...	...	...	...
	Government Tin-dressing Plant ...		...	...	...	3	1	...	...	...	...	...	...	...
	Marble Bar District		...	...	...	...	...	...	...	...	...	...	...	...
Copperfield	Mt. Malcolm District		...	...	...	...	...	...	...	...	...	...	...	...
Coalfield ...	Collie River Coal Mining District ...		...	...	...	...	...	...	...	...	...	...	...	...
TOTAL MACHINERY OTHER THAN GOLD-EXTRACTING			...	...	...	4	1	1	...	...	...	...	...	...
TOTAL MINING MACHINERY			112	367	50	136	47	4	254	38	1,179	196	468	137

MACHINERY erected on the 31st December, 1903—continued.

Chlorination.				Water Supply Plant.				Miscellaneous.									Estimated Value of Plant.		
													Coal Mining Machinery.						
Reverberatory Furnaces.	Cupelling Furnaces.	Refining Furnaces.	Assay Furnaces.	Dams and Reservoirs.	Tanks.	Condensers.	Windmills.	Rock Drills.	Fan Blasts.	Green Blowers.	Water Jackets.	Electric Light Plants.	Screens (Fixed).	Ventilating Fans and Furnaces.	Coal Cutting Machines.	Tumblers and Kickups.	State Batteries.	District.	Goldfield.
																	£	£	£
...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5,500
...	1	...	2	...	6	...	3	...	...	...	...	...	...	...	...	...	...	20,909	41,071
...	...	...	...	...	14	...	...	...	...	...	...	...	...	...	...	...	...	20,162	
...	...	...	...	1	5	...	...	...	...	...	...	...	...	...	...	...	...	...	4,700
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	1	1	1	1	6	2	...	2	1	...	...	3	...	...	...	...	...	...	107,699
...	...	...	...	...	3	...	...	...	...	...	...	...	...	...	...	...	6,457	...	
2	6	6	7	19	83	29	3	32	1	...	...	7	...	...	...	...	...	...	327,780
...	...	1	1	...	4	...	...	...	...	...	...	...	...	...	...	...	4,182	...	
...	4	2	4	5	10	1	...	3	...	...	...	1	...	...	...	...	...	52,384	
...	...	...	1	...	4	...	...	...	...	...	...	...	...	...	...	...	6,294		
...	2	1	6	1	28	21	...	5	...	...	...	1	...	...	...	...	...	98,040	
...	...	...	2	2	5	1	...	...	...	...	...	...	...	...	...	...	7,750		
...	5	3	7	9	32	9	1	46	...	1	...	1	...	...	...	...	...	222,778	438,102
...	2	6	4	1	37	1	...	6	...	...	...	1	...	...	...	...	...		
...	...	...	...	...	...	...	..	...	...	...	...	...	...	...	...	...	5,773	64,900	
...	...	2	1	...	5	...	...	...	...	...	...	...	...	...	...	...	8,988		
...	3	2	4	4	9	...	1	9	...	...	...	...	...	...	...	...	...	...	29,470
2	1	3	5	2	5	2	...	22	...	...	...	1	...	...	...	...	...	258,362	
...	...	2	10	3	36	2	3	48	1	...	...	2	...	...	...	...	...	185,002	
...	1	2	1	...	5	...	...	...	...	...	...	...	...	...	...	...	6,478		585,762
...	3	9	10	6	49	11	4	22	...	...	...	...	...	...	...	...	...		
...	...	...	...	3	2	...	...	...	...	...	...	...	...	...	...	...	4,494	142,398	
...	...	1	1	...	4	...	...	...	...	...	...	...	...	...	...	...	5,449		
...	5	15	10	10	76	39	1	60	1	...	2	7	...	...	...	...	...	138.408	
...	...	2	1	1	...	...	...	...	...	...	...	...	...	...	...	...	10,956		
...	...	1	1	4	28	3	...	10	...	...	...	...	...	...	...	...	...		
...	2	1	1	2	4	...	...	...	...	...	...	...	...	...	...	...	14,667	48,602	
...	...	...	...	...	5	2	...	...	...	...	...	...	...	...	...	...	8,485		357,591
...	5	4	8	3	29	6	1	27	1	...	...	1	...	...	...	...	...	142,394	
...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	3,478		
...	1	2	2	1	7	2	...	6	...	...	...	...	...	...	...	...	...	28,187	
...	...	...	...	1	2	...	...	...	...	...	...	...	...	...	...	...	2,346		
...	5	6	8	11	96	11	...	17	...	...	...	2	...	...	...	...	...	...	118,212
1	3	4	8	6	56	16	1	29	...	...	...	2	...	...	...	...	...	98,145	
...	1	...	1	...	32	4	...	8	...	...	...	...	...	...	...	...	...	15,798	114,493
...	...	...	...	1	4	2	..	...	...	...	...	...	...	...	...	...	...	550	
17	12	15	37	13	233	42	...	333	16	1	...	21	...	...	...	...	...	...	1,699,702
...	10	10	18	20	291	19	...	68	...	...	...	3	...	...	...	...	...	219,972	
...	...	...	...	...	3	...	...	...	...	...	...	...	...	...	...	...	2,413		253,957
1	1	3	3	16	98	20	...	6	1	...	...	1	...	...	...	...	...	33,985	
1	4	6	7	7	43	3	1	10	1	...	...	1	...	...	...	...	...	...	
...	...	...	3	1	2	...	...	...	...	...	...	...	...	...	...	...	3,647	...	89,755
...	3	4	4	8	53	5	3	38	1	...	...	1	...	..	...	...	...	..	
...	1	2	1	1	10	1	...	...	...	...	...	...	...	...	...	...	12,384	...	103,272
...	...	...	...	8	9	3	...	2	...	...	...	1	...	...	...	...	...	...	27,700
...	...	...	...	...	12	...	...	7	...	...	...	...	...	...	...	...	...	...	11,500
...	1	3	10	1	13	1	1	...	...	5	3	1	...	...	...	...	...	...	96,000
24	83	119	190	176	1,458	258	23	816	24	7	5	58	...	...	...	...	114,241	...	4,412,266
2	...	1	1	3	6	...	...	...	1	...	...	1	...	...	...	...	...	54,942	...
...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	2,457		
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2	...	...	1	...	3	2	1	...	...	...	1	1	...	...	...	...	...	22,320	...
...	...	...	...	1	3	...	..	1	...	...	...	1	6	3	3	5	...	43,209	...
4	...	1	2	4	14	2	1	1	1	...	1	3	...	...	...	...	2,457	...	120,471
28	83	120	192	180	1,472	260	24	817	25	7	6	61	6	3	3	5	116,698	...	4,532,737

ROYAL MINT, PERTH BRANCH.

On 20th June, 1899, His Excellency the Governor declared the Perth Branch of the Royal Mint to be open for the receipt of gold for coinage.

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, through the post, 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.

Parcels up to 43 ounces gross may be sent through the post.

An Escort Service is provided by the Police Department for parcels of all sizes. The consignor pays for the carriage by coach or train, but the escort charges are collected by the Mint.

Forms for use in connection with gold sent to the Mint by post or under Police escort can be obtained at the Mint.

The Mint charges are as follows:—

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.
48	0 10 0	420	4 7 6	1,500	11 9 2
50	0 10 5	430	4 9 7	1,600	12 1 2
60	0 12 6	440	4 11 8	1,700	12 14 8
70	0 14 7	450	4 13 9	1,800	13 6 2
80	0 16 8	460	4 15 10	1,900	13 19 8
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 2
260	2 14 2	780	6 19 2	3,700	25 4 8
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 8
390	4 1 3	1,200	9 11 8	5,000	33 6 2
400	4 3 4	1,300	10 4 2		
410	4 5 5	1,400	10 16 8		

For every additional 100ozs. the charge is increased by 12s. 6d.

NOTE.—Additional charges are collected when base metals in a deposit exceed 2 per cent. of its weight.

The following table illustrates the operation of these charges in the case of metal of the value of £3 17s. 10½d. per oz.:—

Weight of Deposit.	Rate of Charge per oz.	Amount of Charge.	Net Value of Deposit.
Ounces.	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	1·5	64 11 8	38,872 18 4

GOLD ESCORT SERVICE.

Table of Rates fixed by the Commissioner of Police.

From	To	Period.	Rate per Ounce.	Remarks.
			d.	
Abbotts	Nannine	Monthly ...	1	
Australia United Mine	Malcolm	Do. ...	1½	
Burbanks	Coolgardie ...	Fortnightly	0½	
Burtville	Malcolm	Monthly ...	0⅞	Not less than 1,000ozs.
Coolgardie	Perth	Fortnightly	0¼	On all gold for the Mint.
Cork Tree	Lawlers	Monthly ...	1	Or if escort is specially provided, cost £4 6s. 6d.
Cosmopolitan Proprietary, Ltd. ...	Kalgoorlie	Do. ...	1	
Cue	Geraldton	Do. ...	1	
Field's Find	Yalgoo	Do. ...	2	
Geraldton	Perth	Do. ...	2	
Kanowna	Kalgoorlie	Fortnightly	0¼	
Kathleen Valley	Lawlers	Do. ...	0½	
King of the Hills	Kalgoorlie	Monthly ...	2	
Kalgoorlie	Perth	Fortnightly	0¼	On all gold for Mint.
Lawlers	Malcolm	Monthly ...	1⅝	4,000ozs. to 4,500ozs.
Do.	Do.	Do. ...	1½	Exceeding 4,500oz.
Laverton	Do.	Do. ...	0¾	Not less than 2,900ozs.
Leinster G.M. Co.	Perth	Do. ...	4½	
Mt. Sir Samuel	Lawlers	Do. ...	0½	Not less than 1,600ozs.
Morgans	Malcolm	Do. ...	0½	Not less than 4,300ozs.
Malcolm	Kalgoorlie	Do. ...	0⅓	Not less than 7,800ozs.
Munara Gully	Nannine	Do. ...	0½	
Nannine	Cue	Do. ...	0½	2,000ozs. to 3,000ozs.
Do.	New Alliance Gold Mine, Burnakurra	Do. ...	Actual cost.	
Norseman	Coolgardie ...	Do. ...	2	
Peak Hill	Nannine	Do. ...	2½	2,000ozs. and not exceeding 2,500ozs.
Do.	Do.	Do. ...	2	2500ozs. and not exceeding 3,000ozs.
Do.	Do.	Do. ...	1¾	Over 3,000ozs.
Ravensthorpe	Hopetoun	Do. ...	1¼	Not less than 500ozs.
Do.	Do.	Do. ...	⅝	Not less than 1,000ozs.
Wiluna	Malcolm	Do. ...	3⅝	Not less than 2,000ozs.
Yalgoo	Geraldton	Do. ...	0½	
Yerilla	Kalgoorlie	Do. ...	1½	

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.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Gold dust and bullion per 100ozs. ...	1 0	2 0	3 0	3 9	4 6	5 0	5 6	6 0

6d. per 100ozs. for every additional 50 miles.

NOTE.—A special reduction of 25 per cent. is made for all gold dust or bullion consigned to the Perth Mint.

To find the value per ounce of gold sent from a mine to the Mint.—Divide the standard gold by the weight before melting, and multiply the result by £3 17s. 10½d. For instance, supposing the Mint return to show:—

	Ozs.
Weight before melting	47·41
Standard gold	38·19

The calculation would be as follows:—

```
4741)3819·0(·805
     3792·8
     ------
       26200
       23705
       -----
        2495
        ----
```

·805 × £3 17s. 10½d. =
·805 × £3·894

```
      ·805
      ----
     19470
    311520
    ------
£3·134(670)
      20
      ---
s. 2·680
      12
      --
d. 8·160
```

= £3 2s. 8d., value per ounce of gold as produced from the mine.

J. F. CAMPBELL,
Deputy Master.

31st May, 1904.

By Authority: Wm. Alfred Watson, Government Printer, Perth.

GOLD ESCORT SERVICE.

Table of Rates fixed by the Commissioner of Police.

From	To	Period.	Rate per Ounce.	Remarks.
			d.	
Abbotts	Nannine	Monthly ...	1	
Australia United Mine	Malcolm	Do. ...	1½	
Burbanks	Coolgardie ...	Fortnightly	0½	
Burtville	Malcolm	Monthly ...	0⅞	Not less than 1,000ozs.
Coolgardie	Perth	Fortnightly	0¼	On all gold for the Mint.
Cork Tree	Lawlers	Monthly ...	1	Or if escort is specially provided, cost £4 6s. 6d.
Cosmopolitan Proprietary, Ltd. ...	Kalgoorlie	Do. ...	1	
Cue	Geraldton	Do. ...	1	
Field's Find	Yalgoo	Do. ...	2	
Geraldton	Perth	Do. ...	2	
Kanowna	Kalgoorlie	Fortnightly	0¼	
Kathleen Valley	Lawlers	Do. ...	0½	
King of the Hills	Kalgoorlie	Monthly ...	2	
Kalgoorlie	Perth	Fortnightly	0¼	On all gold for Mint.
Lawlers	Malcolm	Monthly ...	1⅜	4,000ozs. to 4,500ozs.
Do.	Do.	Do. ...	1½	Exceeding 4,500oz.
Laverton	Do.	Do. ...	0¾	Not less than 2,900ozs.
Leinster G.M. Co.	Perth	Do. ...	4½	
Mt. Sir Samuel	Lawlers	Do. ...	0½	Not less than 1,600ozs.
Morgans	Malcolm	Do. ...	0½	Not less than 4,300ozs.
Malcolm	Kalgoorlie	Do. ...	0⅓	Not less than 7,800ozs.
Munara Gully	Nannine	Do. ...	0⅕	
Nannine	Cue	Do. ...	0½	2,000ozs. to 3,000ozs.
Do.	New Alliance Gold Mine, Burnakurra	Do. ...	Actual cost.	
Norseman	Coolgardie ...	Do. ...	2	
Peak Hill	Nannine	Do. ...	2½	2,000ozs. and not exceeding 2,500ozs.
Do.	Do.	Do. ...	2	2500ozs. and not exceeding 3,000ozs.
Do.	Do.	Do. ...	1¾	Over 3,000ozs.
Ravensthorpe	Hopetoun	Do. ...	1¼	Not less than 500ozs.
Do.	Do.	Do. ...	⅝	Not less than 1,000ozs.
Wiluna	Malcolm	Do. ...	3⅜	Not less than 2,000ozs.
Yalgoo	Geraldton	Do. ...	0½	
Yerilla	Kalgoorlie	Do. ...	1½	

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.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Gold dust and bullion per 100ozs. ...	1 0	2 0	3 0	3 9	4 6	5 0	5 6	6 0

6d. per 100ozs. for every additional 50 miles.

NOTE.—A special reduction of 25 per cent. is made for all gold dust or bullion consigned to the Perth Mint.

To find the value per ounce of gold sent from a mine to the Mint.—Divide the standard gold by the weight before melting, and multiply the result by £3 17s. 10½d. For instance, supposing the Mint return to show:—

	Ozs.
Weight before melting	47·41
Standard gold	38·19

The calculation would be as follows:—

4741)3819·0(·805
3792·8
26200
23705
2495

·805 × £3 17s. 10½d. =
·805 × £3·894
·805
19470
311520
£3·134(670)
20
s. 2·680
12
d. 8·160 = £3 2s. 8d., value per ounce of gold as produced from the mine.

J. F. CAMPBELL,
Deputy Master.

31st May, 1904.

By Authority: Wm. Alfred Watson, Government Printer, Perth.